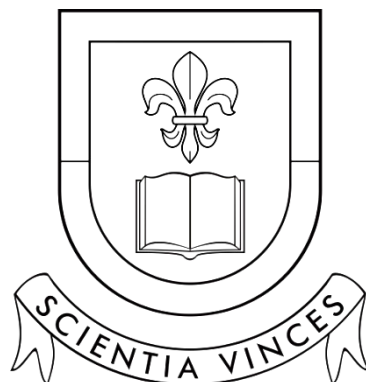


**DAUGAVPILS UNIVERSITĀTE  
DAUGAVPILS UNIVERSITY**



***DAUGAVPILS UNIVERSITĀTES  
62. STARPTAUTISKĀS  
ZINĀTNISKĀS KONFERENCES  
TĒZES***

***ABSTRACTS OF  
THE 62<sup>nd</sup> INTERNATIONAL  
SCIENTIFIC CONFERENCE OF  
DAUGAVPILS UNIVERSITY***

DAUGAVPILS UNIVERSITĀTES  
AKADĒMISKAIS APGĀDS „SAULE”  
2020

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Daugavpils Universitātē docētāju un studējošo zinātniskās konferences notiek kopš 1958. gada. Konferencēm ir starpdisciplinārs raksturs un tajās piedalās gan studējošie, gan arī ievērojami zinātnieki no dažādām pasaules valstīm. Daugavpils Universitātes 62. starptautiskās zinātniskās konferences pētījumu tematika ir ļoti plaša – eksaktās, humanitārās, izglītības, mākslas un sociālo zinātņu jomās.

Krājumā *Daugavpils Universitātes 62. starptautiskās zinātniskās konferences tēzes = Abstracts of the 62<sup>nd</sup> International Scientific Conference of Daugavpils University* apkopoti materiāli, kas tiks prezentēti konferencē organizētajās darba grupās 2020. gada 28.-29. maijā un kas atbilst konferences formālajām prasībām.

Krājuma veidotāji saglabā autoru iesniegto tēžu lingvistisko un gramatisko struktūru.

Par norādītajiem faktiem, izteiktajiem viedokļiem un lietoto terminoloģiju atbild tēžu autori.

The annual scientific conferences at Daugavpils University have been organized since 1958. The themes of research presented at the conferences cover all spheres of life. Due to the facts that the conference was of interdisciplinary character and that its participants were students and outstanding scientists from different countries, the subjects of scientific investigations were very varied – in the domains of exact sciences, the humanities, education, art and social sciences.

The Collection of Abstracts of the 62<sup>nd</sup> Scientific Conference of Daugavpils University contains the abstracts on researches, which will be presented in the corresponding work groups organized within the framework of the conference in May, 28–29, 2020. In the abstracts published in *Daugavpils Universitātes 62. starptautiskās zinātniskās konferences tēzes = Abstracts of the 62<sup>nd</sup> International Scientific Conference of Daugavpils University* we have preserved the authors' style (linguistic and grammatical structures), and the authors themselves are responsible for the facts and opinions reflected and the terminology used in their abstracts.

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# MĀKSLA

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# ART

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## DESIGN OBJECT IN THE URBAN ENVIRONMENT: DEVELOPMENT AND SUSTAINABILITY

**Key words:** sustainable design, urban environment, object, sculpture, installation.

Conceptual design objects are playing an increasingly important role in the development of modern urban environment, which in the 21<sup>st</sup> century are created as creative sculptures and installations as well as in their realization and presentation unconventional ideas are used: from the opportunities created by digital technology to performance art.

In the context of the era, variously designed objects with their visual form and emotional content attract public attention and create the image of each city functionally and stylistically linked to the architecture of the surrounding buildings and urban planning areas, it promotes social activity, entertainment and quality leisure.

The development of the public environment today is of a changing nature which is significantly influenced not only by the desire for an aesthetically attractive and interesting urban space, but also by objective factors: location and feasibility, climatic variability, choice of design material, which is also affected by the economic factor - sometimes the client is reluctant to invest in expensive, contemporary, high-quality materials and development technologies, therefore, more economical ways are being sought, which can often reduce the durability of unique design objects in an urban environment. The goal of the research is to analyze nowadays the brightest trends of design objects and possibilities of sustainability in different urban environments, based on concrete examples from Latvia and abroad.

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## DESIGN OF COMPOSITE MATERIALS AND INTERIOR APPLICATIONS

**Key words:** design, composite materials, interior, design objects

The study is devoted to the topic of composite materials. The aim is to study what kind of composite materials are used to create design objects and how they are used in interior design, what are the advantages and disadvantages of these materials. In the course of the study, an interesting technique is discovered - TERAZZO, which combines pieces of marble with concrete mixtures used in the interior. Based on such a similar principle, a personal experiment is created on how composite materials can work with other objects - stones, metal, glass, ceramics and how it can be applied to design objects.

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## GRAPHIC DESIGN FOR LITERACY LEARNING BOOKS

**Key words:** graphic design, ABC book, literacy, visual presentation of children books, survey.

In the era of modern technology no one is sceptical anymore about the importance of images in process of learning new information, however in society there are many opinions about relevance of books when it comes to improving literacy. It creates a question – if the changes of a new era, where children are introduced to technology at an early age also change the requirements of the book design in connection with perception of the information.

Our affiliation to a certain group of people or nation is described by the language that a child learns from birth in direct and indirect ways. Language has an important role in preservation of a nation and statehood, especially for a relatively small country like Latvia.

Globalization processes have an impact on languages of small countries and they become more endangered, because if the languages are not being practiced and used, they disappear. Latgalian language is in such situation, as it's not required to learn at school, but people use it for their daily communication, transferring it to future generations in this way.

In the world and in Latvia globalization continues, in native language the foreign words are a common recurrence and because of it there is a desire to preserve and popularize Latgalian language by creating a methodical ABC book for kids and their parents.

**Goal of the research** – to explore principles of ABC book development and cognitive perception skills of children, to create an educational ABC book in Latgalian language for kids who are in the preschool age.

**Methods of the research** – theoretical – analyzing and exploration of the literature and the internet resources, empirical – doing surveys and interviews, analyzing analogs.

**Results** – illustrated school books are very important in the process of learning a language for children, that would be relevant to the age differences. Research of the scientific papers allows to make a conclusion that ABC book is still the most effective tool to learn how to read for the children of the preschool age, despite of the major importance of technology in our everyday lives. Researchers pay attention to the layout of the ABC books, connection of a picture to a specific letter and useful methods for studying. ABC books are used at homes for learning purposes and in formal educational institutions. The results of the survey show that society is interested in teaching of Latgalian language to kids, using the ABC book. Respondents have formed an opinion that visual presentation of the book is very important, also bright, imaginative pictures. Majority of survey respondents view the book design important to create the overall character of the book.

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## POSSIBLE FUTURE AND DESIGN EDUCATION

**Key words:** design, education, paradigms, changes, future, improvement

Both in historical discourse and today, design is a professional activity, so design education is associated with specialization in one of the fields of design. Opinions about necessary set of competencies for work in design professions are directly related to ideas about the essence of design, the range of problems to be solved, the project development and implementation cycle and a role of the designer. However, the complexity, instability and variability inherent in today's reality also change the range of problems to be solved by design methods, designer's tasks and work process, thus setting new requirements for knowledge and competencies required to work in the design industry. In a process of this change, design education has a key role in educating future designers who are able to think critically and systemically shaping the world we will live in tomorrow. Design researchers emphasize the need for a paradigm shift in design education accentuating necessity to assess the

greatest future challenges for humanity. The aim of the research- to evaluate the aspects of design education improvement by analyzing theoretical literature and internet resources, as well as design education programs in Latvia and elsewhere in the world.

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## SECONDARY ART SCHOOLS GRADUATES' BUSINESS SKILLS DEVELOPMENT OPPORTUNITIES

The daily issue of any artist is the material side, not altruistic art. This issue is devoted to the author's research and motivational-educational magister work, based on the recognition that the art process is profitable. Linking art to business is a necessary component for the successful integration of art high school graduates into the business environment. Business skills are not actively taught in art schools and colleges in Latvia, although they are necessary for business plans and sustainable business planning. Starting a creative business and pursuing a profession requires not only knowledge of the arts, but also business, which is an area for every aspiring artist to master. The aim of the study work is: to create for the artists, craftsmen and art students the most useful and practicable subject that offers business skills oriented to the specifics of the art business, finding the target audience, identifying sales channels, pricing, developing one's own brand philosophy, word and art marketing. Such a subject could be a Personal Stylist study program. In addition, the subject program should include knowledge in the arts, psychology and business. This teaching and education methodology is based on Minister Cabinet Regulation No. 747 of 27 November 2018, Regulations on the National Standard for Basic Education.

*Silvija Ozola*

## SPECIFIC DEVELOPMENT OF SEGWOLD AND WENDEN FORTIFIED URBAN STRUCTURES CREATED BY THE LIVONIAN BROTHERS OF THE SWORD

The knights of the Livonian *Brothers of the Sword*, applying new constructive means, built irregular layout fortified yards for support places and secular power centres in difficult available places. In Livonia, the first important fortified centre created by monks-knights was financially independent Wenden (Latvian: *Cēsis*) Castle on a cape to control the Gauja Waterway, significant trade routes and the settlement. After the heavy defeat on 22 September 1236 in the Battle of Saule, the knights of the Livonian Brothers of the Sword joined to the Teutonic Order which regulation determined that the convent had to live in monasteries. The knights of the Teutonic Order rebuilt fortified urban structures created by the Livonian *Brothers of the Sword* and established Commandry and Vogtei centres: four blocks formed a square or rectangular building around the courtyard. **Research object:** Segwold (Latvian: *Sigulda*) and Wenden castles in Livonia. **Research goal:** to discover the architecturally spatial uniqueness of Segwold and Wenden castles created by monks-knights in two different construction periods and the fortresses' impact on the settlement planning. **Research problem:** in research of architecturally complicated solution of Segwold and Wenden castles complexes, it is necessary to understand the specifics of construction in chronologically different periods. **Research novelty:** analysis of the planning and spatial structure development of Segwold and Wenden castles built under traditions of two construction periods. **Research methods:** studies of archive documents, projects and cartographic materials of urban planning, published literature and inspection of buildings in nature.

*Silvija Ozola*

## THE DEVELOPMENT OF CITIZEN CATHOLIC CONGREGATIONS' CHURCHES AS A SACRED BUILDING TYPE IN HANSEATIC LEAGUE CITIES OF THE STATE OF THE TEUTONIC ORDER AND THE LIVONIAN CONFEDERATION

On the Baltic Sea southern coast, bishoprics in the late 12<sup>th</sup> century began to establish with the help of military forces – monks-knights. Lands inhabited by the Balts and Finnish-Ugrian tribes came under the authority of Pope and Emperor of the Holy Roman Empire. The construction of cult buildings expanded with the spread of *the Catholic Faith*, developing church types and urban space in medieval towns of the State of the Teutonic Order and the Livonian Confederation. One of the most important cult building types was the citizen Catholic congregations' church became the architectural dominate in Hanseatic League cities and changed urban aesthetics. **Research object:** citizen Catholic congregations' churches. **Research problem:** it is necessary to study citizen Catholic congregations' churches organized medieval town planning around the market in Hanseatic League cities to preserve historical identity during the development of the contemporary urban environment. **Research goal:** analysis the impact of citizen Catholic congregations' churches on the urban space development in Hanseatic League cities. **Research novelty:** analysis of common and local features of citizen Catholic congregations' churches planning and its evolution in Hanseatic League cities during the 12<sup>th</sup>-15<sup>th</sup> centuries. **Research methods:** studies of archive documents, projects, cartographic materials, published literature and inspection of churches in nature, photo fixation.

*Silvija Ozola*

## THE DEVELOPMENT OF FOUR-PART LAYOUT MEDIEVAL TOWNS OF RIGA AND LEMSAL

In Western Europe, the crusades in the 12<sup>th</sup> century expanded to preach *the Catholic Faith* and establish feudal states. Fortified towns at junctions of roadways got a functionally justified four-part layout similar to Jerusalem, where the Church of the Resurrection situated in the orthogonal intersection of the *Cardo* and the *Decumanus*. Lands on the Baltic Seacoast inhabited by the Balts and Finnish-Ugrian tribes came under the authority of Pope and Emperor of the Holy Roman Empire. Catholic church-states or bishoprics were founded. Western European cities became a model for urban planning in the newly established Riga Bishopric (1201–1255). At the beginning of the 13<sup>th</sup> century, the wall-fortified small semi-circular area of German town of Riga adjoined the *Rīdziņa* River became the main military economic base for the Baltics' expansion and the most important commerce and spiritual power centre, where the administration structure and ownership of the most valuable land plots in a four-part layout medieval town at the junction of important traffic routes was the same as in other distant merchants' cities in Europe. **Research goal:** analysis of four-part layouts of Riga and Lemsal (Latvian: *Limbaži*) medieval towns developed at junctions of important traffic routes. **Research problem:** the development of the Riga Bishopric's early fortified town layouts and defense systems has not been sufficiently studied. **Research novelty:** the Riga Bishopric's towns are analyzed in the context of Western European medieval urban planning traditions. **Research methods:** analysis of archive documents, projects and cartographic materials of medieval urban planning, study of published literature, inspection of buildings in nature.



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## **THE IMPORTANCE OF CORPORATE IDENTITY DEVELOPMENT IN ENSURING THE SUSTAINABILITY OF THE COMPANIES OPERATION**

Taking in consideration the competition in the market, the ability and skill of a company to sell their product, service or offer strongly depends on brand performance, quality of the product, the uniqueness of the company and its reputation. Moreover, a strong brand, a well-developed corporate identity and guidelines for its use determine recognition and a successful corporate image amongst competitors.

Taking in consideration the increasing influence of visual communication in today's digital age, corporate design responsibility in business management goes beyond traditional expectations. Corporate design is the result of collaboration between business and design. The success of a company's corporate image depends on the strength and unity of this collaboration. The company Ltd. Nature Line that is the focus of the study is a start-up that started its operations with the help of Rezekne Business Incubator. The author's article reviews and investigates the importance of corporate identity development in ensuring long-term sustainability in business operations. In order to better understand the specifics of the field of start-ups and the development opportunities that are offered to new entrepreneurs, the article also looks at the development of startups in Latvia and their strategic support today.

**The aim of the study** - to identify the conditions of corporate identity design and its successful positioning, as well as the importance of its creation for successful start-up companies. As one of the methods of data collection a survey was developed. The survey uses a series of questions that analyzes the attitude of entrepreneurs need for successful corporate identity design. The questionnaire was prepared using Google form and distributed with the involvement of Rezekne Business Incubator. The period of the research is March 2019; the questionnaire consists of 2 open - unstructured questions, 2 closed - structured questions, 5 multiple-choice and 1 dichotomous questions. 10 respondents - enterprises of Rezekne county and city were surveyed. Amongst the surveyed start-ups are Ltd. Nature Line, Ltd. METTA STEEL, Zelma Kraft, LZ LATVIA, Ltd. Parka mājas, Ltd. ABC, KUUP COFFEE and other start-up companies that started their activities with the help of Rezekne Business Incubator and during their current activity have developed corporate identity design. Companies represent fields as food industry, furniture design, fashion design, manufacturing, hospitality, tourism services and other.

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## **TRENDS OF MODERN CULTURAL MANAGEMENT AND CREATIVE INDUSTRIES AND THEIR IMPACT ON THE NATIONAL ECONOMY**

**Key words:** cultural management, creative industries, project, economy.

In today's changing society, an increasing role is being given to cultural management and the creative industries projects. The role and significance of culture is changing at different times and in different societies, for some it is the entertainment industry, for others it is a source of profit, for others it is a cultural and historical heritage. In a world where natural resources are becoming increasingly depleted and demographic challenges are emerging, innovation and creativity are the main resources for development.

Every year, more and more young and talented artists, musicians and actors appear and graduate in Latvia. Their talented career largely depends on the interest of cultural management and manager in attracting financial resources and creating new, creative projects to promote these artists. The creative thinking and creative solutions characteristic of cultural management and creative industries often create new products using areas such as communication, information technology, tourism, design, etc. There is a misconception in the world and also in Latvia that culture only requires financial investments from the state, culture does not make a profit and it is only an entertainment industry. However, more and more public administration is beginning to study the real contribution of the cultural and creative industries to the national economy.

According to research data from the Ministry of Culture, currently cultural and creative industries are an important sector of the national economy in Latvia, which is a significant source of employment opportunities.

The aim of this study is to analyze the trends of modern cultural management and creative industries and their impact on the national economy.

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## WAYFINDING SIGNAGE DESIGN IN UNIVERSITY CAMPUS TERRITORIES

**Key words:** graphic design, campus sign system, campus wayfinding signage.

Nowadays, higher education institutions are increasingly being designed and built as sophisticated campuses with several buildings of various uses and functions, covering a wide range of users - visitors, students, academics, administration. The ability to navigate on site is an important aspect of university campus functionality, which is most noticeable when adequate signage is lacking. Well designed signage system can help regulate user flow, save time, ensure well-being and create and maintain a positive institution identity.

Wayfinding system is a combination of human and environmental interaction that results in efficient movement from the current location to the desired and required information provision. A successful informative sign system consists of well-considered graphic design, application of ergonomic principles, well planned placement, sign hierarchy and a unified identity.

The lack of information signage in the university campuses can lead to immediate and permanent confusion. Appropriately selected and placed direction signs helps both first-time and regular campus users to find needed destinations with out negative emotional experience, delays and disorientation. A well-considered wayfinding signage system ensures that users know where they are located, where is the location they need to get to, what is the best route to the chosen destination and the ability to recognize it upon the arrival.

Aim of the research: to investigate the design of wayfinding signage and the key component significance within the university campus territories.

Research methods: theoretical: study of the literature, Internet sources and normative documents; content analysis of analogues.

Research results: The most important criteria of evaluating the design of wayfinding signage are: coloring, text composition, visibility, scale on site, material application, and ergonomic factors.

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## **A NEW FIND OF THE RELICT AMPHIPODA PALLASEOPSIS QUADRISPINOSA (G.O. SARS, 1867) IN LATVIAN WATERS**

Pallasea (*Pallaseopsis quadrispinosa*) is the most common relict species in the lakes of Latvia, inhabiting 19 out of 25 lakes with relict fauna. Over the entire study period, it was registered in the following deepest mesotrophic lakes: Banuja, Besona, Vaideves, Dveris, Dzilyezers, Dubulkas, Dubulyu, Ilzas-Geranimovas, Karpa, Kustaru, Leys, Richey, Riebezers, Savino, Sventas, Sita, Tsarma, Yazinkas.

When examining Lake Brigenes on July 31. In 2018, this species was found in trawl in the abyssal of this reservoir. The lake is characterized by sufficient depth (about 30 meters), has thermal stratification of the water column. An epilimnion with a constantly high temperature extends to a depth of 4 meters, then from 5 to 9 meters in the metalimnion the temperature drops from 25 to 8 degrees, in the hypolimnion the changes are small from 6.7 to 4.2 ° C. Favorable temperature for the habitat of the species begins with a depth of 7 meters (12.8 ° C). Oxycline is located at depths of 8-12 meters, where the oxygen content is halved, from 9.3 to 5.1 mg / l, then there is a gradual decrease in the concentration to the bottom to 0.2 mg / l in the bottom layer. Below a depth of 20 meters, oxygen conditions (less than 2 mg / l) become unfavorable for this species.

Thus, in terms of dissolved oxygen content and temperature, the depths suitable for relict habitat are from 8 to 20 meters, which is sufficient for the normal functioning of this type of relicts in this lake.

The work has been performed with partial support of the Belarusian Republican Foundation for Fundamental Research - the contracts B18MSIC-016

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## **A NEW SPECIES OF ANTOCHA OSTEN SACKEN, 1860 (DIPTERA: LIMONIIDAE) FROM SICHUAN, CHINA**

The genus *Antocha* Osten Sacken, 1860 with three subgenera *Antocha* (s. str.) Osten Sacken, 1860, *Orimargula* Mik, 1883 and *Proantocha* Alexander, 1919 includes 158 species, four subspecies and according to Catalogue of the Craneflies of the World this genus is recorded from all zoogeographic regions except Antarctica. The subgenus *Antocha* (s. str.) is the most species-rich subgenus of the genus *Antocha*, with 112 valid species and two subspecies, including 17 species and two subspecies recorded from Sichuan (China). Adults are small (3 mm) to medium-sized (11 mm) crane flies, which are found near streams or rivers. The taxonomy of the genus remains unclear; several species are known only from the unique female holotypes and no phylogenetic analysis of *Antocha* has been undertaken. A new species is described from Sichuan (China), illustrations of an adult insect, antenna, wing, female and male terminalia are provided. Cytochrome oxidase subunit I of mitochondrial DNA

sequences of the new species and two other *Antocha* species obtained in this study was submitted to GenBank (accession numbers: MG674213, MG674214, MG674217).

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## **ANALYSIS OF HABITATS IN ECONOMIC FORESTS, SUITABLE FOR HAIRY PINE BORER (*TRAGOSOMA DEPSARIUM*) – A COMPROMISE BETWEEN NATURE PROTECTION AND THE USE OF FOREST RESOURCES**

Although the amount of deadwood in the forests is rising, the amount of large-dimensioned wood (more than 25 cm in diameter) is decreasing, especially in dry pine forests. By that, populations of Hairy Pine Borer *Tragosoma depsarium* is threatened. This study aims to get information about distribution and information relating to deposits of the *T. depsarium* in certain forest areas.

Distribution of Hairy Pine Borer in Latvia is uneven – localities of beetle is found mainly in large (>1000 ha) pine forest areas. With that, a detailed survey of territory (on a forest stand plot level) and inventory of species localities would consume a lot of resources. That's why there is a need for criteria that will allow a reducing area of study and, at the same time, ensuring that most areas where the species is likely to occur are selected for the study. Since forest site is the basic unit used in Latvian forestry, which is an economic unit that is used for registration of forest growth conditions, determining tree species composition, age and protection, the plot is used as an approach for this inventory.

The following factors for determining the criteria for choosing a potentially suitable habitat were evaluated:

- Available information about species habitat and biology;
- Chamber available information on forest stands (taxation data);
- Chamber unavailable information (amount and type of deadwood in forest stand).

The study was done in east Vidzeme and north Latgale in October 2019.

For each forest site, certain information was collected:

- Location of forest site and survey information (expert and date);
- Species of trees and bushes characteristic to the plot;
- Structure of deadwood and group of size;
- Localities of protected species;
- Notes – habitat humidity level, terrain features;

For each habitat tree suitable for *T. depsarium* certain information was collected:

- Species of the tree and location (coordinates);
- The diameter of a log at the base and top, length;
- Habitat moisture level (dry, moderately moist, moist) at the location of the log;
- Shading of the log (no shading, partly, full) and overgrowth of moss (%);

For each exit hole of *T. depsarium* certain information was collected;

- The diameter of a log in the point of exit hole;
- Number of exit holes and position (concerning cardinal direction);
- The moisture level of a log (dry, moderately moist, moist) at the exit hole point;
- Age of exit hole (this year, older);
- Location of the exit hole on the log (bottom, side, top);
- Notes.

13 *T. depsarium* localities were recorded during the study. Analysing the logs, where exit holes of *T. depsarium* were found, the conclusion was made that average log is 22 cm in diameter (at the point of exit hole), 15 m long and 37% of overgrowth of moss on average. Shading of logs evaluated as partial, moisture level - moderately moist, moist. On average there were 2 exit holes per log, the maximum amount of exit holes - 6 per log. Location of the exit holes on a log - mainly on the top of the log, less often - on a side. However, the real amount of exit holes is not objectively assessable, since in the main cases, exit holes were damaged by woodpecker, so only undamaged exit holes were considered. Gained information will be used in the development of nature conservation plan of area and forest management plan development.

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## **BEETLES (INSECTA, COLEOPTERA) INVESTIGATION IN BLACK ARCHES (LYMANTRIA MONACHA) MASSIVE OUTBREAKS FOCI IN CURONIAN SPIT**

The epigeaic beetle investigation were carried out in territory of Black Arches (*Lymantria monacha*) massive outbreaks foci in Curonian Spit in 2019. Pitfall sampling was carried out during this investigation for six months. Five plots were selected in Arches (*Lymantria monacha*) massive outbreaks foci: two plots were selected in territory, where the bacterial insecticide Foray 48B were used (near Smiltynė and near Alksnynė) and three - in territory, where no pest control measure were used. 10501 specimens of beetles belonging to 136 species and 23 beetle families were caught during this investigation. 52 species of Staphilinidae, 29 species of Carabidae, 9 species of Curculionidae, 8 species of Elateridae were identified during this research. Others families of beetles were represented by 1-3 species. The biggest number of species was established in Alksnynė (72), Juodkrantė (63) plots. The biggest number of specimens was established in Alksnynė (3113 specimens) and Smiltynė plots (2312 specimens), in territories affected by bacterial insecticide, where was big rate of caterpillar mortality. *Staphylinus erythropterus* Linnaeus, 1758 (Staphylinidae) predominated in all the investigation plots. The most abundant this beetle was in Alksnynė (2029 specimens were caught) and Smiltynė (1870 specimens). In this plots *S. erythropterus* predominated throughout the season, its abundant was highest in spring (May) and decreasing from late summer (August). Others dominated species were *Sepedophilus immaculatus* (Stephens, 1832) (Staphylinidae), *Carabus arcensis* Herbst, 1784, *C. violaceus* Linne, 1758 (Carabidae), *Anoplotrupes stercorosus* (Scriba, 1791), *Trypocopris vernalis* (Linnaeus, 1758) (Geotrupidae), *Nicrophorus vespilloides* Herbst, 1783 (Silphidae).

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## **COMPARISON OF VIRULENCE AND ANTIMICROBIAL RESISTANCE GENES IN WHOLE GENOME SEQUENCE OF SALMONELLA ENTERITIDIS ISOLATED FROM FOOD AND VETERINARY SAMPLES**

**Key words:** *Salmonella enterica*, Whole genome sequencing, Resistance, Virulence

Objectives. *Salmonella enterica* (SE) is a significant foodborne pathogen that is transmitted by contaminated food and water. Whole genome sequencing (WGS) plays significant role in public

health, especially food safety with various tools for microbial identification and analysis. The aim of this study was to characterize *Salmonella* Enteritidis isolates from chicken feces and poultry to compare repertoire of virulence and antimicrobial resistance genes using various data analysis tools.

**Materials and Methods.** We did a retrospective data analysis of *Salmonella enterica* isolates from chicken feces (n=10) and poultry (n=10) collected in 2018-2019. WGS data of SE were used to identify acquired antimicrobial resistance genes (ResFinder 3.2), virulence factors (VFAnalyzer), *Salmonella* pathogenicity islands (SPIFinder 1.0) and estimate SE pathogenicity (PathogenFinder 1.1). Data analysis tools used were free available from Center for Genomic Epidemiology and The virulence factor database.

**Results.** All analyzed isolates were human pathogens, had an acquired Aminoglycoside resistance gene *aac(6)-Iaa*. SPIFinder identified SPI-13. Virulence factors (VF) *Agf/Csg*, *Bcf*, *Fim*, *Lpf*, *Stb*, *Std*, *Stf*, *Sth*, *Mg2+* transport, *MisL*, *SinH*, *PhoPQ*, *TTSS* (SPI-1, SPI-2 encoded), *ACE T6SS* were present in all isolates. VF *Pef*, *Peg*, *Saf*, *Sef*, *Ste*, *Mih-14*, *Mig-5*, *Rck*, *Spv*, were present in all isolates from poultry where in isolates from chicken feces these VF varied. None of the isolates had Typhoid toxin VF.

**Conclusions.** We can conclude that all *Salmonella enteritidis* isolates from both groups were human pathogens, had the same Aminoglycoside resistance gene and had acquired SPI-13. Isolates contained a range of virulence factors associated with pathogenesis however comparing both groups there were no specific virulence factors that could significantly affect the transmission of *S. enteritidis* to poultry.

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## **DIFFERENCES IN ELEMENTAL BODY COMPOSITION, LATENCY TO RESUME ACTIVITY AND RESTING METABOLIC RATE OF WESTERN STUTTER-TRILLING CRICKETS (*GRYLLUS INTEGER* SCUDDER, 1902) IN THREE DEVELOPMENTAL SPEED SELECTION LINES**

The elemental composition of organisms belongs to a suite of functional traits that may adaptively respond to fluctuating selection pressures. Life history theory predicts that predation risk and resource limitations impose selection pressures on organisms' developmental time and are further associated with variability in energetic and behavioural traits. Individual differences in developmental speed, behaviours and physiology have been explained using the pace-of-life syndrome (POLS) hypothesis. However, how an organism's developmental speed is linked with elemental body composition, metabolism and behaviour is not well understood. In this study we compared elemental body composition, latency to resume activity and resting metabolic rate (RMR) of western stutter-trilling crickets (*Gryllus integer*) in three selection lines that differ in developmental speed. We found that slowly developing crickets had significantly higher body carbon, lower body nitrogen and higher carbon-to-nitrogen ratio than rapidly developing crickets. Slowly developing crickets had significantly higher RMR than rapidly developing crickets. Male crickets had higher RMR than females. Slowly developing crickets resumed activity faster in an unfamiliar relative to a familiar environment. The rapidly developing crickets did the opposite. The results highlight the tight association between life history, physiology and behaviour. This study indicates that traditional methods used in POLS research should be complemented by those used in ecological stoichiometry, resulting in a synthetic approach that potentially advances the whole field of behavioural and physiological ecology.

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## **EFFECTS OF SPERM DNA FRAGMENTATION ON THE QUALITY OF EMBRYOS OBTAINED BY THE ICSI PROCEDURE IN MALE INFERTILITY CASE**

**Key words:** Spermatozoa, Sperm DNA, Embryo, Pregnancy, In vitro fertilization Sperm DNA damage is common amongst infertile men and may adversely impact natural reproduction, assisted reproduction and to a lesser degree IVF pregnancy. Sperm DNA integrity is vital for successful fertilization, embryo development, pregnancy, and transmission of genetic material to the offspring. DNA fragmentation is the most frequent DNA anomaly present in the male gamete that has been associated to poor semen quality, low fertilization rates, impaired embryo quality, and preimplantation development and reduced clinical outcomes in assisted reproduction procedures. High DNA fragmentation index (DFI) may be associated with poor outcome after ICSI. Our aim was to determine whether DFI impacts embryo quality. The study began in 2015. The study provides data about 123 pairs, for which subjected sperm DNA fragmentation assays. These patients have been treated for infertility with the ICSI method embryos were obtained and the morphological development of the embryos was assessed.

The research is performed in SIA AVA CLINIC accredited Medical Laboratory.

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## **EVALUATION OF THE INFLUENCE OF ANTIMYCIN A AS A MODULATOR OF THE ALTERNATIVE RESPIRATORY PATHWAY ON MORPHO-PHYSIOLOGICAL PARAMETERS IN TRITICUM AESTIVUM L. EXPOSED TO THERMAL STRESS**

Temperature above the normal optimum is sensed as thermal stress by all living organisms and represent one of the major environmental challenges for plants that reduce plant growth and limit crop yields. Resistance to abiotic stresses becomes an essential characteristic of plants because of climate changes. Plant mitochondria belong to the cell compartments dynamically involved in stress response and stress modulation. Therefore, we aimed our attention on the study of the evaluation of antimycin A (AA) as a modulator of the alternative respiratory pathway (AP) on the intensity of growth processes and some physiological parameters of etiolated wheat seedlings, such as maximum length of root, length of first leaf and coleoptile, fresh and dry weights at the whole plant level, leaf area as well as relative water content, saturation water deficit, degree of leaf succulence and sclerophylly. Results showed a significant reduction in root length (59%), leaf length (30%), plant fresh mass (10%), dry mass (14%), and leaf area (25%) under thermal stress which was consistent with the progressive alteration in water relations. Furthermore, the degree of leaf succulence and degree of leaf sclerophylly were severely affected by thermal stress in wheat seedlings. However, during thermal stress the application of AA reduced the leaf length by 23%, coleoptile length by 5%, plant fresh weight by 7%, plant dry weight by 3%, and leaf area by 21% in etiolated wheat seedlings compared to heat-stressed plants without AA. This finding implies that the activation of the AP promoted a mitigating of the damaging effect of thermal stress in wheat seedlings supporting growth processes.

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## **FEATURES OF THE LONG-TERM DYNAMICS OF THE RELICT CALANOID COPEPOD LIMNOCALANUS MACRURUS SARS IN THE TRANSBOUNDARY (BELARUS-LATVIA) LAKE SITA**

Long-term data (1988-2019) of the relic copepod population was analyzed and a sharp decrease was recorded in 2011 after an abnormally high temperature in the surface layer of the lake above 26° C in the previous 2010 from 2483 to 3 ind./m<sup>3</sup>. The reason for the decrease in the number of this stenothermal cold-loving species living in the deep layers of water of the hypolimnion was the reduction in the vertical space suitable for its habitat. Along with the increase in temperature, the oxygen content decreased to critical values (below 2 mg / l) for survival. As an adaptive reaction, vertical movements are observed and crustacean avoidance of zones with oxygen deficiency and high temperature, but in years of a complete absence of vertical space with suitable living conditions, the population decreases sharply.

The impact of both limiting factors leads to a reduction in the spatial niche and a catastrophic decrease in the number of relics, which increases the risk of its extinction from the fauna of the lake. A similar mechanism for the decrease in the number and subsequent extinction of planktonic relict species of crustaceans with increasing temperature can also act in other lakes close in morphometry and trophic level.

The work has been performed with partial support of the Belarusian Republican Foundation for Fundamental Research - the contracts B18MSIC-016

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## **IMPACT OF ZNO NANOPARTICLES ON HORDEUM VULGARE L. SEEDLINGS GROWN IN HYDROPONICS**

Since the consumption of goods containing nanoparticles is becoming increasingly common, a large number of nanoparticles are being released into the environment. This results in accumulation of different nanoparticles in living organisms including plants. This can lead to serious changes in plant organisms, such as changes in plant growth, development, yield, genotoxicity, oxidative stress, resistance, etc. Changes caused by nanoparticles can lead to both negative and positive effects in plant organisms. However, due to the enormous diversity of nanoparticles, plant species and the complexity of plant-nanoparticle interactions, the effects of various nanoparticles on plant organisms and their potential use, are still unknown.

The barley *Hordeum vulgare* L. seedlings were obtained by growing in hydroponics, ZnO nanoparticles were used as stress factor, and miR159c was used for investigation of miRNA expression level under nanoparticle treatment. The aim of this study was to investigate the seed germination rate, cytotoxic, genotoxic effects, stress level, chlorophyll fluorescence and evaluate miRNAs expression levels caused by ZnO nanoparticles in barley seedlings grown on hydroponics. ZnO Evans blue staining, RAPD, Comet assay, confocal laser scanning microscopy and RT-qPCR were conducted.



Obtained results showed statistically significant differences between control and treated seedlings, such as different morphology, cytotoxicity, genotoxicity and stress level. Differences increase with increasing ZnO nanoparticle concentrations.

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## **INVESTIGATION OF SHREWS (SORICIDAE), RODENTS (CRICETIDAE, MURIDAE) AND AMPHIBIA (BUFONIDAE, RANIDAE) HELMINTH FAUNA IN LATVIA**

In the scientific literature nowadays are not published data about the studies carried out in helminth fauna of shrews, rodents and amphibians in Latvia. Viksne (1959) published the helminth fauna of amphibians, but Lesiņš (1959) published the helminth fauna of *Myodes glareolus*. The aim of this study was to determine the helminth fauna of shrews, rodents and amphibians in Latvia.

In period from 2015 to 2019 were captured 191 shrews, 248 rodents and 389 toads and frogs in Latvia. Shrews from three species (*Sorex araneus*, *S. minutus* and *Neomys fodiens*), rodents from 10 species (*Apodemus flavicollis*, *A. agrarius*, *Myodes glareolus*, *Rattus rattus*, *Micromys minutus*, *Microtus arvalis*, *M. agrestis*, *Mus musculus*, *Sicista betulina* and *Arvicola amphibius*) and amphibians from four species (*Bufo bufo*, *Pelophylax esculentus* complex, *Rana temporaria* and *R. arvalis*) were examined for helminths.

The shrews are hosts to seven species of helminths: one Trematoda, two Cestoda, three Nematoda and one Acanthocephala. The rodents are hosts to 14 helminths species of helminths: one Trematoda, five Cestoda and nine Nematoda. In toads and frogs were detected more species of helminths than shrews and rodents. Toads and frogs are hosts to 24 helminth species: one Monogenea, seventeen Trematoda, five Nematoda and one Acanthocephala.

The helminth fauna in the shrews and rodents depends on effect close contact between land and their feeding characteristics, but amphibians helminth fauna are closely connected to their way of life and their stay in the water and the food spectrum.

Five species of helminths (*A. alata*, *Echinoparyhium recurvatum*, *Calodium hepaticum*, *Hymenolepis diminuta* and *Mesocestoides lineatus*) are zoonotic helminths.

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## **KAILGLIEMEŽU HISTOLOĢISKĀS IZMEKLĒŠANAS METODOLOĢIJAS IZSTRĀDE**

*Arion vulgaris* ir Spānijas kailgliemezis, par kura izcelšanās vietu uzskatīja Spāniju, Portugāli, Azoru salas (Kozłowski, 2011), šobrīd, pēc veiktiem filoģenētiskiem pētījumiem tas tiek noliegts, un tā izcelsmes vieta nav zināma (Slotsbo, 2011; Dörler et al., 2019). Pēdējos gados ir kļuvis par kaitīgu invazīvu organismu Eiropā un rada draudus tautsaimniecībai, iznīcinot kultūraugus, citas gliemežu sugas, pazeminot zemes īpašumu vērtību, samazinot uzņēmējdarbību, nodarot lielus ekonomiskus zaudējumus agrokultūru sējumiem, augļu un dārzeņu stādiem un gatavajai produkcijai (Gural-Sverlova et al., 2011; Kozłowski, 2011; Dörler et al., 2019; Jensen et al., 2013). Latvijā pirmo reizi Spānijas kailgliemezis tika konstatēts 2009. gadā Pastendē, pēc tam 2010. gadā Jelgavā (Balalaikins, 2019; Jakubāne u.c., 2018).

Nemot vērā *A. vulgaris* augstās pielāgošanās spējas jauniem dzīves apstākļiem, vājās apkaršanas un ierobežošanas iespējas, to lielo ķermeņa izmēru, ātru izplatību un vairošanos, diētas un ekoloģisko toleranci un dabisko ienaidnieku trūkumu, tas var ātri adaptēties jauniem dzīvesvietas apstākļiem un ātri formēt ļoti blīvu populāciju. Tāpēc tas ir kļuvis par plašu izpētes objektu Eiropā (Gural-Sverlova et al., 2011; Kozłowski, 2011).

Kailgliemežu audu histoloģiskā izmeklēšana palīdz izprast katra reproduktīvās sistēmas komponenta funkcionalitāti un fizioloģiju. Orgānu, audu un šūnu struktūra un funkcijas sniedz informāciju, kura izskaidro visu vairošanās procesu, ietverot gametoģenēzi, spermatozoīdu pānesi, apaugļošanas, partnera spermas uzņemšanas, uzglabāšanas un izmantošanas īpatnības, kā arī olu produkciju (Medeiros et al., 2013).

Tā kā literatūrā nav aprakstīta histoloģisko paraugu sagatavošanas tehnika, kā arī histoloģisko paraugu interpretācija, bija nepieciešams izstrādāt paraugu sagatavošanas un interpretācijas metodoloģiju. Mugurkaulniekiem izmantojamā metodika kailgliemežiem nav izmantojama to īpatnējās anatomiskās uzbūves un apjomīgas gļotu producēšanas dēļ.

Šajā pētījumā ir veikti eksperimenti gan ar dzīvnieku eitanāzijas, gan ar paraugu fiksācijas veidiem, lai iegūtu kvalitatīvus histoloģiskos preparātus. Pārbaudītas dažādas histoloģiskās krāsošanas metodes un to piemērotība kailgliemežu audu analīzei. Izstrādāta kailgliemežu reproduktīvās sistēmas novērtēšanas metodoloģija, kas ļauj novērtēt to reproduktīvās sistēmas funkcionalitāti atkarībā no dažādiem ietekmējošiem faktoriem, piemēram, barības vielu ietekmi.

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## **LANDSCAPE ECOLOGY FACTORS AFFECTING PROTECTED SAPROXYLIC BEETLE (COLEOPTERA) SPECIES IN PINE FORESTS**

Protected saproxylic beetle species have been studied intensively in the last decade in Latvia, resulting in many new findings. Mostly these studies have focused on local ecological factors, but there is lack of knowledge in landscape scale. We assume that at this moment factors affecting many species (including *Boros schneideri*, *Chalcophora mariana* and *Nothorina punctata*) in local scale are clear enough to allow to estimate them in landscape scale also.

Data of findings of mentioned species were obtained from Nature Conservation Agency (Dabas aizsardzības pārvalde) and Latvia's State Forests (LVM) and data of forest stands – from State Forest Service (Valsts meža dienests). Together 353 *B. schneideri*, 128 *C. mariana* and 285 *N. punctata* findings were analyzed. Using ArcGIS program, we randomly selected ten times more absence points for each specie in forest covered areas. Around each point we made a square buffer with edge sizes 100x100m.

The most important factors affecting species at landscape level were forest growth type, forest age, diversity of dominant tree species at sampling plot, forest fragmentation, distance from forest edge, distance from the sea, and geographical location of species' finding.

Species distribution models were made. *B. schneideri* mostly occurs in eastern part of Latvia while *N. punctata* and *C. mariana* near seaside – mostly in western part of Latvia. Special distribution model was made for endangered saproxylic beetle species that lives in pine forests. Although these models allows us to determine most important places for species protection in country and can be used not only for these species but also for other endangered saproxylic beetle species that lives in pine forests. It can't be used for all species as there are slightly different affecting ecological factors for each species and individual models gives better results for each specie individually.

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## **MICROBIOME OF EUROPEAN POND TURTLE (EMYS ORBICULARIS) IN SILENE NATURE PARK, LATVIA**

The European pond turtle (*Emys orbicularis* L., 1758) is a species of long-living freshwater turtle in the family *Emydidae*. Latvia is located in the far north of the modern range of the European pond turtle. *E. orbicularis* is included in the Latvian list of protected species. In 2014 42 captive young adult and semiadult *E. orbicularis* were released in wild for population restoration in Silene Nature Park, Natura2000 territory (Latvia). Animals harbour diverse assemblages of microbial organisms that play key roles in host health and ecology and may be important for conservation efforts.

19 samples of microbiom from these seven *E. orbicularis* were collected from May to September 2019. All captured by fyke-nets individuals had no visual signs of illness; cloacal, skin and mouth swabs were taken with Amies swab. After sampling, animals were returned to the place of capture. Swabs were placed individually into vials with nutrient media for transportation. For bacteria growth a sterile Petri plate with Plate Count Lab-Agar™ was inoculated with an Amies swab and the sample was dispersed using the streak plate method. Plates were incubated in aerobic atmosphere for 72 hours at temperature of 30°C. For isolation and differentiation of bacteria CHROMagar™ Orientation agar was used (incubated in aerobic conditions at 37°C for 24 hours). Identification of bacteria was carried according to CHROMagar™ Orientation Instructions For User. Individual colonies of bacteria were described based on size, color, texture and morphology. Gram's staining was performed as described. Cells are stained with crystal violet. After then cells are treated with iodine, forming a crystal violet/iodine complex, and are washed with an organic solvent (acetone-alcohol), and are stained with red counterstrain – safranin. Bacteria shape and Gram's reaction was observed by the microscope. The bacterial communities largely consisted of two phyla, the *Proteobacteria* and *Firmicutes*. Most common found bacteria was *Pseudomonas* spp. (40%) and *Proteus* spp. (27%). This study provides basic information about the external microbiomes of the released turtles and is the first step in understanding their environmental roles.

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## **MICROORGANISMS IN THE GUT OF OSMODERMA BARNABITA MOTSCH. LARVAE**

**Key words:** gut microbial diversity, *Osmoderma barnabita*.

The insects gut is considered a hostile environment for many environmental microorganism. The purpose of this study was to isolate, quantify and characterize the microorganisms from the gut of the wood-inhabiting beetle *Osmoderma barnabita* Motsch. (Insecta, Coleoptera, Scarabaeidae) larvae. The *O. barnabita* larvae were collected from oak wood in Kaunas, Lithuania.

The larval gut segments were crushed and streaked with a loop on to the surface of: Yeast extract-malt extract-peptone-glucose agar (for yeasts), Malt Extract Agar (for fungi), Nutrient agar (for bacteria) and Starch-ammonia agar (for actinobacteria). Phenotypic and physiological methods were used to

characterize yeast isolates, while macro- and microscopic features were used for identification of filamentous fungi.

All groups of microorganisms (fungi, yeasts, bacteria and actinobacteria) were isolated from the *O. barnabita* larval gut. More than 103 colony forming units (CFU)/gut) were obtained from the larval gut. The number of all isolated microorganisms were lower in the foregut (101–102 (CFU)/gut) than in the hindgut (104–105 (CFU)/gut). The density of bacteria in *O. barnabita* larval gut ranged from  $1.0 \times 10^3$  CFU/gut (in the foregut) to  $6.0 \times 10^4$  CFU/gut (in the hindgut). Our results showed that the hindgut of the larvae microbiota showed higher number of fungi ( $3.3 \times 10^4$  CFU/gut) and yeasts ( $1.2 \times 10^5$  CFU/gut). The number of bacteria and actinobacteria were the same (104 CFU/gut) in both the midgut and hindgut.

Fungi belonging to *Penicillium* and *Mucor* and yeast belonging to *Candida*, *Myxozyma* and *Debaryomyces* genera were isolated from the *O. barnabita* larval gut specimens.

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## OUTBREAK OF BLACK ARCHES (*LYMANTRIA MONACHA*) IN CURONIAN SPIT

*Black Arches* (nun moths) *Lymantria monacha* (Linnaeus, 1758) (*Lepidoptera*, *Erebidae*) is considered to be one of one of the most important forest pest, especially in Central and East Europe, where it goes through periodic outbreaks causing defoliation and resulting in the death of spruce and pine trees. The first signs of defoliation of pine trees were noticed at 2018 in Alksnynė and near Juodkrantė (northern part of Curonian Spit, Lithuania). The research shown, that pine trees were damaged by caterpillars of Black Arches. At 2019 the insecticide Foray 48B were used against this pest to 460 ha of pine stands. The further investigation in 2019 shown, that pest mass reproduction foci is expanding and spread from Juodkrantė to south.

Caterpillars bacterial diseases (up to 97 %) and caterpillars parasitized by Dipterans (*Tachinidae*) were observed in some part of massive outbreaks foci south of Juodkrantė. In the some parts of pest foci, where the needle defoliation is large, the caterpillars start feeding on other tree species: spruces, junipers, birches, apple trees, cherry plum. Caterpillars pick only petiole of birch leaf, on other trees species caterpillars consume almost all leaf or needle. Moths respond poorly to light sources at night. Light attracts them in favourable weather condition, when the air temperature is not lower 18 °C. Under such weather condition the light trap (used 160 W lamp) attracts during the 3 hours 240 male and 80 female of Black Arches moths in 2019, so far in another weather condition only several moths were attracted.

The investigation of Black Arches outbreaks in Curonian Spit shows that pest foci expand to new territory, but in older foci a processes of abundance regulation (diseases, parasitism) started.

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## POPULATION GENETIC STRUCTURE OF THE *DREISSENA* *POLYMORPHA* (PALLAS, 1771) MUSSELS IN LAKE RAZNA, LATVIA

The zebra mussel *Dreissena polymorpha* is a successful invasive bivalve native to the brackish and freshwaters systems of the Ponto-Caspian regions. Mussels were negative impacts on biota that inhabit the pelagic zones of lakes or rivers. Because of their high fecundity and ability to settle on almost any solid substratum, zebra mussels usually out-compete the resident species and cause severe damage to waterworks. In spite of the increasing importance of in studies of *Dreissena polymorpha*,

there are no data in Latvia. The aim of this preliminary study is to begin examine the population genetic structure of invasive species *Dreissena polymorpha* in Latvia.

Genetic structure of the zebra mussel *Dreissena polymorpha* populations from Lake Rāzna was investigated using highly polymorphic six microsatellite loci *Dpol A6*, *Dpo260*, *Dpo 272*, *Dpo101*, *Dpo 221*, *Dpo04*. Studies of genetic structure of population will allow to identify the current situation of invasive species *Dreissena polymorpha* in Latvia. Microsatellites have emerged as the most popular and versatile marker type for ecological applications. Allele number in locus, frequency, allele number in locus, private alleles in population, observed and expected heterozygosity, level in polymorph locus were measured GeneAlex 6.41 software. The microsatellite data set was checked for scoring errors due to stuttering, large allele dropouts, and null alleles with the program MICRO-CHECKER. The population was checked for possible bottlenecks using the program BOTTLENECK, version 1.2.02

Allelic diversity at all described loci was high, ranging from 3 to 13 alleles per locus. The mean observed heterozygosity was 0.58 and the mean expected heterozygosity was 0.70. We found a significant deviation from Hardy-Weinberg equilibrium for the *Dreissena* population from Lake Rāzna. This deviation was observed in all loci and showed a deficit of heterozygotes. Allele frequencies followed an L-shaped distribution i.e., no skew of allele frequencies towards intermediate values were observed in any of the populations, as expected in a non-bottlenecked population at mutation-drift equilibrium.

Genetic monitoring can provide crucial information on genetic diversity, connectivity, fitness, and viability of populations.

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## **PREDICTIVE SPIDER SPECIES DISTRIBUTION MODELLING WITHIN THE APŠUCIEMS MIRE HABITAT, LATVIA**

The spatial distribution pattern is one of the most important characteristics of a species because it helps to understand the optimal environmental conditions for the particular species. Spiders are one of the arthropod groups which appear to be very strongly influenced by the habitat structure, including the composition of the vegetation, the height of the vegetation as well as by different other architectural variations in the habitat. In the present study we investigated how the vegetation influences the distribution pattern of different ground-dwelling spider species. We used a method which is a rather innovative approach in spider ecology studies – we coupled the remote sensing data with the field data and tried to find out as well as to predict the distribution of spider species within the chosen habitat. The field data were collected in the Apšuciems mire – we set up 57 sample plots throughout the whole mire, and in those plots we detected all plant species that were present in there, as well as collected spiders in the pitfall traps. By using cluster analysis, the plant community of the mire was divided into six vegetation groups. The samples belonging to these vegetation groups were attributed to spatial level and used in the machine learning algorithm *Random forest* on the Sentinel-2 satellite image with an accuracy of 10 meters. In order to determine the affinity of each spider species to previously identified vegetation types, the data on spiders were subjected to indicator species analysis. The probability of spider occurrence in the mire was expressed as the total indicator values of each spider species in the identified vegetation groups. Finally, these probabilities were put on the map. The prepared spider distribution maps showed how high is the probability of spider species to occur in each of the identified vegetation types. The results showed that different spider species have very different distribution patterns in a given habitat – some spider species prefer the central part of the mire where there is one specific vegetation type while others prefer the mire margins or other mire parts. Overall, this research showed that remote sensing, when used together with the field studies, can be a very useful method that might help to understand how vegetation influences the occurrence of a spider species in a habitat, as well as it can be used in ecological forecasting to predict the spider distribution within different vegetation types.

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## **PRELIMINARY RESULTS OF A STUDY ON THE ADHESIVE PROPERTIES OF SLUG MUCUS**

Molluscs secrete a mucus that acts like glue, allowing them to adhere to rough surfaces. Mucus protects the mollusc body against desiccation, infections and sun rays, and speeds up wound healing. Snails and slugs can stick tight to wet, vertical surfaces because the mucus do not dissolve in water. Biochemically active substances in mollusc mucus show antimicrobial, antifungal, antiviral, anticancer, antioxidant and regenerative properties. Chemical composition and physical properties of mucus vary depending on different conditions. For example, mucus of small-sized snails contains more carbohydrates than mucus of larger-sized snails. Furthermore, wild-living snails contain 16 times more mucus than snails living in captivity. The viscosity of mucus depends on the mollusc's psychological state – the mucus of disturbed snails is white, very thick and has a high concentration of calcium salts. Moreover, chemical and physical properties of the mucus of slug *Arion subfuscus* has inspired scientists to invent a new sticky surgical glue that adhere to wet, bloody tissues. This type of adhesive is tighter, more flexible than previously used, and has got a greater perspective for use in future. In our study we investigated whether slug mucus prevents or prolongs germination of seeds of different flowering plant species. Also, growth of sprouts from control and experimental groups was observed. Results show that seeds in experimental group were effected by mucus treatment – their germination time was extended significantly. However, experimental sprouts grew faster in comparison with controls in the first two weeks after germination, but later control sprouts overtook experimental sprouts and both groups grew similarly. This suggest that mucus layer serves as an additional barrier during sprouting, but enhances the sprout growth soon after germination. Maybe this is due to the fact that slug mucus contains a lot of biochemically active substances that possibly stimulate growth of young sprouts.

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## **PRELIMINARY STUDIES OF ALGAE IN NATURA 2000 SITE – ILGAS (LATVIA)**

Algae as a part of ecosystems of ponds inhabited by rare and preserved *Bombina bombina*, *Triturus cristatus* and invaded by *Perccottus glenii* in the Nature Park Silene (Natura2000 code LV0300400) and its part Nature Reserve Ilgas (Natura2000 code LV0526300) fund become of special interest. In 2019 in total of 81 microalgae species were registered in phytoplankton, periphyton and microphytobenthos in Ilgas pond (55.689741°; 26.774039°).

Among them are *Bacillariophyta* (43 species), *Chlorophyta* (11 sp.), *Charophyta* (14 sp.), *Euglenophyta* (9 sp.), *Dinophyta* (2 sp.), *Chrysophytata* (2 sp.) and *Xanthophyta* (1 sp.). The genera *Navicula* Bory, *Fragillaria* Lyngbye and *Cocconeis* Ehrenb. were most numerous. *Eunotia* Ehrenb. and *Euglena* Ehrenb. had high biomass with low frequency. Diverse groups were genera *Pinnularia* Ehrenb., *Gomphonema* Ehrenb, *Epithemia* Kütz.

The most numerous were assemblage of microphytes in silt in the bottom of water-body and counted 43 species. On average 92 % of phytobenthos biomass was formed by diatoms (147,21 mg cm<sup>-2</sup>). Three species (*Navicula radiosa* Hustedt, *Epithemia turgida* (Ehrenb.) Kütz, *Pinnularia flexuosa* Cleve), were prevailed in silt by frequency. Phytoplankton biomass (97.7%) was formed by dinoflagellates, represented mainly by *Peridinium cinctum* (O.F.Müll.) Ehrenb. The euglenoids *Trachelomonas volvocinopsis* Svirenko composed up to 30% by frequency.

In periphyton, the most numerous species were green algae *Botryococcus braunii* Kütz, *Spirogyra* sp (*Zygnematophyceae*) and colonial diatoms *Fragilaria virescens* Ralfs, but also euglenoids (genera *Lepocinlis* Perty and *Phacus* Dujard.), green algae (*Pediastrum duplex*, *Ankistrodesmus falcatus*), desmids (*Staurodesmus* sp., *Cosmarium* sp.) and dinoflagellates (*Ceratium cornutum* (Ehrenb.) Claparède et J. Lachmann, *Peridinium cinctum*).

We also noted two interesting algal taxa – *Characium acuminatum* A.Braun and *Desmidium aptogonum* Bréb. ex Kütz. that are rare species in the flora of Latvia. The least species is noted in second since H. Skuja record (Skuja, 1928).

The study was conducted in accordance with legislation of Latvia. We thank for cooperation Latvian – Ukrainian VIAA project No. LV-UA/2018/6 “The ecological and biological triggers of expansion of the invasive fish, Chinese sleeper (*Percottus glenii*), in Eastern Europe”.

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## **PRODUCTS OF DNA OXIDATIVE STRESS DAMAGE AS BIOMARKERS FOR DIAGNOSIS OF EARLY STAGES OF MULTIPLE SCLEROSIS**

Multiple Sclerosis (MS) is an early onset, crippling disease with profound autoimmune component; it is considered to emerge as the result of an interplay between many environmental and genetic factors; role of each factor is not known precisely at the moment. Among multiple potentially relevant influences, oxidative stress is considered to be of potential importance for the aetiology of MS. Broad range of oxidative stress consequences have already been explored, but full picture has not been clarified yet. Upregulation of inducible form of nitric oxide synthase (iNOS) in immune cells is hypothesised to be an important part of oxidative stress component of MS pathology, being associated with the accumulation of reactive oxygen species of nitrogen, peroxy-nitrite (ONO<sub>2</sub><sup>-</sup>), resulting in cellular damage in the regions of CNS, where the immune cell infiltration and/or accumulation is intensified.

Aim of this study was to analyse specific types of DNA from peripheral blood mononuclear cells (PBMNC) of MS patients and to measure the concentrations of nitrates (NO<sub>3</sub><sup>-</sup>) and nitrites (NO<sub>2</sub><sup>-</sup>) in plasma samples from MS patients.

Conventional and modified “comet assays” were applied to quantify the levels of oxidized bases in DNA. Contents of nitrates and nitrites were measured by chemiluminescence on Sievers NOA 280i analyser. A total of 96 subjects were included into the study, with the same number of patients and controls. Study groups of patients were formed according to the chosen method: N = 18 for comet assay, N = 20 both for nitrite and nitrate quantification.

MS patients were found to have higher levels of DNA single-strand breaks, as shown by conventional alkaline comet assay (118.40 ± 14.96 vs 76.29 ± 21.16 AU). In specimens treated with FPG and endonuclease III similar trends were discovered: (FPG - 199.50 ± 20.65 vs 153.30 ± 25.95 AU); (Endonuclease III - 191.60 ± 24.98 vs 143.30±20.66). The differences were statistically significant (p<0.05). It was also found that external damage to DNA, caused by potassium bromate (KBrO<sub>3</sub>) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) is more profound in the cell of the MS patients, indicating greater susceptibility.

Plasma levels of nitrates and nitrites were significantly elevated in MS patients compared to control group: nitrates - 29.181 vs 24.31  $\mu\text{M}$ ; nitrites 0.795 vs 0.643  $\mu\text{M}$ .

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## **REVISION OF THE SPECIES OCCURRING FROM PHILIPPINES ARCHIPELAGO GENUS CELEBIA THOMSON J, 1857**

Beetle taxonomy research in the Oriental region has become a hot topic of research over the last decade, mainly because of the rapid extinction of tropical beetle species due to rapid climate change, deforestation and biodiversity loss.

The genus *Celebia* Thomson J, 1857 is one of the genera that is still poorly studied and the potential number of new species in the genus is high. By comparison, many new species of science have already been discovered and described in closely related genera such as *Eupholus* and *Penthoscapa*. The last taxonomic studies of the genus *Celebia* date back to the early 20th century. It should be noted that since then the number of sites from which new material is available has multiplied. The genus *Celebia* includes non-flying species of reduced dispersal capacity and a high level of endemism, which further increases the possibility that new species may be found in science from new territories.

Three new species of *C. barsevskisi* sp. n. (Mindanao), *C. mindanaoensis* sp. n. (Mindanao) and *C. negrosensis* sp. n. (Negros) have already been described and further genus revision will be a major investment in exploring and enhancing biodiversity in the Oriental region.

Species known from the Philippines; *C. iligana*, *C. lactospreta*, *C. merrillei*, *C. mundocostata*, *C. philippinica*, *C. samarana*, *C. toxopeusi*.

A logical and reasonable continuation of research is to make a revision of genus *Celebia* in the Philippine Archipelago, supplemented by a practicable species determinant. Such a contribution to research into the *Celebia* genus will be of practical use to both scientists and students.

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## **SOME NOTES ON THE TRANSMISSION ON HAEMOPROTEUS PARASITES IN EASTERN PART OF BALTIC REGION**

Infections caused by avian haemosporidian parasites in bird populations can have a profound effect on bird evolution, abundance, or even can have a particularly strong effect for endangered bird populations. It is known that transmission of avian haemoproteids (*Haemoproteus*, Haemosporida) occurs in whole Baltic region. However, our knowledge about the diversity of *Haemoproteus* parasites circulating in Eastern part of this region and the information about the abundance of their vectors remains insufficient. *Culicoides* biting midges (Diptera: Ceratopogonidae) are known to be vectors of avian *Haemoproteus* parasites. So far only few *Culicoides* species are known as competent vectors of avian *Haemoproteus* parasites. The aim of this study was to evaluate *Haemoproteus* parasites, which can be transmitted locally in the populations of tits (Paridae) and Old World flycatchers (Muscicapinae) and to identify *Culicoides* species potentially involved in this transmission.



Blood samples of juvenile birds were collected during the breeding seasons of the year 2016, 2018 and 2019 in Curonian Spit. Biting midges were collected from bird nest boxes. Parasites were identified using both microscopy and PCR-based methods.

From 187 studied juvenile birds 31 were infected with *H. majoris* (genetic lineages: hCWT4, hPARUS1, hPARUS10, hPHSIB1, hWW2) parasites, which are widespread in Europe. Also, 293 *Culicoides* females were collected from nest boxes. *Culicoides kibunensis*, *C. segnis* and *C. pictipennis* were determined as dominant species collected using this method. *C. kibunensis* was found to be infected with *H. lanii* (hRB1), *C. pictipennis* and *C. punctatus* - with *H. minutus* (hTUPHI01 and hTURDUS2, respectively), *C. segnis* - with *H. majoris* (hCWT4), *H. minutus* (hTURDUS2) and *H. tartakovskyi* (hSISKIN1). This study contributes to epizootiology of avian *Haemoproteus* infections by specifying *Culicoides* species which are likely involved in the transmission of haemoproteids in Eastern part of Baltic region.

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## THE FIRST WATER EDNA IDENTIFICATION OF THE EUROPEAN POND TURTLE EMYS ORBICULARIS IN WATERBODIES IN LATVIA

The European pond turtle *Emys orbicularis* is a rare and protected reptile species in Latvia and in Europe. Researching the distribution of the species is important both for the study of its range and ecology, and for its protection. But the northern small ( $n \leq 10$ ) and fragmented populations of the species are difficult to identify in wild with traditional methods (visual observation, catching by fuke nets) or require large resources due to the very low density of turtles populations in Latvia. The use for *E. orbicularis* identification eDNA technologies in the water of ponds makes the search for turtles more effective.

For the first time in Latvia, an eDNA study for the search for *E. orbicularis* in Latvia was conducted in collaboration with SPYGEN (France) during the monitoring of herpetofauna in 2016-2018 and showed high efficiency of the method: all positive test sites were inhabited by turtles, which was later confirmed by visual observation data. The wide use of the method in Latvia requires its further development and adaptation.

The study was conducted in accordance with legislation of Latvia. We thank Latvian Environmental Protection Fund and Latvian Nature conservation agency for the support of the study. We thank SPYGEN for the research of the eDNA in the study.

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## THE INVASIVE FISH CHINESE SLEEPER PERCCOTTUS GLENII IN THE NATURA 2000 PROTECTED LANDSCAPE AREA "AUGSDAUGAVA" (SOUTHEAST LATVIA): TRIGGERS OF AN INVASION

Invasive species are recognized as one of the main threats to the native biodiversity in the world. The invasiveness of alien species is regulated by different mechanisms, so called triggers. The Amur sleeper, *Perccottus glenii*, is a very successful invasive species in Latvia, Ukraine, and in Europe that

threatens native species of aquatic organisms and is especially dangerous for small northern marginal amphibian populations of species such as *Bombina bombina* and *Triturus cristatus*.

Protected Landscape Area Augsdaugava (55.863450°N, 27.142637°; area 52 078 ha) was founded in 1990 and is a territory of Natura2000 (code LV0600400), it also includes Nature park Daugavas loki Natura2000 (code LV0300200). We have conducted field studies of the distribution of *P. glenii* in the area in 2015 – 2019, and we also processed earlier data by authors and data from publications and database.

As a result of the field study, we have found *P. glenii* at 21 waterbodies of different types: home ponds, ameliorative channels, marshes. Triggers of *P. glenii* invasion can have internal character (genetic diversity, ecological plasticity, etc.), also external ones (amelioration, fish stock, relocation and targeted introduction of *P. glenii*, etc.).

The study of the prerequisites for the success of the *P. glenii* invasion in Latvia can contribute both to a better understanding of the interrelationships between local species and the invader species, as well as to enhancing the effectiveness of the measures to limit the *P. glenii* invasion.

The study was conducted in accordance with legislation of Latvia. We thank for cooperation Latvian – Ukrainian VIAA project No. LV-UA/2018/6 “The ecological and biological triggers of expansion of the invasive fish, Chinese sleeper (*Percottus glenii*), in Eastern Europe”.

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## VARIATION OF MOBILE GENETIC ELEMENTS IN PINE GENES AND FLANKING REGIONS

Transposable elements (TEs) distributed in genes or their vicinity influence gene regulation and function. In plants, TEs were shown to modulate gene transcription in the specific environmental conditions by incorporation of cis-active elements, transcription factor binding sites (TFBS) and additional plant promoters. A number of epigenetic regulative mechanisms are linked to the insertion of various TEs, including methylation, antisense transcription, microRNA production and binding, lncRNA formation. Mobile genetic elements are extremely widespread in the conifer genomes, that include important forest species with high adaptive responses. In this study, comparison of the available pine reference genomes of *Pinus taeda* and *Pinus lambertiana* identified distributed TE families located in the vicinity of genes, however, the genes containing insertions are not homologous, reflecting TE expansion after speciation. Formation of gene regulative networks and subnetworks via TEs was investigated. The majority of TE diversity was found within gene introns. Genes with multiple TEs in their introns were found to be involved in many processes according to Gene Ontology annotations, several homologous genes were revealed between species. These genes are involved in many suggested TE-linked gene networks and may function as “global starter” genes in various stress responses. Several potentially important TE families were revealed: DNA TE *MITE3321*, containing several important stress-responsive TFBS; DNA TE *DTX184*, that could potentially form microRNAs and connect about 200 stress-responsive genes; retrotransposon *Copia-1813* containing probable light-responsive sequences and other retrotransposons previously evaluated as transcriptionally active. Molecular markers were constructed for the further investigation of structural variation in the non-model Scots pine (*P. sylvestris*), a species characteristic to Latvian forests and belonging to the subgenus *Pinus* together with *P.taeda*. Plus-trees with different origin and susceptibility to needle cast were analysed, fragments with correlated frequencies among populations were cloned and sequenced. Additional approaches as massive parallel sequencing with sequence-specific selection or enrichment were developed for the investigation of genes associated with TEs in the Scots pine genome.

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## EKONOMIKA UN SOCIOLOĢIJA

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## ECONOMICS AND SOCIOLOGY

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### ADAPTATION OF NATO'S CYBER DEFENCE POLICY (2014–2018)

**Key words:** security policy, NATO, cyber, defence

Cyber threats and cyber-attacks have become a reality in our daily routine as well as one of the main security policy concerns globally. State sponsored cyber-attacks can be a part of hybrid warfare, an instrument to achieve states' geopolitical and economic goals. For these reasons, in recent years cybersecurity has been on the agenda of many international organisations, including NATO. Crucial decisions have been taken, for instance, in 2014 NATO leaders agreed that a significant cyber-attack could invoke a collective response (Article 5) by NATO. Moreover, in 2016 Allies recognized cyberspace as a domain of operations.

The objective of the article is to analyse how NATO's cyber defence policy has shifted from 2014 to 2018 in the light of adaptation of the Alliance's deterrence strategy. The author has put forward a hypothesis that NATO's cyber defence posture has transformed from "deterrence by denial" into a strategy where "deterrence by denial" is augmented by "deterrence by punishment", in response to Russia's illegal and illegitimate annexation of Crimea. Research results will explain the adaptive nature of NATO's cyber defence policy in the context of developments in conventional domain and illuminate the challenges faced by the cyber deterrence posture.

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### ASSESSMENT AND DEVELOPMENT OF SMART ECONOMY IN LATVIA

**Key words:** smart economy, knowledge, innovation, index, Triple Helix Model.

Nowadays a new economy way is developing smart economy. Starting the transition to the smart economy is the increase of the population with higher education, as well as the transition from the "commodity society" to the "information / knowledge society". The smart economy is an economy based on knowledge and innovation. The question was how to measure this knowledge and innovation in a specific area. In this article, the author looked at international smart economy indexes in Latvia, compared to other Baltic states and Central European countries, as well as business, university and government cooperation.

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## **INTERDISCIPLINARY ISSUES IN OCCUPATIONAL SAFETY MANAGEMENT**

**Key words:** occupational safety and health, OSH management, Interdisciplinarity.

The changing nature and reorientation of labour market (both in the field of labour relations and occupational safety and health (OSH)) highlights the need to develop appropriate standards and strategies, including to address future challenges in safety and health policy-making at national and enterprise level. Improvements in working conditions and working environments carry inherently positive contributions to national development and constitute in themselves measures of the success of economic and social policy. In addition, working conditions are largely made up of a variety of technical solutions (equipment, apparatus, computers), which thus create significant physical, chemical, etc. (STEM scope) risks. Today, psychosocial and ergonomic aspects of the work environment are increasingly influencing the majority of employees. IT solutions are also important for OSH management, both for OSH general provision of the work environment system, as well for education of employees. Thus, various interdisciplinary aspects are important in OSH management. In addition, it is a major challenge to integrate the current needs of businesses into standards in order to modernize and adapt the occupational safety and health (OSH) system to the needs of innovative companies in a timely manner.

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## **THE INTERNATIONAL CONCEPT OF FORENSIC ACCOUNTING: THE EXAMPLE OF BANKRUPTCY FRAUD IDENTIFICATION**

**Key words:** forensic accounting, examination, financial statements, bankruptcy fraud, insolvency, fraud transaction The aim of the study is to research and classify a conceptual algorithm of forensic accounting examination using the example of identifying bankruptcy fraud.

The topic of the article is determined by the incompleteness of theoretical developments in the field of forensic accounting and examination and the relevance of the scientific substitution of its methods.

There are special legal requirements and methods based on documented facts that are suitable for the court as evidence used in the forensic accounting examination. The essential characteristics and methods of forensic accounting are presented in the study. The main stages of examination are: items valuation, planning of examination, finding, interpretation of examination results, and expert conclusion.

The authors summarize the international concept of forensic accounting expertise on the example of identifying bankruptcy fraud. The study demonstrates the internationally recognized core algorithm for detecting bankruptcy fraud based on financial statements, which consists of determining economic insolvency and identifying fraud transactions. The research methods are: generally accepted qualitative and quantitative methods of economic science, including monographic analysis of scientific, regulatory and special literature, content analysis, and graphical analysis.

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## **COMPETITIVENESS OF LATVIAN TRAVEL AND TOURISM SECTOR IN THE CONTEXT OF THE EU-COUNTRIES**

The paper addresses the issue of competitiveness in travel and tourism sector in the context of the EU-countries with the main focus on Latvian indicators. As a worldwide leader in international tourism, Europe plays a vital role in the global travel and tourism sector. Statistical indicators show the steady growth in travel and tourism sector globally and allow to predict that it remains conservative also in future. The author analyzes advantages and disadvantages of Latvian travel and tourism sector, based on the Travel and Tourism Competitiveness Index (TTCI). The methodology of the TTCI is based on creation of common index from the meanings of four equally weighted sub-indexes: enabling environment, travel and tourism policy and enabling conditions, infrastructure, natural and cultural resources. The paper attempts to explain, why Latvia is steadily on the bottom of ranking (the 24<sup>th</sup> of 27 EU-countries since 2015), and what factors prevent to improve its position. Speaking about disadvantages, the analyses show that there is a number of factors that can't be influenced in the short term such as climate, natural and cultural resources of the country, number of species, nevertheless, there are certain factors that can be definitely improved. Business environment and infrastructure as a whole are weak points of Latvian economy, making negative impact on Latvian travel and tourism sector. In this context, the main focus might be put on development of tourist service infrastructure and improving business conditions, especially in the regions. As significant advantages are mentioned indicators that have an indirect impact on travel and tourism sector. They are safety and security, health and hygiene, ICT readiness and price competitiveness.

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## **CONCEPTUALIZING RESILIENCE OF RURAL COMMUNITIES**

**Key words:** rural communities, resilience, social resilience, community resilience, neo-endogenous development

The concept of community resilience has become increasingly important in community studies in recent decades. Based on the literature review, the aim of the paper is to conceptualize the resilience of rural communities from the perspective of different theoretical approaches (equilibrium approach, evolutionary approach, socio-ecological perspective, etc.). The resilience of communities means the ability of communities both to adapt and withstand new conditions and influences caused by external factors and to exploit potential risks to their advantage by strengthening their capacity, learning and developing new skills. Analysing the factors influencing the resilience of rural communities, the role of communities in the context of social change is emphasized; therefore, development policy makers should strive to support resilient rural development, recognizing the interplay between locality and resilience, interaction of socio-economic and environmental factors, the role of digital technologies in promotion rural community resilience, etc. Rural policy-making should emphasize the viability of rural communities, where social, economic and environmental aspects are perceived as complementary and not opposed. Particularly in the context of neo-endogenous development, the concept of community resilience includes the idea of community sustainability, community capacity building and learning. The diversity of community resources is a key factor influencing community resilience and contributing to the community's ability to adapt.

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## **DEMOGRAPHIC FACTOR AND THIS IMPACT ON THE ECONOMY IN LATGALES REGION**

Demographic factor have been the subject of a wide variety of studies, which have similar and different conclusions about their impact on the economy in the country. Theoretically, demographic factor includes mortality, fertility and migration trends. Latvia, like as other developed countries, has been experiencing ageing of its process, with fertility rate falling, mortality rate increasing and international emigration growth over 25 years ago. Latgales region is the one of the Latvia south, where is experiencing the dramatical situation with demographic factor. Latgale region is characterized by low population density, low economic activity and particularly rapid population outflow. Furthermore, in Latvia and Latgales region population ageing is expected to accelerate in the next few decades, reducing population growth and having vast implications for people's economic behaviour and for economy as a whole.

In this paper outline past demographic trends in Latgales region, concentrating in changes of population, fertility, mortality and migration rates. As well as was presented some general conclusions about demographic factor and this impact on the economy in Latgales region.

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## **DETERMINANTS OF FINANCIAL DEVELOPMENT OF THE EU COUNTRIES IN THE PERIOD 1995–2017**

**Key words:** financial development, EU, determinants of financial development.

The aim of the research is to determine the impact of openness and political stability which characterize the state of political rights and civil liberties; financial state regulation; the determinant of legal traditions which determines judicial independence, impartiality of the courts, protection of property rights, etc., the determinant of financial institutions, as well as the impact of certain macroeconomic indicators on the financial development of the EU countries in the period 1995–2017.

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## **DIGITĀLĀS EKONOMIKAS JĒDZIENU METODOLOĢIJA**

**Atslēgvārdi:** digitālā ekonomika, dalīšanās ekonomika, GIG ekonomika, informācijas ekonomika, jaunā ekonomika

Digitālā ekonomika ir salīdzinoši jauna ekonomikas joma, kurā tiek novērotas dažādas transformācijas un jauni procesi, līdz ar to parādās jaunas definīcijas un ar digitālo ekonomiku saistīti jēdzieni.

Daudzi zinātnieki savos pētījumos analizē digitālās ekonomikas jēdzienu un digitālo ekonomiku mēdz dēvēt vai atvasināt citos līdzīgos jēdzienos. Šie jēdzieni galvenokārt tiek iedalīti un nošķirti pēc ekonomikas jomas. Piemēram, dalīšanās ekonomika jeb *sharing economy*, kas ir digitālā ekonomika, taču šajā jēdzienā tiek uzsvērta tieši ekonomika, kura tiek balstīta uz digitālām platformām un vienādranga ekonomikas subjektiem.

Raksta autore izšķir populārākos ar digitālo ekonomiku saistītos jēdzienus, proti, dalīšanās ekonomika jeb *sharing economy*, GIG ekonomika, informācijas ekonomika un jaunā ekonomika un izvērtē to veidošanas aspektus.

Raksta mērķis ir analizēt ar digitālo ekonomiku saistītos jēdzienus un noteikt to metodoloģiju. Raksta uzdevumi: (1) analizēt starptautiskus pētījumus un noteikt ar digitālo ekonomiku saistītos jēdzienus; (2) aprakstīt ar digitālo ekonomiku saistītos jēdzienus; (3) noteikt ar digitālo ekonomiku saistīto jēdzienu metodoloģiju; (4) izdarīt secinājumus par digitālo ekonomiku un ar to saistītiem jēdzieniem.

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## **EIROPAS SAVIENĪBAS STRUKTURĀLO UN INVESTĪCIJU FONDU ATBALSTA DINAMIKAS ANALĪZE BALTIJAS VALSTĪS 2004.–2019. G.**

Vairāk nekā puse ES finansējuma tiek novirzīta caur 5 Eiropas strukturālajiem un investīciju fondiem (ESI fondiem). ESI fondu darbības mērķis ir sagādāt investīcijas, ko ieguldīt darbvieta radīšanā un veselīgā, ilgtspējīgā Eiropas ekonomikā un vidē, tā sekmējot ES kopējo izaugsmi.

Baltijas valstis ir piedalījušās 3 ES daudzgadu budžetu shēmās, kā rezultātā visām trim valstīm ir uzņemts vienāds kurss. ES nosaka kopējos ieguldījumu virzienus, bet katrai valstij tiek ļauts realizēt aktivitātes atbilstoši saviem ieskatiem, tomēr orjēntējoties uz vienotu mērķi.

Pētījuma mērķis ir analizēt Baltijas valstu sniegumu ESI fondu ieviešanā caur statistiskajiem indikatoriem ES 28 līmenī 15 gadu periodā un novērtētu Baltijas valstu nacionālo ieguldījumu lomu ES kopējo mērķu sasniegšanā.

Būtiska pētījuma daļa – Baltijas valstu salīdzinošā analīze ESI fondu ieviešanā, lai novērtētu nacionālā līmeņa ieguldījumu politikas veikumu kopējo ES mērķu sasniegšanā. Tāpat Baltijas valstu veikums analizēts ar statistisko indikatoru palīdzību un meklēta to korelācija ar ESI ieguldījumiem. Ieguldītie rezultāti tiks salīdzināti ar katra daudzgadu budžeta shēmas un ES stratēģijas 2020 noteiktajiem mērķiem un vidējo sniegumu ES 28.

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## **EMPLOYMENT AS AN ASPECT OF SILVER ECONOMY: STUDY OF SITUATION IN LATVIA**

**Key words:** silver employment, population changes, factors affecting employment, Latvia.

The long-term development of a country is affected by several global processes – the development of technologies, climate change, as well as the ever growing trends of inequality (United Nations, 2019), which in turn is affected by the population ageing. Studies that show the changes in the number of older people employment, as well as the causes behind these changes, can affect the choice of policy in a country (Farrell, 2020). In this study author analysed the trends of employment and population aged 45-54 and 55-64 in Latvia from 2012 until 2019, as well as uneconomical factors that affect the employment of Latvian population aged 55-64. Regression analysis demonstrates that the changes in the researched population subgroups in 2012-2019 differ – population aged 45-54 is decreasing (linear regression;  $R^2=0.9928$ ), however, population aged 55-64 (linear regression;  $R^2=0.9876$ ) is growing. This study showed that the population aged 45-64 decreased by 3.64% but employment level in this age group increased by 10.34 percentage points in 2019 when compared with data from 2012. Taking into account that the employment rates (in accordance with the methodology of Central Statistical Bureau of Latvia for obtaining the data) include also data about employed pensioners, it was concluded that the changes in the employment levels of working age population (those who are not pensioners) in

this age group are actually lower. When comparing the employment level of population aged 35-44 with employment level of population aged 45-64 in 2012-2019, the latter is lower, indicating factors, which affect the employment of this age group in the labour market. Empirical research found that the most essential uneconomical factors that affect the employment of the Latvian population aged 55-64 are: 1) regular lifelong learning; 2) state of health (physical, emotional, mental health); 3) the skill of adapting to changes in work environment.

*JEL code: J14, I38, J26, I32,*

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## **IF TRANSPORT BRANCH CAN BE THE ENGINE OF PRODUCTIVITY OF A REGION?**

Productivity of region is defined as it's ability to produce as many as possible goods and services, and it can be measured at least by two indicators: GDP per 1 km<sup>2</sup> of a region's territory as well as the earnings index, calculated taking into account the sectoral structure of employment in a region. The results of previous author's research show that in Latvia the lowest productivity calculated by the GDP per 1 km<sup>2</sup> has Vidzeme region. But by the earnings index Latgale region occupies the last place in Latvia, and the Riga region – the first one. Perhaps the reason is that those branches – namely: transport and storage; information and communication services, which are the most productive in Riga and Pieriga regions, are not such in all other regions of Latvia. The aim of this article is to analyze the potential role of transport branch in the productivity of a region based on results of previous studies for the purpose of applying these results in the future empirical investigation of the role of transport branch as the engine of productivity of Latvia's regions. The results of the research worked out by P. Rice and A. Venables on productivity of the UK's regions show that the low productivity of some regions is explained by the fact that in these territories an opportunity to reach cities from rural territories is lower than their average access in the country. The author of this article argues that the distance to an economically significant city would be useful to calculate not only in minutes but also in the costs. The author supposes that reduced price for a trip and sufficient frequency of trips would return for the local government as the rise of the welfare level of a region's inhabitants which [welfare] is driven by the sustainable transport branch's performance in the region, but not only. The sustainable transport branch's performance in a region is the result of target regional management of the movement of population, and in Latvia the interactive web tool on the domestic migration from 2000 to 2019 „Visualized population migration flows in the territory of Latvia” designed by the Central Statistical Bureau could be used to evaluate and to manage the transport branch as the engine of productivity of Latvia's regions.

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## **INSTITUCIONĀLĀS EKONOMIKAS JĒDZIENU TEORĒTISKAIS SKAIDROJUMS UN AKTUALITĀTE**

Reģionu attīstības atšķirības ir aktuāls zinātnisko diskusiju temats. Faktorus, kas ietekmē ekonomikas izaugsmi reģionos pēta institucionālā un jaunā institucionālisma skola. Ekonomiskās attīstības faktoru pētīšana un analizēšana ir nozīmīga, lai saprastu, kas veido vai bremzē reģionu ekonomisko izaugsmi. Klasiskā un neoklasiskā ekonomikas skola, t.sk klasiskās ekonomiskās skolas nozīmīgākais pārstāvis Ādams Smits savā fundamentālajā „Pētījumā par tautu bagātības dabu un cēloņiem” pauda, ka ekonomika ir pašregulējoša sistēma, kuras atsevišķas daļas darbojas sabiedrības labā, kā arī norādīja, ka valsts bagātības pirmavots ir indivīda tieksme pēc labklājības, paužot ideju par ekonomikas



„neredzamo roku”, kas, indivīdam cenšoties apmierināt savas nepieciešamības, netieši dod labumu sabiedrībai kopumā. Institucionālā un Jaunā institucionālisma skola norādīja, ka ir nepieciešams analizēt faktorus, kas veicina ekonomikas izaugsmi, respektīvi – saprast, kas veido šo „neredzamo roku”.

Raksta mērķis ir noskaidrot institucionālās ekonomikas jēdzienu teorētisko skaidrojumu un aktualitāti reģionu attīstībā, īpaši akcentējot institucionālās ekonomikas izveidotāju teorētiskos pētījumus.

*Ieva Vārna*

## **LATVIA AS A SMALL STATE INTERESTS THROUGH THE INSTITUTIONS OF THE EUROPEAN UNION: THE CONTEXT OF STRATEGIC AUTONOMY**

Security and defence cooperation between the Member States of the European Union (EU) has most often been associated with disagreements between Member States. Not only the EU, but also the continent as a whole, is looking for a balance point in a security environment characterized by tensions between the world's great powers. In 2016, the EU defined European strategic autonomy as an official goal of its foreign and security policy. Discord on “Strategic Autonomy” at a time when a strong partnership is more important than ever, is dangerous. For example, for France, which presents itself internationally as the most influential player in the “United States of Europe”, the concept of strategic autonomy has been embedded in national defence policy doctrines since the mid-1990s. However, it is important to emphasize a highlight the differences here: for French policy makers, strategic autonomy is directly related to reducing dependence on, for example, the United States. Meanwhile Latvia does not want to see European Strategic Autonomy that lacks capacity and capabilities, and it does not want that to impede on Latvian – US strategic relations. Therefore, in this research, the author using document analysis and in-depth interviews with the EU and Latvian decision makers, analyzes how advantageous or dangerous the European Strategic Autonomy is for Latvia, a small country in the Baltic region with historical experience of political, economic and military pressure from Russia. While examining Latvia's ability to implement national interests through the EU institutions, it was concluded that capacities are restricted. That is largely due to the different political views of the states engaged in the EU decision-making and security policy strategy formation. The most significant challenges for Latvia and other small EU Member States are pressure exerted by the EU great powers to change the EU's institutional structure in their favor and the objective limitations of defence capabilities. And this clearly reveals the dilemma between building the European Strategic Autonomy and the impact that small countries have on the EU affairs and on international system in general. This highlights how small countries depend on fair and inclusive EU not only economically, but also in security matters.

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## **LATVIJAS STUDENTU FINANŠU PRATĪBAS ANALĪZE**

Autores savā darbā veic Latvijas studentu finanšu pratības izpēti, apzinoties, ka studentu zināšanas, prasmes un kompetence ir mūsu sabiedrības nākotnes virzītājspēks. Veikta studentu finanšu pratības analīze, pamatojoties uz reprezentatīvās aptaujas datiem, kas iegūti aptaujājot respondentus no 27 Latvijas augstskolām (valsts un juridisko personu augstskolas, izņemot koledžas).

Aptaujas rezultātā noskaidrota studentu šī brīža finanšu pratība; informācijas par finanšu pratību iegūšanas avoti; iegūts vērtējums, cik pietiekami augstskolā tiek apgūtas nepieciešamās zināšanas dažādās finanšu jomās un kurās no tām ir zināšanu, kompetenču un prasmju trūkums. Noskaidrota

studentu attieksme pret finanšu riskiem, gatavība uzņemties kreditsaistības, kāda veida kredīti pašlaik ir populāri studentu vidū.

Neraugoties uz to, ka pēdējo gadu laikā ir bijušas dažādas kampaņas par atbildīgu aizņemšanos un finanšu pratību, Latvijas sabiedrībā joprojām aktīvi (ne vienmēr apdomāti) tiek izmantoti ātrie kredīti. Piemēram, vien Latvijas arodbiedrību krājaizdevu sabiedrībā 2019. gadā 18 % (katrs piektais) no izsniegtajiem aizdevumiem ir, „glābjot no parādu jūga”, pārkreditēti ātrie kredīti.

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## OPTIMIZATION OF ECONOMIC OPERATIONS OF COMPANIES “X”, “Y” AND “Z”

**Key words:** economic activity, financial analysis, optimization.

Subject of the research is financial indicators of companies “X”, “Y” and “Z”. The aim of the article is to carry out financial analysis of companies “X”, “Y” and “Z” and to analyze tax payments in the state budget for 2014-2018, as well as to make proposals on the possibilities of optimization of business activity.

Financial analysis in each company is important because it helps a business manager understand the financial situation of a company and draw conclusions about what steps need to be taken to improve the financial situation. Financial analysis of economic activity is an important part of economic science because it is one of the functions of the enterprise management system. The management system of a company consists of 4 functions, which are interrelated – planning, accounting, analysis and decision made by management. In order to be objective and effective, the business management decision-making process must be focused on identifying the capabilities and reserves of the company that will optimize the use of the resources within the company. The results achieved during the period are compared with those of competing companies. However, analyzing a company's economic performance is not just one of the functions of running a business, but it is also a thinking system that needs an information base.

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## VALSTS ATBALSTA PASĀKUMI COVID-19 KRĪZES PĀRVĀRĒŠANAI TŪRISMA NOZARĒ

Pēdējā laikā ikdienas dzīvi un ekonomisko situāciju ne tikai Latvijā, bet visā pasaulē ir ļoti strauji mainījusi COVID-19 slimības izplatība. Finanšu tirgos ir notikušas nepieredzēti straujas korekcijas, akciju cenas ir kritušās un obligāciju riska prēmijas augušās. Vislielākais nezināmas faktors, protams, ir pats vīruss un tas, cik ātri izdosies apturēt tā izplatību. Šī nenoteiktība redzama arī analītiķu prognozēs. Piemēram, eirozonas un ASV ekonomikas izaugsmes prognozes šim gadam ir plašā intervālā no neliela IKP krituma līdz pat gandrīz 10% samazinājumam. Lai arī pēc kāda scenārija veidotos ekonomikas atveseļošanās, Latvijas ekonomika ir cieši saistīta ar lielajiem, globālajiem tirgiem. Līdzīgi kā citur pasaulē, arī Latvijas ekonomikā nezināmo ir vairāk nekā zināmo, un izdarīt prognozes šobrīd ir ļoti grūti. Aktuālu datu par Latvijas ekonomikas attīstību šobrīd ir ļoti maz, taču tie visi norāda uz lielāku vai mazāku ekonomikas izlaides kritumu. Visticšāk skartās nozares (darbība faktiski apturēta): aviācija, viesnīcas, restorāni, izklaide, tūrisma aģentūras, auto noma un tirdzniecība. Tās dod pienesumu Latvijas ekonomikā vairāk nekā 6,5% no IKP, nodarbina vairāk nekā 80000 strādājošo, dod vairāk nekā 600 milj EUR no valsts budžeta. Iepriekš minētais tiešā veidā paralizējis gan reģionālo tūrismu, gan tūrisma nozari kā tādu. Raksta autori analizē valsts atbalsta pasākumus, kā galvenos atbalsta instrumentus ekonomikā – dīkstāves pabalstus un ALTUM programmas. Tiek

aprakstīti un analizēti valsts atbalsta pasākumi Lietuvā un Igaunijā. Meklēti risinājumi atbalsta pasākumiem tūrisma industrijas reanimēšanai reģionos, ņemot vērā trīs iespējamus ekonomikas attīstības scenārijus – pozitīvo, bāzes un bāzes ar šīgada IKP kritumu robežās no 4% līdz 20%. Kurš no šiem scenārijiem realizēsies – tas lielā mēra būs atkarīgs no tā, cik ātri pasaulē izdosies ierobežot vīrusa izplatību un cik ātri ekonomika spēs atkopties. Taču iekšēji Latvijas ekonomika ir daudz stabilāka nekā 2008. gadā, un šobrīd gan pasaulē, gan Latvijā ir iedarbināti būtiski monetārie un fiskālie ekonomikas atbalsta mehānismi.

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## **SMALL POWERS IN ENGLISH SCHOOL THEORY OF INTERNATIONAL RELATIONS**

**Key words:** Small power, International system, International society, English School.

Small power research has been going on in the field regardless of the fact that there is no common definition of a research object. Research deals with small powers which is broader notion than small states. English School of international relations is one of the theories suitable for small power research because it deals with interaction of states in international society. The theory was developed by Martin Weight, Headly Bull and Barry Buzan.

The aim of the research is to look at the problem of defining small powers in the field and to find one of the possible definitions for small power according to English School theory of international relations. This aim will help the English School theory effectively adapt to small power research, which has been rather neglected topic in the discipline. The used method to address the problem is qualitative text analysis. In the research it is necessary to look at the main approaches or schools of thought that exist for defining small powers in international relations before creating a definition.

The key results: there have been five main methodological approaches in international relations for defining small powers: qualitative, quantitative, structural, security and comparison approach. To define small powers in the English School of international relations, a definition is created according to the two main concepts of the theory. According to the first concept, smallness can be defined as state's relative lack of influence in international system and, according to the second, it creates necessity for power maximization through mechanisms of international society.

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## **SOFT POWER OF CHINA AND NARRATIVE OF CORONAVIRUS: DEPICTION OF DISCOURSES IN CHINA GLOBAL TELEVISION NETWORK**

The expression of the *soft power* of the People's Republic of China has been a widely debated topic in the scientific community since 2000. The issue has gained an additional spotlight since 2016, with China accentuating its new media policy. The practical nature of the new media policy can be seen in the end of 2016 after starting a group of live-in media channels (CCTV/China Global Television Network) with a full coverage of the media agency, which includes 6 television channels and alongside downstream digital platforms. Their task is to broadcast content available to the international community in English, French, Spanish, Russian, Arabic and other languages on events in the PRC, international events and the role of the PRC. The purpose of the other broadcasting media, according to the media itself, is not only to storm internationally topical events, but also to offer the "special viewpoint" of the PRC and to explain and explain the political decisions of the PRC to the international community, thereby "balancing" the prevailing Western media information.

As the Chinese media reflects the narrative of coronavirus to the international community, the aim of this study is to see how much the information is framed in concepts of soft power in the context of crisis communication. The study deals with information addressed to the international community via CCTV/CGTN. Coronavirus narrative development is addressed in a dynamic perspective, identifying narrative changes and elements of soft power in it.

The study concluded that the narrative of coronavirus was used as an opportunity to strengthen the concepts of soft power of China, as well as the creation of new elements of soft power by adjusting its message to the response of Western society and the reality of the spread of the virus in Europe. Media action in the context of these narrative dynamics is seen as part of a broader strategy for China's soft power development.

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## **STAGES OF DEVELOPMENT OF SOCIAL INSURANCE OF SELF-EMPLOYED PERSONS IN LATVIA**

The rapid development of IT has led to the opportunity to work online, which is actively used by residents around the world. There are new professions that allows you to work from home so no need to go to workplace. International cooperation is gaining momentum. Customers are looking for employee in countries with cheaper labor force to optimize costs. Interest of independent economic activity - self-employed is growing.

In EU countries, the definition of self-employment is different. The legislation and social protection of self-employed people are also different. In Latvia, self-employed need to make social insurance mandatory contributions, a pension contribution, as well as all necessary tax payments by themselves. As a result of the research, the main stages of development of social insurance of self-employed person were highlighted and problems of each stage were identified.

Keywords: self-employment, social insurance, self-employed person, Baltic states, pension contributions, mandatory insurance contributions

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## **SUSTAINABILITY OF DEMOCRACY: PROSPECTS FOR YOUTH EDUCATION POLITICS IN DIGITAL AGE**

The sustainability of democracy in the digital era is a matter of scientific debate and urgency. Support for representative democracy is statistically declining and directly in democratic states. At the same time, the rise of populism and the informative challenges posed by social networks raise the question of the individual's role in the sustainability of democracy.

In the context of critical thinking and media literacy, the issue of youth policy is crucial. What aspects should be embedded in youth policy, based directly on the needs of the youth segment and on attracting interests to policy, is the aim of this study.

To identify the inhibiting factors and find ways how to empower and stimulate Youth to become societally and politically active members of the society, defending and advocating the issues that concern that age group - in depths interviews were carried out with Youth age member candidates of European Parliament elections, NGOs working for Youth, and institutions working towards strengthening youth involvement and participation.

The outcome of the study shows the need to change the principles of youth policy itself by significantly increasing the presence of young people in policy development. From policy elements, the role of simulation, and modern methods as design thinking in policy education needs to be increased. A major paradigm shift is the reformulation of awareness about the objectives to be achieved in youth policy: the most important result of the study shows that young people's political activity and support for democracy stem from the development of activities outside the policy frame, which opens up a debate on the criteria to be measured in youth policy.

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## THE CULTURE OF TRUST IN POLITICALLY ACTIVE YOUTH IN LATVIA

In the article authors unveil cross-dimensional meaning of the trust culture as a key concept for efficient democracy on the map of European Union's current challenges. With special focus on politically active youth authors defines what are core elements in trust-building and how they are challenged under current pressure of populism, anti-pluralism and nationalism. Youth population and their perception of trust is directly linked to delivery of democracy within particular segment of population, though gaps in trust leads to gaps in democracy.

To deliver the key objective - understanding of trust and self-reflection on trust within youth population which is politically active in Latvia, authors deliver chain of in-depth interviews with youth population representatives.

Trust gaps:

1. The expectation gap – all informants underlined the lack of youth issues on political agendas thus explaining the idea of common youth passivity in participatory politics; while the same time openly recognizing that politicians are not interested in youth precisely because of mentioned passivity.
2. The credibility gap – all informants underlined lack of knowledge considering Europeanness, political processes and political technology as such, but with focus on issues of credible sources.
3. The attitude gap – perception of democracy as *a product not a process*. Linkage between consumerism, customer experience and all present need of entertainment is also a factor for future discussion and analysis.
4. The knowledge network gap – both information gathering to credit particular source and credibility and valuation of informational clusters are totally different for youth population.
5. The critical thinking gap – a common feature for all informants was a claim that there is too much information, which makes decision on right and wrong complicated. A single unite authorized source of information would be appreciated.

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## **YOUTH - FOUNDATION FOR FUTURE OF CIVIC SOCIETY IN LATVIA: HOW TO EMPOWER AND STIMULATE YOUTH TO BECOME POLITICALLY ACTIVE?**

Active civic society is the roots of any democracy and Youth is the most powerful and influential investment in the future of social capital. Political participation is one of the most successful ways of representing the interests and needs of any group, including the topical issues of young people.

Unfortunately, according to the Flash Eurobarometer 455 on European Youth evaluation of social and civic participation – the most of respondents in Latvia – 58% haven't participated in any social or civic activities, and only 7% had participated in activities of a political organization or party. Likewise, the minor part of the Youth had participated in elections in Latvia: 44% at local, 31% at regional, and 43% at a national level.

To identify the inhibiting factors and find ways how to empower and stimulate Youth to become societally and politically active members of the society, defending and advocating the issues that concern that age group – in depths interviews were carried out with Youth age member candidates of European Parliament elections, NGOs working for Youth, and institutions working towards strengthening youth involvement and participation.

The research results showed that traditional forms of member and volunteer involvement are not effective and efficient working towards the Youth. There is a demand for the paradigm change, related to the new age of consumption dominating over ideology. Parties need to research each and every potential volunteer or member, to provide stimulus and benefits, appreciation and gratitude, exciting journey and experience, as well as the desirable platform of socialization and networking for the young people. The political marketing strategy and tools have become not only the way to look for the votes but as well to attract new members or volunteers.

**\*\*Particular research is a part of the project „Values in action: promotion of responsible, secure and educated civil society in Latvia through research and model development”.\*\***

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## **ZINĀŠANU IETEKMES UZ ILGTSPĒJĪGU ATTĪSTĪBU ATSPUGUĻOJUMS LATVIJAS INSTITUCIONĀLAJOS UN NORMATĪVAJOS DOKUMENTOS**

Mūsdienās zināšanas ir kļuvušas par nozīmīgu nemateriālo resursu uzņēmumos. Zināšanas spēj ietekmēt uzņēmumu konkurētspēju un to attīstību. Attīstīta un uz zināšanām balstīta uzņēmumu darbība ir priekšnosacījums arī reģionu ilgtspējīgai attīstībai. Zināšanas visā cilvēces pastāvēšanas vēsturē ir ietekmējušas sociāli ekonomiskos procesus un sabiedrības attīstību. Politikas plānošanas dokumentos Latvijas izaugsmes veicināšanai ir izceltas tieši zināšanas un cilvēkresursi, kam ir nozīmīga loma ekonomikas attīstībā un konkurētspējas nodrošināšanā.

Pētījuma mērķis ir analizēt Latvijas normatīvos un plānošanas dokumentus, kuros ir atspoguļotas zināšanas un to ietekme uz ilgtspējīgu attīstību. Analizējot normatīvos un politikas plānošanas dokumentus, kas hronoloģiski ir izstrādāti no 2000. līdz 2015. gadam, un salīdzinot to aktualitāti ar pašreizējo situāciju Latvijas reģionu attīstībā, ir atspoguļoti tādi jēdzieni kā „zināšanas”, „ilgtspējīga attīstība” un „cilvēkkapitāls”. Latvijas institucionālie plānošanas dokumenti un normatīvie akti ir izstrādāti konkrētam laika periodam līdz 2020. gadam, tādēļ autore analizē dokumentus no vēsturiskā aspekta, jo pamatā analizētie dokumenti tika izstrādāti laikā no 2010. līdz 2015. gadam.

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# MENEDŽMENTS

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# MANAGEMENT

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*Rasaq Ajibola Sijuola*

## MANAGEMENT CONSTRAINS TOWARDS PROVISION OF INCLUSIVE EDUCATION FOR PEOPLE LIVING WITH DISABILITIES IN LAGOS (NIGERIA)

**Key words:** Development, Disabilities, Employment, Exclusion, Inclusive education, People.

There are plethora of issues relating to disability and people living with disabilities in Lagos, Nigeria such as lack of inclusive education, discrimination, lack of access to health services (Amusat, 2009; Asiwe and Omiegbe, 2014; Adebisi, et al., 2014; Abang, 2007; Akinbola, 2010). In Lagos, individuals with impairments, regardless of their age, are regarded as disabled people or handicapped (Asiwe and Omiegbe, 2014). There is a widely held belief that people living with disabilities are unfit to work or make any meaningful contribution to the society. The current system of education for people living with disabilities is not properly planned and managed in Lagos and needs close attention.

A critical research into management constrains towards provision of inclusive education for people living with disabilities in Lagos is essential. The critical question to be examined in the study is: What are the constrains towards provision of inclusive education for people living with disabilities? This is burn out of the perception previous studies identified the existence of poverty among them but failed to assess other management constrains impacts on the daily lives of people living with disabilities in Lagos. The study seeks to includes a questionnaire designs for people living with disabilities to explore their needs and current situation. Nigeria subsequent leadership has not deemed it fit to ensure that people with disabilities are part of government appointees, where they can contribute their quota to national development and the sustainable development goals of the nation (Mohammed, 2017). Therefore, the earlier the country indicate interest to incorporate people with disability to national objectives and goals the better for development.

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## MANAGEMENT THE FUNDING OF THE PUBLIC HEALTH CARE IN GEORGIA TOWARDS QUALITY HEALTH CARE SYSTEM

**Key words:** public health care, health care policy, health financing.

The topicality of the issue of the study is determined by the need to improve the quality of the public health care system in the Republic of Georgie. The public health care in Georgia requires significant improvements to reach a higher quality of management of financing and regulation of the public health care system. In this article, we have compared Georgia's health care system in several European countries in terms of financial and qualitative. In Europe, the share of government spending on healthcare in overall state expenditures ranges from 4 to almost 20%. It is notable, that the priority of health expenditures in the state budget is being increased along with the national revenue growth. The share of government healthcare on overall public expenditures (%) Georgia - 6.9 % Estonia - 13.7 % Germany - 19.4 % (The data are taken from the World Bank Open Data 2016).

Proper management and regulation of healthcare contribute to the well-being of the country and its population. The increase in government funding can only be justified if the health system achieves its goals of using existing resources more effectively and efficiently.

Research methodology: The study includes documentation and legislation of the Georgian public health system, as well as EU good practice cases, their comparison and analysis with Georgia. The study includes individual interviews with officials involved in the public health system. This study explores the reasons for good practice in EU countries.

The aim of this study is to analyze the sustainability of public health care policy and to explore the arrangement of financing to public care and exploring the better quality mechanisms in arranging public health care. The authors offer suggestions on how to improve the public health care system in Georgia.

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## MEDIĀCIJAS IZMANTOŠANAS IESPĒJAS LATVIJĀ

**Atslēgvārdi:** alternatīvas domstarpību risināšanai, alternatīvās domstarpību risināšanas metodes, domstarpības, domstarpību risināšana, meditācija.

Līdz ar sabiedrības attīstības tendencēm mainās ekonomiskā situācija, sabiedrības sociālā struktūra, attiecības un vērtības. Nepārtrauktā kustībā un mijiedarbībā veidojas jaunas attiecības, rodas domstarpības, kurās tiek apdraudētas vērtības un kuru risināšanai nepieciešams meklēt efektīvākas domstarpību risināšanas metodes. Lai panāktu, ka domstarpībās iesaistītās puses izmanto efektīvāko domstarpību risināšanas veidu, tiek attīstīta sabiedrības izpratne par taisnīguma sasniegšanas iespējām, pilnveidota un bagātināta domstarpību risināšanas sistēma ar alternatīvām domstarpību risināšanas metodēm. Kā viena no alternatīvo domstarpību risināšanas metodēm ir meditācija. Mediāciju domstarpību risināšanā pasaules valstu praksē izmanto jau vairākus gadu desmitus, un tā ir atzīta par efektīvu alternatīvo domstarpību risināšanas metodi. Mediāciju ar labiem rezultātiem izmanto valsts iestādes, privātzņēmumi, sabiedriskās organizācijas, privātpersonas domstarpību risināšanā dažādās nozarēs un jomās. Kā mediācijas priekšrocības visbiežāk tiek norādītas: ātrums, izmaksas un efektivitāte.

Latvijā mediācija valstisku nozīmi ieguva 2014. gada 18. jūnijā līdz ar Mediācijas likuma stāšanos spēkā un mediācijas kā alternatīvas domstarpību risināšanas metodes izmantošanas atzīšanu. Lai gan līdz šim mediācija Latvijā vēl nav guvusi augstu popularitāti un sabiedrības uzticību, mediācija attīstās, par to liecina mediācijas izmantošanas iespējas dažādu domstarpību risināšanā un augstie mediācijas kā alternatīvas domstarpību risināšanas metodes izmantošanas domstarpību risināšanā efektivitātes rādītāji praksē. Lai mediācija kļūtu par sabiedrības kultūras sastāvdaļu, ir nepieciešamas pārmaiņas sabiedrības kultūras un tiesiskās apziņas līmenī.

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## REVIEW STRATEGIC LEADERSHIP ROLE IN CREATING AGILE SUPPLY CHAIN IN THE 21<sup>ST</sup> CENTURY BUSINESS ENVIRONMENT

**Key words:** Leadership, Strategic Leadership, Agile Supply Chain.

Today, the leader is considered an individual that has the power and ability to manage the organization. In most cases, a leader is also expected to take leadership in duties and responsibilities. The purpose of this study is to investigate the role of strategic leadership of the 21st century in creating an agile supply chain in business environments. The research method is a descriptive and analytical study using library resources including books and articles in the databases. Using the available library resources, the literature and theoretical foundations of the research variables including supply chain agility and strategic leadership were discussed. Finally, by examining the research question, conclusions were made and suggestions were presented. The results of this



research showed that strategic leadership in the 21st century could have the supply chain agility by influencing human resources and inhuman resources.

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## **THE ADAPTATION OF THE YOUNG PRESCHOOL LEADERS**

**Key words:** preschool educational institution, the young leader, adaptation.

Nowadays it is quite complicated to initiate work in any area, therefore the issue of adapting of young preschool educational institution leaders has become really urgent. The aim of the research is to identify the adaptation problems of young preschool leaders. Using the interview method in the research, the problems of adaptation of the young preschool leaders and possible ways of solutions were described also adaptation facilitating and hindering factors were identified: likewise, the recommendations for more successful adaptation period of young preschool leaders were elaborated.

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## **THE INCLUSION OF OLDER PEOPLE IN LIFELONG LEARNING AS A REDUCTION THE IMPACT OF AN AGEING POPULATION IN LATVIA**

**Key words:** population aging, seniors, ageism, lifelong learning, University of the Third Age.

The proportion of older people is increasing in Latvia, a rapid process of demographic ageing of society is taking place. The authors draw attention to the consequences of these important changes, as well as to the needs and concerns of an aging population. The article reviews the negative stereotypes in Latvian society regarding senior citizens, analyses some of the lifestyle features of older people, mentions some risks both for seniors and for society as a whole, which are caused by insufficient attention to the issue of population aging. Preparation for this article was made using research methods such as the analysis of normative documents and scientific publications, compilation of experience and good practice in different countries etc., and it also evaluates existing and possible future measures to reduce the impact of ageing population. The aim of the article is to explore the possibilities of including seniors in lifelong learning, based on the experience of European countries, in order to reduce the negative consequences of an aging population. According to the authors, it is necessary to create informative preconditions for the establishment of a senior lifelong learning system in Latvia.

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# KĪMIJA

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## CHEMISTRY

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### BENZANTHRONE DYES AS MEDIATORS IN THREE-STEP FÖRSTER ENERGY TRANSFER SCAFFOLDED BY INSULIN AMYLOID FIBRILS

The non-radiative energy transfer between the donor and acceptor chromophores via long-range dipole-dipole interactions is a distinguishing feature of the Förster resonance energy transfer (FRET), a powerful tool for studying the structural and dynamic characteristics of biomolecules and their assemblies. The enhancement of the long-range FRET efficiency may occur in the chromophore system where the energy is transferred from a primary donor to final acceptor through the mediator fluorophores. This FRET technique, known as a multi-step FRET (msFRET), has found numerical applications in DNA sequencing, protein labeling, estimating the stoichiometry of protein complexes, designing the molecular photonic wires, etc. In our previous works the multi-step FRET has been successfully employed for detection of a particular class of protein aggregates, amyloid fibrils, that are thought to be involved in the development of more than 40 human disorders. As a continuation of previous research, in the present study the benzanthrone dyes, a well known class of fluorescent compounds with emission in a wide spectral region, were taken as mediator dyes in the four-chromophore system consisting of a classical amyloid marker Thioflavin T (ThT, primary donor), a certain mediator dye and two squaraine dyes SQ4 and SQ1 (terminal acceptor).

Our main goal was to perform a comparative analysis of six benzanthrone dyes (BA), viz. ABM, MBA, A6, A8, AM1 and AM2, which served as jumper dyes in the FRET cascade ThT → BA → SQ4 → SQ1, scaffolded by the fibrillar (InsF) or control (non-fibrillized) insulin (InsN). The maximum efficiencies of energy transfer derived for the pairs ThT → BA from the quenching of the donor fluorescence by the acceptor follow the order: ABM (82%) > A6 (80%) > AM1 (72%) > MBA (58%) > A8 (57%) > AM2 (42%) on the insulin fibril matrix. At the same time, no energy transfer ThT → BA has been observed in the presence of the non-fibrillized protein. The FRET efficiencies in the donor-acceptor pairs BA → SQ4 and SQ4 → SQ1 were substantially lower in the control protein compared to those in the amyloid fibrils, except the system with A6. The FRET chains containing A6, ABM and AM1 demonstrated the highest efficiencies of the three-step energy transfer from the initial donor (ThT) to the terminal acceptor (SQ1) in the insulin fibrils. The estimates of the average inter-chromophore distances indicate that a certain benzanthrone dye and the other recruited chromophores occupy the different fibril binding sites. In summary, the proposed msFRET-based approach can be useful for the development of sensitive fluorescence techniques for amyloid fibril detection in vivo.

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## **BIOGAS PRODUCTION ANALYSIS FROM AQUACULTURE SAMPLES**

Renewable energy source biogas represents wide range of opportunities. Biogas is used in electricity generation and heating. Its alternative fuel limits pollution on the environment. Biogas can be produced from various biomass resources, some of them animal waste, energy crops, landfill sites, wastewater, food waste. Biogas production helps organic waste transform into compost, it is a way to recycle heavy metals. Anaerobic digestion is process in which organic substrates break down to methane without oxygen includes. This process is used in a digester to produce biogas.

Purpose of this work is to produce biogas using laboratory bioreactor, research the resulting chemical composition of biogas, methane yield and volume. The work analyzes the samples of aquaculture suitability of biogas production. For successful performance experiment tests samples on humidity and the amount of organic matter. The first step is preliminary preparation of samples. Second step is to choose the ratio of the proportion of substrates. Next, prepared substrate is loaded into the bioreactor. Reactor operates at mesophilic temperature.

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## **BENZANTRONU ATVASINĀJUMU TERMISKĀS SADALĪŠANAS PROCESU IZPĒTE**

Mūsdienās plaši izmanto benzantrona grupas atvasinājumus gan rūpnieciskās nozarēs, gan zinātniskos pielietojumos to izcilo fizikālo īpašību dēļ. Pētījuma mērķis ir izpētīt benzantronu krāsvielu termokīmiskās un spektroskopiskās īpašības, ar nolūku atrast stabilākus materiālus materiālzinātnes un biotehnoloģijas pielietojumiem. Pašlaik vielu raksturošanai izmanto termiskās analīzes un spektroskopijas metodes. Spektroskopiskās metodes kopā ar termiskās analīzes metodēm ir efektīvas vielu pētišanā. Tās sniedz svarīgu informāciju par materiāla ķīmisko un fizikālo īpašību raksturojumu, atverot jaunas pētniecības iespējas un praktisko pielietojumu nākotnē. Darba rezultātā iegūti jauni nozīmīgi dati par benzantronu krāsvielu termiskām un spektroskopiskām īpašībām un to izmaiņām temperatūras ietekmē.

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## **JAUNU LUMINOFORU SINTĒZE AR BENZIMIDAZOLA UN AMINOSKĀBJU ATLIKUMIEM**

Mūsdienās luminiscējošām krāsvielām ir plašs praktiskais pielietojums, vien biežāk tos izmanto bioloģijā, ķīmijā un medicīniskajos izmeklējumos. Amīdi, kuri bija izvēlēti kā pētījuma objekti, ir sastopami augu un dzīvnieku izcelsmes vielās, piemēram, nikotīnamīds (B3 vitamīns) nodrošina dzīvus organismus ar nepieciešamo enerģiju, bet karbamīds (urīnviela) ir nozīmīgs dzīvo organismu metabolisma produkts.

Pētījumā galvenais uzdevums bija sintezēt jaunas luminiscējošās krāsvielas, lai iegūtu stabilus savienojumus ar izteiktu luminiscenci, kurus varēs pielietot medicīnā un dabaszinātnēs. Darba mērķa sasniegšanai bija veikta aizvietošanas reakciju izpēte starp benzantrona halogēnatvasinājumiem un

aminoskābju virkni. Iegūto produktu analizē un ķīmisko savienojumu struktūras pierādīšanai izmantoti IS un KMR spektroskopijas un mass-spektrometrijas metodes.

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## METHOD FOR THE ANALYSIS OF SYNTHESIS GAS FROM BIOMASS GASIFICATION FOR THE DETERMINATION OF NITROGEN ORGANIC COMPOUNDS

Conversion of abundantly available biomass to synthesis gas and hydrogen helps protect the environment. Synthesis gas can be converted into clean liquid fuels, and hydrogen is an encouraging energy producer.

Gasification thus is a promising technique for the production of energy from biomass, with non-catalytic gasification with air (partial oxidation) or steam at high temperatures being a conventional method of producing synthesis gas and hydrogen from biomass. The main product of biomass gasification, a mixture of gases containing mainly carbon oxides, hydrogen, and nitrogen, also contains a small amount of methane and other lighter hydrocarbons. Ash particles, volatile alkali metals, and tar are biomass gasification products too.

Ammonia (followed by HCN) is the most abundant nitrogen species present in gasification product gas. However, there are also other organic nitrogen compounds present at lower concentrations which can cause deactivation of downstream catalysts.

The given work deals with a method of solid-phase adsorption (SPA) for determining the concentration of nitrogen organic compounds. Knowing the most popular nitrogen organic compounds of biomass tar, four compounds, Pyridine, Pyrrole, Benzonitrile un Quinoline were selected for study. A stock solution was made in dichloromethane. Desorption and adsorption efficiencies of the tar compounds on amino-phase sorbent and on activated coconut charcoal were studied.

Adsorption efficiency of Pyridine, Pyrrole, Benzonitrile un Quinoline on amino phase adsorbent and on activated coconut charcoal was explored. Adsorption efficiency is calculated in %% as a ratio of the mass of the compound collected on a sorbent to the total mass of this compound in the gas that was drawn through the sorbent column.

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## SPECTROSCOPIC STUDY OF 3-AMINO BENZANTHRONE PHOSPHORYL DERIVATIVES

Benzanthrone based derivatives nowadays are used as luminescent dyes in many fields of natural sciences research. Currently such dyes are widely used for various investigations - to stain animal cells, visualize subcellular structures etc. The purpose of present research was to study spectral properties of new 3-amino benzanthrone phosphoryl derivatives in detail. The study of spectral properties of the obtained products was carried out on the basis of the analysis of the spectra of absorption and fluorescence in various organic solvents compared to other derivatives benzanthrone. These derivatives have bright orange-red luminescence in various media. For investigated dyes large Stokes shift values (about 100 nm) are observed, excitation maxima of the dyes are located near 500 nm and emission maxima near 650 nm. In addition, these compounds are showed strong fluorescent solvatochromism. Thereby spectral characteristics of obtained dyes demonstrate their potential as biomedical probes for proteins, lipids and cells.

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## **VARIOUS ROUTES FOR SYNTHESIS OF NITRILE AND AMIDINE FROM 3-BROMOBENZANTHRONE**

Many benzanthrone derivatives are strongly fluorescent compounds and a number of research show them to be perspective and useful as fluorescent dyes for biological and environmental applications. Amidines have wide spectrum of application including fluorescent dyes. Nitriles are generally useful for acquisition of many various compounds, unsubstituted amidines as one example.

Various methods for synthesis of 3-cyanobenzo[de]anthracen-7-one from 3-bromobenzo[de]anthracen-7-one were studied and tried out as one part of this work. Firstly, synthesis using formamide as a cyano group source and anhydrous nickel(II) acetylacetonate as a catalyst was performed. Although it is evidently possible to obtain desired nitrile, conversion of starting compound is relatively low. Secondly, synthesis using  $K_4[Fe(CN)_6] \cdot 3H_2O$  as a CN group source and  $Pd(OAc)_2$  as a catalyst was performed. It showed much better conversion of starting compound, but a couple of byproducts form as a result as well. It is now theorized that another approach to obtain 3-cyanobenzo[de]anthracen-7-one could be implemented: recent research describes synthesis of aromatic nitriles from Grignard reagents and dimethylmalononitrile as a CN group source. Next aim is to choose most appropriate route and conditions for the best yield of the desired product.

As a second part of this work subsequent synthesis of amidine from 3-cyanobenzo[de]anthracen-7-one was performed. Pinner reaction and following reaction with ammonia was applied.

MS and TLC analysis were utilized to characterize synthesized compounds.

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# VESELĪBAS APRŪPES ZINĀTNE

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## HEALTH CARE SCIENCE

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### DIFFERENCE BETWEEN CHILDREN IMMUNIZATION RATE IN GP PRACTICES IN RIGA AND REGIONS OF LATVIA

**Key words:** vaccination, parents, children, public health, immune system.

**Introduction.** Vaccination is a procedure in which the immune system is exposed to an antigen, such as an inactivated toxin or attenuated pathogen. Children vaccination is one of public health's salient achievements. Alongside environmental public health measures, it constitutes as the most successful and cost effective global public health measure to reduce disease-related mortality. But in Europe, for example, children vaccination coverage rates have gone down in last few years, including in Baltic states. It is important to recognize the factors which are causing this issue and raise awareness of the importance of vaccination.

**The aim** of this study was to find out if there is a difference between children immunization rate and parental understanding, and engagement in Riga and regions of Latvia.

**Materials and methods.** The survey was carried out from October 2019 to January 2020 in general practices in Riga, the capital city of Latvia, and in regions of Latvia 478 parents volunteered and anonymously replied to originally created questionnaire. Obtained data was statistically analyzed in Microsoft Excel 2013 and IBM SPSS software, 20.0 version.

**Results:** Participants were divided in 2 groups, those who live in Riga (group 1) - 49,4% (n=236), and those who live in regions of Latvia (group2)-50,6 % (n=242). Children of 81.6% (n=390) parents are fully or partly vaccinated according to the National vaccination calendar of Latvia. There was 25,4% (n=60) children unvaccinated by at least one vaccine in group 1 and 11,6 % (n=28) in group 2. Main reasons not to support vaccinations in group 1 - afraid of possible side effects of vaccinations 41,7% (n=25), uncertainty about necessity of vaccinations 75% (n=45), afraid of dangerous substances within vaccines 25% (n=15) and the thought that children are receiving too many vaccinations in early age 16,7% (n=10). But in group 2 results was respectively: 17,9% (n=5), 71,4% (n=20), 42,9% (n=12), 7,1% (n=2). Main source of information regarding vaccinations in group 1 was family doctor 74,2% (n=175), family doctor's assistant 33,9% (n=80), online parent groups 32,2% (n=76), medical resources in internet 11% (n=26). But in group 2 results were respectively: 81,8% (n=198), 39,7% (n=96), 5,4% (n=13), 3,3% (n=8).

**Conclusion:** We noticed that there is a high number 18,4% (n=88) of children unvaccinated by at least one vaccine according to the National vaccination calendar of Latvia. There are more unvaccinated children in group 1, so there definitely is an association between living place ( $p=0,000093$ ). As well as parents tend to use more online parent groups as a source of information regarding vaccinations than in group 2 ( $p<0,00001$ ). Decision to not vaccinate children leaves them unprotected against diseases, and also lowers the overall rate of vaccination coverage, threatening herd protection.

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## **INFORMATION LITERACY SKILLS REGARDING MEDICAL KNOWLEDGE ON THE INTERNET AMONG YOUNG PEOPLE IN LATVIA**

**Key words:** health, skills.

**Objectives:** Information literacy skills regarding medical knowledge on the Internet are important and should be kept in mind when consulting the patient, especially when the patient is young. The aim of the study was to clarify the information literacy skills among young people regarding health issues.

**Material and methods:** Originally developed questionnaire including 39 open and multiple choice questions about sexual education and knowledge, use of contraception including emergency contraception was used for survey carried out from December 2018 to May 2019 in two ways: (1) in the Internet *visidati.lv* (N=141, 26%) and (2) by distributing hard copies in educational institutions (N=210, 37%), and employees in the private sector (N=210, 37%). It was approved by RSU Ethics committee (Nr. 6-3/123). Data was statistically analysed in Microsoft Excel 2013 and IBM SPSS Statistics 23 (software, version 20.0).

**Results:** 561 people in the age group from 16 to 30 years participated in the study, however, detailed statistical analysis was carried out in 3 age groups = 16-20; 21-25; 26-30. Question on date of the publication on the Internet regarding health issues and education level of the author was answered as important by female respondents accordingly - 66 % (N=124, age group 16-20 years old); 85 % (N=77, age group 21-25 years old); 83 % (N=48, age group 26-30 years old) (p=0,006). Question date of the publication on the Internet regarding health issues and education level of the author was answered as important by male respondents accordingly - 77 % (N=103, age group 16-20 years old); 67 % (N=13, age group 21-25 years old); 86 % (N=12, age group 26-30 years old) (p=0.04).

It was found that young female respondents do not discuss their health issues with their doctors - 73 % (N=137, age group 16-20 years old)(p=0,130).

**Conclusions:** Most of the young people tend to be critical regarding information they read on the Internet.

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## **“GOLDEN HOUR” AS A PREDICTOR OF COMPLICATIONS AND OUTCOMES IN POLYTRAUMATISED PATIENTS**

**Background.** The “golden hour” is time period from development of trauma till patient’s arrival in specialized trauma center (within first hour after injury). Some studies emphasize the importance of early arrival to the hospital and its influence on survival and complication rate; however other studies focus on the importance of prehospital care and patient stabilization upon arrival to trauma center.

**Aim.** To analyze the importance of “golden hour” principle and if it can be used as a predictor of complications and poor outcome in polytraumatised patients.

**Methods.** Patients admitted to RECUH department of traumatology between 2018 and 2019 were retrospectively included in the study. ISS was calculated and patients were stratified in groups using Sampalis criteria and regarding the admission within “golden hour” and later than one hour after trauma. Totally 6 patient groups were formed: Group I - arrival within “golden hour” Injury severity score (ISS) 16-25 (N=28), Group II - arrival within “golden hour” ISS 26-30 (N=2), Group III - arrival

within "golden hour" ISS>30 (N=8), Group IV - arrival later than 1 hour, ISS 16-25 (N=31), Group V - arrival later than 1 hour, ISS 26-30 (N=9), Group VI - arrival later than 1 hour, ISS>30 (N=8). Overall complication rate and outcomes were analyzed. For data analysis MS Excel 2013 and SPSS 19.0 was used.

**Results.** Overall clinical data of 300 patients were analyzed and 99 had ISS  $\geq$ 16, from whom 13 patients were excluded due to lack of data. Totally 86 patients (58 males) with mean age  $49 \pm 28$  years were included. Regarding the mechanism of trauma 25 (29%) pedestrians were hit by car, 21 (24%) - falls from height, 25 (29%) - traffic accidents and 15 (17%) patients had other type of trauma mechanisms. Hemodynamic stability was not influenced by arrival time at the emergency department, however patients from Group III were more tachycardic comparing to heart rate at the site of accident 85 vs. 114 beats per minute,  $p < 0.05$ . Mean Glasgow coma scale (GCS) significantly differed in patients with ISS 26-30, patients in Group II (14 points), were more responsive comparing to Group V (11.8 points),  $p < 0.05$ . Statistically significant changes in serum lactate levels were observed comparing patients arriving early and late. Patients in Group I were more severely hypoperfused comparing to Group IV lactate levels of 2.85 mmol/l vs. 2.02 mmol/l,  $p < 0.05$  and in Groups II and Group V, 1.9 mmol/l in vs. 2.0 mmol/l,  $p < 0.05$ . Highest median lactate level (3.56 mmol/l) was detected in Group VI. 73% of patients from Groups I-III had undergone at least one operation while in Groups IV - VI - 83%. Overall 2.2 surgical interventions were necessary in Group I- III patients, comparing to 2.8 operations in Groups IV- VI,  $p < 0.05$ . In total 234 red blood cell units were transfused with highest median amount in Groups III - and Group VI - 6.76 units of fresh frozen plasma were transfused with highest amount in Group II - 6 units. Overall hospital stay was shorter in patients from Groups IV-VI comparing to Groups I-III, but it was not statistically significant, however ICU stay was shorter in patients arriving late 7.9 vs. 13.2 days,  $p < 0.05$ . Only 1 patient died (Group VI) due to uncontrolled internal bleeding.

**Conclusions.** "Golden hour" can be used as a prognostic tool to predict patient's severity at the admission, complication rate and outcomes. Further studies with larger patient population are needed to more precisely prove this concept.

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## **ADENOID VOLUME, ALLERGY AND GASTROESOPHAGEAL REFLUX DISEASE - POTENTIALLY INFLUENCING FACTORS OF THE OUTCOME OF ADENOTOMY**

**Introduction.** Gastroesophageal reflux disease (GERD) and allergy are main concomitant diseases which have influence on symptoms of patients with adenoid. Allergy is found in 40% of pediatric population and can lead to impaired nasal breathing. Endoscopic examinations show that big adenoid can be found without concomitant allergy and enlarged inferior nasal turbinates - with small adenoid. Latest scientific data proves that GERD is one of the main factors which can lead to hypertrophy of pharyngeal tonsil.

**Aim.** To identify patients who have no clinical benefits from adenotomy and to characterize this patient group and their concomitant diseases to improve selection of patients for adenotomy.

**Materials and methods.** From November 2015 to January 2017 in the Department of Otolaryngology of Children Clinical University Hospital in Latvia the prospective, clinical study "Adenotomy: results of surgical treatment" took place. During the study association among clinical symptoms, size of adenoid and results of adenotomy was analyzed. Parents filled in the form before and after the operation. During the operation surgeon registered size of the adenoid and other objective findings. Size of the adenoid was measured by measuring cylinder.

**Results.** Data was collected about 196 patients before and 79 patients 1- 3 months after the operation. Mean adenoid volume was  $2.31 \pm 1.41$  ml. At least one of the GERD symptoms was present in 83.16%



(163 / 196) of patients. The most common complaint by patient's parents was "bed smell from the children mouth in the mornings". At least one type of allergy was present in 59 or 30.10 % of patients. More than 10 or 16.95% of patients had more than 1 type of allergies. More frequently food allergy was found. The biggest adenoids ( $6.50 \pm 1.73$  ml in size) were found in patients without allergies or with such GERD symptoms as "bed smell from the mouth in the mornings" and "cough during physical activity". The smallest adenoids ( $0.60 \pm 0.57$  ml in size) were found in patients with food allergy and such GERD symptoms as "cough during night sleep or in the mornings" and "resent gastroenteritis"

**Conclusions.** It is advisable to examine and if necessary treat patients with GERD before adenotomy if patients are younger than 3 years of age and especially if symptoms are not severe. It is advisable to perform basic allergy diagnostic testing for children with adenoid because allergic rhinitis and adenoid may present with similar symptoms and the diagnosis may be incomplete and the treatment - with low efficiency. The degree of impaired nasal breathing and level of improvement after surgical treatment is not affected by size of the adenoid. The size of the adenoid is associated with combinations of symptoms of GERD and allergy.

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## **ADOLESCENT ADHERENCE TO SLEEP HYGIENE RULES IN LATVIA**

**Objectives:** Healthy sleep is important at every age, but is especially crucial during the teenage years. Good sleep helps to succeed at school and prevents sleepiness during the lessons. But various reasons may affect adherence to sleep hygiene, such as electronic devices and drinking caffeine-containing beverages as part of a normal lifestyle. Over time, chronic sleep deprivation can cause increased fatigue, depression, anxiety, poor concentration and a wide range of health ailments.

**Methods:** The survey was carried out among 264 8<sup>th</sup> to 12<sup>th</sup>-grade students (ages 14-19 years). A questionnaire was used to assess sleep patterns and sleep hygiene using the Adolescent Sleep Hygiene Scale (ASHS) and daytime sleepiness using the Pediatric Daytime Sleepiness Scale (PDSS). The analysis of this research was done by using Microsoft Excel 2010 and the SPSS statistical program.

**Results:** The analysis of ASHS showed that the most highly endorsed items affecting sleep hygiene were: "At weekends, I stay up more than 1 h past my usual bedtime" (mean = 1.9) and "During the hour before bedtime, I do things that make me feel very awake" (mean = 2.6). However, the least endorsed items according to the study were: "I fall asleep in one place and then move to another place during the night" (mean = 5.7) and "After 6. p.m. smoke or uses drinks with alcohol" (mean = 5.5). The ASHS also showed a significant difference in results between joint grades 8<sup>th</sup> and 9<sup>th</sup> and grade 12<sup>th</sup>. For example, older students more frequently are staying up past the usual bedtime, they use the bedtime routine and drink more caffeine-containing beverages. The analysis of PDSS showed daytime sleepiness results in a range from 1 - 28 with an average score of 16.7.

**Conclusion:** There is a noticeable difference in sleep hygiene between age groups. Mostly sleep hygiene is affected by common sleep pattern behaviors, but the overall sleep hygiene in Latvia is satisfactory and students are well educated about sleep hygiene.

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## **ADVERSE CHILDHOOD EXPERIENCE AMONG WOMEN IN POSTNATAL PERIOD AND A CHARACTERISTIC OF A REPRODUCTIVE ANAMNESIS**

**Objectives:** Adverse Childhood Experiences (ACEs) have a tremendous impact on lifelong health and opportunity. In 2018 there were 1 billion children in the world that had experienced physical, emotional abuse and neglect. ACE scores of  $\geq 4$  are associated with the highest risk for negative health outcomes. ACE are potentially traumatic events that occur to children under 18 years of age. [1] Adverse childhood experiences are associated with increased odds of health-risk behaviours, especially suicide attempt, early smoking initiation, alcohol abuse, drug use and risky sexual behaviour.[2]

**Aim:** To investigate adverse childhood experience prevalence among women in postnatal period and its correlation with age of the first sexual experience, with age of the first pregnancy and legal abortion.

**Method:** The cross-sectional study included women who were hospitalized in Pauls Stradins clinical university hospital obstetric department and Rīga Maternity hospital during the time period 01.11.2019. to 17.01.2020. The research method was a questionnaire that consisted of reproductive anamnesis questions and an ACE Study questionnaire. An analysis of the data was performed using MS Excel and IBM SPSS statistics.

**Results:** In total there were 110 respondents, the mean age was 30.7 years. Out of all respondents, 73,6% had at least 1 ACE point. An ACE score of  $\geq 4$  (group 1) was found with 20% of respondents, 80% women had less (group 2). By domain, 67,3% of women experienced household disfunction, 36,6% had been abused, and 14,5% had been neglected.

On average the first sexual experience in group 1 was 17,8 years and 17,0 years in group 2. ( $p=0,330$ ). Average mean age of first pregnancy in group 1 was 26,12 years, and in group 2 it was 24,05 years. Four women have had teen pregnancy and three out of them had an ACE score of four or more. Out of all respondents 33 have had an abortion. Out of all these cases 20 were miscarriages and 13 legal abortions. Legal abortions in group 1 were found with 11,4% of women and in group 2 13,6% ( $p=0,768$ ). The number of pregnancies in group 1 was - 1 pregnancy for 31 women (35,2%), 2 pregnancies for 28 women (31,8%), 3 pregnancies for 15 women (17%), 4 pregnancies for 8 women (9,1%), 5 and 6 pregnancies for 5 (5,7%) and 1 (1,1%) women accordingly. In group 2 - 1 pregnancy for 5 women (22,7%), 2 pregnancies for 9 women (40,9%), 3 pregnancies for 4 women (18,2%), 4 pregnancies for 2 women (9,1%), 5 and 6 pregnancies for 1 (4,5%) and 1 (4,5%) women accordingly ( $p=0,784$ ).

**Conclusions:** There was no statistically relevant correlation between ACE score, age of the first sexual experience, age of the first pregnancy and legal abortion. Adverse childhood experience are common among women in postnatal period, the most common was household dysfunction, more precisely divorced parents and an alcoholic in the family.

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## **ANALYSIS OF PEDIATRIC SEVERE SEPSIS INCIDENCE AND MORTALITY AMONG CHILDREN AGE 1 MONTH TO 18 YEARS**

**Key words:** Children, Severe sepsis, Long-term outcome, Mortality, Readmission.

**Objective** Sepsis is the life-threatening organ dysfunction due to a dysregulated host response to infection. It still remains as a global health problem of major importance. Pediatric severe sepsis continues to be a source of significant in-hospital morbidity and mortality with extremely high health care costs.

**Materials and methods:** We conducted a retrospective cohort study representing survivors of pediatric severe sepsis age 1 month to 18 years in Children's Clinical University Hospital, Riga over the years 1998-2019. Risks were reported as Hazard Ratios (HRs) with 95% of confidence intervals (CIs). Survival plots was made using Kaplan-Meyer estimator.

**Results:** 2424 cases with severe sepsis among children were identified, 297 (12,5%) of whom died over the period from 1998-2019. 56,2% (n=167) died in hospital or within 28 days after admission; 43,8% (n=130) died subsequently. 8% (n=193) of survivors were readmitted at least once. The most common underlying cause of sepsis related death was respiratory infection - 42% (n=81), second most common was central nervous system site - 19,2% (n=37). Mortality rate in sepsis patients is 27% higher than for not-sepsis patients. Age less than 1 year was highly associated with subsequent readmission and respiratory site of infection was the most common - 52,6%.

**Conclusion:** Readmission occur after 1 in 9 pediatric sepsis hospitalizations and is associated with adverse outcome. The mortality rate remains high; therefore, improved clinical management and implementation of large-scale clinical trials are necessary to improve treatment and reduce readmission time.

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## **BREASTFEEDING PROBLEMS AND USE OF INFANT FORMULA WITHOUT MEDICAL INDICATIONS**

**Background.** Each year formula-feeding becomes a more popular option among the new mothers, although there are only some indications for its use. A lot of new mothers are not qualitatively educated on breastfeeding procedure and lactation- inducing techniques, therefore they encounter difficulties that induce them to use baby milk, even though often there might not be any medical indications.

**Objective.** The aim of this study is to investigate the problems that bring mothers to apply formula feeding without confirmed medical indications.

**Methods.** This cross-sectional cohort study includes 534 new mothers that use infant formula to feed their infants (under 1 year old). The respondents filled in an anonymous questionnaire of 47 questions. The study was conducted from 1.12.19 to 31.01.20, in family doctors' offices, the Department of Obstetrics and Gynaecology of Jelgava Hospital, kindergartens and groups of new mums from Latvia in the Internet. Data were processed using «Excel» and «SPSS 2.0» programs.

**Results.** The series of questions that test correct application of the main principles for inducing lactation were correctly answered by 28 respondents (5.24 %). Correct breastfeeding technique expose 23 (4.3 %) of respondents, however, only 3 (0.6 %) of them fed their children for the necessary duration of time (30- 45 min). The attempts of family doctors to find out problems that mothers encounter during breastfeeding, negatively correlate with the prevalence of weight deficiency among newborns (by 39.37 % lower prevalence). Lactose intolerance as a cause to use formula was selected by 11 % of respondents, but only 0.7 % had a weight deficiency after the first month (which is the main sign of lactose intolerance). Babies of women with flat nipples where unable to take breast (52.94 %), to hold breast (54.91 %) and to suck breast milk (16.34 %), but none of the respondents had tried the special nipple shields. 43 % of respondents counted weight gain from the birthday (19 % of them noted weight deficiency), however other 57 % of respondents counted weight gain from the day they left hospital (23 % of them noted weight deficiency).

**Conclusions.** Most of the women either do not try to apply lactation-inducing methods or use them incorrectly. Often, family doctors do not try to find out physiological causes of a decreasing breast milk supply before they prescribe a formula. There is no common method in Latvia to count weight gain during the first month. Most women are not qualitatively educated about breastfeeding procedure, essentials and lack advice to solve possible problems.

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## ANTERIOR RHINOSCOPY ROLE IN DIAGNOSTICS OF NASAL OBSTRUCTION

**Key words:** Anterior rhinoscopy, Nasal obstruction, Rhinomanometry.

**Objectives.** The aim of this study was to estimate association between anterior rhinoscopy findings and nasal obstruction. The great majority of functional and mechanical factors that can cause nasal obstruction can be visualized by anterior rhinoscopy that is quick to perform diagnostic test. Acoustic rhinometry and 4-phase-rhinomanometry are objective diagnostic methods that are used to evaluate nasal respiratory function. Acoustic rhinometry measures volume of nasal cavity, 4-phase-rhinomanometry-nasal resistance.

**Materials and methods.** Participants-50 volunteers with or without complaints about nasal breathing. Examination methods- acoustic rhinometry, 4-phase-rhinomanometry, anterior rhinoscopy. Association between anterior rhinoscopy findings and nasal obstruction was analyzed using descriptive statistics and Mann-Whitney U test. For all findings detected in more than 10 individuals, two independent group(with/without finding) comparison to objective measurements was performed to look for difference in data distribution between these two groups.

**Results.** Statistically important difference in data distribution between two groups(with/without finding) when compared to objective measurements, was found for 2 anterior rhinoscopy findings. Volunteers with septal hyperaemia have lower volume of right nasal cavity ( $p=0,024$ ; median(Q1;Q3)- 4,01(3,42; 4,61)cm<sup>3</sup> with finding and 5,14(4,14; 7,82) cm<sup>3</sup> without it). Volunteers with turbinates hypertrophy have higher nasal resistance during inspiration ( $p=0,042$ ; median(Q1;Q3)- log 1,05(0,75; 1,61) with finding and log 0,72(0,55; 1,02) without it). No parameters were found that would show statistically important difference in data distribution between two groups for more than one finding.

**Conclusions.** There is no significant association between anterior rhinoscopy findings and objective measurements - nasal obstruction can not be evaluated by anterior rhinoscopy.

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## ASSESSMENT OF RESPONSE TO CHEMOTHERAPY IN PATIENTS WITH LYMPHOMA

**Background.** Lymphomas are malignant tumors of the lymphoid tissues. Hodgkin's lymphoma (HL) and non-Hodgkin's (nHL) lymphoma have some similar clinical symptoms however incidence and mortality of nHL is higher. Patients with HL and aggressive types of nHL can be cured with current chemotherapy. For patients with indolent nHL the goal of chemotherapy is induction of remission. Assessment of response to chemotherapy is done by computed tomography (CT). Response evaluation criteria in lymphoma (RECIL 2017) include complete response, partial response, minor response, stable and progressive disease.

**Aim.** To analyse and statistically summarize the response to chemotherapy of different types of lymphomas using RECIL.

**Methods.** A retrospective study was conducted at the PSCUS Cancer Clinic. 85 patients with histologically confirmed lymphoma, who underwent chemotherapy, were enrolled. Data was processed using IBM SPSS Statistics 22.

**Results.** The minimum age of the patients was 24 years, the maximum was 89 years (M = 58; SD = 16.5). CT results after chemotherapy are unknown for 27% of patients (n = 23).

In 21% (n = 17) of the patients HL was confirmed. In this group, men (n = 12) prevailed with a 2:1 ratio. 71% (n = 12) of the patients reached complete remission, 29% (n = 5)-partial remission after chemotherapy. In 79% (n = 64) of the patients, nHL was confirmed. This group did not have sex predominance. The aggressive type of nHL was confirmed in 71% (n = 46), the most common histological form in this group was diffuse large B cell lymphoma. After chemotherapy 53% (n = 24) of the patients achieved complete, 6% (n = 3) - partial remission, and 11% (n = 6)-disease progression. The indolent form was confirmed in 29% (n = 19) of patients. The most common histological type in this group was follicular lymphoma. In this group, complete remission was achieved by 43% of patients (n = 6), partial - by 29% (n = 4) patients, stable disease - by 21% (n = 3) patients, disease progression- by 7% (n = 1) of the patients.

**Conclusion.** All lymphomas are sensitive to chemotherapy. The best result in achieving complete remission had HL. In the second place is aggressive nHL, however, it has a rather high percentage of disease progression. In third place to achieve complete remission is indolent nHL, however, it has a relatively high percentage of partial remission and stable disease.

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## ASSESSMENT OF THE FREQUENCY OF HEADACHE AND QUALITY OF LIFE OF PATIENTS WITH MIGRAINE

**Background.** Migraine is one of the leading causes of disability worldwide[1]. Migraine attacks vary in frequency and severity among patients.

**Aim.** To evaluate the frequency of headache in study group and possible associations with other chronic diseases and to evaluate the quality of life between in study group and control group.

**Methods.** A prospective study was conducted in Health Center 4, in a headache specialist's office. 100 patients with migraine (study group, SG) and 100 people without migraine (control group, CG) filled out questionnaires and diaries during a month, where they daily noted their headaches (SG) or pain of other localization (CG) and quality of life (QoL). Statistical analysis was performed for 82 (SG) and 80 (CG) participants using Excel, IBM SPSS.

**Results.** An independent T-test showed that there was no statistically significant difference (p = 0.03) in age between SG (M = 42.6; SD = 13.3) and CG (M = 44.8; SD = 13.4).

53,6% (n = 44) of a patients (SG) had headache more than 4 times a month (frequent migraine attacks), 36% (n = 16) of them have taken preventive therapy, most often: tricyclic antidepressants (n = 8; 50%). People with frequent migraine attacks more often suffer from high intensity headaches (p = 0.043) and foggy head feeling (p = 0.025) than people with less often migraine attacks. Mental diseases (p = 0.003) and skin diseases (p = 0.03) prevail in SG. During a month, SG more often marked their QoL as very poor compared to CG (M = 1.29, M = 0.73; p = 0.04).

**Conclusion.** Many patients had often migraine attacks and higher pain intensity and feeling of foggy head, despite the prophylactic therapy used. Migraine attacks had negative impact on the QoL.

[1] Global, regional, and national burden of migraine and tension-type headache, 1990-2016: a systemic analysis for the Global burden of disease study 2016. GBD 2016 Headache collaborators. The Lancet, November 2018.

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## ASSESSMENT OF THE POST HOSPITAL PATIENT REHABILITATION FLOW

**Key words:** Cerebrovascular disease, rehabilitation, NIHSS score, mRs score.

**Introduction:** Rehabilitation helps stroke survivors relearn skills that are lost when part of the brain is damaged. For some stroke survivors, rehabilitation will be an ongoing process to maintain and refine skills and could involve working with specialists for months or years after the stroke.

**Aim:** To assess the post hospital patient rehabilitation flow, to distinguish whether there is association between patient NIHSS score, mRs score and designated rehabilitation.

**Methods:** The study included 315 patients who had been treated at Pauls Stradins Clinical University Hospital who were diagnosed with cerebrovascular disease and who have been hospitalized for at least 1 day, and were looked by Physical medicine and rehabilitation doctor.

**Results:** A total of 315 patients were analyzed. The average days spent by patients in the hospital was 12,51 days ( $\pm 6,90$ ), the average days that patient received rehabilitation was 6,88 ( $\pm 4,33$ ). Out of 315 patients 31,1% of them were discharged from hospital to receive further rehabilitation at home, 36,5% were discharged to receive further rehabilitation at rehabilitation center, 24,1% – ambulatory rehabilitation, 2,9% – were transferred to different hospital and 5,4% - outpatient rehabilitation center.

**Conclusions:** The results reveal association between patient NIHSS score, mRs score and designated rehabilitation, and that there is no association between patient gender and designated rehabilitation.

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## BELIEFS REGARDING DIETARY SUPPLEMENTS IN USERS AND NON-USERS

**Key words:** Opinions, dietary supplements, effectiveness.

**Objectives.** The dietary supplement market has been growing in Latvia and worldwide. Little research involving beliefs regarding dietary supplements has been conducted, therefore, this study aimed to explore and compare the beliefs in dietary supplements of users and non-users.

**Materials and methods.** In this study mixed methods were used. A questionnaire including multiple choice as well as open ended questions was created using Google Forms and distributed by social media. Quantitative data were analyzed using IBM SPSS Statistics 23. The respondents' beliefs were sorted in themes and categories reported below.

**Results.** A total of 348 responses were collected and 83% of them were from women. It was not mandatory to explain opinion about food supplement efficiency, but 78% chose to do so. Of these people 85% were using dietary supplements. 50% of users' opinions were positive and could be classified into subjective (wellbeing, ease) and objective (blood tests and fitness results) categories. About a third of all respondents were not sure of the effect because of concerns about information (conflicting, lack of information) and product properties (depends on contents, dosage, producer, aim). 71% of non-users' and 28% of users' opinions were defined as negative and were either related to the product itself (safety issues, lack of effects, product properties) or other reasons (necessity, placebo, marketing strategies).

**Conclusions.** According to the results of this study, most of the respondents were using dietary supplements, but the majority of collected opinions did not express trust in the efficacy of them. Users denied the effects more than expected and further research should be done in order to explore the reasons behind it in more detail.

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## **BLOOD AND LYMPHATIC VESSEL DENSITY IN DIFFERENT MORPHOLOGICAL TYPES OF BASAL CELL CARCINOMA**

**Key words:** vascular and lymphatic density, basal cell carcinoma.

**Introduction.** Basal cell carcinoma (BCC) is the most prevalent skin cancer that tends to appear on the sun-exposed skin of the head and neck region. There are four major, distinctive, morphological types of BCC: nodular, micronodular, infiltrative, and superficial. Blood vessels and lymphatic vessels participate in the regulation of inflammation and are important contributors to malignancy.

**Aim.** To study vascular and lymphatic density in different types of basal cell carcinomas.

**Materials and methods.** Excised tissue samples of 79 BCC patients were processed routinely, sectioned and stained immunohistochemically with anti- $\alpha$ -smooth muscle actin and anti-podoplanin antibodies labeling blood vessels and lymphatic vessels, respectively. We performed a quantitative estimation of vascular and lymphatic density in 10 vision fields in the tumor-surrounding stroma for each tissue sample. Statistical analysis was performed applying SPSS version 24.0 software.

**Results.** Statistically higher blood vessel density was found in the nodular and micronodular type of BCC reflected by mean values 13.7 and 13.1, accordingly, comparing with infiltrative and superficial types where the mean value was only 7.7 and 8.4, accordingly ( $p=0.01$ ). Statistically higher lymphatic vessel density was found in micronodular type, whereas the lowest in superficial BCC – 4.7 and 3.2, accordingly. Finally, the mean value of lymphatic vessel density in infiltrative and nodular BCC was 4.2 and 3.9, respectively ( $p=0.014$ ).

**Conclusion.** The blood vessel and lymphatic vessel density differed significantly when nodular and micronodular BCC, with the similarity of values, were compared to two other types of BCC – infiltrative and superficial. Vascular density was more superior when compared to lymphatic density.

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## **BOTANICAL INGREDIENTS IN COSMETICS: IMPACT OF NOVEL FORMULATION CONTAINING BETULA ALBA (BIRCH) SAP ON BIOPHYSICAL PARAMETERS OF THE SKIN**

**Key words:** Dermatology, hydration, viscoelasticity, Betula alba, birch sap.

**Introduction.** Gradual accumulation of different factors can disturb epidermal barrier function, corneocyte differentiation, lead to disintegration of collagen and elastic fibers, increase transepidermal water loss, reduce hydration and elastic recoil leading to dryness, laxity and reduced healing capacity of the skin. Active substances found in birch sap (organic and amino acids, betulin, micro- and macroelements) possess its use as ingredient with antioxidant, anti-inflammatory, cell stimulating and water-replacing properties improving wound healing, epidermal barrier function and hydration.

**Aim of the study.** The aim of this study was to evaluate impact of novel cosmetic formulation containing birch sap on biophysical parameters of the skin.

**Materials and Methods.** Participants were asked to apply the test product on inner aspect of the left forearm twice a day. The right forearm was considered a control site. Instrumental assessment of hydration and viscoelasticity (R2, R5, R7) parameters was made using Corneometer CM 825 and Cutometer dual MPA580 (Courage & Khazaka, Germany) accordingly. Parameters were evaluated four times (before application as well as 1 hour, 5 days and 4 weeks after daily use of the product).

Paired and independent sample T-test was used for analysis of collected data with  $p < 0.05$  considered statistically significant.

**Results.** Statistically significant improvement in skin hydration level was observed regarding the experimental site when compared with the control site after 1 hour and 4 weeks (39.83 SD=30.86 % vs. 0.83 SD=15.14 %,  $p < 0.001$ ). There was statistically significant increase in moisture levels of both sites after 5 days, though percentage increase was significantly higher on the left site.

**Conclusions.** Daily use of *Betula alba* sap containing cosmetics leads to good immediate as well as long term outcome providing marked improvement in moisture level of the skin.

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## BURNOUT SYNDROME IN LATVIAN POPULATION

**Objectives.** Burnout syndrome is an emotional and / or physical fatigue, exhaustion observed as a consequence of prolonged emotional distress, related to human self - image and working conditions. Factors contributing to the syndrome can be divided into two groups: the human personality related and work conditions related. These factors are closely related to each other. A man with a low self-esteem can try to compensate his emotional state by excessive work, this paying too less attention to his own needs.

Maslach Burnout questionnaire measure persons emotional exhaustion, depersonalization, personal accomplishment.

**Aim.** Find out what people have more risk to be burnout, people who work in medical fields or people who work in other fields. People who study and work or people who just work. Emotional exhausted will be man or women.

**Materials and methods.** People were invited to fill in anonymous questionnaire about their education, work, study status and fill Maslach Burnout questionnaire. Sum up each respondent Maslach Burnout questionnaire results. People were divided in 2 groups one group who work in medical sphere and people who work in other fields. Same respondents were divided groups: people who work and study, and people who just work. Survey data were analysed in Exel and SPSS.

**Results.** Anonymous questionnaire answered 131 respondent total 109 (83,2%) women and 22 (16,7%) men

Maslach burnout questionnaire results showed that 60 (55%) women feel high emotional exhaustion, while 11 (50%) men feel low emotional exhaustion.  $P = 0,001$

61 people who answered that they are altruists, after Maslach burnout questionnaire results 39 (63,9%) feel high emotional exhaustion, while 70 people who answered they are not altruists 31 (44,2%) feel low emotional exhaustion  $p < 0,001$

101 respondents answered that they study and working 53 (52,4%) feel emotional exhaustion and 30 respondents just work 14 (46,6%) feel low emotional exhaustion  $p = 0,013$

68 respondents are working in medical fields 44 (64,7%) feel high emotional exhaustion, and other 63 people working other fields 26 (41,2%) feel medium emotional exhaustion  $p < 0,001$

57 (83,8%) respondent from 68 who work in medical fields feel high depersonalization, 63 respondent who work in other fields 39 (61,9%) feel high depersonalization  $p = 0,010$

68 people who work in medical fields 58 (85,2%) have low personal accomplishment, 63 people who work in other fields 39 (61,9%) feel low personal accomplishment



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## CARDIOEMBOLIC ISCHEMIC STROKE IN A GROUP OF YOUNG PATIENTS

**Key words:** cardioembolic ischemic stroke, young patients.

**Introduction.** Among young patients cardioembolism is one of the most common causes of stroke.

**Aim.** To identify the most common sources of cardioembolism for ischemic stroke in young patients.

**Materials and Methods.** A retrospective study was carried out among 64 patients younger than 55 years old, who were hospitalized at Rīga East Clinical University Hospital with a diagnosis of cardioembolic stroke. The frequency of cardioembolism sources were analyzed. Patients were subdivided in 2 subgroups according to the age ( $\leq 49$  and  $>49$  years old). This division was chosen because 49 years of age in many research papers is the most common upper limit of age, which defines patients as young patients with stroke. The causal relationship of the patent foramen ovale (PFO) to stroke was assessed using the Risk of Paradoxical Embolism (RoPE) Score. The data was analyzed using SPSS.

**Results.** 32,8% had atrial fibrillation (AF), 20,3% - PFO, 15,6% - dilated cardiomyopathy, left ventricular hypertrophy, 7,8% - mechanical valves, 4,7% - left ventricular thrombus, atrial septal aneurysm with PFO, 3,1% - paroxysmal AF, recent myocardial infarction and left ventricular wall motion abnormalities, 1,6% - left atrial thrombus, left ventricular aneurysm without thrombus, congestive heart failure with EF  $<30\%$ , apical akinesia and ventricular septal aneurysm. Comparing 2 age groups ( $\leq 49$  years old (n = 31) and  $>49$  years old (n = 33)), PFO (41,9%) is the leading source of cardiac embolism in patients of  $\leq 49$  years old, in contrast, in patients of  $>49$  years old, the leading source of cardioembolism is AF - 54,6%, while no PFO is detected in any of the patients in this group. All patients with PFO on the RoPE score have a score of  $\geq 7$ , indicating a high likelihood of stroke association with pathology.

**Conclusion.** The most common source of cardioembolism in patients younger than 55 years old is AF. PFO plays a leading role in patients under 49 and AF - over 50 years old.

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## CD44 ANTIGEN AS AN INDICATOR OF EARLY STRUCTURAL CHANGES IN ORAL LEUCOPLAKIA

**Background and Aim.** Oral leucoplakia (OL) represents the most common potentially premalignant oral epithelial disorder of the oral cavity (1 - 5 % Lodi et al, 2016). In order to reduce the incidence of oral cancer and improve the treatment outcomes, research is under way to find such markers that may indicate early malignant changes in OL. In last year's again there has been increasing interest of CD44 antigen which is a cell-surface glycoprotein involved in cell-cell interactions, cell adhesion and migration (Baillie et al 2017). This marker is also used as a cell-surface marker of several cancers, also tongue (Yanamoto et al 2014). However, the literature suggests that expression of CD44 in potentially premalignant oral lesions is very controversy (Baillie et al, 2017; Zhuy et al, 2014). Aim - to evaluate the expression of CD44 in epithelial and mesenchymal structures of OL.

**Materials and methods.** We have used specimens from 69 patients with OL and 5 samples with normal oral mucosa. Specimens were stained by haematoxylin eosin and immunohistochemical detection of CD44 pan was done by EnVision method in 34 OL. CD44 labelled epithelial layers of oral

mucosa and macrophages were counted in 3 fields of vision at 400x magnification. Results were evaluated by Excel program.

**Results.** In our research OL involved mainly buccal mucosa (54,6%), tongue (18,1%), gingiva, floor of mouth and palate (each 9,1 %). Ratio male: female was 11:1, the average age of patients was 52, 9±7,2 years. Accordingly WHO classifications, 63 OL were conventional but 6- of proliferative verrucous type. In normal mucosa CD44 expression was weakly positive in the cytolemma of 2-7 layers of epithelium above basal membrane. Expression of membranous CD44 in OL varied from 8 to 27 layers of oral mucosa involving basal and intermediate layers. But there was lack of marker in superficial layers, except some parakeratotic cells. The mean value of macrophages in healthy submucosa was 5,4 but in OL - 30,0.

**Conclusions.** 1. Quantitative overexpression of CD44 antigen in OL is due to increased number of labelled epithelial layers containing glycoprotein. 2. Evaluation of mononuclear cells in submucosa of leucoplakias proved that it is 5,6 times higher than in healthy persons and possibly it reflects their active involvement in the defence from malignant transformation.

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## CLINICAL CASE OF LATE-PRESENTING ACCIDENTAL GLACIAL ACETIC ACID INGESTION

**Key words:** Glacial acetic acid, essence of vinegar, corrosive injury, electrolyte imbalance.

**Introduction:** Glacial acetic acid 70%, also called 'essence of vinegar', was used to pickle food in Latvia and other northern European countries. In 2010, the Latvian government prohibited its sale due to safety concerns. It was replaced by vinegar (9% acetic acid). Ingestion of glacial acetic acid causes severe upper gastrointestinal (GI) corrosive injury which can be fatal.

**Clinical case:** A 68-year-old woman was transferred from a district hospital to the Toxicology and Sepsis Clinic of Riga East Clinical University hospital (RECUH). While intoxicated, the patient mistook a bottle of glacial acetic acid for alcohol, which she accidentally ingested. She realised her mistake but was embarrassed and did not seek immediate medical attention. Two days later, the patient presented to a district hospital with ongoing throat pain and oliguria. She was referred to RECUH primarily to treat acute kidney failure (Cr = 522  $\mu\text{mol/L}$ ). Upper GI endoscopy showed stage-3B corrosive injury of the oesophagus and stomach. Renal replacement therapy, requiring heparinization, was commenced. However, intermittent GI bleeding developed from this. Parenteral feeding was commenced to facilitate healing of her GI injury. As the patient suffered from stage-3 chronic cardiac insufficiency, a significantly positive intravenous fluid balance resulted in acute pulmonary oedema. Treatment for this produced hypernatraemia (193  $\text{mmol/L}$ ). Further intravenous fluids to normalise serum sodium resulted in repeated episodes of pulmonary oedema. The electrolyte imbalance did not respond to therapy and the patient's condition continued to worsen. She died from acute neurologic injury and multi-organ failure on the 25th day of hospitalization.

**Conclusion:** Earlier presentation to hospital and initiation of therapy, in this case may have resulted in a better outcome. Although glacial acetic acid has been banned in Latvia, it is still found in many homes. Accidental ingestion may be devastating, require prolonged treatment for severe GI injury and result in chronic GI scarring. Mortality, from secondary injury such as GI perforation, septicaemia and multi-organ failure, is common.

**Summary:** This report describes a fatal case of late-presenting accidental glacial acetic acid ingestion.

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## CLINICAL OUTCOME REVIEW IN PATIENTS AFTER ELECTIVE CARDIAC SURGERY AND ACUTE CARDIAC SURGERY

**Key words:** Elective cardiac surgery, acute cardiac surgery, left ventricular ejection fraction.

**Introduction.** Characteristics of acute or elective cardiac surgery varies the outcome of surgery. In literature reduced EF and acute cardiac surgeries are considered as high-risk cardiac surgeries. EF(<40%) is considered as noticeable disfunction<sup>(1)</sup>.

**Materials and methods.** A retrospective descriptive study was held in the Cardiac Surgery Anesthesia and Intensive Care Department year 2018 of Pauls Stradins Clinical University Hospital. The study included 109 randomized cardiac surgery patients. Clinical data were collected from the medical records of patients. All the data was collected, statistically analyzed in SPSS statistical analysis platform.

**Results.** From 109 patients 29.4% (n=32, 95% Confidence interval 21.1-37.6%) underwent acute cardiac surgery 1-7 days after hospitalization and had LVEF<40% (1.group), 70.6% (n=77, CI 62.4-78.9%) underwent elective cardiac surgery, had LVEF>40% (2.group). In both groups survival was 91.7% (CI 86.2-96.3%), 90.6% (CI 78.1-100%) of 1.group and 92.2% (CI 85.7-97.4%) of 2. group, however no statistically significant correlation was found between lethality in these two groups (p=0.785). Time spent in the ICU (p=0.004) and in the hospital (p=0.009) both showed statistically significant correlation in either groups. Erythrocyte (p=0.007), platelet (p=0.015), plasma transfusions (p=0.015) correlate with both groups, but no correlation with cryoprecipitate transfusion (p=0.309), surgery fluid balance (p=0.899), diabetes (p=0.982) and catecholamine support (p=0.087) was noticed. The Kaplan-Meier survival rate at 15 days was 60% for 1.group and 36.5% for 2.group.

**Conclusion.** Acute high risk cardiac surgery patients with normal EF spent more time in ICU and had longer overall hospitalization time. However the need for blood components was higher in elective high risk cardiac surgery patients with low EF group. 15 days survival rate was higher for acute patients.

1. Pieri M., et al, 2016

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## COMPARATIVE EVALUATION OF CENTRAL RETINAL VEIN THROMBOSIS USING OCT AND OCT ANGIOGRAPHY

**Key words:** Central retinal vein thrombosis, optical coherence tomography, optical coherence tomography angiography.

**Objectives.** Retinal vein occlusion (RVO) is the most common retinal vascular disease after diabetic retinopathy, which can cause vision worsening and lead to vision loss. Disturbed venous drainage can induce macular oedema and neovascularization. The aim of the research was to analyze and compare changes in retina in patients with CRVT using OCT and OCTA.

**Methods.** 10 patients with CRVT were analyzed using optical coherence tomography (OCT) and optical coherence tomography angiography (OCTA). Central macular thickness was measured with OCT, foveal avascular zone (FAZ) was measured with OCTA and to measure best corrected visual acuity (BCVA) ETDRS chart was used. Data was analyzed using Word Excel and IBM SPSS 22.0, Spearman's rho and Wilcoxon tests were used to analyze statistics.

**Results.** 5 men and 5 women were analyzed. Average age of patients was 73,3 years. Mean FAZ in thrombosed eye was 0,506mm<sup>2</sup> (IQR=0,357) and in the intact eye it was 0,248mm<sup>2</sup> (IQR=0,076) -

without statistically significant difference ( $p=0,074$ ). Mean BCVA of the thrombosed eye was 0,36k.n. Mean central macular thickness at the beginning of thrombosis was 413,6 $\mu$ m (IQR=471,8) and after treatment - 254,4 $\mu$ m (IQR=67,0). There was found statistically significant high negative correlation between the size of FAZ in the thrombosed eye and BCVA of the same eye ( $r=-0,812$ ;  $p=0,004$ ). There was found statistically significant difference between retinal thickness of the thrombosed eye at the time of thrombosis and retinal thickness of the thrombosed eye after treatment ( $p=0,037$ ).

**Conclusion.** 1. Patients with larger FAZ after CRVT were associated with lower visual acuity.  
2. A trend of the size of FAZ between thrombosed eye and the intact eye was noted.  
3. Central macular thickness is significantly decreasing after the treatment and is associated with better visual acuity.  
4. OCT and OCTA can be used as diagnostic and prognostic tool for patients with CRVT.

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## **COMPARISON OF CRANIAL ULTRASOUND AND MAGNETIC RESONANCE IMAGING FINDINGS IN NEONATAL SEIZURE PATIENTS**

**Key words:** Neonatology, seizures, cranial ultrasound, magnetic resonance imaging.

**Objectives:** Determining the underlying cause of neonatal seizures is the foundation of precise seizure management, and can help to define the prognosis of patient. The cranial ultrasound (US) in most clinics is used as the first line diagnostic tool for central nervous system evaluation, because of it's convenient use. However magnetic resonance imaging (MRI) is considered as the most sensitive cranial imaging study for determining the possible etiology of neonatal seizures. In this study we describe the most frequent cranial US and MRI findings in neonatal seizure patients admitted to the Neonatal Intensive Care Unit (NICU) of tertiary care Children's Clinical University Hospital, Riga, Latvia.

**Materials and methods:** In a retrospective review of electronic medical records we gathered neonatal seizure patients admitted to NICU in the period of 1st January, 2019 to 31st December, 2019. Relevant data of neonatal seizure patients who underwent both cranial US and MRI was collected in MS Excel, statistical processing performed in IBM SPSS software.

**Results:** In total 28 (15 female, 13 male) neonates with clinically detected seizures and consequentially performed cranial US and MRI were included in the study, of those 19 born in term ( $\geq 37$ th gestational week), 9 born preterm ( $< 37$ th gestational week). Hypoxic ischaemic encephalopathy (HIE) was suspected in 18% ( $n=5$ ) of cases when US was performed. HIE was approved by MRI in 25% ( $n=7$ ) of patients, as well cytotoxic edema was identified with MRI in 57% ( $n=4$ ) of HIE cases. Focal ischaemic brain injury was detected in 18% ( $n=5$ ) of patients with MRI, and in only 1 patient with US. Intraventricular hemorrhage (IVH) was more often detected with US - 29% ( $n=8$ ), with MRI - 21% ( $n=6$ ). Periventricular leukomalacia associated with IVH, brain malformations and intracerebral hemorrhage of various localizations were equally common detected by both US and MRI. Subdural hemorrhage ( $n=5$ ) and hemosiderin depositions ( $n=2$ ) was only detected by MRI. However high echodensity of periventricular region ( $n=7$ ) was only described when cranial US was performed.

**Conclusions:** While MRI can specify more details of the intracerebral defects, ultrasound might be better at detecting IVH and periventricular region lesions.

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## **COMPARISON OF EFFICACY AND INCIDENCE OF SIDE EFFECTS AFTER LABOR INDUCTION WITH PGE1 AND PGE2 FOR NULLIPARA WOMEN: INTERNATIONAL EXPERIENCE**

**Introduction:** Labor induction (LI) is a widely used necessary procedure, being performed to benefit the health of both mothers and children. Nulliparous women with an unfavorable cervix, requiring LI, are believed to be at higher risk of acute cesarean section (CS) as well as several researches show differences in incidence of perineal rupture, nausea and other adverse effects, comparing to non-induced deliveries. But does prostaglandin (PGE) type, used for LI influence efficacy and incidence of complications?

**Aim of the study:** To compare efficacy and incidence of complications after LI induction with PGE1 and PGE2 methods following the regimens of 3 different hospitals.

**Material and methods:** A cross-sectional international study, conducted in Riga Maternity hospital (RMh), Paul Stradins university hospital (PSUh) and University hospital Hradec Kralove (UhHK), included 121 women after LI. Subjective comparison was obtained from self-filled questionnaires, while objective data included LI protocols. Data was processed with Microsoft Excel and IBM SPSS Statistics 22.0.

**Results:** PGE1 (oral) was used in both RMh and PSUh in 100% (n=82), median(IQR) dosages 137(150)mcg. PGE2 (cervical) was used in 100% (n=39) in UhKH, median dosage 1300(0.0075) mcg for LI with/without previous PGE2(3 mg) or Foley catheter for labor preinduction (LP), p=0.720. No statistically significant differences were found between incidence of acute CS (18.2%, n=22), amniotomy rate (51.7%, n=61), oxytocin use rates (47.5%, n=56), episiotomy rates (46.5%, n=47), newborn hospitalization rate (7.4%, n=9), incidence of nausea as a side effect (18.2%, n=22), incidence of vomiting as a side effect (8.3%, n=10), duration of the 1st period of labor (345(275) min), the 2nd period of labor (63(60) min), the 3d period of labor (10(5) min), Apgar score at the 1stminute (8 (1)), Apgar score at the 5th minute (9(1)).

Statistically significant difference was found between:

- Time before onset of the 1stperiod of labor (9.5(14.4) hours after PGE1 and 15(4.8) hours after PGE2);
- Incidence of perineal rupture (62.2% (n=51) for PGE1 and 38.5% (n=15) for PGE2);
- Total blood loss (300(100) ml for PGE1 and 200(150)ml for PGE2);
- Incidence of back pain as a side effect (6.1%(n=5) for PGE1 and 17.9%(n=7) for PGE2).

**Conclusions:** PGE1 may require longer period of time to develop regular uterine contractions and may be associated with bigger blood loss during delivery and higher incidence of perineal ruptures. However in case of LI using PGE2, exists higher probability of developing back pain as a side effect. Further evaluation needed.

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## COMPARISON OF OCCUPATIONAL ENVIRONMENTAL RISK FACTORS AND TYPICAL ACCIDENTS FOR HEALTHCARE SPECIALISTS IN PSYCHONEUROLOGICAL AND MULTI-PROFILE HOSPITALS

**Key words:** psychoneurological hospital, multi-profile hospital, healthcare professionals, risk factors.

**Introduction.** The research work is devoted to risk factors of work environment and analysis of typical accidents in the psychoneurological hospital that are common for health care specialists with the work main purpose of finding out and comparing risk factors of work environment and typical accidents in psychoneurological hospital and for multi-profile hospital healthcare specialists.

**Objectives.** Identify and compare the risk factors of the working environment and the typical accidents in the psychoneurological hospital and multi-profile hospital of healthcare specialists.

**Materials and methods.** Survey data was collected from healthcare specialists using a questionnaire in Vidzemes multi-profile(hospital Nr.1) and Strenči psychoneurological(hospital Nr.2) hospitals from 02/26/2019 to 03/16/2019 and analyzed using IBM SPSS.

**Results.** Total 70 health care workers were interviewed. 42 health care specialists from Hospital Nr.1 and 28 respondents from hospital Nr.2 participated in the survey. There were 11 doctors and 31 medical nurses from hospital Nr. 1 and 13 doctors and 15 nurses from hospital Nr.2. Respondents included in the study ranged from 18 to 65 years old. Based on the results obtained, it can be concluded that the incidences of injuries( $p=0.006$ ), the need for physical endurance ( $p=0.001$ ), exposure to potentially infected objects( $p=0.008$ ), contact of medical personnel with psychological violence from relatives( $p=0.004$ ), the prevalence of allergic reactions between workers( $p=0.003$ ) and the incidence of officially registered accidents depend on the profile of the hospital ( $p=0.058$ ).

**Conclusion.** Analysis of the data cannot demonstrate that the increased number of occupational environmental risk factors in the psychoneurological hospital also affects the number of accidents compared to a multi-profile hospital. The results obtained cannot be referred to the overall count of health professionals, depending on the hospital.

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## COMPARISON OF THE ANALGESIC EFFECT OF ESP AND TEA AFTER THORACOTOMY

**Background.** Erector spinae plane (ESP) block is an interfascial plane block where a local anaesthetic is injected in a plane below the erector spinae muscle. Anatomical and radiological investigations indicated its likely site of action is at the dorsal and ventral rami of the thoracic spinal nerves. The ESP block is a new technique and holds promise as simple and safe for thoracic analgesia in acute postsurgical or posttraumatic pain as well as chronic neuropathic pain as good as thoracic epidural analgesia (TEA).

**Aim.** Evaluate ESP analgesic effect after thoracotomy to TEA and compare mean opioid consumption in 48h after surgery for each regional block.

**Methods.** A prospective study was conducted in the Hospital of Tuberculosis and Lung diseases in Latvia between January 2020 and March 2020. 10 patients with block randomization were divided in 2 groups: 5 patients had ESP block with 15 ml 0,25% *S. Bupivacaini* after thoracotomy and 5 patients had TEA block with 0,1 ml/kg 0,25% *S. Bupivacaini*. Catheters for TEA method was inserted under ultrasound guidance. Both groups had the same systemic analgesics for first 24h after surgery: *S.*

*Ketorolaci* 60 mg, *S. Acetaminofeni* 4g, *S. Metamizoli* 4 g and *T. Etoricoxibi* 90 mg. Pain score was evaluated from 1 to 10 (numeric rating scale - NRS). Postsurgical pain after thoracotomy was assessed during first 48 hours. If patient had pain > 4, one of opioids were added: *S. Tramadol* 100 mg i/m or *S. Fentanyl* 0.05 mg i/v. Both drugs were converted to morphine milligram equivalent. We used descriptive statistics and t independent test to investigate statistically significant association between both techniques.

**Results.** The study included 10 randomized patients after thoracotomy - 5 patients in each group. ESP group had 5 men and 1 woman, mean age M = 57.20, SD= 8.11; mean body mass index (BMI)= 25.79 kg/m<sup>2</sup>. TEA group had 3 men and 2 women, mean age M = 69.40, SD= 3.78; mean BMI= 28.10 kg/m<sup>2</sup>. Results showed statistically significant differences in pain reduction between both groups (p<0,05). ESP worked better as an analgesic than TEA and subjective pain at ESP was lower after 2h, 25h, 28h, 31h, 32h (mean pain level=0.6;m= 0.8;m= 0.4;m= 0.4; m=0.4; m=0.4) compared to TEA (m=2.8;m= 3.0;m=2.0;m= 2.0;m= 2.4;m= 2.6). Mean opioid consumption during 48 h in ESP group was 52 mg but in TEA group - 60mg. Consumption is not statistically significant between both groups. (p=0.45).

**Conclusion.** Study indicates that it can provide adequate and fast analgesia with gradual pain decrease. However, TEA did not reduce the pain as good as ESP and pain constantly persisted <4. Most of patients reported no pain or very low pain after 43h in both groups.

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## COMPLICATIONS AND SIDE EFFECTS ASSOCIATED WITH DOBUTAMINE STRESS ECHOCARDIOGRAPHY AT THE RIGA EAST CLINICAL UNIVERSITY HOSPITAL

**Key words:** Dobutamine stress echocardiography, side effects.

**Introduction.** Dobutamine stress echocardiography (DSE) is a widely used pharmacologic stress testing with simultaneous echocardiographic visualization of cardiac structures for the diagnosis and evaluation of coronary artery disease. The risk of DSE complications is low, dobutamine administration is usually safe and well tolerated. However, side effects - cardiac and non-cardiac - exist and need to be recognized.

**Aim.** To determine the incidence of DSE complications and side effects at the Riga East Clinical University Hospital.

**Materials and methods.** Retrospectively, 224 (104 female, 120 male) patients with DSE protocols performed at RAKUS in 2019 were analyzed and the incidence of complications and side effects were assessed. The mean age of the study group is 65.69 ± 9.8 years old. In 46.40% of cases, atropine was used. Attaining target heart rate - 89.70%. Data were statistically processed using IBM SPSS Statistics.

**Results.** The overall incidence of side effects caused by DSE is 74.1%, which is very close to number reported in the literature, i.e. 76% (Mahmarijan JJ et al.,1994). No serious complications such as death, asystole, ventricular fibrillation, sustained ventricular tachycardia, myocardial infarction were observed. Chest pain occurs in 21% of cases, ventricular extrasystoles - 33%, supraventricular extrasystoles - 15.60%, nonsustained ventricular tachycardia - 10.30%, paroxysmal supraventricular tachycardia - 4.50% and paroxysmal atrial fibrillation - 1.30%. Hypotension was observed in 12.50% and severe hypertension in 1%. Left ventricular outflow tract obstruction was observed in 17% and left ventricular mid-cavity obstruction in 2.20%. Among non-cardiac side effects, the most commonly observed was dyspnea - 6.30%.

**Conclusion.** DSE is generally safe and well tolerated stress test. No life-threatening complications were observed. Non-cardiac complications are rare. The most common of arrhythmias are ventricular and supraventricular extrasystoles.

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## **CORRELATION BETWEEN DIFFERENT ATTACHMENT STYLES AND PSYCHOSOMATIC SYMPTOMS**

**Key words:** Attachment style, psychosomatic symptom, adult, questionnaire.

**Objectives:** In present cross-sectional study we examined correlation between different attachment styles in adults and psychosomatic symptoms.

**Hypothesis:** Persons with insecure attachment styles have greater association with psychosomatic symptom severity and prevalence.

**Materials and methods:** During time period February 2020 – March 2020 adults aged from 18 – 40 were surveyed. Participants completed an anonymous, self – administered, standardised questionnaire (*Original Attachment Three Category measure; DSM 5 Self –related level 1 Cross Cutting symptom measure, PHQ 15*) assessing age, sex, education, presence of chronic diseases, attachment style and psychosomatic symptom severity.

**Results:** The survey was completed by 288 adults. Among the 288 respondents, 137 were included because they completed inclusion criteria (age from 18 – 40 and noted presence of psychosomatic symptoms). Included were 115 females and 22 males. Most of respondents (68%) were with insecure attachment styles and only 32% with secure attachment. More severe psychosomatic symptoms noted respondents with insecure attachment styles. 43% of respondents with avoidant attachment style noted that their psychosomatic symptom severity is medium – severe, only 20% with secure attachment and 60% with ambivalent attachment style. Also was found medium, statistically significant association between attachment styles and psychosomatic symptom severity ( $p < 0.001$ ; Cramer's V test 0.394).

**Conclusions:** There exists a moderate, statistically significant association between insecure attachment styles and psychosomatic symptoms. Severe psychosomatic symptoms more often prevail in people with avoidant attachment style, while people with anxious attachment most often exhibit moderate psychosomatic symptoms. For people with secure attachment, psychosomatic symptoms are mostly minimal or mild.

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## **CORRELATION BETWEEN PARENT-ADOLESCENT COMMUNICATION LEVEL AND ADOLESCENT SOMATIZATION LEVEL**

**Key words:** parent-adolescent communication, adolescent somatisation.

**Introduction:** Family environment, parenting style and quality of communication between parents and adolescents is critical to adolescent adjustment and mental health.

**Aim:** To evaluate parent-adolescent communication level and adolescent somatization level and determine whether there is a correlation between parent-adolescent communication level and adolescent somatization level.

**Methods:** A cross-sectional research using survey with 2 questionnaires was performed. The respondents of the study were the patients age 11 to 18 of Children's Clinical University Hospital of Latvia. Parent-Adolescent Communication Scale (PACS) included 20 questions to measure parent-adolescent communication. Children's Somatization Inventory (CSI-24) was used to measure somatization level. Data on patient diagnosis was gathered according to International Classification of Diseases, 10<sup>th</sup> Revision (ICD-10). The obtained data was analysed using IBM SPSS Statistics v.22 software.



**Results:** The study involved 54 patients from departments of endocrinology, gastroenterology, rheumatology, pneumonology, dermatology, allergology of Children's Clinical University Hospital. 61,1% were girls and 38,9% were boys. All participants were divided into 2 groups that was determined by patient's diagnosis: 17 patients with functional illness and 37 patients with organic illness. Significant somatization level differences were found between girls and boys (Mann-Whitney U test:  $U=152$ ;  $p=0,001$ ). Median ( $Q_1$ ;  $Q_3$ ) of somatization level for girls 23,0 (18,9; 30,1) and for boys 13,0 (6,5; 20,5). Significant somatization level difference was found between group with functional illness and group with organic illness ( $p<0,5$ ). Median ( $Q_1$ ;  $Q_3$ ) of somatization level for group with functional illness 25,0 (17,4; 39,8) and for group with organic illness 19,0 (8,0; 23,0). Parent-adolescent communication did not differ between boys and girls (Mann-Whitney U test:  $U=245,5$ ;  $p=0,73$ ). Median ( $Q_1$ ;  $Q_3$ ) of parent-adolescent communication for girls 67,0 (58,5; 77,0) and for boys 70,0 (68,0; 81,0). No statistically significant correlation was found between parent-adolescent communication and adolescent somatization level ( $p>0,5$ ).

**Conclusion:** Parent-adolescent communication does not affect somatization level among adolescents. Adolescents with functional illness have higher somatization level than adolescents with organic illness.

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## **CORRELATION BETWEEN PATIENT KNOWLEDGE ABOUT SEDENTARY PATIENT CARE AND HOSPITALIZATION LENGTH**

Regular physical activity is significant for physical and mental health. It is essential for all health professionals to counsel their patients to engage in physical activity independently on patient's physical state or disability. Hospitalization and communication with the patient may improve knowledge about required and suitable physical activity.

The aim of the study was to investigate whether patients with longer hospitalization time have better knowledge about sedentary patient care.

Patients were interviewed with a questionnaire. Questionnaire was developed based on the guidance of World Health Organization guidelines "Global recommendations on physical activity for health (2010)". Statistical analysis was performed with SPSS statistics software.

This study included 101 hospitalized patients from National Rehabilitation Centre „Vaivari”. 60.4% (61) were women and 39.6% (40) were men.

35.6% (36) answered correctly in the questionnaire about when patient is defined as sedentary. 83% (30) from those who answered correctly were hospitalized for less than 15 days.

41.6% (42) respondents answered correctly about how much moderate physical activity is required for these kind of patients. 50% (21) from those who answered correctly were hospitalized for 15 days and more. Hospitalization length was not significantly important in both of these groups ( $p>0,05$ ).

Hospitalization length was not the factor that impacted patient knowledge about sedentary patients. Furthermore, their knowledge should be tested more precisely.

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## **CORRELATION BETWEEN TUMOR MARKER LEVELS AND PET/CT FINDINGS IN PATIENTS WITH BREAST CANCER**

**Key words:** PET/CT, breast cancer, tumor marker, CEA, CA15-3.

**Objectives:** In breast cancer patients tumor markers Carcinoembryonic Antigen (CEA) and Cancer Antigen (CA) 15-3 can help in disease monitoring, determining therapy effectiveness, and clinical staging. However, these markers lack sensitivity and specificity. As continuous analysis and other examinations may lead to unwanted anxiety and therefore decreased quality of life for the patient, it is important to know, what kind of disease progression could increased markers indicate. The aim of this study was to clarify what correlation do tumor markers CEA and CA 15-3 have with Fluorine-18 fluorodeoxyglucose (18F-FDG) Positron Emission Tomography/Computed Tomography (PET/CT) findings in patients with breast cancer.

**Materials and Methods:** This retrospective study took place in Riga Stradiņš University Nuclear Medicine Clinic from March of 2016 until June of 2019. Adult patients with histologically proven breast cancer who had tested their tumor marker levels and later underwent a PET/CT examination were included in this study. The patient histories, laboratory results and PET/CT reports were analysed. Patients with inconclusive PET/CT findings and patients who had their tumor markers tested more than two months before the PET/CT examination were excluded from this study. Statistical analysis was performed with SPSS Statistics analysing software.

**Results:** All 67 patients were women with the median age of 53 years. In PET/CT positive patients CEA median was 1.99 ng/mL and CA 15-3 median was 23.40 U/mL, but in PET/CT negative patients - 0.70 ng/mL and 15.00 U/mL, respectively (CEA  $p=0.011$ , CA 15-3  $p=0.005$ ). Both CEA and CA 15-3 were higher in patients with PET/CT positive bone metastases (CEA 5.35 ng/mL, CA 15-3 58.00 U/mL) than in patients without bone metastases (CEA 1.07 ng/mL, CA 15-3 16.15 U/mL) (CEA  $p=0.005$ , CA 15-3  $p=0.001$ ). Both markers were also higher in patients with other PET/CT positive extra nodular metastases (CEA 2.48 ng/mL, CA 15-3 49.30 U/mL) when compared to patients without other extra nodular metastases (CEA 1.06 ng/mL, CA 15-3 17.29 U/mL) (CEA  $p=0.017$ , CA 15-3  $p=0.013$ ). Only CA 15-3 was higher in patients with lymph node involvement (26.10 U/mL) compared to patients with PET/CT negative lymph nodes (15.60 U/mL) ( $p=0.025$ ). Furthermore, median CA 15-3 levels increased in patients with a higher number of metastases: 12.40 U/mL in monometastatic, 21.10 U/mL in oligometastatic, 55.40 U/mL in polymetastatic disease ( $p=0.001$ ).

**Conclusions:** Increased tumor markers CEA and CA 15-3 in breast cancer patients correlate with PET/CT positive findings. Both, increase in CEA and CA15-3 levels are associated with bone and extra nodular metastases, but only increased CA 15-3 is associated with lymph node metastases. The highest tumor marker level is expected in patients with bone metastases and/or in case of polymetastatic disease.

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## **CORRELATIONS AMONG BRAIN MAGNETIC RESONANCE IMAGING (MRI) AND CEREBROSPINAL FLUID (CSF) ANALYSIS FINDINGS IN CONFIRMED ENCEPHALITIS**

**Key words:** encephalitis, MRI, CSF.

**Introduction.** Encephalitis is relatively rare. Timely diagnosis has important implications for each patient because it's hard to predict how the disease will affect them.

**Aim.** This study aimed to assess MRI associations with certain cerebrospinal fluid levels.

**Materials and methods.** For this retrospective study the chosen time frame was from January 1st 2012 till December 31 2018. The MRI sequences under study were T2-weighted, T2-FLAIR and DWI scans. As for CSF analysis we opted for cytosine, total protein and glucose. IBM SPSS Statistics 19 was employed to analyze all obtained data.

**Results.** 67 patients with encephalitis; 3 groups were formed: those without any MRI signs for encephalitis (n=18 (26.9%), min. age=23yr, max. age=80yr), those with partial signs (n=37 (55.2%), min. age=21yr, max. age=91yr) and those with very typical signs (n=12 (17.9%), min. age=21yr, max. age=87yr). Spearman's correlation was applied between MRI and the cytosine (n=66,  $r_s=-0.08$ ,  $p=0.55$ ), total protein (n=67,  $r_s=-0.09$ ,  $p=0.47$ ) and glucose (n=61,  $r_s=-0.05$ ,  $p=0.71$ ). According to this we don't have sufficient evidence to suggest a significant correlation. The Kruskal-Wallis test of cytosine ( $p=0.81$ ), total protein ( $p=0.77$ ) and glucose ( $p=0.74$ ); the same is also for Mann-Whitney U test (cytosine  $p=0.71$ ; protein  $p=0.55$ ; glucose  $p=0.97$ ). Overall all cerebrospinal fluid levels show a fairly alike distribution between groups which shows in depth how the correlation and test results came to be.

**Conclusion.** This study indicates that the differences are not statistically significant meaning that not every brain MR imaging sign can be applicable to certain cerebrospinal fluid parameters.

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## **DEPRESSION AND GENERALIZED ANXIETY DISORDER AMONG GENERAL PRACTITIONERS IN LATVIA: RELATION TO WORKING PRINCIPLES OF PRACTICE, WORK EQUIPMENT, FAMILY STATUS AND OTHER CHARACTERISTICS**

**Introduction:** Data from Europe show that the incidence of depression is 6.9% of the population, while anxiety disorders – 14%. In majority of depression/anxiety studies the main subject groups were patients (most commonly with chronic diseases) compared to general population. Only recently in Latvia studies involving health professionals have been provided. General practitioners (GP's) may be more exposed to the development of depressive/anxiety spectrum disorders compared to their colleagues in hospital, since GP's are the first line of help to face patients with different medical complaints, patients social issues, have to manage the practice (i.e. company) work, are responsible for large amounts of documentation, and their monthly salary is highly dependent not only from high quality work, but also from the number of patients enrolled in practice and the proportion of underage patients in the practice. Social and professional isolation from other colleagues due to the intensity of work and the location of practice should also be mentioned as a risk factor.

**Aim of the work:** To clarify which personal and work-related factors may influence the development of depressive and/or anxiety spectrum disorders among general practitioners in Latvia.

**Results:** Respondents completed PHQ-9 (Patient Health Questionnaire-9) and GAD-7 (General Anxiety Disorder-7) screening questionnaires, severe depressive symptoms were found in 5 (4.2%), moderately severe in 7 (5.8%), moderate in 24 (20.0%), but mild symptoms in 46 (38.3%) GP's; severe anxiety disorder occurred in 3 (2.5%), moderate in 21 (17.5%) but mild in 30 (25.0%) GP's. A positive correlation was found between the more severe depressive symptoms and the time spent on documentation/telephone consultations ( $r = 0.270$ ;  $p < 0.01$ ), these GP's had a difficulty in carrying out their work/household duties, communicating with people ( $r = 0.289$ ,  $p < 0.01$ ). Depressive symptoms ( $r = 0.281$ ,  $p < 0.01$ ) and anxiety ( $r = 0.192$ ,  $p < 0.05$ ) are more uncommon to those GP's who feel replacable at their practice. Work, casual activities and communication seems to be more difficult to those GP's who do not feel financially appreciated ( $r = 0.185$ ,  $p < 0.05$ ) and those who do not feel replaceable at their practice ( $r = 0.188$ ,  $p < 0.05$ ). Depressive symptoms correlated with anxiety ( $r = 0.642$ ,  $p < 0.01$ ). No statistical significance was found between family status, number of children or GP's length of employment.

**Conclusions:** Disorders of the depressive spectrum among GP's are widespread -- moderate to severe symptoms are present in 10% of primary care professionals. A similar situation is observed in case for anxiety disorders, with 20% of GP's having moderate to severe symptoms. The data, compared with the general population, show a higher probability of mental illnesses such as depression or generalised anxiety disorder among GP's. The results showed that GP's suffer more frequently with a combination of depression and anxiety disorder than isolated generalised anxiety disorder or isolated depressive disorder. We are looking at the trend that the psychoemotional health of a GP's is largely affected by the situation at their workplace- whether there is a colleague who replaces in absence and substitutability *per se*, as well as by the financial support from the government, also the time spent to settle documentation. The results show that a large part of the primary care professionals have difficulties in carrying out their work duties and communication with people, this indicates deterioration in the quality of work and the likelihood for more frequent errors caused by the human errors in diagnostics, treatment and patient monitoring. It should be noted that questionnaires were filled out by the most active part of GP's - those who attend conferences and are socialising between colleagues. It would be beneficial to continue this study with larger group of respondents with survey tools that can reach a wider audience of respondents.

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## DERMOSCOPIC MONITORING OF SHINY WHITE STREAKS DURING TOPICAL TREATMENT OF ACTINIC KERATOSIS

**Background and Objectives.** It has been shown that dermoscopy improves diagnostic accuracy of a clinician. Nevertheless, data on dynamics of dermoscopically seen structures and treatment impact on them is scarce. Therefore, we chose to monitor shiny white streaks (SWS), during topical treatment of actinic keratoses (AK).

**Materials and Methods.** AK lesions located on face or scalp were treated with either topical 5% 5-fluorouracil cream (5FU) or daylight photodynamic therapy with methyl aminolevulinate (DL-PDT). Dermoscopic assessments were performed before start of therapy, at peak inflammatory phase and one-month post-treatment (Follow-up visit).

**Results.** Of 38 lesions followed, before start of therapy SWS were present in 18 (47%) lesions. In five cases (13%) SWS remained present through all visits. In three cases (8%) SWS were present until the Follow-up visit. In ten (26%) AKs SWS disappeared at the peak inflammatory phase, but in four (11%)

of those SWS later reappeared. Of 20 (53%) lesions without SWS at the first visit, only one (3%) developed SWS at a Follow-up visit.

**Conclusions.** SWS seem to be variable structures that can be unseen in inflamed lesions, disappear following topical treatment of AK and sometimes appear post-treatment. It could be important to take into consideration the dynamics of SWS when assessing their presence.

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## **DIABETIC KETOACIDOSIS AND ACUTE PANCREATITIS IN CHILDREN'S CLINICAL UNIVERSITY HOSPITAL FROM 2015 TILL 2017**

**Background and aims of the research.** Type 1 diabetes and pancreatitis both are common endocrine and exocrine pathologies of the pancreas in a paediatric population, while their acute presentations- diabetic ketoacidosis (DKA) and acute pancreatitis (AP)- require a prompt diagnosis and intensive treatment. Furthermore, as discussed in literature and research studies, there's still space for more data on the interchanging relationships between DKA and AP. The aim of the study was to evaluate and analyse the characteristics and possible relations between DKA and AP in a paediatric population.

**Materials and methods.** A retrospective evaluation of 207 cases, corresponding International Classification of Diseases (ICD-10) codes E10.1 and K85, for the time period of 2015-2017 was carried out, using Microsoft Excel and IBM SPSS Statistics.

**Results.** A retrospective evaluation showed that most admission rates in the study group were due to type 1 diabetes with DKA (79,2%). DKA was a complication both in newly diagnosed (64%) and established type 1 diabetes patients (36%), and, furthermore, there was a significant correlation between the duration of illness and previous DKA episodes in patient's history ( $p < 0.01$ ). The analysis of AP diagnostic criteria showed the presentation of abdominal pain in 97,7% AP patients and there was a definite correlation between lipase and abdominal imaging results (95,3% versus 75,6%;  $p < 0,01$ ), as well as lipase and cholesterol levels ( $p < 0,05$ ). When comparing both medical emergencies, there was a statistically significant difference between the two regarding the time spent in ICU ( $p < 0,001$ ), mean age ( $10,8 \pm 4,7$  in DKA group versus  $13,8 \pm 3,8$  in AP group,  $p < 0,001$ ) and typical presentations, such as polyuria, polydipsia, weight loss, wasting and abdominal pain ( $p < 0,001$ ). One of the more interesting findings showed that there was nonspecific as well as marked increase, reaching the diagnostic criteria, in pancreatic enzyme levels in type 1 diabetes patients with DKA- amylase and lipase was  $\geq 3$  times higher than normal in 3,3% DKA patients and these findings were consistent with a correlation between pH and lipase levels ( $p < 0.01$ ).

**Conclusions.** This study shows that DKA is an important complication both in newly diagnosed and already established type 1 diabetes patients. Meanwhile, AP has well-established diagnostic standards that were reaffirmed in this study group, showing that these criteria work well also in the less researched paediatric population. When researching the interchanging relationships between the two pathologies, the statistical analysis showed a rise in pancreatic enzyme levels in diabetic patients, and, furthermore, these changes correlated with metabolic acidosis, thus emphasizing the urgency of prompt diagnosis and treatment.

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## DIGITAL EYE STRAIN: PREVALENCE OF SYMPTOMS AND ITS ASSOCIATED FACTORS

**Key words:** Digital eye strain, duration of computer use, ocular symptoms.

**Objectives.** Computers and other visual display devices have become an essential part of daily life. It is estimated that in 2019, 53,6 % of the global population used the Internet. With the increased use, digital eye strain (DES) has become an important occupational health problem. The aim of this study was to define the prevalence of DES among computer users and explore its association with duration of computer use, workstation arrangement and other factors.

**Materials and methods.** The study design- a cross-sectional study. The data was gathered using the structured questionnaire. Chi-square test, Mann-Whitney U test and probit regression were used to determine the association between two variables. Data analysis was performed using IBM SPSS Statistics 22 and MS Excel.

**Results.** Among the total of 247 subjects, the prevalence of DES was 74,9%. Majority of the respondents were females accounting for 67,6 % (N=167). 22,7% and 20,2 % of respondents were using a computer for 2-4 hours and 4-6 hours per day. Dryness, headache and blurred vision were the most common reported symptoms with prevalence of 73,3%, 72,9%, and 70,4%. Females were found to be at a higher risk for development of burning sensation ( $p=0,008$ ), headache ( $p=0,017$ ), dry eyes ( $p=0,026$ ) and coloured halos around objects ( $p=0,034$ ). Burning sensation was strongly associated with duration of computer use ( $p=0,036$ ) and each hour of computer use increased the prevalence of the symptom by 3,8%.

**Conclusion.** High prevalence of vision and ocular related symptoms were noted among participants. Factors such as mean duration of daily computer use, pre-existing eye disease, taking breaks, workstation arrangement were not significantly associated with the prevalence of DES or its severity. Females were at a higher risk for development of DES, however further studies are needed to determine factors associated with digital eye strain.

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## DISTRIBUTION OF PATIENTS WITH GASTRIC PRECANCEROUS LESIONS FROM JANUARY TILL JUNE 2016 AT DIGESTIVE DISEASES CENTER GASTRO

**Background.** Patients with gastric precancerous lesions are considered to be at higher risk to develop gastric cancer. Different level risk groups of gastric precancerous lesions should be stratified for different surveillance strategies according to MAPS (Management of precancerous conditions and lesions in the stomach) guidelines.

**Aim.** To determine the prevalence of different stages of gastric precancerous lesions during the period from January to June 2016 at Digestive diseases center GASTRO.

**Materials and methods.** Patients who underwent upper endoscopy and biopsy protocol according to the updated Sydney system at GASTRO were included in the study. Histological data were classified according to the classification system of OLGA and OLGIM. Excel program is used for data input.

SPSS statistics 22 is used for data statistics analysis using descriptive methods. The level of statistical significance was set at  $p < 0.05$ .

**Results.** A total of 1622 patients who underwent upper endoscopy were evaluated. Mean age was  $57,4 \pm 14,2$  (range 14-92), 35,5% ( $n = 494$ ) were men. OLGA 0 stage - 21%, I stage - 35%, other stages - 6%. OLGIM 0 stage - 37%, I stage 13%, II stage - 8%, other stages - 4%. No dysplasia was found - 91%, but 8,8% have low degree dysplasia and 0,4%- high grade dysplasia (Table 1). Using Spearman's correlation test, a statistically significant correlation was found between age and degree of dysplasia ( $r_s = 0.107$ ,  $p < 0.05$ ).

Using Spearman's correlation test between age and OLGA I stage ( $r_s = 0,085$ ;  $p = 0,001$ ), age and OLGA II stages ( $r_s = 0,142$ ;  $p < 0,001$ ), age and OLGIM I stage ( $r_s = 0,085$ ;  $p = 0,001$ ), age and OLGIM II stage ( $r_s = 0,125$ ;  $p < 0,001$ ) and age and OLGIM III stage ( $r_s = 0,076$ ;  $p < 0,002$ ) correlation was found.

**Conclusions.** There is a statistically significant connection between age and degree of dysplasia, OLGA I, OLGA II, OLGIM I, OLGIM II and OLGIM III stages. According to MAPS guidelines, 7.3% of high-risk group patients should be followed up every 3 years, 8,8% of patients with low grade dysplasia should be followed up every year, but 0,4% of patients with high grade dysplasia - every 6 month.

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## **DO VITAL SIGNS IN PRE-HOSPITAL SETTING HAVE ANY IMPACT ON PULMONARY ARTERY THROMBOEMBOLISM PATIENT OUTCOME**

**Background.** Detection of first vital signs always has important value on general status, severity prediction and possible result. In PATE according to literature should be increased heart and respiratory rate, lower blood pressure and oxygen saturation.

**Aim.** The aim of this study is try to find correlation or association between vital signs (including Glasgow coma scale and glucose level), age and calculation of patients CHA2DS2-VASc score in compare with hospitalization length and each other of those indicators.

**Methods.** This retrospective study analyzed 177 patients in Pauls Stradiņš Clinical University hospital with confirmed PATE and their first vital signs detected in ambulance in pre-hospital setting in year 2018. Data were structured and analyzed with SPSS IBM and MS excel programs, results compared with available literature sources.

**Results.** Vital signs was not detected completely in all patients before hospitalization: 33 patients missed oxygen saturation, 30 breathing rate, 20 blood pressure, but Glasgow coma scale was detected for 60, temperature for 102 and glucose level only for 3 patients. According collected data there was found no correlation between heart rate, systolic and diastolic pressure, age, calculated points of CHA2DS2-VASc score, temperature and Glasgow coma scale compared with hospitalization length, breathing rate was found with negative correlation coefficient ( $p=0,022$ ) oxygen saturation with positive correlation coefficient ( $p=0,038$ ) compared with hospitalization length.

**Conclusions.** First vital signs don't have any predictive value in PATE patient hospitalization length. There was found positive correlation between oxygen saturation and hospitalization length, which doesn't show any meaning, and negative correlation between respiratory rate and hospital stay, that completely differs from literature data and PATE severity scores.

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## **EATING HABIT CHANGES IN LATVIAN SENIORS IN 5 YEAR AND 10 YEAR TIME**

**Objective.** Nowadays healthy nutrition principles is one of healthy lifestyle principles. When people became older human organism need less energy because metabolism tend to decrease. Seniors have to eat less than adults and choose wisely what to eat. Doctors recommend to decrease amount of food for seniors to eat.

**Aim.** The aim of research was to get information about seniors eating habits changes in 5 year and 10 year time.

**Materials and methods.** With the help of survey information about senior eating habits changes in 5 year and 10 year time in Latvia were gained. IBM SPSS Statistics v.23 was used to perform statistic analyze.

**Results.** Overall 61 responds were gained and analyzed. Average respondent age was 71,46. From whom 33 were females but 28 males. In 5 year time 48,5% (N=16) of females and 85,7% (N=24) of males have not changed their eating habits, 45,5% (N=15) of females and 7,1% (N=2) of males started to eat less. One male and one female started to eat less meat products. One female started to drink more water and one male started to eat more vegetables. In 10 year time 42,4% (N=14) of females and 82,1% (N=23) of males have not changed their eating habits, 42,4% (N=14) of females and 7,1% (N=2) of males started to eat less. Two females started to eat less meat products and one male excluded meat products from his daily meals. One female eat less dairy products, one of females eat more vegetables and one female and one male – more fruits.

**Conclusion.** The results shows that more than half of seniors have not changed their eating habits in 5 year and 10 year time. Females are more tend to change their eating habits than males.

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## **EFFECT OF VITAMIN D SUPPLEMENTATION ON PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS**

**Key words:** D vitamin supplementation, systemic lupus erythematosus.

**Introduction:** Systemic lupus erythematosus (SLE) is a chronic, autoimmune inflammatory disease that affects several organs and systems of the body. Vitamin D deficiency seems to be associated with SLE activity, partly due to dysregulation in cytokine production balance.

**Objectives:** The aim of this review was to systematically assess the effects of vitamin D supplementation on systemic lupus erythematosus.

**Methods:** The search was carried out in the Scopus and PubMed for published clinical trials with no limit regarding year of publication, and no restriction regarding gender, age, and ethnicity, all published in the English language. Research papers published from 01.01.2010 to 01.01.2017. There were used the following search terms ( "D vitamin supplementation" ) and ( "systemic lupus erythematosus" ). Articles that met the inclusion criteria were assessed for eligibility using "PEDro" rating scale.

**Results:** From thirty-four found studies, four studies were included in the review. For the comparison were chosen serum D vitamin levels and SLEDAI (Systemic Lupus Erythematosus Disease Activity Index) scores in people with systemic lupus erythematosus. SLEDAI scores were compared in SLE patients before/without oral D vitamin use and after/with treatment. In all four included studies the results show that higher serum D vitamin concentration is associated with lower SLE disease activity. One research found an inverse significant association between 25 (OH) D levels and the VAS score



(degree of fatigue) ( $P= 0.001$ ). Two researches found that in adjusted linear regression models, lower serum 25 (OH) D concentrations were associated with higher average SLEDAI scores (  $p = 0.01$  ). Third research found that an increase in the 25 (OH) D level was associated with a decrease in the mean SLEDAI ( $P= 0.032$ ). And fourth research found a significant improvement in SLEDAI scores in SLE patients used oral D vitamin in comparison to the control group ( $P = 0.011$ ).

**Conclusion:** Current research shows that systemic lupus erythematosus disease activity (SLEDAI) score is inverse associated with serum D vitamin concentration.

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## **EFFECTS OF FACIAL AND JAW INJURIES ON THE DURATION OF HOSPITALIZATION AND NEUROLOGICAL SYMPTOMS IN PAUL STRADIN'S CLINICAL HOSPITAL**

**Background:** One of the broader categories of injuries that belong directly to the main socio-economic problems of any country and affect all layers of the world's population are maxillofacial and mandibular injuries.

**Aim:** The aim of this study was to determine whether the FISS scale can be predictive of the length of hospital stay of patients, whether age can influence the number of FISS scale scores, namely the severity of the injury, and whether FISS and GCS are interrelated.

**Methods:** This retrospective study was performed at Pauls Stradiņš University Clinical Hospital (Riga, Latvia). All patients were first taken to the hospital's admissions department with varying degrees of facial bone household, road accident or criminal injury, and then emergency or scheduled surgery in 2018. A total of 87 patients were selected. Patients who did not have surgery were excluded from the study. Demographic data (age, gender, comorbidities), as well as the location and types of injuries, the Glasgow Coma Scale (hereinafter - GCS) and the time of hospitalization were extracted from patients' medical histories. The total score was calculated for each patient according to the FISS scale (Facial Injury Severity Scale) according to their injury severity and location. Patients were divided into two groups according to the anatomical location of the trauma: the upper and middle part of the face and the lower part of the face.

Continuous data were presented as mean  $\pm$  SD. The D'Agostino-Pearson omnibus test was used to determine the type of data distribution. Fisher's exact test was used to compare qualitative data. Mann-Whitney test was used to compare scale scores between the two groups. Kendall's correlation coefficient and linear regression model were used for data correlation and prediction. To compare the correlation coefficients, Kendall's rank correlation coefficient was converted to the Spearman rank correlation coefficient and then Fisher's z-transform was used. The level of statistical significance was assumed to be p-value  $<0.05$ .

This study has been accepted by the Research Ethics Commission of the Institute of Cardiology and Regenerative Medicine, University of Latvia.

**Results:** In general, no normal distribution was observed for all data, therefore non-parametric tests were used. The number of men was predominant in both groups: 85.11% versus 14.89% (min = 18; max = 75; Me = 30; IQR = Q1 - Q3 (28 - 45)) in the FUAMP[1] group and 88.10% versus 11, 90% (min = 18; max = 65; Me = 33; IQR = Q1 - Q3 (22.75 - 41.25)) in the FLP[2] group with no statistically significant difference ( $p = 0.763$ ). All patients were hospitalized and operated on urgently at the Oral and Maxillofacial Surgery Center. On average, patients were hospitalized for  $2.51 \pm 1.72$  days (95% CI 2.01 - 3.01) (min = 1; max = 9; Me = 2.5; IQR = Q1 - Q3 (1 - 3)) In the FUAMP group and  $3.02 \pm 1.89$  days (95% CI 2.43 - 3.61) (min = 1; max = 10; Me = 3; IQR = Q1 - Q3 (2 - 4)) without any statistical difference ( $p = 0.102$ ). The duration of hospitalization counted from the day of admission until the patient was discharged. The mean FISS score was  $1.87 \pm 1.39$  (95% CI 1.46 - 2.28) in the FUAMP group and  $3.14 \pm 1.26$  (95% CI 2.75 - 3.54) in the FLP group with a statistically significant difference ( $p$

<0.0001). In the FUAMP group, a significant positive correlation was observed between the length of hospitalization and the score according to the FISS scale (Kendall's  $\tau = 0.218$ ;  $R^2 = 0.024$ ; **p-value = 0.032**; intercept coefficient = 2.15; p-value < 0.0001), however, there were no statistically significant differences in the FLP group, although approaching it (Kendall's  $\tau = 0.192$ ;  $R^2 = 0.545$ ; p-value = 0.076; intercept coefficient = 1.92; p-value < 0.05;). No statistically significant difference was observed between the correlation coefficients of the two groups ( $z = 0.19$ ;  $p = 0.849$ ).

The number of points on the FISS scale had no significant correlation with age in both the FUAMP group (Kendall's  $\tau = 0.155$ ; p-value = 0.127) and the FLP group (Kendall's  $\tau = 0.074$ ; p-value = 0.500). There were no statistically significant differences between the correlation coefficients of the two groups ( $z = 0.5$ ;  $p = 0.617$ ). Looking for the correlation between the GKS scale and FISS scale point scores, no significant correlation was found in the FUAMP group (Kendall's  $\tau = -0.059$ ; p-value = 0.539), but there was a statistically significant negative correlation in the FLP group (Kendall's  $\tau = -2.216$ ; p-value = 0.038). However, there were no statistically significant differences between the correlation coefficients of the two groups ( $z = 1.1$ ;  $p = 0.262$ ).

**Conclusions:** The majority of patients in this study were male. The FUAMP group had, on average, more points on the FISS scale than the FLP group. Most patients in both groups were smokers. For most patients, the GKS score was 15 with no difference between groups. There was a weak but statistically significant positive correlation between the duration of hospitalization and the FISS scale in the FUAMP group, however, there was no correlation in the FLP group. There were no statistically significant differences between the two group correlations. No statistically significant correlation was found between the patients' age and FISS scale in either the FUAMP or FLP groups. There were no statistically significant differences between the two group correlations. No significant correlation was observed between the GCS and FISS scales in either the FUAMP or FLP groups. There were also no statistically significant differences between the two group correlations

[1] FUAMP- Face upper and middle part

[2] FLP – Face lower part

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## **EFFECTS OF IONIZING RADIATION ON THE REPRODUCTIVE SYSTEM OF WORKERS AT BORDER INSPECTION POSTS**

**Key words:** Ionizing radiation, male reproductive system, female reproductive system, human fertility.

**Introduction:** There is no dose limit value for the effects caused by ionizing radiation: any exposure (including low doses) may become a cause of disease development in the course of life. Under normal conditions, the radiation doses received are very low and do not have clinically observed tissue effects, but this effect is likely to occur in the long term, leading to reproductive complications.

**Objectives:** The aim of the work is to investigate the extent to which ionizing radiation is obtained by border inspection post workers and what is the most frequent malfunctioning of the reproductive system for employees, as well as to compare the data obtained with a control group that are not exposed to ionizing radiation at work.

**Materials and Methods:** The ethics committee's permission to conduct a survey was obtained before the study was launched. Participants were voluntarily surveyed about their reproductive system. A quantitative study was carried out on the part of the study in the border inspection post of the Latvian State Border Guard. Study participants were divided into two groups: employees who were in contact with ionizing radiation and a control group without exposure. The study was carried out in the period from December 2019 to March 2020. The resulting data were statistically processed using Microsoft Excel and IBM SPSS programs.

**Results:** The results were analysed in two separate groups but under the same conditions. From the analysis of the data, it was concluded that men and women working for 11-15 times on-call per month

with total length of service of 6-15 years and regularly exposed to ionizing radiation developed the highest number of reproductive complications ( $p < 0.05$ ). The largest number of men works in an 11-15 debut month and partner pregnancies are the most common in 6 months to one year, since family planning began. In a group that is in contact with ionizing radiation, 11.1% of the cases become pregnant more than 1 year. In contrast, in the control group, only 2% of pregnancy occurred longer than 1 year  $p = 0.002$ . For those working 16-20 months, 25% of the cases experienced difficulties during pregnancy and, conversely, the number of difficulties decreased to 12.5% as the number of calls fell. In the control group, problems were 18.5%, only for those who worked 11-15 on-call months. Similarly, the study group contained data on child developmental disorders in the investigational population, which is 16.1% more than in the control group.

**Conclusion:** The results of the study indicate reproductive health damage by ionizing radiation and therefore the initiation of preventive measures should be adopted in working areas subject to occupational exposure.

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## **EMOTIONAL WELLBEING AMONG HEALTH CARE SPECIALISTS DURING COVID - 19 PANDEMIC**

**Objectives:** In January 2020 the World Health Organization (WHO) declared the outbreak of a new coronavirus disease, COVID-19 and in March 2020, WHO made the assessment that it can be characterized as a pandemic. [1] The outbreak of this disease is likely to be stressful for people. Fear and anxiety regarding a disease like this can cause strong emotions in people. [2] The study in China represents data on depression and anxiety levels among health care workers during Covid-19 pandemic. The results show that 50,4% of respondents have symptoms of a depression and 44,6% have symptoms of anxiety. [3]

**Aim:** To investigate the prevalence of depression and anxiety during Covid - 19 infection pandemic among health care specialists.

**Method:** A cross-sectional study. The online survey was distributed using social networking service Facebook. The questionnaire consisted of demographic questions and a hospital anxiety and depression scale (HADS). HADS is commonly used to determine the levels of anxiety and depression that a person is experiencing. The HADS is a fourteen point scale - seven for anxiety and seven for depression. An analysis of the data was performed using MS Excel and IBM SPSS- descriptive statistics.

**Results:** In total there were 107 respondents, out of them 88 (82,2%) were women and 19 (17,8%) - men. The median age was 28 years, age group 22 up to 62 years old.

Out of all respondents 93 (86,9%) live in a city, 8 (7,5%) in a small town and 6 (5,6%) in the countryside. Out of all respondents 3 (2,8%) were extremely worried about Covid-19 pandemic and the possible resulting situations, 41 (38,3%) were worried, but not so much, 40 (37,4%) were worried only a little and 23 (21,5%) were not worried at all.

A life companion (61%), close friend (46%), parents (44%) and work colleague (37%) are closest people respondents share their thoughts and feelings with. 99,1% noted they were worrying about something during this time. The most common topics that cause worries are ambiguity about the future situation (67%), worries about relative or own health (66%) and financial situation (36%). Out of all respondents depressive sensations were found with 11.2% of people, border depression status were found with 8,4%. An anxiety was found with 19,6% and border anxiety - 13.1%. Out of all respondents eight felt both- anxiety and depressive sensations.

**Conclusions:**

1. Anxiety is more prevalent than depression among health care specialists. One third of respondents have border anxiety or anxiety, and one fifth have border depression or sensation of depression.
2. Around two fifths of the respondents are worried about the current situation. In most cases people worry about the ambiguity of their future, the health of their relatives or selves and their financial situation.

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## **ETHANOL: A SERIOUS MODIFIABLE RISK FACTOR OF ACUTE TRAUMATIC EXTRA-AXIAL INTRACRANIAL HEMMORHAGES**

**Key words:** Neurosurgery, ethanol, narcology, emergency medicine.

**Background:** Traumatic extra-axial hematomas are serious emergencies of Neurosurgery and are often related to the consumption of alcohol. Therefore we evaluated the prevalence of alcohol intoxication in patients with epidural and subdural hematomas and how alcohol intoxication affects several routinely taken measures at the time of admission.

**Methods:** Data on patients hospitalized with acute subdural and epidural hematomas in Riga East Clinical University Hospital from 2012-2014 were collected. The data was then analyzed using non-parametric tests (Chi-Square, Mann-Whitney U, Spearman's correlation).

**Results:** 141 patients were included in statistical analysis (117 males and 24 females). The mean average age of the patients analyzed was 55 years (SD=18 years). The Blood alcohol test was positive in 59 out of 141 patients (41.84%), and the mean average blood alcohol concentration (BAC) was 1.06% (IQR 1.74 - 3.32). Patients who also had skull base fractures had higher mean average BAC (1.57% [IQR 0.00 - 3.165]), compared to patients without skull base fracture (1.27% [IQR 0.00 - 1.64]),  $p=0.002$ . Positive BAC also correlated to lower GCS (Glasgow Coma Scale) Scores ( $u = 1527.00$  ;  $p=.001$ ), which in turn was also proven to be a predictive factor of longer hospitalization time ( $r_s = -.440$   $p < .001$ ), larger width of hematoma ( $r_s = -.441$ ,  $p < .001$ ) and midline shift. ( $r_s = -0.594$ ,  $p < .001$ ).

**Conclusions:** This study shows that the use of alcohol not only is a serious risk factor of traumatic extra-axial injuries but also correlates with lower GCS scores, thus increasing the length of hospitalization. We believe, this proves again how important it is to educate people about the dangerousness of excessive use of alcohol.

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## **EVALUATION OF MAGNETIC RESONANCE IMAGING AND CLINICAL CHARACTERISTICS OF PITUITARY ADENOMAS IN RIGA EAST CLINICAL UNIVERSITY HOSPITAL INPATIENT SETTING**

**Introduction.** Approximately 10 to 15 % of all intracranial neoplasms are pituitary adenomas. Depending on the size, they are classified as macroadenomas (>1 cm) and microadenomas (<1 cm). In a clinical setting, pituitary adenomas can be classified as non-functioning and functioning adenomas depending on the hormonal activity. Magnetic resonance imaging (MRI) is the most precise imaging modality for the pituitary gland. Different properties regarding the extent of expansion, attenuation and signal characteristics provide with various imaging results and are important in establishing a correct diagnosis and treatment plan.

**Aim.** To evaluate and describe the radiographic features of MRI in different pituitary adenomas and assess their clinical properties.

**Methods.** MRI properties and medical records of 64 patients admitted to Riga East clinical university hospital from year 2018 to 2019 were retrospectively reviewed. Additionally, patient referral details and clinical features were compiled. Magnetic resonance imaging protocol consisted of 2 mm thin sections that were performed in the coronal and sagittal planes. T1 weighted sequences pre and post intravenous contrast admission and T2 weighted sequences of the sellar region and tumor invasion were analyzed. The volume of macroadenomas was calculated using the geometric formula, which is  $\frac{1}{2} * (\text{length} * \text{width} * \text{height})$ . Statistical data interpretation was done by *IBM SPSS Statistics v23*.

**Results.** Of 64 patients, 41 cases (64.1%) were macroadenomas and 23 (35.9 %) were microadenomas at the mean age of  $54.3 \pm 4.1$ . Macroadenomas were statistically equally prevalent in females: 21 (51.3 %) and males 20 (48.7%;  $p < 0.05$ ). Microadenomas were significantly more prevalent in females than males: 18 (78.2 %) vs 5 (21.8 %), respectively ( $p < 0.05$ ). The median volume of macroadenomas in men was 2.40 cm<sup>3</sup> and 2.29 cm<sup>3</sup> in females. MRI imaging modalities showed predominantly hypointense to isointense signal in T1 sequence, and heterogeneously hyperintense signal in both postcontrast enhancement T1 and T2 sequences. A statistically significant association was found between macroadenomas and heterogeneously hyperintense signal in postcontrast T1 images ( $p < 0.01$ ). Unilateral parasellar invasion of the cavernous sinus was found in 48.7 % (n=20) macroadenomas, bilateral parasellar invasion was found in 9.7 % (n=4) macroadenomas. 62.1 % (n=41) of adenomas were functioning and 37.9 % (n=23) were non-functioning. Compression of the optic chiasm was found in 65.9 % (n=27) macroadenomas. Varying degrees of visual impairment, that was associated with optic chiasm compression was observed in 28.5 % (n=20) cases ( $p < 0.05$ ). Other common clinical abnormalities, associated with macroadenomas, during patient admission were nausea 51.5 % (n=34;  $p < 0.01$ ) and headache 50 % (n=33;  $p < 0.01$ ).

**Conclusions.** Macroadenomas were equally prevalent in both genders, but microadenomas were more prevalent in women. Male patients presented larger volume lesions. Majority of macroadenomas displayed a heterogeneously hyperintense signal in T1 postcontrast imaging, that may suggest autolytic lesions within the adenoma. Majority of patients are admitted with similar clinical symptoms: headache, nausea and visual impairment. Knowledge of imaging properties and clinical background of pituitary adenomas can help establish a more accurate diagnosis of sellar lesions and ensure more accurate therapeutic response.

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## **EXPLORING AND COMPARISON OF THE REASONS BETWEEN RESIDENTS OF RIGA AND LATVIAN PROVINCES REFUSING OF VACCINATION INCLUDED IN THE LATVIAN VACCINATION CALENDAR**

**Key words:** Vaccination, reasons of refusing, vaccination calendar.

**Introduction.** Vaccination is necessity nowadays. Thanks to vaccination, Latvia was able to cope with diseases such as smallpox, polio, mumps, measles, rubella, etc. However, according to a survey by the European Commission in 2018, Latvia was among the three leaders among countries whose residents are skeptical about the benefits of vaccines. Only 68.2% of the inhabitants of Latvia do not doubt the effectiveness of vaccinations. It is very important to identify and compare the reasons for the refusal of the residents of Latvia from the planned vaccination, in order to avoid the skepticism of the country's inhabitants to the planned vaccination in the future.

**Objectives.** The purpose of the study was to compare and identify the reasons for refusing mandatory vaccination of residents of Riga and Latvian provinces.

**Materials and methods.** The survey information was collected from residents of Riga and other cities of Latvia using online questionnaire. Then collected information was analyzed using IBM SPSS.

**Results.** Questionnaires of people who reject vaccines was selected for the study. Out of 42 respondents, 15 are living in Riga, 27 in different Latvian regional cities. Most often the respondents say that the absence of time is the common reason for vaccines refusal (33,33%). In second place follows distrust of medicine (26,19%) and third place is laziness (11,9%). Other reasons, such as fear of possible health problems, vaccines are not effective, fashion trend, fear of medical manipulations, vaccines are created only for business, are less popular. Comparing the reasons in Riga and other cities, we can conclude, that In Riga the main reason is the lack of time (66,67%), but in other cities - distrust of medicine (29,63%). During the study it became known that 61,9% of interviewed people do not believe to vaccines effectiveness, 65% of them live in provinces. As well as, 11.9% of respondents did not hear about the vaccination calendar.

**Conclusion.** As a result of the study, it was found that the most popular identified reasons are absence of time, distrust of medicine and laziness. Most often people do not get vaccinated due to absence of time. Also it became known that the reasons differ in Riga and in other cities of Latvia. The residents of Riga most often do not have enough time, but residents of the provinces do not trust medicine. Also, in Riga there are no such reasons as laziness, vaccines are created only for business, fear of medical manipulations, fashion trend and fear of possible health problems.

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## **EXPLORING AND COMPARISON OF THE REASONS FOR THE REJECTION OF STATE-APPROVED FREE SCREENINGS AMONG RESIDENTS OF RIGA AND OTHER LATVIAN PROVINCES**

**Key words:** State-approved free screenings, reasons for rejection.

**Introduction.** In Latvia exist a program for free screening for cervical, breast and colon cancer, but only 43% of women who receive invitations use this opportunity. Only 16% were tested for colon cancer over the past year (representative of the National Health Service Julia Voropaeva). At present, colon cancer in Latvia is the third most common cancer, however, only 32% of cases are diagnosed at an early stage. Compared with other EU countries, Latvia lags in screening attendance rates. Also screening is economically effective only with a high level of responsiveness of the population, therefore this topic is relevant in the medical industry and in the economic.

**Objectives.** The aim of the study was to compare and identify the reasons for the rejection of state-approved free screenings among residents of Riga and other Latvian provinces.

**Materials and methods.** Information for the study was obtained using online questionnaires from residents of Riga and other cities of Latvia. Collected information was analyzed using IBM SPSS.

**Results.** For this study was selected people who can use free screening. Out of 49 respondents, 35 are living in Riga, 14 in different Latvian regional cities. According to statistics, the main reason for the rejection of free screenings is a lack of time (36,73%). The next reasons are laziness (26,53%) and fear of medical manipulations (18,37%). Other reasons, such as distrust of medicine, statement that screening are not effective and other reasons are less popular. Comparing the reasons in Riga and other cities, we can conclude, that In Riga the main reasons are the lack of time (20,41%) and laziness (20,41%), but in other cities - the lack of time (16,33%). As a result, it became known that in screenings of the colon participated 38,46%. 52,94% of women at risk were screened for cervical cancer. And 77,78% of women participated in free breast cancer screening.

**Conclusion.** During the study, it was found that the most popular reasons for not visiting free screenings were the lack of time, laziness and fear of medical manipulations. Also, it became known that the reasons differ in Riga and in other cities of Latvia. The residents of Riga most often do not have enough time and ignore free screenings because of laziness, while for the residents of the provinces the reason was only a lack of time. Moreover, women are offered to visit all three types of screening for free, but for men only screening for colon cancer, which is the most unvisited, it can be concluded that the responsiveness of men is much less than the responsiveness of women.

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## **FACTORS ASSOCIATED WITH LONG-TERM MORTALITY IN CHILDREN WITH HEAD INJURY ADMITTED TO THE NATIONAL PAEDIATRIC INTENSIVE CARE UNIT IN LATVIA**

**Introduction.** Head injuries are very common in children and associated with high mortality and morbidity both in short and long term. There are no data available on long-term outcomes of children with head injuries in Latvia.

**Aim.** The aim of the current study was to analyze factors associated with long-term mortality in children with head injury requiring admission to the national paediatric intensive care unit in Latvia.

**Methods.** This retrospective, descriptive study was performed in the Pediatric Intensive Care Unit (PICU) of Children's Clinical University Hospital. All children admitted to the PICU with head injury were included from 1998 to 2014. Clinical data were collected from paper medical records and from electronic medical records. Epidemiological data was gathered from Central Statistical Bureau of Latvia (CSBL). Cox regression and Kaplan-Meier survival analysis were done by using SPSS Statistics (v23.0) software.

**Results.** From 823 children with head injury, 683 children were included in the study; 457 (66,9%) were male and 226 (33,1%) were female. About 140 children with head trauma were excluded because of uncorrect personal information. From all studied children, 653 (95,6%) were alive and 30 (4,4%) had died by November 25, 2019. In Cox regression analysis age group, patient sex, surgical intervention were associated with risk of dying, while mechanical lung ventilation (HR 6.47; 95% CI 2.86–14.66;  $p < 0.001$ ) and geographic region of Latgale (HR 3.7; 95% CI 1.28–10.74;  $p = 0.016$ ) were independently associated with increased mortality.

**Conclusion.** This study identifies risk factors associated with long-term mortality following pediatric head injury in Latvia. While unsurprisingly patients with more severe injury requiring mechanical lung ventilation had worse outcomes, finding that patients from one particular region of Latvia have higher mortality requires further investigation and perhaps improvement of acute care services.

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## **FACTORS ASSOCIATED WITH SYMPTOMS OF DEPRESSION AND ANXIETY AMONGST LGBT+ YOUNG ADULTS IN LATVIA**

**Key words:** LGBT, depression, anxiety, sexual minority, risk factors.

**Introduction.** Several studies have confirmed that young adults, who self-identify as lesbian, gay, bisexual, transsexual, etc. (LGBT+), are at increased risk for depression and anxiety symptoms compared to heterosexuals. Stigma, discrimination, abuse, a lack of family support and relationship problems adds an additional layer of risk on top of biological, social, environmental and psychological factors, which can lead to depression/anxiety. However, research provides no data about LGBT+ individual mental health in Latvia.

**Aim.** To find out the cause of depression and/or anxiety amongst sexualminority individuals (SMI) and heterosexuals in Latvia, and to identify factors related to depression/anxiety symptoms amongst LGBT+ young adults in Latvia.

**Materials and methods.** Cross-sectional survey was applied, in which participated young adults from Latvia, who were split into two groups: LGBT+ and heterosexual individuals. Participants completed questionnaire, which included questions about education, employment, relationship status, family, experience of violence, traumatic events, mental health, alcohol and drug use, sexual orientation, experience of discrimination, depression and anxiety symptoms. Depression symptoms were assessed using the Patient Health Questionnaire (PHQ-9), anxiety – using Generalized Anxiety Disorder (GAD-

7) scale. Participants were invited through Association of "LGBT and their friends Mozaika" and social networks, using snowball sampling.

**Results:** 49.8 % (n=126) of participants self-identified as LGBT+, 50.2 % (n=127) as heterosexuals. LGBT+ individuals were more likely to have anxiety symptoms (73%, GAD-7>5) compared with heterosexuals (64.6%),  $p=0.019$ . There is statistically significant difference ( $p = 0,001$ ) between the depression rates in LGBT+ group and heterosexuals. There is a more predominant history of childhood abuse amongst LGBT+ individuals, which is associated with higher level of anxiety ( $p<0.001$ ) and depression ( $p=0.003$ ), than amongst heterosexuals. In childhood sexual minority individuals more often were victims of parental neglect (11.9%,  $p=0.038$ ), and now all of them have depression symptoms ( $p=0.021$ ). Emotional abuse was associated with symptoms of depression and anxiety the closest ( $p=0.029$ ,  $p<0.001$ ). Depression and anxiety symptoms were more common in LGBT individuals with previous history of a mental illness like depression, anxiety disorder, self-harm. 10.31% from LGBT+ group have attempted suicide, and majority of them (84.62%) have both depression and anxiety symptoms. SMI use alcohol more frequently than heterosexuals - 23% of LGBT+ individuals and 14.9% heterosexuals use alcohol  $\geq 2$  times a week. A similar trend can be observed in drug use. Individuals who did not disclose their sexual identity to anyone experience depression (100%) and anxiety (83,3%) much more often than those who have disclosed to someone, especially father ( $p=0,013$ ). Negative reactions to disclosure were associated with higher depression (100%) and anxiety (80%) symptoms, whereas positive reactions serve as a protective factor for both anxiety ( $p=0,001$ ) and depression ( $p=0,009$ ). Depression and anxiety symptoms were also associated with low education level, unemployment, incomplete family and severe illness of a relative.

**Conclusions:** Similar to the rest of the world, SMI in Latvia are more likely to experience anxiety/depression. Most of the risk factors for depression and anxiety overlap for LGBT+ and heterosexuals. However, many LGBT+ young adults experience unique and additive stressors and traumatic experiences, which distinguish their experience from the heterosexual majority. Our society can help to reduce the depression/anxiety prevalence in SMI by providing a positive environment for their sexual orientation/gender identity self-disclosure.

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## **FAMILY DOCTOR PRACTICES PATIENTS UNDERSTANDING AND AWARENESS ABOUT USING NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS) AND OCCURRING SIDE EFFECTS**

**Key words:** Non-steroidal anti-inflammatory drugs, pain, inflammation, side effects.

**Introduction.** Non-steroidal anti-inflammatory drugs (NSAIDs) are one of the most commonly used drugs in the world. They are daily used by millions of people: for infants with fever and for adults with different types of pain.

**Aim.** To study habits of NSADs use in the population, reasonableness of use and understanding of NSAIDs effects and side effects.

**Materials and methods.** A retrospective cross-sectional study, which surveyed 100 patients using a questionnaire prepared for this study and approved by GP practice. The obtained data were processed with Microsoft Office Excel 2010 and SPSS 21 programs.

**Results.** The study included 100 respondents aged from 18 to 80 years, of which 69% were women and 31% - men. 87% of respondents have used NSAIDs. 52% (n = 69) of the questioned were convinced of the analgesic and antipyretic effects of NSAIDs. The most commonly used are Paracetamol - 28% (n = 64), Ibuprofen - 29% (n = 67), Diclofenac - 17% (n = 40), Nimesulide 10% (n = 24). Most, 72% (n = 62), use NSAIDs as needed. 66% (n = 55) have used the preparations 4 years and longer. 56% (n = 51) use both by doctor's appointment and on their own initiative. More commonly,



NSAIDs are used to reduce headaches in 21% (n = 58), back pain in 16% (n = 42) and 14% (n = 39) in fever. 65% (55) of the patients are aware of the side effects that may cause NSAIDs. 44% (n = 45) using these drugs did not have side effects, for other they caused inflammation of the gastric mucosa (gastritis) in 18% (n = 19) and diarrhea in 14% (n = 14). 64% (n = 55) do not use gastric treads when using NSPL, but of those who use, the most commonly used is Omeprazole - 48% (n = 15). Patients over 60 years use NSAIDs in 93% (n = 26), mostly for reduction back pain - 26% (n = 18) and joints pain - 20% (n = 14). But side effects in this age group was in 57% (n = 16), where the most frequent was also the gastric mucosal inflammation (gastritis) - 39% (n=11).

**Conclusion.** The results show that the majority of respondents are aware of and use NSAIDs. Mostly these drugs are used both by doctor's appointment and on their own initiative. The frequently used is Paracetamol, Ibuprofen, Diclofenac and Nimesulide. Most of these medications are used at times, as needed, but for a long time - from 4 years and longer. Patients are aware of the possible side-effects, which may be caused by NSAIDs and if they appear, then stops use. Most patients with NSAIDs do not use gastric mucosal treads.

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## **FRUIT AND VEGETABLE CONSUMPTION IN SENIORS IN LATVIA**

**Objective.** Heathy nutrition is one of the healthy lifestyle principles. Including fresh fruits and vegetables in a daily diet is one of the healthy nutrition principles in any age. This also include senior population. It is recommended to eat 400 grams of fruits and vegetables every day.

**Aim.** Research aim was to get information about fruits and vegetable consumption in senior population in Latvia.

**Materials and methods.** With the help of survey information about fruit and vegetable daily consumption in senior population in Latvia were gained. IBM SPSS Statistics v.23 was used to perform statistic analyze.

**Results.** Overall 64 responds were gained but 3 responds were excluded, 61respond were analyzed. The answers were obtained from 33 women and 28 men. Average respondent age was 71,46. On average seniors eat 240,16 grams vegetables and 195,9 grams fruits per day. It is 436,06 grams of fruits and vegetables combined. Respond range -minimum 0 grams and maximum 1000 grams per day of fruits and vegetables. One person eat none vegetables per day and three respondents eat none fruits per day. Female respondent tend to eat more vegetables then male respondents.

**Conclusion.** Overall seniors in Latvia eat enough fruits and vegetables per day as doctors recommend with several exclusions.

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## **HAND HYPOTHERMIA RELATED TO THE USE OF VARIOUS DEVICES IN CONTINUOUS WORK WITH COMPUTER**

**Key words:** computer work; pain; ergonomics; mouse; wrist; hypothermia.

**Introduction.** Working with computer is characterized as static. That is why ergonomic is very important part in continuous work with computer. The proper workplace requires specialized chair with back support system, right desk height and width. The location of the equipment is also important, such as placing computer keyboard and computer mouse. The placement of the wrist is also very important. The palm of the hand should be kept level of the elbow level. During continuous work with computer there is complains that are related to hand hypothermia. Hand hypothermia can

cause such symptoms as pain, stiffness in palm of the hand, shoulder pain. This symptom can be explained by pathophysiological mechanism that develops in our body during prolonged work with computer mouse. Hypothermia is caused by microcirculation in the hand due to incorrect ergonomic positioning. Reduced circulation in the extremity can not only promote objective complaints, but also affect the muscles and cause limb musculoskeletal disorders. There are several specific hand devices for computer work to prevent hand hypothermia. The aim in this study is to check the several devices for their efficacy in preventing hand hypothermia for people affected by continuous work with computer.

**Materials and methods.** Research was carried out in Riga Stradins University. *Participants voluntary worked three hours with computers using computer mouse using different hand devices for support of the palm. All participants were tested in the same environment.* The measurement of the skin temperature were made by medical digital camera ICI ETI 7320 Pro. The specialized imaging where taken 15 minutes apart. Three different types of specialized hand-worn devices were used. All data was analysed using software IR Flash Medical version 2.14.14.4 (Infrared Cameras, Inc.) and statistically analysed using Microsoft Excel 2019.

**Results.** At the beginning of the research, average skin surface temperature of the right wrist among participants was 22,85 °C. During the continuous work of three-hours with computer the skin surface temperature of the wrist dropped by 3,15 °C and was 19,70 °C. Measuring skin surface temperature of the fingers at first was 20,72 °C and at the end of the study 16,77°C; with the difference average of about 3,96°C. Using three different hand-worn devices the major temperature difference was -5,49°C, and least -1,13°C. The room temperature was controlled and was 22°C, humidity level 28%.

**Conclusions.** None of the devices used in research was superior, but all of them significantly decreased hypothermia in right wrist of participants. All participants developed hypothermia and at least of the following symptoms: stiffness, feeling cold in the wrist or fingers, discomfort or even pain. We strongly advise to use hand supporting devices during work with computer.

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## **IMMUNOMODULATING THERAPY EFFECTIVENESS AMONG RELAPSING REMITTING MULTIPLE SCLEROSIS PATIENTS IN RIGA EAST UNIVERSITY HOSPITAL „GAIĻEZERS”**

**Introduction.** Multiple sclerosis (MS) is autoimmune-mediated disease of the central nervous system. MS leads to severe physical, cognitive and neurological problems in young adults. Approximately 87% of MS patients present with relapsing remitting MS (RRMS), characterized by acute attacks (relapses) followed by partial or full recovery (remission). Immunomodulating therapy (IMT) is used to decrease disease activity – decrease frequency and severity of relapses, slow progression of MS. Patients with no disease activity have no relapses, no progression of disability (measured by EDSS) and no new or active (enhancing) demyelinating lesions on magnetic resonance imaging (MRI).

**Aim.** To investigate IMT effectiveness among RRMS patients in time period from 2017 till 2019.

**Materials and methods.** It is a quantitative, cross-sectional study. Our study included Riga East University Hospital “Gaiļezers” RRMS patients who have started IMT in time period from 2010 to 2018. All included patients received 2 MRI scans in time period from 2017 to 2019.

**Results.** Totally 84 patients were included in the study – 49 women (58.3%) and 35 men (41.7%). 30 patients (35.7%) had no relapses, no progression of disability and no MRI activity in this time period. 13 patients (15.5%) had MRI activity without relapses and progression of disability. 19 patients (22.6%) had relapses and MRI activity without progression of disability. 4 patients (4.8%) had MRI activity and progression of disability without relapses. 1 patient (1.2%) had progression of disability without MRI activity and relapses. 8 patients (9.5%) had relapses without progression of disability and MRI activity. 9 patients (10.7%) had acute relapses, progression of disability and MRI activity.

**Conclusions.** IMT can not stop MS progression among majority of MS patients despite its effectiveness – only 35.7% of patients had no disease activity. 64.3% of patients had clinical or radiological MS progression despite an IMT.

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## **IMPACT OF INFORMATION TECHNOLOGIES IN THE EDUCATION IN PHYSICAL THERAPY AND IN THE CLINICAL NEUROREHABILITATION**

During last years, we observe an introduction of information and communication technologies (ICT) in every field, including in education, diagnostics and therapy.

The goal of current work is to emphasize the potential of modern computer-based technologies in the process of rehabilitation – in clinical practice and in education.

Neurorehabilitation (NR) is an interdisciplinary thematic field between Neurology, Neurosurgery, Physical and Rehabilitation Medicine (PRM). Rehabilitation is a functional therapy, based on a detailed functional evaluation. Grasp, balance and gait are important elements of the everyday life functionality of patients in NR-clinical practice and is crucial for their independence in activities of daily living (ADL), respectively for their autonomy and quality of life.

Contemporaneous technologies are very useful during the assessment of balance – stabilometry or baropodometry. Robotic NR with exoskeleton is used for gait training. Virtual reality devices are applied for grasp and grip training.

We will present some typical cases of diagnostics and NR with application of modern technologies from our own modest clinical practice. For illustration of clinical utility of stabilometry we will present a case of vertebro-basillar insufficiency. Exoskeleton NR using Hybrid Assistive Limb (HAL) will be explained by presentation of clinical cases of post-stroke hemiparesis and spinal cord injury with inferior paraparesis. Impact of Virtual reality devices in grasp and grip recovery will be described by cases with hemiparetic hand (after stroke and after traumatic brain injury).

Importance of ICT in the learning process will be demonstrated by the results in our students using electronic books with video-films on the educational disciplines: kinesiology, manual therapy, neurorehabilitation, balneology, ergotherapy. E-books ameliorate significantly the level of professional competences of students in physiotherapy, medical doctors-trainees in PRM and medical doctors and health professionals - participants in long-life learning courses.

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## **IMPACT OF LATE DIAGNOSIS OF ONYCHOMYCOSIS ON THE COURSE OF THERAPY**

**Key words:** late diagnosis, treatment, onychomycosis.

**Introduction.** Onychomycosis was and remains a significant problem in modern medicine. The reason is the relatively low effectiveness of the treatment and relapses of disease often occurring after treatment. Clinical studies have shown that the efficiency of systemic antibacterial agents is between 40 and 80% after treatment and between 14 and 50% after 5 years. The topicality of the problem is also evidenced by the long duration of treatment and the untimely start of treatment, which in turn

increases the chance of other people becoming ill. This work examines the effect of the period of disease progression without treatment to therapy duration.

**Objectives.** To investigate the influence of late diagnosis of onychomycosis on the course of therapy.

**Materials and methods.** Survey data was collected from patients with onychomycosis using a questionnaire in Riga 1<sup>st</sup> Hospital from 11/20/2019 to 12/20/2019 and analyzed using IBM SPSS.

**Results.** According to the results of the study treatment of onychomycosis takes about 10 months if patients start treatment no later than 12 months after first symptoms. Statistics show that after 11 months, the duration of treatment of the disease starts to increase rapidly and increases from half a year to 35 months. The time period from 0 to 11 months after the first symptoms does not significantly alter the duration of treatment. It cannot be concluded that after 18 months of onychomycosis progression the duration of treatment will be 3 years, but it is clear that more than 12 months without onychomycosis treatment significantly increased treatment duration and costs. It is statistically significant ( $p$  or Sig number is 0.045 (less than 0.05)).

**Conclusion.** As a result of the study, information about late onychomycosis diagnosis was confirmed. The progression of disease to onset of treatment varies from three months to one and a half years, but only 20% of patients start treatment earlier than six months. Although people do not see a doctor as soon as possible, it does not significantly affect the course of treatment if onychomycosis treatment was started 12 months ago. After a year, the complexity and duration of the treatment process begins to increase rapidly. Statistically, 20% of patients start treatment only after 12 months, that immediately increases treatment duration by up to three times and affects medication choices. According to statistics, treatment duration in some cases can reach up to three years.

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## **IMPACT OF WORKING CONDITIONS ON EATING HABITS FOR MEDICAL PROFESSIONALS IN LATVIA**

**Introduction.** Lunch is one the main meals of the day, which usually for most of adults is consumed at their work place. If an incomplete meal is being consumed on a daily basis for long periods of time – chronic gastrointestinal health conditions can develop. Medical professionals are subjected to a specific work conditions and working space that may affect their daily eating habits.

**Aim.** The aim is to determine what are the conditions and eating habits for medical professionals in Latvia and whether these habits reflect in their gastrointestinal health condition.

**Results.** During the research, 117 Latvian medical professionals have been surveyed. Survey included questions about their lunch breaks, lengths of the break, how long time they spend eating, food types they consume and what gastrointestinal symptoms they have if at all. 91% of respondents were female and accordingly 9% male. 52% noted that they do not have a lunch break at their work, 48% have it. Out of all respondents 81% spend less than 15 min consuming their meal, 19% spend 15min and more. In fact, 10% of respondents do not eat lunch at work at all. 74% of respondents admit, that they do not have enough time for eating. 42% of respondents consume wholesome meals, but for 58% respondents the meals are incomplete. 89% of all respondents have gastrointestinal symptoms, 11% have none. 26% of respondents have a diagnosed gastrointestinal medical condition. 15% have GERS diagnosis.

**Conclusions.** Medical professionals in Latvia do not have a good condition to have healthy lunch, as more than a half of the respondents claim to have no lunch break available. Mostly eating process happens in a hurry and the meals are largely incomplete. Most of the respondents note that they have gastrointestinal symptoms. To find out correlation between eating habits at workplace and their gastrointestinal health condition further examination would be needed.

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## **IMPACT OF WORKING CONDITIONS ON EATING HABITS FOR OFFICE WORKERS IN LATVIA**

**Introduction.** One of the most important meals of the day is lunch. Adults usually have to have lunch at work. Workplace conditions can affect how lunch is held. Without having wholesome lunch for a long periods time, it is possible to develop different kind of gastrointestinal diseases. A large part of Latvian adult population work in an office environment, so it is important to assess how lunch is held in this particular Latvian population.

**Aim.** The aim is to determine what are the conditions for office workers to have a healthy meal, and what are the eating habits of office workers in Latvia.

**Results.** During the research, 121 Latvian office workers have been surveyed. Survey included questions about their lunch breaks, lengths of the break, how long time they spend eating, food types they consume and what gastrointestinal symptoms they have if at all. 59% of respondents where female and accordingly 41% male. 98% noted that they do have a lunch break at their work, 2% do not have it. Out of all respondents 60% spend less than 15 minutes consuming their meal, 40% spend 15min and more. 12% of respondents admit, that they do not have enough time for eating. 55% of respondents consume wholesome meals, but for 45% respondents the meals are incomplete. 29% of respondents eat a wholesome meal and spend at least 15min for eating. 66% of all respondents have gastrointestinal symptoms, 34% have none. 8% of respondents have a diagnosed gastrointestinal condition.

**Conclusions.** Office workers in Latvia have a good condition to take time for a healthy lunch. Also, the majority of respondents are having a wholesome and balanced lunch. Nevertheless, most of the respondents claim to have some gastrointestinal condition. To find out correlation between specifically at eating habits and their gastrointestinal health condition, further examination would be needed.

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## **IMPORTANCE OF CARDIOVASCULAR SCREENING FOR UNIVERSITY'S VOLLEYBALL TEAMS PLAYERS IN LATVIA**

**Key words:** Sudden cardiac death, American Heart Association 14- point evaluation, athlete resting 12-lead electrocardiogram.

**Introduction.** Sudden cardiac death (SCD) is the leading cause of mortality in athletes during sport activities. American Heart Association (AHA) 14- point evaluation and a resting 12-lead electrocardiogram (ECG) for cardiovascular screening have proven to be effective methods to determine athletes with cardiovascular diseases which are related with SCD events.

**Objectives.** The objective of this research was to perform screening for volleyball teams of universities in Latvia, using AHA 14- point evaluation and resting 12-lead ECG methods.

**Materials and Methods.** A prospective study were volleyball athletes from universities of Latvia participated in cardiovascular screening using the AHA 14-point evaluation method and a resting 12-lead ECG by using International criteria for electrocardiographic interpretation of athletes from November 2019 till March 2020. SPSS 23 was used for statistical analysis.

**Results.** 154 athletes participated in the research: 84 women, average age – 22.5 years (SD 5.5), and 70 men, average age – 25.6 years (SD 4.9). According to AHA 14-point evaluation method results,

119/154 (77.3%) athletes answered positively to at least one question. For 110/154 (71.4%) athletes were found to have at least one physiological change in their resting 12-lead ECG. For 15/154 (9.7%) athletes abnormal ECG changes were observed. For athletes who got at least 4 points (n=10) there were more frequent abnormal resting 12-lead ECG findings than athletes who had less than 4 points (n=144) ( $p < 0.01$ ).

**Conclusions.** In order to detect early heart diseases which are associated with increased risk of SCD events it is important to accurately perform cardiovascular screening for university volleyball athletes. It is advisable that physicians clarify athlete family and cardiovascular history and perform physical examination for student athletes.

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## INCIDENCE OF DERMATITIS AS AN OCCUPATIONAL DISEASE AMONG HAIRDRESSERS

**Key words:** dermatitis, atopy, eczema, allergy, hairdressers, occupational.

**Introduction:** Occupational diseases are very common in the hairdressers' profession including dermatitis.

**Objectives:** To systematically assess about incidence of dermatitis as an occupational disease among hairdressers.

**Methods:** Data was collected using data base PubMed and ResearchGate, using search terms ("dermatitis" or "dermatoses"), (and ("occupational disease") and ("hairdressers")). Research papers published from 30.01.2006 to 01.01.2018. Articles that met the inclusion criteria were assessed for eligibility using "PEDro" rating scale. All participants were 18 - 65 years old, with a median age of 32.5 years. Research participants no chronic diseases, which can be associated with dermatitis before work about hairdressers.

**Results:** From twenty found studies, six studies were included in the review. Hairdressers were selected and analyzed for this study, used questionnaires - model I was adjusted for general characteristics such as age, gender, family anamnesis status, allergies, educational level, smoking status, weekly alcohol consumption, amount of regular exercise, and perceived state of health. Model II was additionally adjusted for work characteristics such as business type, exposure to hairdressing chemicals and whether personal protective equipment was used (gloves, masks, protective clothing). Independent variables were exposure to chemical substances, the training status of the hairdressers, and the main tasks required of them (hair painting, washing, wetting, hair drying, styling and other), and the dependent variable was the incidence of dermatologic symptoms. The relationships between work characteristics and dermatologic symptoms were evaluated by estimating odds ratios using multiple logistic analysis. The prevalence of self-reported hand contact dermatitis or eczema among female hairdressers was 51.3% and 20.7% among male. It was significantly associated with the age, seniority in this profession and unprotected wet work of more than 2 hours per day was found to be a significant risk factor ( $P$ -value = 0.021 and 0.035 respectively). Furthermore, there was significant association between self-reported hand contact dermatitis and personal history of atopy ( $P$  value = 0.001) and family history of atopy. ( $P$ -value=0.031).

**Conclusion:** Hairdressers are at increased occupational risk of developing hand and wrist/arm dermatitis. Working intensity and personal protective equipment improves occupational health stills for hairdressers.

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## **INFLUENZA AND PERTUSSIS VACCINATION DURING PREGNANCY. DIFFERENCE BETWEEN VACCINATION RATES IN RIGA AND REGIONS OF LATVIA**

**Key words:** pregnancy, vaccine, influenza, whooping cough, immune system.

**Introduction.** It's been proven repeatedly that influenza and pertussis vaccinations are safe for pregnant women and their developing babies and effective in preventing serious complications from influenza and whooping cough. When pregnant women get flu vaccine and Tdap, they pass protective antibodies to their developing babies, keeping them safe from influenza and whooping cough during the first few months of life. Vaccination also reduces a pregnant woman's own risk for these diseases. The CDC recommends pregnant women receive an influenza vaccine during any trimester and Tdap early in the third trimester of each pregnancy. Flu shots reduce a pregnant woman's risk of hospitalization due to flu by 40% and the risk to her baby under 6 months by 72%. Tdap reduces the risk of hospitalization for whooping cough by 91% for infants under 2 months.

**The aim** of this study was to find out if there is a difference between pregnant women immunization rate from influenza and whooping cough, as well as their understanding and engagement in Riga and regions of Latvia.

**Materials and methods.** The survey was carried out from January 2019 to April 2019 in Riga Maternity Hospital and in maternity wards in regions of Latvia. 189 postpartum women volunteered and anonymously replied to originally created questionnaire. Obtained data was statistically analyzed in Microsoft Excel 2013 and IBM SPSS software, 20.0 version.

**Results.** Participants were divided in 2 groups, those who live in Riga (group 1) - 48,7% (n=92), and those who live in regions of Latvia (group2)-51,3% (n=97). 23,9 % (n=22) postpartum women were vaccinated from influenza and 9,8 % (n=9) from whooping cough in group 1, but in group 2 were vaccinated 30,9 % (n=30) from influenza and 8,2% (n=8) from whooping cough. Major reasons for being unvaccinated were fear about baby's health 65,7% (n=46) and the perception that vaccination was not necessary 40 % (n=28) as well as the vaccine cost 21,4% (n=15) in group 1, but in group 2 results was respectively: 61,2 (n=41), 43,3 %(n=29) and 34,3 % (=23). 77,2 % (n=71) reported receiving a recommendation for flu vaccination from a doctor or other medical professional and 16,3 % (n=15) for vaccination from whooping cough, but in group 2 results were respectively: 78, 4% (n=76) and 13,4 (n=13).

**Conclusion.** We noticed that there isn't statistically significant difference between living place and immunization rate from influenza and whooping cough. There is a very small part of postpartum women who had received recommendations from medical professionals about whooping cough vaccine during pregnancy( 16,3 % (n=15) in group 1 and 13,4 (n=13) in group 2.

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## **INFLUENZA VACCINATION RELOAD FOR PATIENTS AGED 65 YEARS, AFFECTING FACTORS, PATIENT AWARENESS AND ATTITUDES**

**Key words:** influenza, vaccination, prevention.

**Introduction.** Influenza is an acute, contagious virus infection. Compared to other infectious diseases, it differs with the rate of spread, the frequency and severity of the complications caused. In particular, patients aged 65 are affected. The proportion of vaccinated population against seasonal influenza is

very low. In people over 60 years of age, influenza immunity results in vaccination of only 60%, but in the case of the sick, without complication.

**Aim.** Evaluate the influenza vaccination reload in the patient population over 65 years. Find out the attitude of influenza vaccination and the factors that prompted it to be done.

**Materials and methods.** A retrospective cross-section study in which 250 patients were surveyed through a questionnaire prepared for this study and validated by a family doctor. The resulting data was processed with Microsoft Office Excel programs 2010 and SPSS 21.

**Results.** The study involved 250 respondents aged 65 and 67% (n = 168) were female and 33% (n = 82) were male. In patients with higher education, 20% (n = 51), 47% vaccinated against influenza (n = 24), with an average special rate of 33% (n = 43), with an average of 37% (n = 19) and a basic education of 52% (n = 11). With incomes > 300 EUR per person per month, only 44% have been vaccinated (n = 66), with incomes between 150 and 300 EUR - 29% (n = 26) and incomes up to 150 EUR per month - 50% (n = 5). A family doctor is visited every three months at 65% (n = 162), of which 49% (n = 80) have been vaccinated against influenza. 93% (n = 232) believe that influenza is a dangerous disease. 56% (n = 142) of influenza vaccination information is obtained from a family doctor. 57% (n = 142) had been vaccinated against influenza before anketting. 89% (n = 222) of respondents were offered vaccination by a family doctor. 48% (n = 119) of patients, vaccination will not be carried out this season. Plans to make 53% (n = 133) in the coming years. 68% (n = 66) are vaccinated to reduce the development of complications. 42% (64) do not vaccinate against influenza because they never suffer, 35% (n = 54) do not believe in the effectiveness of vaccination, 12% (n = 18) are afraid of possible side effects. As the most effective means of preventing influenza, 44% (n = 109) of those surveyed consider the respect for personal hygiene for the use of factors, masks and gloves, and 43% (n = 107) for vaccination.

**Conclusion.** There is no correlation between income and influenza vaccination and between education and vaccination. The most vaccinated are in groups that regularly visit a family doctor. A higher proportion of respondents had not been vaccinated against the flu. Most vaccinations are intended to reduce potential complications and plan to do so in the future. Vaccination and personal hygiene are considered to be the most effective way of preventing influenza.

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## **INTRODUCTION OF OBSTRUCTIVE SLEEP APNOEA CHECK-UP IN RIGA EAST UNIVERSITY**

**Introduction.** Obstructive sleep apnoea (OSA) is defined as repetitive apnoea or hypopnea episodes during sleeping. About 80% individuals with moderate or severe OSA are undiagnosed because there is no direct screening tool. It is important to determine patient's tendency for obstructive sleep apnoea before any prominent symptoms appear. According to several studies OSA is one of the risk factors for acute coronary syndrome (ACS).

**Aim.** Evaluate OSA check-up and patient's compliance in Riga East University Hospital among ACS patients.

**Methods and materials.** The study was conducted in Riga East University Hospital during November 2019 - January 2020 period in Cardiology department. 105 consecutive patients with ACS were prospectively evaluated for OSA. Patients were asked to complete STOP-BANG questionnaire. According to STOP-BANG results, high risk group patients were asked to perform polygraph examination. IBM SPSS Statistics version 20 was used for data statistical analysis.

**Results.** Out of 105 patients 45 of them did not correspond to inclusion criteria. 14 patients refused to participate in the study. The remaining 46 were evaluated with STOP-BANG questionnaire and were divided into 2 groups - low and high-risk group. High risk group: 1 (8,3%) females, 11 (91,7%) males, median age 48 (39,5-59) years, median BMI 34,15 kg/m<sup>2</sup> (29,37-36,68). High risk group patients



performed examination with polygraph: 8 of them did it correctly, 4 patient's results were uninterpretable due to several reasons. 3 out of 8 patients had mild OSA mean AHI from 5 to 15 events/hour, and one patient had severe OSA AHI=38 events/hours, in 4 cases OSA was not proved.

**Conclusions.** It is important to detect patient's tendency for Obstructive sleep apnoea as it is a risk factor for many diseases. Performing intrahospital screening for obstructive sleep apnoea on regular basis needs to be carefully planned: it should be accessible for patient, cost-effective, easily evaluated.

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## IS ENERGY BASED PHYSIOTHERAPY USE REASONABLE FOR THOSE WHO DO NOT HAVE FEMALE SEXUAL DYSFUNCTION?

**Objectives:** High Intensity Focused Electro-Magnetic technology (HIFEMt) – innovative physiotherapeutic method for diminishing weakness of pelvic floor muscles (PFM). Its effect is based on intense focused electromagnetic fields, causing contractions of higher tension than Maximal Voluntary contractions of PFM. As strong PFM is associated with high sexual function and satisfaction, HIFEMt is believed to have great prospectives in treatment of Female Sexual dysfunction (FSD). But could it be used to improve sexual life in case of normal sexual function?

**Aim:** To compare HIFEMt use for FSD patients and non-FSD patients.

**Material and methods:** 40 women, aged 25 to 45, selected according to specific criteria, underwent ten HIFEM technology procedures according to local regimen. Data was obtained from questionnaires, filled before the 1<sup>st</sup> and the 10<sup>th</sup> procedures, using validated Female Sexual Function Index (FSFI) – suggesting FSFI < 26.55 for the diagnosis of FSD – and supplementary questions. Data was processed with Microsoft Excel and IBM SPSS Statistics 22.0.

**Results:** 60% (n=21) of patients were nullipara. 50% (n=7) of those, who had ≥1 child had episiotomy/ruptures during labor. 22.9% (n=8) have tried Kegel exercises as a method to improve the quality of sexual life before. In 91.4% (n=32) partner knew about the research and supported woman. 48.6% (n=17) named anorgasmia as the reason of participation in the research, 42% (n=15) – libido problems, 20% (n=7) – pain during intercourse. Before the start of procedure cycles 60% (n=24) of all patients had FSD, with the mean (IQR) value 22.50 (4.85) with the lowest numbers in Desire domain (3.10 (1.00)).

87.5% (n=35) of patients have undergone full procedure cycle. 12.5% (n=5) were excluded because of developing contraindications for the procedures (pregnancy, acute infections, hemorrhoid disease). 5.7% (n=2) developed complications after 7<sup>th</sup> and 10<sup>th</sup> procedure (PFM hypertonus (n=2)), both non-FSD group.

After the 10<sup>th</sup> procedure 42.9% had FSD (n=15) with FSFI 27.17 (3.58). The biggest changes were in Orgasm domain (0.84 (1.37)) after the 5<sup>th</sup>; 0.93 (1.6) after the 10<sup>th</sup>. Medians (Q1-Q3) of FSFI changes from 1<sup>st</sup> till 10<sup>th</sup> procedure between FSD group and non-FSD group were statistically significant: 6.1 (3.1-11.1) and 1.9 (-3.1-5.0).

**Conclusion:** HIFEMt shows better results in symptomatic therapy of FSD than as method of improvement of previously normal sexual function – its use for non-FSD patients is possible, however each case should be considered individually. Further evaluation needed.

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## ISCHEMIC STROKE IN PATIENTS YOUNGER THAN 55 YEARS OLD

**Key words:** ischemic stroke, young patients.

**Introduction.** Stroke affects patients under 55 years old in 10% of cases and, unfortunately, this number is increasing.

**Aim.** To determine the incidence of ischemic stroke subtypes in young patients.

**Materials and methods.** A retrospective analysis of the medical records of 277 (27% female, 73% male) patients younger than 55 years old, who were hospitalized at the Rīga East Clinical University Hospital with a diagnosis of cerebral infarction during the period 01.01.2017 – 01.11.2019. The stroke subtype was determined according to the Causative Classification of Ischemic Stroke (CCS). Data were statistically processed using IBM SPSS Statistics.

**Results.** Stroke etiology was found to be cardioembolic (most often due to atrial fibrillation and patent foramen ovale) in 23%, supra-aortic large artery atherosclerosis in 20%, small artery occlusion in 11%, other causes (arterial dissection, cerebral vasculitis, meningitis, hyperviscosity syndrome, abnormalities of thrombosis/hemostatic, partially thrombosed cerebral aneurysm, primary/secondary antiphospholipid syndrome) in 5%. In 41% of the remaining cases, etiology was cryptogenic (undetermined stroke subtype). Typical stroke risk factors are present in all stroke subtypes: smoking – 42%, arterial hypertension – 69%, atherosclerosis – 48%, dyslipidemia – 58%, and diabetes – 10%. The higher percentage of atherothrombotic stroke in young adults is associated with high prevalence of vascular risk factors.

**Conclusion.** In the young patient group cardioembolism is considered to be the most common cause of stroke. However, in most of the patients the etiology of stroke could not be determined, almost 23% of these patients did not undergo a complete clinical, laboratory and radiological examination.

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## KIDNEY FUNCTION IN PATIENTS WITH CHRONIC PANCREATITIS

**Introduction.** Chronic pancreatitis is associated the loss of skeletal muscle mass. Muscle contains 98% of the total body creatine, most of which exists as phosphocreatine, the rest as free creatine. Creatinine is the breakdown product of creatine. It is the most widely used measure of renal function. The total muscle mass determines the creatine pool size and thereby creatinine production. As a result, the estimated glomerular filtration rate (eGFR) in analyses is higher than real one.

**Aim.** The objective of this study was to investigate and compare creatinine level, eGFR, stages of chronic kidney disease (CKD) among chronic pancreatic patients and control group.

**Materials and methods.** The three - year period (2015 – 2018) retrospective study in a single university hospital in Latvia. The group of chronic pancreatitis included patients whose diagnosis is confirmed by computed tomography, but there was no pathology in control group. *eGFR calculated by the CKD – EPI formula.* SPSS v.22 was used for statistical analysis.

**Results.** A total of 162 patients were studied and further divided into two diagnostic groups: chronic pancreatitis patients (N=81) and control (N=81). In each group there were 25% (N=20) women and 75% (N=61) men.

In chronic pancreatitis group mean creatinine level was 71,96 (95% CI 67,13 – 76,80)  $\mu\text{mol/L}$ , while among control it was 81,47 (95% CI 76,05 – 86,90)  $\mu\text{mol/L}$  ( $p=0,004$ ). Mean eGFR of chronic pancreatitis and control group was 98,94 (95% CI 94,69 – 103,19) and 81,47 (95% CI 78,83 – 87,59)  $\text{mL}/\text{min}/1.73\text{m}^2$  ( $p<0,001$ ).

CKD was 1 stage 79,5% (N=62), 2 – 19,8% (N=16), 3 – 2,5% (N=2), 4 – 1,2% (N=1) in chronic pancreatitis patients, but in control group it was 45,7% (N=37), 39,5% (N=32), 14,8% (N=12) ( $p<0,001$ )

**Conclusion.** Our analysis demonstrates that patients with chronic pancreatitis have lower creatinine level, chronic kidney disease stages and higher glomerular filtration rate than control group.

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## KNOWLEDGE AND ATTITUDES TOWARDS COMPLEMENTARY AND ALTERNATIVE MEDICINE AMONG MEDICAL STUDENTS IN LATVIA

**Introduction.** Nowadays there is an effective treatment for most of the leading diseases. However, a big amount of people continue to use complementary and alternative medicine (CAM). CAM is a group of health care systems, practices and products not presently considered to be part of allopathic medicine. A better understanding of medical students knowledge and attitude toward CAM will help to evaluate the future usage of CAM.

**Aim.** The aim of the study was to evaluate Latvian medical student's knowledge and attitudes towards alternative medicine.

**Materials and methods.** It is a quantitative, cross-sectional study based on anonymous survey. The target group of our research were medical students from Latvia. Respondents were asked to evaluate their knowledge and attitudes towards CAM through 5 – scores rating scale.

**Results.** Totally 106 participants were included in this study. Medical students are more knowledgeable in massage therapy (3.62, SD – 0.76) and phytotherapy (2.88, SD – 1.21), but they are less knowledgeable in Ayurvedic medicine (1.74, SD – 0.88) and manual therapy (2.00, SD – 1.09). Massage therapy (4.06, SD – 0.81) and acupuncture (2.89, SD – 0.79) were ranked as most effective CAM, Ayurvedic medicine (1.43, SD – 1.15) and homeopathy (1.63, SD – 0.88) were ranked as least effective CAM. No one of respondents (0.00%) will recommend CAM as main therapy method, but 60.4% of respondents will recommend CAM as additional therapy method. 64.1% think that patients have right to choose between CAM and orthodox medicine. 92.5% of respondents will encourage the use of CAM together with orthodox medicine. 71.7 % of respondents want to be trained more on CAM after becoming a doctor.

**Conclusions.** Massage was ranked as most effective and known CAM. Despite a deficient in knowledge on CAM, students believe that knowledge on CAM would be useful in their future career. Majority of the students have positive approach towards usage of CAM as additional therapy method.

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## **KNOWLEDGE OF LATVIAN DERMATOLOGISTS IN OCCUPATIONAL SAFETY USING LIQUID NITROGEN AND CRYOSURGERY SPRAY GUN**

**Key words:** Cryosurgery, dermatology, occupational safety, liquid nitrogen.

**Background.** Cryosurgery using liquid nitrogen and cryosurgery spray gun is often used among dermatologists all over the world, but information on occupational safety in this area is not easy to obtain.

**Objectives.** The aim of the study is to evaluate the knowledge of Latvian dermatologists in occupational safety using liquid nitrogen and cryosurgery spray gun.

**Materials and methods.** The methods used in the study include literature review and survey. The literature on safety aspects to be considered when working with liquid nitrogen and cryotherapy equipment was reviewed. A web survey was used to evaluate the knowledge of dermatologists. IBM SPSS Statistics was used to analyze the results, descriptive statistical analysis and Independent Samples T Test was applied ( $p < 0.05$  was considered as statistically significant).

**Results.** 28 respondents took part in the survey. Latvian dermatologists' knowledge of occupational safety using liquid nitrogen and cryosurgery spray gun reaches 63%. Individual results of the surveyed specialists varies from 30% to 90%. Most of the respondents (54%,  $n = 15$ ) admitted that they had not read the instructions for use of the cryosurgery spray gun, however, their knowledge of occupational safety was not statistically significantly worse than those who had read the instructions.

**Conclusion.** The knowledge of dermatologists can be assessed as mediocre. There is insufficient knowledge about the properties of nitrogen as a chemical element, as well as its storage conditions, various pressure regulation systems and the principles of operation of cryosurgery spray gun. In order to improve the knowledge, it is recommended to promote the availability of the instructions for use of the spray gun, to upgrade their content, to incorporate the issue in conferences related to dermatology, as well as to perform training in the workplaces of specialists.

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## **LONG-TERM RADIOLOGICAL AND CLINICAL RESULTS OF CERAMIC-ON-CERAMIC THA**

**Introduction.** Nowadays, when total hip joint arthroplasty is the method of choice for hip joint degenerative disease, researches for most appropriate and durable bearing material still continue. Ceramic-ceramic bearings have several advantages but are more fragile than other materials and may complicate with squeaking sounds which cause discomfort for the patient.

**Aim.** The goal of this research is to evaluate late clinical and radiological results of hip arthroplasty with ceramic-ceramic bearings.

**Methods.** Patients who underwent total hip arthroplasty with ceramic-ceramic bearings in period between 2001-2009 were included. Clinical results were analysed by using Harris Hip score before and >10-year after surgery. Data were gathered from patient history files and in outpatient visits. Radiographic results were analysed with Charnley-De Lee and Gruen scales.

**Results.** Data from 19 patients with average age 43.38 years at the time of surgery were analysed. Median time since operation was 14 (11-15) years. Pre-operative Harris Hip Score was on average 62.7,

while post-operative median was 96 (93.5-99). Wilcoxon Signed-Rank Test showed higher late post-operative than pre-operative scores in all cases ( $p < 0.05$ ). The median score increased by 32.5 points. Squeaking sounds were observed in 5 patients (23.8%). All of them had an increased BMI ( $> 25$  kg/m<sup>2</sup>). There was a medium strong association between these two variables ( $\phi = 0.313$ ). Evaluation of the radiologic imaging  $> 10$  years after surgery showed no aseptic loosening or osteolysis around the endoprosthesis.

**Conclusion.** Collected late results of hip arthroplasty with ceramic-ceramic bearing demonstrate good long-term outcome and does not lead to osteolysis around the implant.

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## MICROVASCULAR DENSITY IN GLIOBLASTOMA AND DUFFUSE ASTROCYTOMA

**Introduction.** Glioblastoma (GBM) and diffuse astrocytoma (DA) are primary glial cell tumors of central nervous system (CNS). GBM is the most aggressive and invasive type of CNS tumor and has been designated Grade IV by WHO. GBM remains an incurable tumor with a median survival of only 15 months. DA is WHO grade II tumour of CNS. The median overall survival of DA patients is 70 months. Microvascular density (MVD) has been an approach for characterization of vasculature in many tumours including gliomas. MVD has been shown to correlate with the aggressiveness of several cancers. New growth in the vascular network is important because proliferation of cancer cells depends on an adequate supply of oxygen and nutrients and the removal of waste products.

**Aim.** The aim of the study was to evaluate and compare MVD in GBM and DA.

**Materials and methods.** The retrospective study analyzed morphologically proven GBM and DA cases. Immunohistochemical detection of CD34 was used for highlighting the microvessels. The areas of the highest neovascularization were found by scanning the tumor section at low power (40x). Then individual microvessels was counted at a high-power (400x). Each count was expressed as the highest number of microvessels found within 400x magnification.

**Results.** Totally 118 GBM cases and 23 DA cases were included in our study. Among GBM patients were 64 women and 54 men, among DA patients - 11 women and 12 men. The mean age of GBM patients was 61.69 years (95% CI [59.55, 63.83]), the mean age of DA patients was 36.89 years (95% CI [33.06, 40,68]). GBM mean MVD was 36.43 (95% CI [32.72, 39,28]), DA mean MVD - 24.48 (95% CI [19.68, 28.32]). There is a statistically significant difference between MVD in GBM and DA ( $p = 0.004$ ).

**Conclusions.** In this study, mean MVD in GBMs and DA was 36.43 and 24.48, correspondingly. There is a statistically significant difference between MVD in GBM and DA. More aggressive tumors have higher MVD.

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## MISUSE OF BENZODIAZEPINES AMONG PATIENTS WITH SUBSTANCE USE DISORDER

**Key words:** benzodiazepine, misuse, polysubstance abuse, dependence, overdose

**Introduction.** Benzodiazepines (BZDs) is a widely prescribed group of medication which became popular with lots of clinical uses that include therapy of anxiety, insomnia and alcohol withdrawal. However, as majority of medicines, BZDs have a variety of side effects that are associated with misuse, tolerance and dependence. This group of medication is commonly used among polysubstance

abusers and usually combined with other illicit substances that increase risk of using large doses of BZDs and even overdose.

**Aim.** The aim of the study is to research and analyse the prevalence and tendencies of BZDs misuse among patients with substance use disorder (SUD).

**Materials and methods.** In the retrospective analysis, the data were collected using the data base from Jelgava Psychoneurological Hospital "Ģintermuiža" and Daugavpils Psychoneurological Hospital, Latvia. Clinical data were collected from paper medical records of patients with the diagnosis of SUD and screened for nonmedical use of BZDs. Descriptive statistics were done by using Microsoft Excel and SPSS Statistic software.

**Results.** There were 100 patients of age 14 to 64 years old involved in the study: 21 (21%) were females and 79 (79%) were males. The average age was 24,02 for all participants (24,7 for males, 21,7 for females). The main admission diagnosis according to ICD classification included mental and behavioural disorders due to use of alcohol (2%), opioids (23%), cannabinoids (2%), sedatives or hypnotics (9%) and multiple drug use and use of other psychoactive substances (64%). As a primary drug of abuse were opioids (51%), cannabinoids (23%), alcohol (8%), and amphetamines (5%). All patients had history of nonmedical use of BZDs in their anamnesis. 13% of patients were primary addicted to tranquilizers. Clonazepam was the most common drug used among SUD patients (58%), other medications were Alprazolam (10%), Phenazepam (10%) and Nitrazepam (3%). There were no data about the precise name of the used drug in 19% of cases. The dosage of Clonazepam among polysubstance users fluctuated from 2 mg to 60 mg per day that exceeds therapeutic dosage.

**Conclusions.** Results of the study showed that the group of opioid users misuse BZDs the most in comparison with other polysubstance abusers. Individuals abusing BZDs in combination with other drugs consume much higher doses of BZDs than the therapeutic ones.

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## **MOST COMMON SYMPTOMS AND MEDICATION USE FOR RECURRENT DEPRESSIVE DISORDER PATIENTS IN GENERAL PRACTITIONER'S PRACTICE**

**Key words:** Depression, Medication, Sleep Disorders, Anxiety, Antidepressants, General Practitioner.

**Background.** Depression is one of the most common mental illnesses. There are very many factors, which can contribute to development of depression, e.g. pain, chronic disease, loss of a relative, unemployment and financial problems. Every year, depression occurs to about 30 million people in the EU. According to statistics, 1 of 14 people in the age of 15 to 64 has depression in Latvia. General practitioner is often the first person to meet a patient if they have some problems, so it is very important to notice the patient's problems fast. Since 2015, general practitioners can prescribe state compensated medication for specific diagnoses, so patients can be treated ambulatory, without the involvement of a psychiatrist.

**Aim.** To explore the most common symptoms for patients diagnosed with "Recurrent depressive disorder", and compare how these coincide with the guidelines. Find out the most commonly prescribed compensated medications for the treatment of recurrent depressive disorder in the practice of general practitioners.

**Materials and methods.** Quantitative retrospective study was made, using the program *Medius*. There were selected patients with diagnosis "Recurrent depressive disorder". The research was made in two general practitioner practices. Statistical analysis was performed with SPSS 22.0. The Shapiro-Wilk, Mann-Whitney, and Spearman tests were used for analyzing results.

**Results.** From 2748 patients there were 185 people with diagnosis "Recurrent depressive disorder", 142 women and 43 men. Mean patient age was 46 years. The most common symptoms were anxiety (50.8%), sleep disorder (37.3%) and depressed mood 32,4%. 68.6% of the people had 2 symptoms, 17.8% had 1 symptom, and 13.5% had 3 symptoms. The most common medication was Serotonin Reuptake Inhibitors (SSRIs) – prescribed for 93.5%, *Tricyclic antidepressants* (TCAs) were prescribed for

6.5%. More than half of patients (67%) were using additional medication – sleeping pills, tranquilizers or antipsychotics.

**Conclusions.** Results show that the most common symptoms for depression patients are anxiety and sleep disorders. Most often prescribed medications are SSRIs. Summarizing the symptoms of all the patients, it can be concluded that general practitioners' diagnosis and therapy matches the guidelines, so it is very important, that the general practitioner can promptly start the therapy for recurrent depressive disorder.

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## **MUSCULOSKELETAL DISORDERS OF THE NECK AND UPPER EXTREMITY RELATED TO CONTINUOUS WORK WITH A COMPUTER**

**Key words:** computer work; musculoskeletal disorders; pain; ergonomics.

**Introduction.** Today our world is unimaginable without technology and computers. Based on technology advances, computers have become an essential tool in workplace. According to EUROSTAT data, that was published in year 2017, almost 70% of the population use computers daily. Working with a computer is characterized as static. That is reason why ergonomics is a very important part of workplace. Such symptoms as lower back, neck and shoulder is common after continuous work with a computer in modern society.

**Materials and methods.** The research was carried out in Riga Stradins University, Latvia. The total number of participants was 42. Students and workers were interviewed with The Nordic Musculoskeletal Questionnaire (NMQ). The Nordic Musculoskeletal Questionnaire (NMQ) is standardized questionnaire, allowing us to compare severity of musculoskeletal disorders and general complaints and further use them in epidemiological studies. NMQ questionnaire was adopted for use in this study and contained questions about duration of continuous work with a computer. Obtained data was analysed using Microsoft Excel 2019 software.

**Results.** From 42 respondents, 57,1% (n=24) were using computer longer than three hour per day. In 69% (n=29) of cases computer mouse was used instead of trackpad. Most of participants, 73,8% (n=31), felt discomfort in musculoskeletal system during continuous work with a computer. Only 21,4 % (n=9) were taking breaks during work. Using The Nordic Musculoskeletal Questionnaire (NMQ) it was found that during the last 12 month respondents had such complaints as pain, discomfort and numbness in neck 69% (n=29), shoulder 50% (n=21), upper back 45,2% (n=19) and lower back 40,5% (n=17). During previously mentioned period of time 35,7% (n=15) have seen a physician due to symptoms in musculoskeletal system, mostly in the neck and upper extremity. Respondents also were asked about headaches related to continuous work with a computer: 66,7% (n=28) had at least one episode of headache after prolonged work with computer. 28/42 participants noted, that headache primarily was felt in the back of the head and shoulders, that hypothetically could be related to tension headaches type.

**Conclusions.** The results of this study showed that that people who are affected by long working hours with computer experience such complaints as pain in the neck and upper extremity, shoulder and upper back. Headache is also common complaint after work with computer. Workplace should be optimised based on principles of ergonomics and we strongly advise taking breaks during work.

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## **NEW ONSET DIABETES MELLITUS AFTER KIDNEY TRANSPLANTATION: DEMOGRAPHIC DATA AND BODY-MASS INDEX ANALYSIS**

**Background.** New onset diabetes mellitus (NODAT) has been recognized as an increasing problem in kidney transplantation (KT), with an impact on patient morbidity and transplant function. NODAT usually occurs early after transplantation, and is diagnosed according to general population guidelines. Older patients, male gender and high body mass index (BMI) impact the development of NODAT.

**Aim.** The aim of the study is to analyze the correlation between patient age, gender and BMI association with development of NODAT.

**Materials and methods.** A retrospective study involving 216 patients undergoing KT between 2014 and 2017 were enrolled. Patients were divided into two groups: NODAT group and control group (without NODAT). Demographic characteristics and BMI data influencing the development of NODAT were studied using Shapiro – Wilk or Kolmogorov-Smirnov test, Chi-square or Fisher exact test, Cramer’s V and Mann-Whitney test.

**Results.** A total of 191 patients were analysed (25 were excluded due to death or insufficient information) of which 13 or 6,81 % developed NODAT. Statistical analysis showed that the mean age in NODAT group was  $47.81 \pm 14.30$  years, (95% CI 45.69 – 49.93) compared to control group  $52.38 \pm 12.50$  years (95% CI 44.83- 59.94), ( $P=0.24$ ). The results of gender division were quite equal for both groups : 46.15% men and 53.85 % women in the NODAT group versus 52.54% men and 47.46% women in control group,  $P=0.78$ ,  $V1=0.03$ . The mean BMI in NODAT group was  $25.30 \pm 6.34$  kg/m<sup>2</sup> (CI 95% 24.35 – 16.25 kg/m<sup>2</sup>) compared to  $27.05$  kg/m<sup>2</sup> (95% CI 24.05-30.04 kg/m<sup>2</sup>),  $P=0.12$ .

**Conclusion.** According to results and based on the above it can be concluded that none of the analyzed parameters influence the development of NODAT. By including a higher number of patients we could expect to have greater statistical credibility.

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## **DEPRESSION, BIPOLAR AND ANXIETY DISORDERS AMONG LYME DISEASE PATIENTS IN LATVIA**

**Background.** Lyme disease or Borreliosis is tick-borne disease widespread all around the world. Latvia as a part of North Europe is located in the main endemic area.

**Objective.** The aim of the study was to evaluate a mental health of Borreliosis patients.

**Materials and methods.** Cross-sectional study was conducted in Lyme disease support group in Facebook. 223 respondents filled out the questionnaire. The answers were collected using Google survey functionality and data was statistically analysed in IBM SPSS Statistics 22. The questionnaire has been adapted from M.D. Robert Bransfield’s “The Neuropsychiatric Assessment of Lyme Disease” assessment form [1]. Respondents filled 6-point (0 – no symptoms, 5 – max symptoms) or 2-point (yes, no) Likert scale of ordinal data.

**Results.** The questionnaire has been filled by 192 women (86.1%) and 31 men (13.9%). Mean age = 43.6; SD = 11.58; Min = 18; Max = 72 years. There was a serious tendency among respondents to gravitate towards positive answer in depression scale (Median = 3.00,  $n = 48$ , 21.5%) and the same tendency was explorable for bipolar disorder (Median = 3.00,  $n = 46$ , 20.6%), the same pattern described data with lesser extent in Obsessive compulsive disorder (OCD) scale (Median = 2.00,  $n = 49$ , 22%) and for General anxiety disorder (GAD) (Median = 2.00,  $n = 38$ , 17%). There was a



statistically significant ( $p = 0.01$ ) non-parametric Spearman's rho correlation between depression and bipolar disorder ( $r = 0.687$ ) and even higher between OCD and GAD ( $r = 0.713$ ).

**Conclusions.** Depression, bipolar disorder, OCD and GAD are common in the sample group of Lyme disease patients in Latvia. The statistical tests showed high comorbidity between bipolar disorder and depression and between OCD and GAD. The broader investigation of mental spectrum disorders is advisable among Lyme disease patients.

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## OVERVIEW OF NECROTIC PANCREATITIS TREATMENT IN RECUH „GAĪLEZERS”. FON.

**Key words:** Focused open necrosectomy (FON), necrotic pancreatitis.

**Objectives.** Necrotic pancreatitis is one of the most severe acute pancreatitis forms with relatively high mortality 15 – 32% (World Journal of Emergency Surgery, 2019). FON is minimally invasive surgical treatment method which firstly was done in Riga East Clinical University Hospital in 2008. Aim of this study was to evaluate FON – mortality, complications (pancreocutaneous fistula, intestinal fistula and bleeding), hospitalisation time (total time and time in intensive care unit), length of FON, dynamics of inflammatory markers, need for reoperation and patient severity before surgery (amount of necrosis, development of sepsis before surgery) and compare with conventional surgical necrosectomy (CON).

**Materials and methods.** Retrospective study of patients who underwent FON from 2016 till 2019, data were collected from patients medical histories.

**Results.** Totally 43 patients underwent FON with average age 49,5 years (29 - 79y.) Intrahospital mortality rate were 7% (3patients). 11 patients had complications (25,6%) – 4 had intestinal fistula (9,3%), 6 - pancreatocutaneous fistula (14%), 1 - bleeding ( 2,3%). Mean hospitalisation time were 38,5 days (8-115 d.), mean time in intensive care unit – 16,6 days (0-107 d.). Mean length of procedure were 71,3 minutes (25 – 135 min). 17 patients had repeated surgeries (39,5%). Before surgery 22 patients had sepsis (51,1%), amount of necrosis were excluded due to lack of data. CRP levels significantly decreases in 7th postoperative day. (130 mg/L before surgery to 63mg/L in 7th postoperative day)

**Conclusion.** FON can be used in treatment of necrotizing pancreatitis due to relatively low mortality rate (in CON patients – 9,2%, V.Fokins, 2018), lower complication rates (in CON – 30%, V.Fokins, 2018), shorter hospital stay (in CON – 69, V.Fokins, 2018) and necessity of repeated surgeries also decreases (in CON – 65,3%, V.Fokins, 2018).

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## **PATIENT AGE AS A RISK FACTOR FOR PHYSICAL ACTIVITY RECOMMENDATION WITHHOLDING**

Regular physical activity is significant for physical and mental health. All health professionals should counsel their patients to engage in physical activity independently on patient's age, physical state or disability. According to the data in the USA only 22-45% of patients older than 65 years received recommendations about physical activity from their general practitioners. 56% of these patients were asked about physical activity habits, but only 34% received recommendations about physical activity. The aim of this study was to determine whether age is a factor that impacts how often does a patient receive recommendations about physical activity.

Patients were interviewed with a questionnaire. Questionnaire was developed based on guidance of World Health Organization guidelines "Global recommendations on physical activity for health" (2010). Statistical analysis was performed with SPSS software.

This study included 101 hospitalized patients from National Rehabilitation Centre "Vaivari". 60.4% (61) were women and 39.6% (40) were men.

Patients were divided in to 3 age groups: 20.7% (21) were under 30 years, 14.8% (15) were in the age range from 31 to 50 and 64.3% (64) were older than 50. 42.8% (9) from group under age of 30 received recommendations about physical activity on every personnel visit and 57.2% (12) received them only once or not at all. 80% (12) from age range 31 to 50 received recommendations about physical activity on every personnel visit and 20% (3) received them only once or not at all. 81.5% (53) from group that were older than 50 received recommendations about physical activity on every personnel visit and 18.5% (12) received them only once or not at all. There was correlation with how often patients received recommendations about physical activity and their age, older patients tended to receive recommendations more often than younger patients. Nevertheless, in the age group under 30 years, 24% (5) patients stated that they have had episodes when they did not wish to communicate with medical personnel and did not wish to receive recommendations about physical activity. In the two remaining age groups: from 31 to 50 only 13% (2) and in the age group older than 50 15% (10), respondents stated the same.

Age was a statistically significant factor when it came to giving recommendations about physical activity. One could argue that maybe it was as a result from the fact that younger people tended to have more episodes when they did not wish to communicate and receive recommendations from the medical personnel.

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## **PATIENT ASSESSMENT WITH COPD EXACERBATION IN RAKUS HOSPITAL "GAĪEZERS"**

**Key words:** COPD, exacerbation, treatment.

**Introduction:** COPD exacerbation accelerate the loss of lung function, COPD progression, which in turn causes the decline of physical activities, reduces the quality of life, and increases the risk of death, exacerbations also increase the proportion of health care costs attributable to COPD.

**Aim:** To assess the patient treatment with COPD exacerbation and compare the findings with world-wide excepted guidelines and practices.

**Methods:** The study included 120 patients who had been treated at Riga East Clinical University Hospital "Gaīlezers" who were diagnosed with an exacerbation of and who have been hospitalized for at least 1 day.

**Results:** A total of 120 patients were analysed, of which 70.8% (n = 85) were hospitalized in the pulmonary ward, 16.7% (n = 20) were placed in the internal medicine ward and 12.5% (n = 15) in another profile ward. The average time spent by patients in the hospital regardless of which ward the patient was hospitalized to was 7.5 days ( $\pm 3.56$ ).

**Conclusions:** Applied treatment and its duration was in line with the guidelines and foreign research data. The average time spent by patients in the hospital regardless of which ward the patient was hospitalized to was 7.5 days. In many cases, medical documentation had incomplete recommendations.

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## PATIENT MOTIVATING FACTORS TO COLORECTAL CANCER SCREENING

**Background.** The aim of screening is to discover latent disease in the population in order to detect the disease in its early stages. The colorectal cancer screening method used in Latvia is the examination of occult blood in faeces. The target group is people 50-74 years old. There are two invitation strategies of colorectal screening accepted in Latvia - family doctor referral to the laboratory or test tube and instructions for the patient provided by the family doctor. In the latter case, the test must be returned to the family doctor.

**Aim.** The aim is to identify the main motivating factors that encourage patients to screen for colorectal cancer.

**Methods.** The data were collected from November 2019 to January 2020. The study population were patients from a certain family doctor's practice, who have performed a colorectal screening test at least once. All participants signed a consent. A non-anonymous, self-administered questionnaire was used for data collection. The questionnaire consisted of 11 single-choice questions, 1 multiple-choice and 1 free-response question. The study was approved by the Ethics Committee. Data were statistically analysed using *IBM SPSS Statistics 22 program*, with Spearman's Rho test. We created a correlation between frequency of the family doctor's attendance and frequency of the colorectal cancer screening.

**Results.** A total of 244 patients filled the questionnaire- 73 were male and 171 were female, the average age was 63 years. Motivating factors to do colorectal screening included - family doctor invitation for 208 (36.9%), for 120 (21.3%) people the fact that test is for free, 82 (21.3%) medical assistant/nurse, 3 (0.5%) other doctors recommendation, 28 (5%) the fact that test is done at home, 96 (17%) simplicity of the test, 24 (4.3%) recommendations from friends, 3 (0.5%) other reasons.

From those who filled questionnaires, 13 (5.3%) visited their family doctor once a month, 74 (30.3%) once every six months, 86 (35.2%) once a year, 19 (7.8%) once every two years, 52 (21.3%) less than once every two years. Frequency of the colorectal cancer screening - 96 (39.3%) people had it once, 123 (50.4%) had it twice, 22 (9%) three times, and 3 (1.2%) people more than four times.

Results of Spearman's rho correlation shows that there is strong positive relationship between frequency of the family doctor's attendance and frequency of the colorectal cancer screening. (Correlation coefficient  $\rho = 0.46$ ), data are statistically significant ( $p = 0.0001$ ).

**Conclusions.** The family doctor is the main motivating factor for patients to take part in colorectal cancer screening. As well medical assistant/nurse, the fact that the test is for free, simplicity of the test plays a big role in promoting colorectal cancer responsiveness among patients.

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## **PATIENT-CENTERED CANCER CARE AT MASARYK MEMORIAL CANCER INSTITUTE**

**Background.** Patient-centered care entails providing multiple aspects for optimal cancer care, however necessities of oncology patients are often difficult to manage by healthcare system. Therefore, it is needed to evaluate the efficiency of care centeredness, in order to improve delivery of cancer care.

**Aim.** The study aimed to investigate patient-centered oncology care at Masaryk Memorial Cancer Institute (MMCI), Czech-Republic as seen by foreign nationals.

**Methods.** A questionnaire of patient-centered cancer care was proposed to non-czech citizens treated at MMCI. It was designed by an INTENT group as part of Interreg Central Europe project. Questionnaire included 5 sections- information on disease; shared decision making; accessibility to services; psychological support; participation in clinical trials. Time of survey was from April until June 2019. Data was proceeded using SPSS 22.0.

**Results.** Overall 25 of 138 questionnaires were received back, 76% females, 24% males. Age distribution- 18-34 years (8%); 35-49 years (32%); 50-64 years (16%); 65 and older (44%). The most common cancer sites were breast (23%), colorectal (13%) and prostate (10%). Overall 54% of respondents marked meeting in person with healthcare professional as the most important channel on receiving disease related information. 52% prefer to be informed on available treatment alternatives, 20% needed more support from doctors when evaluating different treatment options. Only 28% did not want to participate in shared decision making. Regarding the accessibility to services, more time dedicated during doctor visits was reported as necessary by 48% respondents. Services beneficial at home are nursing support (20%), physical therapy (18%), pain control care (17%). Psychological support was reported as beneficial at any stage of disease by 48% respondents. Lastly, 96% marked research as necessary condition to improve cancer care and 92% were willing to donate tumour tissue samples to Biobank.

**Conclusion.** Majority of oncology patients prefer receiving disease related information from healthcare professional in person, as well as being involved in shared decision making regarding medical treatment. More dedicated time, availability to medical and psychological services are important in order to improve patient-centered cancer care.

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## **PATIENTS WITH RENAL MANIFESTATION OF AMYLOIDOSIS: SINGLE CENTER EXPERIENCE**

**Key words:** Amyloidosis, amyloidosis-associated kidney disease, CKD, ESRD, survival.

**Objectives.** The amyloidosis constitutes a group of diseases in which proteins deposit extracellularly in tissues as insoluble fibrils. Renal disease is a frequent manifestation of the amyloidosis and often is the major source of morbidity. Without treatment, amyloidosis-associated kidney disease usually progresses to end-stage renal disease (ESRD). (Dember, 2016) The Aim of this study was to assess the relationships between the clinical parameters and patients survival.

**Materials and methods.** In retrospective study 40 patients were enrolled with renal biopsy-proven amyloidosis during the period from January 2014 to January 2020 treated in Pauls Stradiņš Clinical

University Hospital, Riga, Latvia. Descriptive and analytical statistics were performed on SPSS, level of statistical significance was set at  $p < 0.05$ . GFR was calculated by CKD-EPI formula.

**Results.** The mean age of study group at enrolment time was 64.5 years [95% CI: 60.8-68.1]. The gender distribution was male 42.5% [27.5-57.5] versus females 57.5% [42.5-72.5]. Biopsies showed that patients had three types of amyloidosis: AA 50% [35-67.5], AL 37.5 [22.5-52.5] and ATTR 12.5% [2.5-25]. Mean serum creatinine and proteinuria at diagnosis were  $163.1 \pm 19.9 \mu\text{mol/l}$  and  $5.3 \pm 3.8 \text{ g/day}$ , respectively; and chronic kidney disease (CKD) stage I, II, III, IV and V renal disease were present in 22.5%, 20%, 20%, 27.5%, and 10% of the patients. Mean temporal trends in length of hospital stay was 37.9 days [23.1-58.5]. There were no proof of significant relationship between length of hospital stay and patient survival [ $p=0.855$ ]. Symptomatic other organ involvement (OOI) had 25% of patients – heart, intestine, lungs or CNS, but there were not found a significant relationship between OOI and patients survival [ $p=0.053$ ]. OOI doesn't have an impact on patients length of hospitalization [ $p=0.112$ ].

**Conclusion.** At time of diagnosis more than half of the study group patients had CKD I-III. There are no proof that OOI, type of amyloidosis and hospitalization duration has any impact on patients survival.

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## PERCEIVED HEALTH RISKS AND SMOKING RELATED SYMPTOMS IDENTIFIED BY ELECTRONIC CIGARETTES USERS

**Introduction:** Electronic nicotine delivery systems as well as electronic cigarettes are devices designed to deliver nicotine to organism in the form of aerosol. Electronic cigarettes and others electronic nicotine delivery systems (ENDS) have been growing rapidly in popularity among youth and adults in Latvia over the last decade. It is believed that electronic cigarette and others electronic nicotine delivery systems (ENDS) use promotes the current use of both types of smoking that have adverse health effects.

**Aim of this study:** is to examine smoking status of electronic cigarettes users, awareness of health damage risks, as well as to research symptoms associated with electronic cigarettes use.

**Methods:** A total of 243 adults were invited to fill anonymous survey regarding questions on source of smoking status, electronic cigarettes use and nicotine concentration in e-liquid, perceived knowledge about perceived health risks and smoking related symptoms during the past year. Data was processed using MS Excel 2010 and SPSS 20.

**Results:** Electronic cigarette users were divided into three groups depending on smoking status, it is a current or dual 46,9% ( $n = 70$ ), former smokers 46,3% ( $n = 69$ ) and non-smokers 6,7% ( $n = 10$ ). During the last year of smoking current users noted the most common symptoms as dry mouth (46,7%), cough (42,4%), bad breath (31,5%), but former and non-smokers more often noted none of symptoms (25,0% and 29,7%).

Higher level of awareness about health risks survey participants reported about conventional cigarette smoking than electronic cigarette use ( $t = -12,8$ ,  $df = 482$ ,  $p < 0,001$ ). Furthermore, survey participants reported lower health risks for smokers and bystanders form electronic cigarettes than from conventional cigarettes ( $t = -12,3$ ,  $df = 482$ ,  $p < 0,001$ ).

As smoking associated diseases respondents noted lung cancer, cardiovascular diseases, stroke, arterial hypertension, peripheral vascular disease and gastric ulcer, but a statistically significant difference between electronic and conventional cigarette smoking associated diseases was not observed ( $\chi^2 = 14,9$ ,  $df = 9$ ,  $p = 0,09$ ).

**Conclusion:** Electronic cigarettes are more popular between current and former conventional cigarettes smokers, who also more often noted smoking associated symptoms. In addition respondents have not widely available and objective information about potential health risks of electronic cigarettes and about possible consequences for different population groups.

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## **PHYSICAL MODALITIES AND CONTEMPORARY REHABILITATION METHODS FOR WELLNESS, SPA AND MEDICAL TOURISM IN BULGARIA**

Medical tourism refers to people traveling to a country other than their own to obtain medical treatment. In the past this usually referred to those who traveled from less-developed countries to major medical centers in highly developed countries for treatment unavailable at home.

Health tourism is a wider term for travel that focus on medical treatments and the use of healthcare services. It covers a wide field of health-oriented, tourism ranging from preventive and health-conductive treatment to rehabilitational and curative forms of travel. Wellness tourism and Medical tourism are related sub-fields; Wellness tourism is oriented to prevention. Medical tourism is oriented to treatment and rehabilitation.

Modern Balneology encloses a continuum of sciences, including investigation of mineral waters, hydro-geological knowledge, balneo-chemical and micro-biological analysis, balneo-engineering, methods of application of the water on the human organism (hydrotherapy, balneotherapy & thalassotherapy), combined methods (hydrokinesitherapy and balneokinesitherapy); procedures with therapeutic muds (peloidotherapy). Ultimately, the modern notion of SPA (considered by some authors as acronym of "Salus per aquam" or "Sanitas per aquam" / "Health through water") was introduced in common life. Bulgaria has a lot of mineral waters and therapeutic muds.

There is a tradition in the field of rheumatology, neurology & neurosurgery, orthopedics and traumatology.

Principal therapeutic procedures will be mentioned. We will present some results of our own clinical rehabilitation practice. In our country balneotherapy and peloidotherapy are important chapters of the Specialty "Physical and Rehabilitation Medicine (PRM)".

Current work presents the experience of Bulgarian balneological school: some contemporaneous aspects of the theory and the practice of Balneology, including its impact in the development of health, wellness and medical tourism in Bulgaria.

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## **PLAYING-RELATED MUSCULOSKELETAL DISORDERS ASSOCIATED FACTORS BETWEEN MUSICIANS AND PREVENTIVE MEASURES**

**Introduction.** Musicians are at risk of playing-related musculoskeletal disorders (PRMD), with incidence ranging from approximately 30% to 90% in the neck, shoulder, arm, hand, finger, upper and lower spine. Musicians have different practice habits, like warm up before they start to play. Such habits like spending a lot of time to the computer, refusing physical exercise can worse self-being condition.

**Aim.** The aim of work is to find out most common pain and their origin among musical school teachers and students, which is connect with musical play and prevention of pain during musical play.

**Methods.** Musicians, who are studying or teaching in music secondary school were invited to fill in anonymous questionnaire about their well-being during they are playing musical instruments and weekly habits influencing PRMD.

**Results.** The results from 158 respondents 58 (36%) reported, that during the musical instrument play feel pain. 74 respondents reported, that they do not warm up before musical play and 44 (59%) feel pain during musical play. 84 musicians who warm up before musical play, only 14 (16%) reported that they feel pain during musical play.

Divided musicians into year groups, the smallest results who warm up before musical play is 15-16 years old musicians only 16 (31%) from 51 respondents warm up before musical play and the highest result of pain during musical play have 15-16 years old musicians 33 (64%) respondents from 51.

In total, 111 (70%) respondents from 158 doing physical activities. 22 (38%) from 58 respondents, who are doing physical activity feel pain during musical play, but 36 (62%) from 58 who are not doing physical activities are feeling pain during musical play.

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## POLYTRAUMA DEMOGRAPHICS AND OUTCOMES INVOLVING MOTORCYCLE ACCIDENTS IN LATVIA

**Background.** Lately we can see growing popularity in motorcycles, making them a significant factor in daily transportation. Thus comes also risks to involvement in accidents and severe injuries related to them.

**Purpose.** To furthermore analyse data that corresponds to amount of motorcycle trauma, severity of trauma, death rate.

**Material and methods.** The analysis of the data was done retrospective from January 2017 to October 2018 using anonymized Polytrauma register.

**Results.** In total 579 patients were assessed according to polytrauma protocol. For this retrospective study inclusion criteria was only motorcycle trauma. 45 patients were included in study. This specific trauma makes up 11.72% of all road associated accidents.

From the included patients 7 were female patients and 38 males. The median age was 45 years. All patients also had done obligatory alcohol tests, that showed 8 patients did not meet Latvia's regulations of allowed alcohol in blood while driving motorised vehicles (BAAL  $\leq$  0.5). That makes 17.78% of all who were involved in motorcycle accidents. Analysing ISS (injury severity score), showed that median ISS score for females was 2, males 10 and the maximum ISS 49 and 75 respectively. This showed that incidence and ISS severity was higher for male patients, also that males makes up 84% of all cases. No significant correlations found between gender and ISS score ( $p=0,17$ ). Overall intrahospital death rate after motorcycle accidents was 2.2%. Median ISS was 9 points. Correlation between ISS and death rate was statistically significant ( $p=0.044$ ).

**Conclusion.** Predominant involvement in motorcycle trauma was male gender which made up 84% of all cases. The median ISS was 9 points. Study showed that death rate for intrahospital motorcycle trauma is 2.2%.

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## **POLYTRAUMA MECHANISM HAS IMPACT ON OUTCOME AND REFLECTS ENVIRONMENTAL AND SOCIAL HAZARDS IN LATVIA IN YEAR 2019**

**Objectives:** The aim of the research was to compare the demographics, injury mechanisms and outcomes in polytrauma patients admitted to biggest polytrauma ward in Latvia – Riga East University Hospital “Gailezers”

**Methods:** A cross-sectional analysis of the data prospectively collected from January 01 2019 to December 31 2019 was performed. The variables included the injury mechanism, injury characteristics, patient demographics and outcome.

**Results:** In total, 469 patients were admitted to the polytrauma ward and assessed according to polytrauma protocol. The median age of the Cohort was 44.5 with a acknowledgeable dominance of male patients, 73.9% vs 26.1%. The most frequent mechanism of injury was falling from a height in 26.5% of cases, then the second and third most frequent mechanisms were pedestrian stricken by a vehicle in 24.88% cases and the injured vehicle driver in 21.83% cases. Falling from a height caused musculoskeletal injuries in 87.39% of cases, visceral trauma in 48.72% and neurotrauma in 32.48% of cases. Vehicle stricken pedestrians have acquired musculoskeletal trauma in 67.79%, visceral trauma in 24.84% and neurotrauma in 22.68% of cases, however injured vehicle drivers acquired musculoskeletal injuries in 65.95%, visceral trauma in 27.26% and neurotrauma in 16.92% of cases.

86.24% of admitted patients had ISS lower than 20, 12.35% had ISS between 20 and 50, and 1.39% had ISS more than 50. In total 10 patients were not saved, which results in 2.34% mortality rate. 2 patients died with ISS lower than 20, 1 patient with ISS between 20 and 50. All patients with ISS over 50 had exitus letalis. The falling from a height injury mechanism had the highest mortality rate of 1.41%. 1 patient died after got stricken by a vehicle and 1 patient after falling from stairs.

**Conclusion:** The most common mechanism of a cohort was falling from a height, followed by a pedestrian stricken by a vehicle, with the predominance of male patients. Similar mechanisms were involved in musculoskeletal and neurotrauma.

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## **POSTOPERATIVE QUALITY OF LIFE IN PATIENTS AFTER SPINAL INTRADURAL EXTRAMEDULLARY TUMOR RESECTION**

**Key words:** COMI score, Spinal tumor, intradural tumor.

**Introduction.** Intradural extramedullary tumors compile 2/3 of all primary intraspinal neoplasms. Analysis of postoperative results in patients also considering their preoperative neurological and functional status would help to improve tactics and algorithms, predict outcome before surgery.

**Aim of the study.** Our aim of the study was to evaluate outcome in patients undergoing surgical treatment for spinal intradural extramedullary tumor and to analyze pain intensity, symptoms, quality of life, complications and neurological disturbances according to the localization of the tumor, type and surgical approach.

**Materials and methods.** Retrospectively collected data from 49 patients with intradural extramedullary tumors who underwent surgery were analyzed and compared in relation to pain



intensity in the back and limb, surgical approach, neurological deficit and patient-rated The Core Outcome Measure index (COMI score) up to 60 months after surgery. Data were analyzed using Word Excel and IBM SPSS 22.0.

**Results.** Study included 49 patients (80% were female and 20% men). Average age was 57.5 years. Regarding location- In 27(55%) spinal tumor was thoracic, 15(31%) cervical, 7(14%) lumbar. Histological examination revealed, that in 25(51%) cases tumor type was meningioma, schwannoma 15(31%) , myxopapillary ependymoma 5(10%), neurofibroma 4(8%). In majority 23(52%) of all the cases surgical method was hemilaminectomy, in 21(48%) laminectomy, with no statistical difference in outcome between those methods. Complications after the surgery were found in 8(23%) patients. Patients complained about back pain in 17(42%), 10(25%) had pain which radiate to extremity, 8(20%) patients have paresthesia, 5(12.5%) have no complain after surgery. There was found statistically significant difference between tumor localization and motor function decrease in arm and limb. ( $p<0.01$ ). There was statistically significant difference between pain intensity in legs and tumor localization after surgery. ( $p<0.01$ ). Mean postoperative COMI score was 39 points with higher point level 45 for lumbar part(maximal possible point level 60 for cases without functional deficit).

**Conclusion.** Pain level and neurological function disturbances after surgery were higher for patients with cervical and thoracic tumors. COMI scores were better for patients with lumbar tumors. 85% of patients were satisfied with their quality of life up to 60 months after surgery.

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## PREVALENCE OF EATING DISORDERS RISK IN RĪGA STRADIŅŠ UNIVERSITY STUDENTS

**Key words:** eating disorders, students.

**Introduction.** There is a high prevalence of eating disorders. Point prevalence has increased from 3.5% for the 2000–2006 period to 7.8% for the 2013–2018 period.

**Aim.** To evaluate prevalence of eating disorders risk among students.

**Methods.** A cross-sectional research using anonymous Google Forms survey was performed. The respondents of the study were the students of Rīga Stradiņš University (RSU) Social Sciences and Health Care and Medicine programmes. Disordered eating attitudes were assessed using the self-report 26 question The Eating Attitudes Test 26 (EAT-26). A score at or above 20 on the EAT-26 indicates a high level of concern about dieting, body weight or problematic eating behaviours. The obtained data was analysed using IBM SPSS Statistics v.22 software (Chi-Square Test, Mann-Whitney Test, Cronbach's Alpha Test).

**Results.** Altogether 309 students submitted their responses. 88,7% were female and 11,3% were male. All participants were divided into 2 groups: Health Care group students from following faculties were included: Faculty of Medicine, Faculty of Rehabilitation, Faculty of Pharmacy and Faculty of Public Health and Social Welfare. Social Sciences group had students from Faculty of European Studies, Faculty of Law and Faculty of Communication. Health Care group which consists of 193 students and Social Sciences group - 116 students. All participants were divided into 3 age groups: age 18 - 20, age 21 - 24 and >24 years old. 160 students were aged 18 - 20. 122 students were aged 21-24 and 27 students older than 24 years. 33% of respondents survey results indicated a high level of concern about dieting, body weight or problematic eating behaviours. Among women 35,4% were high risk of eating disorders but among men 14,3% and that is statistically significant difference,  $X^2=6,258$ ,  $p=0,012$ . Risk of eating disorders do not differ in Social Sciences group and Health care group,  $X^2=0,104$ ,  $p=0,747$ .

**Conclusion.** Study showed that a high risk of eating disorders is highly prevalent among students.

## QUALITY OF LIFE AND EMPLOYMENT OF PATIENTS WITH MULTIPLE SCLEROSIS

**Introduction.** Multiple sclerosis is a chronic autoimmune disease which affects the central nervous system. The illness cannot be fully cured and is leading cause of disability for younger people in their prime working age.

**The aim** of the study was to evaluate quality of life and employment status of patients and find if there is an association with a patient's disability level based on EDSS (Expanded Disability Status Scale).

**Methods and materials.** This cross-sectional was conducted in Riga East Clinical Hospital's outpatient clinic. Patients on a voluntary basis filled a printed-out anonymous survey. The questionnaire's quality of life questions were based on EQ-5D-5L standardized instrument for measuring general health and employment questions were based on "Work productivity and activity impairment questionnaire: Multiple sclerosis v2.0". Data regarding patient EDSS grade were obtained from ambulatory documentation. All data were analyzed using IBM SPSS statistics(vers.26.0) software.

**Results.** 52 patients with confirmed multiple sclerosis diagnosis partook in the survey. The average score of patients EDSS were  $2.3 \pm 1.7$  (range: 1.0-6.5)

Most patients answered that they had no problems in mobility (n = 28 (53.8%)), self-care (n=42 (80.8%)) and usual activities (n = 31 (59.6%)). The most popular answer in pain or discomfort was that patients experience mild problems (n=22 (42.3%)) and a majority of patients have no problems regarding depression or anxiety (n = 24 (46.2%)). There was a significant statistical difference regarding patient's EDSS score and patient's answers regarding their mobility, self-care, usual activities and pain or discomfort ( $p < 0.001$ ,  $p < 0.001$ ,  $p < 0.001$ ,  $p = 0.001$ ). But no statistically significant difference was found between patient's EDSS score and their answers in depression or anxiety ( $p = 0.207$ ).

Majority of patients (n = 38 (73.1%)) responded that they are employed. Patients which were employed were asked to self-evaluate in 1-10 scale the effect multiple sclerosis has on their work ability. The average score was  $3.13 \pm 0.35$ . A positive and statistically significant correlation was found between patient's EDSS score and patients self-evaluated score ( $r = 0.470$ ,  $p = 0.003$ ).

**Conclusion.** Most patients answered that they had mild problems regarding pain or discomfort but had no problems regarding mobility, self-care, usual activities and depression or anxiety. Low EDSS score and patient survey data shows that patient's quality of life is not hampered heavily but they can feel the symptoms caused by multiple sclerosis. Patients with low EDSS continue to work but multiple sclerosis is influencing their work ability.

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## RARE CASE OF ASYMPTOMATIC CUTANEOUS LEIOMYOMATOSIS IN 65-YEAR-OLD PATIENT

**Key words:** Dermatology, leiomyomatosis, smooth muscle tumor, leiomyoma cutis.

**Introduction.** Cutaneous leiomyomas are rare solitary or multiple benign intradermal neoplasms arising from smooth muscle cells in adolescence or early adulthood. Multiple leiomyomas appear as superficial firm papules or nodules that form clusters in linear or dermatomal distribution. Majority of leiomyomatosis patients have fumarate hydratase gene mutation associated with early-onset cutaneous and uterine lesions (Reed's syndrome) and early-onset renal cell cancer. Over time

cutaneous leiomyomas may develop painful paroxysms that appear spontaneously or are induced by physical or emotional stimuli. Leiomyomatosis should be differentiated from a broad spectrum of benign and malignant lesions such as leiomyosarcoma and cutaneous metastases.

**Case description.** A 65-year-old woman presented to the dermatologist's office with a 10-year history of slowly growing, painless, firm lump on her left breast. Patient's medical history was not significant except breast augmentation surgery 30 years ago. On examination solid, nodular, well-demarcated, painless tissue mass, approximately 1.5 cm in diameter was seen on the left breast and multiple small nodules of similar structure arranged in zosteriform distribution were seen on patients left trunk and back. An excisional biopsy was performed with histopathological findings consistent with the suspected clinical diagnosis of leiomyomatosis.

**Conclusions.** Excisional biopsy is relatively safe treatment method for solitary lesions, however gradual increase in tumor size and quantity can lead to disfiguring appearance of the skin and declining surgical treatment efficacy.

**Summary.** This report presents rare case of asymptomatic patient with multiple cutaneous leiomyomas. Thorough evaluation (genetic testing, gynaecological examination and renal imaging) needs to be performed in order to exclude Reed's syndrome and hereditary leiomyomatosis and renal cell cancer.

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## **RISK OF PROGRESSION OF CANNABINOID INDUCED PSYCHOTIC DISORDER AND SCHIZOPHRENIA**

**Background.** Cannabis is one of the most long established recreational drugs in Europe. According to the European Monitoring Centre for Drugs and Drug Addiction report 2019, it is the most commonly used illicit drug in Latvia, with nearly 10% of those in the 15-34 age group reporting having used cannabis in 2018. The reports have shown an association between cannabis use, cannabis-induced psychotic disorders and schizophrenia development. However, a question about cannabis use and its impact on mental health still remains open and controversial. There are a vast variety of risk factors associated with the development of cannabis-induced psychotic disorders and their progression to schizophrenia.

**Aim.** The aim of the study was to investigate the risk factors in the development of cannabis-induced psychotic disorders, their progression to schizophrenia, the incidence of development schizophrenia from cannabis-induced psychotic disorders, as well as clinical diagnosis variations.

**Methods.** In a retrospective analysis, the patient data was collected from the database of the hospital "Gintermuiža" and Daugavpils Psychoneurological Hospital. The data was analyzed using Microsoft Excel and SPSS IBM v. 20.

**Results.** Data from 100 hospitalized patients with a psychotic spectrum diagnosis according to ICD10 and a background use of cannabinoids was collected and analyzed. The main risk factors for cannabis-induced psychotic disorder were identified according to the collected data. The data fields being: Gender (male 90%; female 10%), Age (mean age 18-25 y.o. 60%), Level of Education (secondary education 25%), Marital Status (unmarried 55%), Living conditions (with family 60%), Employment Status (unemployed 55%), Children (no children 85%), Family history of mental disorders (unknown 70%, positive 25%), Family Status (one parent family 50%), Dose of use (unknown 90%), Methods of usage (70% Marijuana), Length of usage (1-3 years 30%), Frequency of usage (less than 3 times per week), Other drug abuse (poly drug use 50%).

**Conclusion.** The highest risk of cannabis-induced psychotic disorders and schizophrenia development is in young, unmarried, unemployed male patients without children. Most of the patients consume cannabis in the form of Marijuana and have 1-3 years history of cannabis use. Poly drug use was observed in half of cases.

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## **ROLE OF EXTERNAL CEPHALIC VERSION IN REDUCING THE CESAREAN DELIVERY RATE**

**Background.** Although term breech presentation is relatively rare, it continues to be one of the indications for cesarean section. External cephalic version (ECV) may reduce the number of breech presentations and cesarean sections.

**Aim.** To evaluate the effectiveness of this obstetric manoeuvre to increase the proportion of vertex presentation among fetuses that were formerly in the breech position near term, so as to reduce the caesarean section rate.

**Methods.** A retrospective study was conducted in Riga Maternity Hospital. The ECV data was reviewed over a period of 4 years at Riga Maternity Hospital between 2016 and 2019. 160 women were enrolled who accepted to perform ECV (age range 16-45 years old). Women were divided into 2 groups: successful and non-successful ECV. A p-value of <0.05 was considered significant. Association was calculated by Pearson chi-square and Independent samples t-test. Logistic regression was used to predict the effectiveness and complication rate.

**Results.** Mean age of women M=30.16; SD=5.15 years, gestational age at ECV M= 261 (37+2 weeks); SD=6.61 days. The success rate of the procedure was 45.6% (n=73). ECV near term was associated with a reduction in non-cephalic presentation and cesarean section (OR= - 2.89; 95%CI: 0.02-0.13) (p=0.01). Regression showed only the number of parities as a significant factor for prognosing vaginal birth. The risk for cesarean delivery decreases in 57% with every number of vaginal birth (p=0.03). It also showed 78% chances to predict delivery using collected data from this study which is not significant. 49.4% had a vaginal delivery, 28.1% had an emergency cesarean after a successful version. Complications at delivery after successful ECV were in 17.50% and in 25% unsuccessful. There is no association between complications and external version (p=0.33). There was an association with complications: neonate in ITU 3.68 (95%CI: 1.11-12.11) (p=0.02), blood loss (p=0.01) and Apgar score in 1<sup>st</sup> minute (p=0.01). There was no association with present meconium at birth (p=0.96), postpartum bleeding (p=0.29), uterus dysfunction (p=0.29), fetal distress (p=0.11), premature membrane rupture (p=0.65) or placental abruption (p=0.66) after version.

**Conclusion.** The external cephalic version is a safe and effective manoeuvre reducing the risks caesarean section. Complications are not associated with the external version. There are multiple factors which impact the result of delivery and only prognostic factor was parity.

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## **ROLE OF HYPERGLICEAMIA IN ICU PATIENTS WITH ACUTE BRAIN DAMAGE**

**Background.** One of the most important source of energy for effective brain functioning is glucose. For patients with acute brain damage the most frequent complication is hyperglycaemia and it indicates worse prognosis. High glucose level is associated with higher mortality rate and worse clinical course, that's why daily monitoring of glucose level, adequate control of it plays important role.

**Aim.** The aim of this study is to determine hyperglycemia influence on patients with acute brain damage, on severity of the disease and outcome.

**Methods.** A prospective study in Pauls Stradiņš Clinical university hospital Intensive care unit in academic year 2019/2020. Data were collected from patients' medical records. Data were analyzed with SPSS IBM and MS excel programmes, results compared with available literature sources.

**Results.** This study included 35 patients, 6 (17,14%) had type 2 diabetes mellitus. 18 (51,42%) patients were transferred to another department, 16 (45,71%) patients died and 1 (2,87%) patient continued to be in intensive care unit after the end of this study. Hospitalization length in ICU varied from 2 - 77 days. With correlation method was found statistically significant correlation ( $p=0,001$ ) between maximal blood glucose level per 24 hours and Glasgow coma scale calculated points without patient, who didn't fit in homogenic data group and separately also showed statistically reliable result( $p=0,000$ ). Patients in diabetes mellitus group had no statistically significance, but appropriate correlation coefficient( $p=0,318$ ). Detected glucose level in pre-hospitalization setting could have impact on hospitalization length( $p=0,061$ ). Glucose concentration in first days had influence on development of brain edema( $p=0,005$ ), but it had no effect on complication formation and need for neurosurgical interventions.

**Conclusions.** Higher glucose concentration as independent variable has negative impact on patients' neurological status, clinical course and hospitalization length.

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## **ROLE OF STABILOMETRY IN THE REHABILITATION ALGORITHM OF A PATIENT WITH VERTEBRO-BASILAR INSUFFICIENCY**

**Key words:** Physical and Rehabilitation medicine (PRM), Physiotherapy, Stabilometry, Vertebro-basilar insufficiency (VBI).

By definition, vertebro-basilar insufficiency (VBI) is a clinical pattern, resulting from decreased blood-flow in the posterior cerebral circulation. The incidence of VBI increase during last years.

We present a male patient of 65 years, transferred to our PRM Department for excessive pain and stiffness in the neck region and muscles around it; balance and gait instability. During clinical exam (at the admission) we diagnosed: vertebral syndrome, balance and gait instability, positive Romberg. X-Ray and Magnetic Resonance Imagery (MRI) of the cervical spine demonstrated osteochondrosis, spondylosis and spondylarthrosis. During Computerized Stabilometry, we observed altered center-of-Pressure (COP) trajectories and COP-oscillations with open and closed eyes.

We applied a complex rehabilitation, including preformed physical modalities (LASER and Magnetic field), individualized physiotherapeutic and occupational therapeutic programme, accentuating on balance and gait training, patient education.

We noticed significant efficacy of the rehabilitation: improvement of the range of motion of the cervical spine, pain relief, balance and gait stabilization, amelioration of autonomy in activities of daily life.

Our opinion is, that every patient with posture instability needs consultation with a medical doctor – specialist in Neurology and in Physical and rehabilitation medicine. We consider that early rehabilitation must be considered in cases with vertebra-basilar insufficiency. We emphasize on the impact of stabilometry for objective evaluation of the equilibrium disturbances and for individualization of PT-complex to the correspondent patient in the respective stage of his condition. Some recommendations for the rehabilitation complex are formulated.

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## **ROTA VIRUS VACCINE INFLUENCE AGAINST GASTROENTERITIS CASES WITHIN 1-8 YEARS OLD CHILDREN**

**Key words:** Vaccination, Rotavirus, Children, Gastroenteritis, Infection, Diarrhoea.

**Background.** Rotavirus infection is the most common reason for severe diarrhoeas in children. According to the data of World Health Organization (WHO) from 2013, every year almost 215 000 children under the age of 5 years old die from rotavirus infection, which can be controlled by a vaccine. Since January 2016, about 80 countries have included rotavirus vaccine in their immunization schedule. Many of these countries documented a significant decrease in rotavirus specific and other diarrhoea causing diseases. However, despite of these arguments, there are many parents, who do not want their children to be vaccinated, so it is important for healthcare professionals to carry out further research and have evidence based arguments to oppose these parents.

**Materials and methods.** Quantitative retrospective study was made. 221 medical histories of children born between 2010 and 2017 were analysed. The results were compiled in charts using Microsoft Office Excel and Microsoft Office Word.

**Results.** Considering that vaccination against rotavirus was included in the National Immunization Schedule only in 2015, the vaccination coverage varied from year to year: in 2010, there was only 1 vaccinated child, in 2014, the number of vaccinated children reached 14, and in 2017 there were 26 vaccinated children. Results show that in 2014, when rotavirus vaccination was available with 50% compensation, the amount of vaccinated children significantly increased – 42% of the children were vaccinated. In the period from 2014 to 2018, among all the children who had been vaccinated, there were only 5 cases of acute gastroenteritis, all of which were treated without hospitalization. Summarizing all of the recorded cases of gastroenteritis in children born between 2010 and 2017, it could be concluded that after the inclusion of rotavirus vaccine into the National Immunization Schedule there was a general decrease in the number of illness cases.

**Conclusions.** The results show that children who had rotavirus vaccine, had fewer episodes of the disease. Acute gastroenteritis was not so common among these children. All of the illness episodes were not so severe, and there was no hospitalization episodes. Since the introduction of rotavirus vaccine there are also fewer episodes of acute gastroenteritis among non-vaccinated children.

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## **SEASONAL FLU VACCINATION TOPICALITY FOR CHILDREN 6 TO 23 MONTHS OLD IN 2019/2020 FLU SEASON AT FAMILY PHYSICIAN'S PRACTICE**

**Key words:** flu season, children, annual flu vaccination coverage.

**Introduction:** Latvia is one of the countries where flu epidemic occurs annually in winter season. One of the most effective prophylaxis activities is flu vaccine. Since 2019/2020 autumn, flu vaccine is included and updated in state vaccination calendar of children vaccination and is fully covered from government for 6 to 23 months olds and pregnant women.

**Aim:** To clarify what impact on flu vaccination coverage has been made in 2019/2020 flu season by including fully covered flu vaccine in state vaccination calendar for children aged 6-23 months in

comparison with 2018/2019 flu season, and to find out and compare parents' opinions of vaccinated and unvaccinated children about flu vaccination in this season.

**Materials and methods:** A cross-sectional quantitative study using a survey of Family Physician's children ambulatory cards and 150 questionnaires for parents. Responded data was summarized and processed by Excel and IBM SPSS Statistics programmes.

**Results:** In 5 random Family Physician's practices children aged 6 to 23 months: 12 out of 353 were vaccinated (3.4%) in 2018/2019 season compared to 2019/2020 season children aged 6 to 23 months: 79 (24.2%) out of 327 were vaccinated. The number of vaccinated children has increased in 2019/2020 season and it is statistically trustable ( $p < 0.001$ ).

Parents choose to vaccinate their children because: in 50% (19) of cases parents worry that their child would get flu, in 31,6% (12) of cases parents trust Family Physician's recommendations, in 18.4% (7) of cases parents choose to vaccinate children because the vaccine now is fully covered in state vaccination calendar.

If vaccinated and unvaccinated children parents' groups are compared it is seen that 73,7% of parents in vaccinated group have positive attitude to the vaccine and 19.6% - in unvaccinated group ( $p < 0.001$ ).

If vaccinated and unvaccinated children parents' groups are compared it is seen that 71.1% of parents in vaccinated group are informed about the flu vaccine by Family Physician and 40.2% - in unvaccinated group ( $p < 0.001$ ).

It is evident that 28,9% of parents in vaccinated group have trust in flu vaccine safety and 8% - in unvaccinated group which is comparatively less than in vaccinated group and the result is statistically trustable ( $p < 0.001$ ).

If vaccinated and unvaccinated children parents' groups are compared it is evident that 40.2% of parents in unvaccinated group do not trust flu vaccine because of the annual changes in vaccination and necessity of revaccination every flu season, and 18.4% - in vaccinated group ( $p < 0.001$ ).

**Conclusion:** The number of vaccinated children against flu has increased in Family Physician's practices chosen by the authors of the research in 2019/2020 flu season. However vaccination coverage is still very low. In the group of vaccinated children the parents are mostly informed about the vaccine by Family Physician and there is a general tendency of positive attitude towards the flu vaccine and its safety. In the group of unvaccinated children the main reason of distrust the vaccination is the annual changes in vaccination and necessity of revaccination every flu season.

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## **SONOGRAPHIC MEASUREMENT OF CERVICAL LENGTH IN THE THIRD TRIMESTER FOR PREDICTING PRETERM BIRTH: ASYMPTOMATIC PATIENTS AND PATIENTS WITH THREATENED PRETERM LABOR**

**Introduction.** Tools, that could help to predict and diagnose preterm labor (PL) are of an outstanding importance and play a major role in decreasing incidence of the newborn mortality and further developmental disturbances. One of those tools is cervical length (CL) measurement - as a risk assessment method it used from 18th to 24th gestational week (GW) as a part of routine ultrasonography (USG), but as a PL diagnostic method - for the patients presenting with the PL threats. But, while the 2nd trimester indicative CL cut-off values of 25 mm are well-known and widely used, maximally sensitive and specific CL cut-off value for threatened PL and beneficence of this tool for asymptomatic patients in the 3rd trimester remains unclear.

**Aim of the study.** To analyze CL, measured between 28+0th and 36+6th GW as a prognostic factor for PL in the presence of PL symptoms (contractions and lower abdominal pain) as well as expediency of the routine CL measurements in the 3rd trimester for nulliparous patients.

**Material and methods.** A prospective study, conducted at the Riga Maternity Hospital, included 134 pregnant women, divided into 2 groups. SP group (n = 43) - patients with PL threat symptoms. AP group (n = 91) - patients, came for the routine 3rd trimester USG screening without symptoms of PL. Transvaginal USG was performed, measuring CL. Afterwards women were followed-up till the day of delivery. Data were processed with the IBM SPSS Statistics 22.0. The associations of the qualitative data (e.g. CL and PL) were verified by the Chi-square test or, if  $<100\%$  of the expected value is  $\geq 5$ , by Fisher's direct test. The strength of the association was determined by the Phi ( $\phi$ ) value (0.1-0.3, 0.3-0.5 medium,  $> 0.5$  - strong).

**Results.** 119 patients finished the research. The median  $\pm$  interquartile range (IQR) of CL was statistically significantly shorter in the SP group (31.2 $\pm$ 4.6 mm), than in the AP group (36.5 $\pm$ 6.1),  $p=0.01$ . The gestation time at birth was statistically significantly lower in the SP group (39.0 $\pm$ 3.3 GN), than in the AP group (39.7 $\pm$ 1.3 GN),  $p=0.04$ . The incidence of PL in the SP group was 20.6% (n=7), which is statistically significantly different from the AP group: 1.2% (n=1),  $p = 0.001$ . The association of SP group CL lengths  $<30$  mm (n=10),  $<25$  mm (n=7),  $<20$  mm (n=5) with the PL was statistically significant ( $p=0.01$ ,  $p=0.01$ ,  $p=0.003$ , respectively), the strongest association was with CL $<20$  mm ( $\phi=0.64$ ), comparing to  $\phi=0.61$ ,  $\phi=0.42$  for CL $<25$  mm and  $<30$  mm. In the AP group for the only PL case, CL was  $>35$  mm, so no association was found between PL and CL $<30$ mm (12.6%, n=11),  $<25$ mm (2.3%, n=2),  $<20$  mm (1.1%, n=1).

**Conclusions.** CL, measured for nulliparous patients between 29th and 36+6th GW, in the presence of PL symptoms could help to identify patients at the increased risk of PL. However, in asymptomatic patients routine CL measurement at that gestational time does not help to predict PL

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## THE IN VITRO STUDY OF BACTERIOSTATIC EFFECT OF LATVIAN POLYHERBAL FORMULATION USING AGAR DILUTION METHOD

**Background.** Nowadays antimicrobial resistance is major concern regarding the development of healthcare, thus, it is crucial to test different options on its management.

Many researches have shown that polyherbal formulations are an option for the development of a remedy when it comes to managing different skin infections, but there are almost none made out of vulnerary plants that could be found in Latvia.

**Aim.** The aim for this study was to test a new polyherbal formulation "Velvet", made out of Latvian vulnerary plants. We determined its bacteriostatic effect on Gram+ and Gram- microorganisms in order to implement it for wound infection treatment.

**Method.** In this study, agar dilution method was used. Microorganisms were inoculated on mixture of agar and polyherbal formulation. After 24 hours in thermostat 37.7° C, colonies were counted and bacteriostatic effect was calculated. After that, resazurin stain method was used to visualise viable bacteria.

We had chosen two Gram+ (*S. aureus*, *E. faecalis*) and four Gram- (*E. coli*, *P. mirabilis*, *P. aeruginosa*, *K. pneumoniae*) microorganisms. As a control, we took agar and rapeseed oil mixture, because it is the base for "Velvet".

For formulation to be bacteriostatic, it needs to suppress 99.5% of microorganisms from obtained results from control.

**Results.** "Velvet" had bacteriostatic effect on both of Gram+ microorganisms (*S. aureus* was suppressed 99.99%; SD 0.01 and *E. faecalis* was suppressed 99.99%; SD 0.005). On Gram- microorganisms, results were as following - *P. aeruginosa* was suppressed 99.75%; SD 0.14, but *P. mirabilis*, *K. pneumoniae* and *E. coli* had almost no difference from controls (all three with 100% growth).



**Conclusion.** Results from our research suggest, that “Velvet” polyherbal formulation could be used for Gram+ infections, but most of Gram- microorganisms are resistant to it. In future, it would be useful to find some vulnerary plant options that possess a bacteriostatic effect on Gram-, to add them to this formulation.

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## THE KNOWLEDGE OF MEDICAL STUDENTS ABOUT LOW-DOSE RADIATION RISKS IN INTERVENTIONAL RADIOLOGY

**Introduction.** In the last two decades the interventional radiology treatment of cardio-, neuro-, and peripheral vascular conditions has surpassed open surgeries. It has numerous benefits, including fewer major adverse events, shorter hospital stays, and faster recovery. However, there's been increasing scientific and clinical evidence that chronic exposure to fluoroscopy, which emits low-dose ionizing radiation, is putting interventional medical professionals at risk for serious health conditions, including cancer. So, it is important to acknowledge these risks.

**Aim.** The aim is to determine the knowledge of the students of the Faculty of Medicine about the effects of low-dose radiation to the health of interventional radiologists.

**Results.** During the study, 78 Medical students of Riga Stradins University have been surveyed. Survey included questions about basic principles of radiation, principles of protective equipment in interventional radiology and main health risks of occupational ionizing radiation exposures. The obtained data shows: average rating - 56.6%, mode - 66.7%, median - 60%. 95% of students consider that radiation and the diseases caused by it are up-to-date to the issue of interventional radiology. 87% of students note that the influence of radiation to interventional radiologists plays a key role in the choice of this specialty.

**Conclusions.** The study shows that medical student knowledge about interventional radiology is moderate. Students lack the understanding of the basic principles of radiation and personal protective equipment. Also, students are unaware of the potential health risks in interventional radiology. Study suggests that students should be educated more about interventional radiology and its different occupational health risk aspects.

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## THE NIGHT - SHIFT WORK IMPACT ON WORKERS BIOLOGICAL CLOCKS, HEALTH AND PRODUCTIVITY

**Key words:** Night – shift work, emergency medicine, biological clock, health, productivity.

**Introduction:** People who work night shifts are at risk of changing their biological clock types, as well as declining productivity and developing health problems associated with lack of sleep and breaking the circadian rhythm.

**Objectives:** The aim of the work is to analyze the differences between the types of workers' biological clocks and to explore the impact of the specific nature of the day and night work on the productivity and health of emergency workers.

**Methods:** In the study was used an international questionnaire “ Activity morningness – eveningness questionnaire (MEQ) ” which was offered to emergency medicine department workers, and by which the study participants were divided into different groups by type of biological clocks. There were some additional questions about workers subjective productivity and health assessment. The resulting data has been statistically evaluated through IBM SPSS program.

**Results:** Participated 100 emergency medicine department workers. Age median was 28 years old. There were 81 women and 19 men. By MEQ there was stated, that 35 participants have evening biological clock type, and 65 participants have middle biological clock type ( $p = 0.015$ ). The results of the study show that the assessment of worker productivity during the prescribed periods is different from the types of employees' internal biological clocks ( $p > 0,05$ ), which concludes that the circadian rhythm of employees has been disrupted due to day-to-day work. As well as day-to-day work, and fatigue after this has an effect on the general feeling and health of employees, calling for symptoms of disorder in different organ systems.

**Conclusion:** The study demonstrates that the night - shift work increases the risk of changing employees biological clock, as well as declining productivity and developing health problems.

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## THE PREVALENCE OF MUSCULOSKELETAL PAIN AMONG IT AND COMPUTER SCIENCE STUDENTS

**Introduction:** Although computer eases everyday life, the use of it is accompanied by risk factors, like, repetitive movements, prolonged sitting in awkward and static postures, that can contribute to the occurrence of musculoskeletal disorders. IT and computer science students may be at greater risk for the development of musculoskeletal symptoms and disorders due to the intensive computer use that takes an essential part of their studies.

**Objectives:** The purpose of this study was to assess the prevalence of musculoskeletal pain among computer science and IT students.

**Materials and methods:** This cross-sectional study was conducted using an anonymous online questionnaire. The survey contained questions about demographic, computer use and musculoskeletal pain existence. Analysis of research data was performed using Microsoft Excel and the Statistical Package for Social Sciences (SPSS) version 20. The level of statistical significance was set at  $P < 0.05$ .

**Results:** A total of 150 IT and computer science students 88% were right-handed, 68% (N=102) were male students with a median age of 22.8 years (18-43). The highest prevalence of MSP, which was associated with computer use was in neck region 48% (N=72), spine 59% (N=89), where the frequency of pain in the lower back and upper back was respectively 35% and 42%. According to upper limb pain was reported by 59% (N=89), the most affected regions were the wrist and hands 36.7 % and shoulders 31%. The least common reported body area of MSP was lower extremities. The significant risk factor for the overall MS status was the female gender, not doing exercises and the use of computer >2h without break.

**Conclusion:** Overall, 87% of students reported experiencing MSP in at least one body part. The most frequently reported pain localization was neck, back, buttock and upper limbs. Pain significantly affects life quality, therefore, the high prevalence of pain reported by students suggests identifying preventive measures that will reduce symptom occurrence and worsening.

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## THE RISK OF DEPRESSION, ANXIETY, AND SUICIDALITY IN PATIENTS WITH PSORIASIS

**Introduction:** depression, anxiety, and suicidality are very common in patients with psoriasis.

**Objectives:** To systematically assess about incidence of depression, anxiety, and suicidality in patients with psoriasis compared with the general population.

**Methods:** Data was collected using data base PubMed and EuropePMC, using search terms (“depression”), (“anxiety”), (“suicidality”) and (“psoriasis”). Rqesearch papers published from 01 Aug 2010 to 28 May 2019. Articles that met the inclusion criteria were assessed for eligibility using “PEDro” rating scale. All consecutive patients aged 18-64 years, registering in the Department of Dermatology, and diagnosed to have psoriasis, were taken up for the study. Research participant are without congenital psychiatric and dermatological diseases, they developed after 18 years of age. The study includes patients who have been observed for more than 3 years at medical care professionals

**Results:** From thirty-five found studies, six studies were included in the review. All subjects were screened for depression, anxiety, perceived stress, and quality of life using the PHQ-9, GAD-7, perceived stress scale (PSS) and WHOQOL-BREF respectively. Subjects who received positive scores on any of the mental health screening instruments were taken up by the Department of Psychiatry for further management. Appropriate psychiatric treatment was then added to the treatment regimen prescribed by the Department of Dermatology. A total of 146,042 patients with mild psoriasis, 3,956 patients with severe psoriasis, and 766,950 patients without psoriasis were included in the analyses. 16.6% reported that their quality of life was “poor” to “very poor” and 35.6% patients reported “neither poor nor good.” To the question “How satisfied are you with your health?” 28.9% patients reported “poor” to “very poor” and 36.7% reported “neither poor nor good.” Total PASI score (severity of psoriasis) had a significant positive correlation with total depression score ( $r = 0.465, P = 0.000$ ), anxiety score ( $r = 0.515, P = 0.000$ ) and suicidality score ( $r = 0.544, P = 0.000$ ) Incidence of clinical diagnosis of depression, anxiety and suicidality in patients with psoriasis was 25.9, 20.9 and 0.9 per 1000 person years.

**Conclusion:** Quality of life was significantly lower in patients with psychiatric comorbidities. There is a need for routine screening of all patients with psoriasis for psychiatric comorbidities as early detection of these comorbidities is the first step in effective management.

**Keywords:** depression, anxiety, suicidality, psoriasis.

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## THE ROLE OF BYSTANDERS IN OUT-OF-HOSPITAL CARDIAC ARREST

**Objectives:** To research the role of bystanders in out-of-hospital cardiac arrest. Create suggestions and methodical recommendations as possible.

**Materials and methods:** The analysis of the electronic calling cards for 2018 and 2019 of the State Emergency Medical Service (SEMS) of Latvia has been performed, the indicated complication of which has been resuscitation, successful resuscitation, unsuccessful resuscitation. Data were processed with MS Excel and SPSS programs, comparative statistics were performed.

**Main results:** Research in cardiac arrest resuscitation has affirmed that the most important role have recognition of cardiac arrest, timely calling for EMS and initiation of CPR. All these things are performed largely by lay bystanders. Overall 2538 resuscitations were performed, of which 27,6% were successful resuscitation. There is a tendency that as the patient’s age increases, the number of successful resuscitations decreases, also with age, resuscitations were performed more often at home.

About a quarter (24,2%) of all resuscitations happened in a public place. Arrival time of EMS team reached the patient and performed CPR in 2018 was 7,52 – 8,44 minutes and in 2019 was 7,75 – 8,23 minutes. In most of cardiac arrest cases, bystanders did not perform CPR measures (60,3%).

**Conclusion:** The most important influencing factors in the outcome of resuscitation are the patient's age, the location, the first aid provided by bystanders, the time until the arrival of EMS and the first observed heart rhythm in a patient with cardiac arrest. Involvement of bystanders plays an important role in the effectiveness of resuscitation, whose activities affect the patients' chances of survival and further events. About a quarter (24,2%) of all resuscitations happened in a public place. The increase in the number of successful resuscitations is observed for resuscitation events that happened in public places. In most of cardiac arrest cases, bystanders did not perform CPR (60,3%). In 20.7% of cases were performed traditional CPR and in 18.9% of cases – compression-only CPR. It is necessary to create a register of AED devices available in Latvia and their locations, to ensure the availability of data to the EMS service and the public. The EMS service of Latvia, in cooperation with the Ministry of Education and Science, to develop a pilot project for the provision of first aid in educational institutions, increasing the knowledge and skills of pupils (preferably starting from the 7th / 8th grade), teachers in the provision of first aid every year.

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## **THE ROLE OF COMPUTED TOMOGRAPHY IN THE DIAGNOSIS OF PANCREATIC NEOPLASMS**

**Key words:** Computed tomography, pancreatic neoplasms.

**Objectives.** Nowadays more pancreatic neoplasms are detected during radiological investigations and it is important to determine the role of CT in diagnosis and differential diagnosis of pancreatic neoplasms.

**Materials and methods.** Retrospective study was conducted to analyze 40 patients with pancreatic neoplasms, who had done CT of the abdomen and histological confirmation of neoplasm in Riga East University Hospital from 01.02.2016. to 01.02.2018. Data were analyzed using IBM SPSS 23.0.

**Results.** Mean age was  $64,5 \pm 11,0$  years, females were 27 and males 13. In histological conclusion 82,5% (n=33) of neoplasms were pancreatic adenocarcinomas, 10,0% (n=4) were NET, 5,0% (n=2) mucinous cystadenomas and 2,5% (n=1) serous cystadenomas. Neoplasms were located mainly in the pancreatic head 57,5% (n=23), in the pancreatic body 22,5% (n=9), in the tail 12,5% (n=5) and in the neck 7,5% (n=3). In CT scans pancreatic neoplasm size were Me=2,90 cm and IQR 2,20 - 4,85 cm. In CT native phase pancreatic neoplasms mostly were hypodense 62,5% (n=25), isodense were 30,0% (n=12) and hyperdense 7,5% (n=3). Mean density for pancreatic adenocarcinoma in native CT scan was  $30,88 \pm 7,17$  HU versus  $54,05 \pm 15,53$  HU in parenchymatous scan. Mean density for NET in native CT scan  $30,88 \pm 7,17$  HU versus  $116,50 \pm 37,48$  HU in parenchymatous scan. Mean density for cystadenomas in native CT scan  $14,00 \pm 5,29$  HU versus  $16,33 \pm 6,81$  HU in venous scan. There was statistically significant association between malignant tumor size and distal metastasis ( $p < 0,05$ ), where patients without metastasis had mean tumor size  $2,97 \pm 1,35$  cm, and those with metastasis  $4,65 \pm 2,53$  cm. There wasn't statistically significant correlation between malignant tumor size and tumor density in native CT scan ( $p > 0,05$ ;  $r = -0,14$ ). There wasn't statistically significant correlation between malignant tumor grade and tumor density in native CT scan ( $p > 0,05$ ;  $r = -0,17$ ). CT sensitivity of detecting pancreatic neoplasm was 83,78% and specificity 66,67%. CT sensitivity of determining TNM stage of pancreatic cancer were: T stage 71,88%, N 90,91%, M 87,50% and specificity were: T stage 37,50%, N 66,67% and M 95,83%.

**Conclusion.** CT has a sensitivity of 83,78% and specificity of 66,67% in detecting pancreatic neoplasms. There was statistically significant association between larger malignant tumor size and positive distal metastasis.

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## **TREATMENT OF PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA AT PREHOSPITAL STAGE**

**Background.** Paroxysmal supraventricular tachycardia (PSVT) is common diagnosis in prehospital stage. On average, every year Emergency Medical Services (EMS) attend 1500 calls where patients are diagnosed with PSVT. Complications of PSVT vary from syncope to sudden death, which is why it is important to recognize PSVT early, diagnose it and start an adequate treatment following guidelines and algorithmic recommendations specifically for prehospital stage.

**Purpose.** The aim of the study is to determine the treatment protocol and tactics chosen by EMS team leaders for patients diagnosed with PSVT.

**Materials and Methods.** The study was conducted at Emergency Medical Service in Latvia and based on EMS data from call cards selected by the criterion - supraventricular paroxysmal tachycardia. The method of the study is quantitative data processing, data grouping, data compilation and statistics analysis of data. Obtained data were analysed using SPSS version 22.0 and Microsoft Excell.

**Results.** In the course of the study, 1505 data for the year 2018 were obtained, and 1495 data were accepted as valid. The average age of patients with PSVT was  $59 \pm 17,4$  years. From all data 64.5% or 950 were female, 35.5% or 525 were male.

In guidelines Adenosin is recommended as the first-line treatment for PSVT. In most or 61,1% of the cases EMS team leaders used Adenosin for treatment of PSVT, but in 38,9% of cases they did not use Adenosin at all.

In 17,6% cases Adenosin was combined with an other antiarrhythmic drug. And in 58% of these cases, Adenosin was used only in doses of 5mg or 10mg not as recommended in guidelines, where it is 5mg à 10 mg à 10 mg.

In 3,4% cases where PSVT was diagnosed, there was not treatment performed at all. The patient was simply transported to the hospital or a 0,9% NaCl solution was used to flush the peripheral vein catheter, but no medications were given to treat the PSVT.

Although the guidelines state that synchronized ECV is used when the patient's condition is hemodynamically unstable, out of all 17 calls, synchronized ECV was used only on 5 patients with this condition.

**Conclusions.** In the course of the assessment it was found that in most calls carried out in year 2018, EMS team leaders followed the guidelines and algorithmic recommendations for treatment of PSVT, however, in a large proportion of cases the algorithm for treatment of PSVT was not respected.

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## **TYPE TWO DIABETES MELLITUS COMPENSATION HIGHLIGHTS FOR SENIORS**

**Key words:** Type two Diabetes Mellitus, older adults, treatment goals, safest therapy, glucose compensation.

**The actuality of theme.** Despite the aging population prevalence of diabetes increases. Seniors have a higher risk of hypoglycemia and cognitive impairment, which can complicate glycemic control. It is very important to have a higher target HbA1c to avoid complications. If the patient and his relatives have a comprehension of the disease and treatment, the physician will get compliance from the patient and he will be ready for self-control. Compliance positively refers to long term diabetes compensation and can significantly reduce the development of complications.

**Objectives.** To explore glycemic correction options and efficiency in seniors. To explore the safest hypoglycemic therapy for older patients.

**Materials and methods.** The study included 51 type two diabetes mellitus patients from 65 years of age from 19 general practitioners practices. Data were obtained from patients' cards including laboratory tests, physical examinations, anamnesis, prescribed medication.

**Results.** 31 (60,8%) patients did not feel low blood glucose. Elevated glucose levels did not feel 43 (84%) patients. Glucose levels controlled 45 (88,2%) patients and pre-meal glucose controlled 42 (82,4%). On average, HbA1c was 6,83%. Women had increased waist circumference, but only 4 men had less than 102 cm waist circumference. 42 (82,4%) used oral hypoglycemic drugs. 35 patients, who used hypoglycemic drugs had HbA1c 6,74%, 9 patients, who used insulin HbA1c had 7,66%, but patients, who used both agents mean HbA1c was 7,32%. Medication with a higher risk of hypoglycemia physicians prescribed less. 36 (70,6%) were not hospitalized in 2019. Daily physical activities did 41 (80,4%) patients. In 2019 visual inspection had 37 (72,5%). 43 (84,3%) had no support from their relatives or others. Those 23 (45,1%) patients, who used lipid-lowering drugs mean low-density lipoprotein was 1,84 mmol/L.

**Conclusion.** Seniors do not recognize low blood glucose, the risk of hypoglycemia is high, therefore their target HbA1c has to be from 7,5%. It is very important to have support from their relatives or others, especially for those patients who use insulin and have cognitive impairment. Those patients, who controlled blood glucose levels as well as blood pressure, had better HbA1c. In most cases the study shows good cooperation with their doctor, patients understand the importance of the therapy, controlling the complications and taking into account the physician recommendations which provides the best outcome.

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## USAGE OF SOCIAL MEDIA TO CONSULT THE EMERGENCY CONTRACEPTION USE AMONG DIFFERENT POPULATION GROUPS IN LATVIA

**Objectives:** Published literature claim that 15 to 24 years old youngsters, women and people with lower education use social media and trust the information found more often than older people, men and people with higher education. Aim of the study is to find out what people groups regarding their demographic data are using social media more to consult the emergency contraception use after unprotected vaginal sexual intercourse in Latvia.

**Materials and methods:** Originally created questionnaire about people habits using social media regarding emergency contraception was carried out from December 2018 to May 2019 in the internet and by distributing hard copies in schools, universities, and for the employees in the private sector. Data was statistically analysed in Microsoft Excel 2013 and IBM SPSS software, version 20.0.

**Results:** 509 people (16–30 years) voluntary and anonymously participated in the study. Statistical analysis was done in the age groups - 16–20 years (n=328; 58%), 21–25 years (n=109; 19%), 25–30 years (n=72; 13%). 48% of respondents (n=245) have had unprotected sexual intercourse. 50 % of them (n=124) have searched the information about emergency contraception in social media after unprotected sexual intercourse. Study showed that younger people (16–20 years) (63.4 %) (n=59) (p=0.001), women (49.5%) (n=109) (p=0.028) and respondents with primary (54.3%) (n=25) and secondary education (58.5%) (n=24) (p=0.023) have searched the information regarding emergency contraception in the social media more often. 33% of participants (n=45) searched information on mammaunteti.lv, 23% (n=32) searched on calis.lv, 18% (n=24) on youtube.com.

**Conclusion:** Respondents below 20 years old, women and respondents with primary and secondary education are using social media to seek information on emergency contraception more often than

other population groups. More studies are required to clarify the reasons why mammamunteti.lv, calis.lv and youtube.com are the most used platforms.

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## USEFULNESS OF LUNG ULTRASOUND IN COMMUNITY ACQUIRED PNEUMONIA FOLLOW-UP IN CHILDREN

**Key words:** ultrasound, pneumonia, pediatric, lungs.

**Introduction.** Pneumonia is the most common cause of death in the world for children under the age of five. Community-acquired pneumonia is a clinical diagnosis, but radiological examinations are used to diagnose and evaluate complicated cases. Nowadays diagnostic procedures, such as chest x-ray, are performed very often, therefore children are more exposed to ionizing radiation. Three chest x-rays are routinely performed in patients with community-acquired pneumonia.

**Aim.** Reduce ionizing radiation in pediatric population.

**Materials and Methods.** A prospective study was conducted at the Childrens Clinical University Hospital from 01/10/2019 to 01/02/2020. Chest x-ray was replaced with lung ultrasound procedure. The data obtained in the study were collected and analyzed in Microsoft Excel.

**Results.** The study involved 32 patients, including 12 girls and 20 boys. Childrens age ranged from 3 months to 14 years. The median age was 4 years, IQR = 4.25. The median age was 3 years for girls and 5 for boys. The average age was 5.03 years, 4.8 for girls and 5.15 for boys. In the study, patients underwent lung ultrasonography instead of second chest x-ray and therefore reduced the amount of ionizing radiation by 0.025 mSv.

**Conclusion.** Lung ultrasound is a useful examination for the dynamic evaluation of patients with pneumonia, since it is possible to see pathological findings, make measurements and compare them with previous data.

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## VITAMIN D DEFICIENCY IN PREGNANCY AND RISKS OF PREECLAMPSIA

**Key words:** 25-Hydroxyvitamin D, pre-eclampsia, pregnancy.

**Introduction.** Vitamin D deficiency may be a risk factor for negative outcome in pregnancy. Vitamin D may be important in the pathogenesis of severe preeclampsia. Objectives. We sought to examine relations between maternal serum 25-hydroxyvitamin D (25[OH]D) concentration in pregnancy and the subsequent diagnosis of preeclampsia (PE).

**Methods.** Data was collected using data base PubMed and WileyOnlineLibrary, using search terms "25-Hydroxyvitamin" or "D-vitamin", "pregnancy" and "pre-eclampsia". Researches published from 18.08.2010 to 13.11.2014. Articles that matched the inclusion criteria were assessed for eligibility criteria using "PEDro" rating scale. All chosen studies had control group - participants included women of reproductive age with singleton pregnancies with absence of any chronic medical illnesses were selected.

**Results.** From fifty-seven found studies, five studies were included in the review. Venous blood samples (2 mL) were taken and the level of 25-dihydroxy vitamin D (25-OH-D) was measured. If the levels of 25-OH-D were less than 10 ng mL, between 10 ng mL and 29 ng mL or more than 30 ng mL, they were considered as indicate of deficient, insufficient and normal 25-OH-D concentrations, respectively. In the first study that was examined, the 25(OH)D deficiency was significantly higher in

the pre-eclampsia group [p=0.03]. In second study average serum 25-OH-D concentration that had women with severe pre-eclampsia tended to be lower compared with the women with temperate pre-eclampsia [14,33 ± 9.8 ng mL<sup>-1</sup> vs. 18,37± 14,4 ng mL<sup>-1</sup> , p=0.34]. In third study, the vitamin D deficiency was significantly higher in the pre-eclampsia group [odds ratio (OR) = 24.04, confidence interval (CI) = 2.10–274.8, P = 0.01]. Fourth case study of 25(OH)D and preeclampsia, showed a > 2-fold increase in risk of preeclampsia when circulating 25(OH)D concentrations were <20 ng/mL. In the fifth case, Vitamin D deficiency was significantly higher in the pre-eclampsia group, p=0.002. Conclusion. Our results confirmed our hypothesis that women with developed severe preeclampsia had significantly lower maternal serum 25(OH)D in time of pregnancy compared with healthy women with uncomplicated term pregnancies.



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# VĒSTURE UN KULTŪRAS VĒSTURE

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## HISTORY AND HISTORY OF CULTURE

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*Henrihs Soms*

### DAUGAVPILS LATVIEŠU SABIEDRĪBA PRESES UN PUBLICISTIKAS SKATĪJUMĀ: 1920

1920. gadā Daugavpils pēc Rīgas un Liepājas bija trešā lielākā Latvijas pilsēta, kurā dzīvoja 29 000 iedzīvotāju. Latvieši bija tikai 5% no pilsētas iedzīvotājiem. Par latviešu sabiedrības dzīvi Daugavpilī informēja tā laika Latvijas preses izdevumi, viens no tiem – latgāliešu laikraksts „Latgolas Vārds” bija reģionāls izdevums, kura redakcijas darbojās Rīgā un Rēzeknē. Daugavpilī tolaik latviešu laikraksti netika izdoti.

Daugavpils latviešu sabiedrībai veltīto laikrakstu informāciju var sistematizēt vairākās grupās: latviešu pārstāvju darbība ieceltajā pilsētas domē, latviešu organizēšanās sakarā ar Latvijas Satversmes vēlēšanām, latviešu iesaistišanās jaundibinātajās (atjaunotajās) sabiedriskajās organizācijās (Daugavpils Latviešu biedrība, Katoļu biedrība „Saule”, Daugavpils dzelzceļa mezglā kultūrveicināšanas biedrība), latviešu mācību iestāžu (1. ģimnāzijas, „Saules” sieviešu arodskola) darbinieku aktivitātes, Daugavpils garnizona karaspēka vienību virsnieku un kareivju daļība pilsētas sabiedriskajā dzīvē, garīdzniecības pārstāvju aktivitātes.

Daugavpils latviešu sabiedrību veidoja arī Latvijas Republikas iestāžu darbinieki – juristi, policijas darbinieki, tirdzniecības, kultūras un izglītības darbinieki, inženieri, muitnieki, pastnieki, kuru sabiedriskās aktivitātes tika atspoguļotas preses slejās. Periodikas skatījumā Daugavpils pazīstamākās personības bija advokāts O. Muižnieks, banku darbinieks A. Bērziņš, policijas darbinieki K. Berķis, J. Brauns, pasta darbinieks F. Anže, maiznieks J. Stencelis, dzelzceļnieks K. Freimanis un citi.

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### AUTOCEPHALOUS ORTHODOX CHURCH OF UKRAINE: TREND OR UNIQUE SITUATION? CASE STUDY OF LATVIA

**Key words:** church, orthodoxy, religion, Ukraine, Latvia.

Following the annexation of the Crimean Peninsula and the military conflict in Eastern Ukraine, relations between Ukraine and Russia deteriorated, including in the area of the Orthodox Church. Until now, the only recognized Orthodox church in Ukraine was the Ukrainian Orthodox Church of the Moscow Patriarchate. However, in early 2019, the Patriarchate of Constantinople granted the Orthodox Church of Ukraine autocephaly, thus officially recognizing it. The Crimean Peninsula and the military conflict in Eastern Ukraine also led Latvia to review its relations with Russia, including in the area of the Orthodox Church. For example, starting from summer 2019, the head of the Latvian Orthodox Church, metropolitans and bishops must be Latvian citizens who have lived in Latvia for the last 10 years. At the end of the year, the “Latvian Orthodox Autonomous Church in the jurisdiction of the Patriarchate of Constantinople” was registered – a structure parallel to the Latvian Orthodox Church under the jurisdiction of the Moscow Patriarchate. Considering that Latvia and Ukraine are in the sphere of Russian foreign policy interests, are subject to Russian compatriot policy and have a large number of parishioners of the Orthodox Churches under the jurisdiction of the Moscow Patriarchate, it was decided to examine whether granting autocephaly to the Orthodox

Church of Ukraine is a unique situation, or it is also possible in Latvia. In this article, the preconditions that led to the establishment of the autocephalous church in Ukraine were clarified, as well as it was examined whether such preconditions exist in Latvia. It was concluded that the necessary condition for the establishment of an autocephalous church in Ukraine is the historical basis, while the sufficient condition is the tendency of the then President of Ukraine to legitimize power. Such preconditions do not exist in Latvia.

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## **IMPACT OF A SMALL MEMBER STATE ON EU SANCTIONS POLICY TOWARDS BELARUS: CASE STUDY OF LATVIA (2014-2019)**

**Key words:** Latvia, Belarus, European Union, sanctions, economy.

In comparison to other European Union member states, Latvia has been active in building bilateral relations with Belarus. This is primarily due to several factors: geographical location, a set of historical factors, as well as similarities in mentality. These preconditions have been important enough to indicate Latvia's increased interest in the EU's policy towards Belarus. The problems with human rights in Belarus has significantly limited Latvia's ability to influence the EU's common position in the context of promoting political dialogue, but this has not prevented it from influencing the economic policy of the EU. Latvia's priority was lifting sanctions applied by the EU against Belarus in the period from 2012 to 2019. It was aimed at developing and strengthening economic ties, trying to achieve the most beneficial result for both Latvia and Belarus. Considering the assumptions that it is advantageous for Latvia to establish economic relations with Belarus, the paper examines how Latvia has tried to achieve the abolition of the sanctions regime at the EU level in order to achieve a favorable result. The paper examines whether and how Latvia, as a small EU member state, can influence the EU sanctions regime against Belarus, thus influencing the EU policy towards Belarus in general. It is concluded that between 2012 and 2019 Latvia has sought to block a number of EU attempts to impose an economic sanctions regime on Belarus.

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## **LATVIA'S CONTRIBUTION TO INTERNATIONAL MISSIONS AND OPERATIONS: A WAY TO ACHIEVE POLITICAL GOALS**

**Key words:** New institutionalism, institutions, international operations, Latvia's national contingent.

**Reason of writing:** The most important Latvia's contribution to the collective defence is involvement in international operations. The involvement of Latvia's national contingent in international operations comprises several stages: preparation, deployment and post-deployment. The institutional framework plays an important role in the above-mentioned stages, because it includes decision making procedure and planning in compliance with the international operation tasks and responsibilities of soldiers.

**The aim is to:** 1) identify the institutional system and responsibilities of institutions to prepare, deploy and provide the necessary support for Latvia's national contingent during and after international operation, 2) determine whether the perception of policy makers has changed over time, 3) explore practical aspects of Latvia's involvement in international operations.

**Methodology:** Research is based on analysis of new institutionalism, defence policy planning documents, interviews with officials from the Ministry of Defence of the Republic of Latvia and the National Armed Forces of Latvia.

**Results:** The most important authors of new institutionalism are J. March and J.P. Olsen, B.G. Peters etc. New institutionalism has three basic approaches: historical institutionalism, rational choice institutionalism and sociological institutionalism.

Latvia's participation in international operations is important part of Latvia's defence policy and Latvian national contingent is instrument for the defence policy makers to achieve political goals, therefore significant attention should be paid to the national contingent's preparation, deployment and post-deployment stage. The stages of involvement of Latvia's national contingent in international operations may be considered as a path - a basis for Latvia to be not only a security and defence receiver, but also a provider.

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## **LIELDIENU SVINĒŠANAS ĪPATNĪBAS MŪSDIENĀS: LATGALES REĢIONA PIEMĒRS**

Kā liecina 2018. gadā veiktās aptaujas dati (apkopoti 540 respondentu viedokļi), mūsdienās Lieldienas Latgalē ir samērā populāru reliģisko svētku piemērs, kuru tradīciju ievērošanas detalizēta analīze atklāj zināmu pretrunu starp vietējo iedzīvotāju pārliecību (viss tiek ievērots, nekas nemainās) un reālo situāciju (mainās vai zūd atsevišķas tradīcijas, Lieldienas komercializējas u. tml.).

No vienas puses, reģionā dominē pozitīva attieksme pret Lieldienām (97,3%) kā būtiskākiem kalendārā iekļautiem svētkiem (82,19%). Respondenti sevi raksturo kā aktīvus Lieldienu svinību dalībniekus (94,8%) un tik tiešām tic, ka viņi pilnībā ievēro to tradīcijas (93,9%). Aptaujāto viedokli apstiprina fakts, ka Latgalē līdz šim aktīvi praktizēta olu krāsošana (95,3%), svētku galda klāšana (92,1%), tuvinieku apciemošana (75,8%), ciemiņu uzņemšana (74,5%), kā arī citas tradicionālas Lieldienu darbības.

No otras puses, mūsdienų dzīves apstākļi ienes korekcijas Lieldienu svinību norisē un atsevišķu tradīciju ievērošanas pakāpē. Tostarp kā būtiskākās transformācijas jāmin: 1) svētku sagatavošanas posma manāmā reducēšana: visbiežāk Lieldienu priekšvakarā tiek sakopts mājoklis un sagatavots vienkāršs svētku mielasts; dažreiz pat šī prasība netiek izpildīta; 2) baznīcas ceremoniju daļēja ievērošana vai pakāpeniska atteikšanās no tām: Lieldienās baznīcu regulāri apmeklē tikai 62,7% un Lielo gavēni ievēro – tikai 39,4% no aptaujāto respondentu kopskaita, un lielākoties tie ir vecāka gājuma cilvēki; 3) komercializācijas procesu iespaids: arvien biežāk reģionā tiek iegādāta, nevis saskaņā ar tradīcijām patstāvīgi gatavota Lieldienu atribūtika – dekors, olas, pīrāgi, kuliči; 4) izklaides aspekta pastiprināšanās: šajā sakarā jāmin Lieldienu šūpošanās (41,7%), ko reģionā mūsdienās lielākoties uztver ārpus pašu svētku konteksta, kā arī olu ripināšana (36,2%) un olu meklēšana (33,7%), tradicionālas spēles, kuru mērķauditorija šobrīd pārsvarā ir bērni.

*Maija Grizāne*

## **ORAL HISTORY SOURCES IN RELIGIOUS STUDIES OF SOVIET PERIOD: THE CASE OF OLD BELIEVERS IN LATGALE**

Nowadays historical science in Latvia is involving oral history sources as a unique and necessary complex for any research on historical events of the 20<sup>th</sup> century. Critical analysis of the oral history sources make them as important as classically used archival documents. In such a field as religious studies of the soviet period oral history sources may become the only information source of people's everyday life and religiosity. Moreover, only oral history sources can provide data on people's experience, attitude and feelings. This presentation focuses on the case of Old Believers in Latgale and their practice of religiosity under atheistic propaganda. Comparison of data from archival documents and oral testimonies allows investigation on problems with religious practice of the studied group and discovering the roots of modern secularisation and decrease in activities of religious practice.

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## **REVISIONIST HEDGING AND SHOCK: THE CASE OF QATAR IN THE ARAB SPRING**

**Key words:** Qatar, the Middle East, the Arab Spring, Small state security, Syria, Iran, Saudi Arabia, Persian Gulf.

During the Arab Spring (17 December 2010 – 10 July 2017), the small Persian Gulf country Qatar utilized high profile and proactive foreign policy, which was characterized by active support to different non-state actors seeking to overthrow ruling regimes within several Arab countries. This raises the question – why? The following paper analyses Qatar's foreign policy approach to one of the major conflicts of the Arab spring – Syria, arguing that the strategy of hedging employed by Qatar vis-à-vis its main regional rival Iran and the main regional ally Saudi Arabia was the underlying reason for its assertive and aggressive posture. The paper also introduces revisionist theoretical approach to hedging, arguing that its enabler in the case of Qatar in Syria was the state of shock the MENA regional system was facing during the years mentioned above.

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## **SOVIET "EAST" AND "WEST": THE VALIDITY OF COMPARING THE HISTORY OF SCHOOL EDUCATION OF THE LATVIAN SSR AND THE KAZAKH SSR IN 1945-1956 (ON THE EXAMPLE OF DAUGAVPILS AND SEMIPALATINSK)**

The purpose of the study is to justify a comparative study of school education in the Latvian SSR and the Kazakh SSR in 1945-1956. The absence of significant studies on the history of the formation of these Soviet peripheries was revealed during the research of historiography. The problem of studying the history of the formation of the Soviet period is revealed from a new perspective and new ways of development of research thought are shown in our work. In this article Kazakhstan and Latvia appear as representatives of the "culture of the East" and "culture of the West", respectively; the author gives an explanation of the importance of the 1940-1950s. (the period of Stalinism) as the time of a key turn in the development of Soviet education, and it also justifies the choice of Semipalatinsk and Daugavpils as objects of a situational analysis (case study) in the context of studying the problems of education of the Soviet period. Based on the study, the validity of a comparative analysis of the concrete historical situations of Kazakhstan and Latvia in the field of education was proved.

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## **THE CHALLENGES OF HISTORICAL LITERACY EDUCATION. THE DEVELOPMENT OF CRITICAL THINKING OF STUDENTS DURING STUDIES OF HISTORICAL SOURCES IN THE SCHOOLS OF LITHUANIA**

Independent analysis of sources is important whilst educating oneself concerning the meaning, perception and thinking of history, because it creates opportunities to perceive the process of historical analysis as well as to acquire the skills of historical source accumulation, the critical

evaluation thereof, how to read it, the provision of context, questioning of history, involvement in the explanation of history, and recognition of a multi-perspective narrative.

Within the report: 1) Programs which regulate educational content are analyzed; 2) as well as the scientific studies of the development of thinking, whilst working with historical sources, which record the requirements of perceptual development; 3) the results of the empirical analysis are presented as they identify the problems that arise for the teachers and students of history during the history lesson whilst developing the critical thinking of the students when they have to work independently with historical sources.

The goals and assignments, as declared by the general historical education programme, are abstract and they do not present the model of the growth of understanding (by level) of historical sources. Requirements are not defined for working with historical sources at the satisfactory, general and higher levels.

Having analyzed academic literature, a statement can be made that it recommends the creation of conditions for a student to analyze more than one primary and or secondary source, to evaluate different information, how it is presented, circumstances, to use evidence constructively, to perceive history not as a whirlwind of facts, but as a consistent story of causes and consequences, presenting more conclusions. Up to now this has been a real challenge for a student within the history class – and it is quite often not met well.

The study has revealed, that for students, the hardest part of historical didactics is working with historical sources. Difficulties arise, because of excessive breadth of the subject of history as well as the programmes of the National State Exam. Within those, most attention is paid to the learning of facts, and, as a consequence, too little time remains to apply the theoretical knowledge gained.

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## **WHAT DO THE PEOPLE OF THE BALTICS THINK ABOUT NATIONAL DEFENSE ISSUES: A COMPARISON OF THE LATEST TRENDS IN ESTONIA, LATVIA AND LITHUANIA**

The military activities carried out by the Russian Federation in Ukraine in 2014 and in the following years marked the deterioration of the security situation in the Baltic States as well. Because the borders of the countries had been changed by a brutal military force, thus putting an end to the principle of not changing the borders that had existed since World War II.

In such a context, it became particularly important for national governments to understand what their own citizens think about national security issues.

In all three Baltic States - Estonia, Latvia and Lithuania - periodic surveys on national defense issues have been conducted.

The aim of this article is to compare the latest tendencies between the Baltic States based on survey data and to conclude whether there are any significant changes in them.

The article will analyze issues such as support for NATO membership, the presence of NATO troops, support for the country's military forces, and the need for the population to acquire more military knowledge and skills.

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# TIESĪBU ZINĀTNE

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## LAW

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### **ADMINISTRATĪVĀS ATBILDĪBAS ĪPATNĪBAS PAR AMATPERSONAS LIKUMĪGO PRASĪBU NEPILDĪŠANU VAI AMATPERSONAS DARBĪBAS TRAUCĒŠANU**

Pēdējā laikā atbildība par administratīvo pārkāpumu izdarīšanu un to piemērošanas īpatnības ir viens no visvairāk diskutējamiem jautājumiem juridiskajā vidē. Šāda aktivitāte ir saistīta ar būtiskām izmaiņām šajā jomā, kas ir sagaidāmas tuvākajā nākotnē. Tiek plānots, ka 2020. gada 1. jūlijā stāsies spēkā Administratīvās atbildības likums un tajā brīdī zaudēs spēku Latvijas Administratīvo pārkāpumu kodekss. Administratīvās atbildības likumā ir ietverts pilnīgi jauns redzējums par administratīvo pārkāpumu procesu un to realizēšanas kārtību. Tajā skaitā minētajā likumā ir paredzētas būtiskas izmaiņas attiecībā un administratīvo pārkāpumu un piemērojamo sodu sistematizāciju. Atšķirībā no esošā regulējuma tiek paredzēts dekodificēt administratīvo pārkāpumu sistēmu, iekļaujot pārkāpumus un piemērojamos sodus attiecīgo nozari regulējošajos likumos (Administratīvās atbildības likuma 2. panta trešā daļa). Vienlaicīgi tika uzdots veikt administratīvo pārkāpumu un sodu revīziju, lai šādu sistēmu padarītu par mūsdienīgu un vieglāk izprotamu visām administratīvā pārkāpuma procesā iesaistītām pusēm. Lai sasniegtu minēto mērķi tika izpildīts vai tiek pildīts nopietns pasākumu kopums dažādās jomās. Veicot šādus pasākumus, tika konstatēts, ka dažas jomas nav noregulētas nozaru likumos. Piemēram, administratīvos pārkāpumus pret sabiedrisko kārtību un dažus administratīvos pārkāpumus, kas apdraud pārvaldes kārtību, nav iespējams iekļaut nevienā no spēkā esošā likumā. Līdz ar to šobrīd notiek aktīvs darbs, lai izstrādātu pilnīgu jaunu likumu. Administratīvo sodu likumā par pārkāpumiem pārvaldes, sabiedriskās kārtības un valsts valodas lietošanas jomā tiek paredzēts noteikt administratīvos pārkāpumus pārvaldes, sabiedriskās kārtības un valsts valodas lietošanas jomā un sodus par tiem, kā arī to institūciju kompetenci, kuras piemēro sodus par šiem pārkāpumiem. Analizējot minētajā likumā ietvertos pārkāpumus, rada interesi likuma 4. pantā ietvertais administratīvais pārkāpums – “amatpersonas likumīgo prasību nepildīšana vai amatpersonas darbības traucēšana”. Minētais pants ir viens no piemēriem, kad vairāku administratīvo pārkāpumu sastāvu būtiskas pazīmes ir iekļautas vienā administratīvā pārkāpuma sastāvā. Izveidojot jaunu pārkāpuma sastāvu, tiek paredzēts atteikties no spēkā esošiem pēc rakstura līdzīgiem pārkāpumu sastāviem.

Kā rāda pieredze, amatpersonām ir bieži jāsakaras ar gadījumiem, kad personas nepilda likumīgas prasības vai traucē pildīt amata pienākumus. Līdz ar to ir būtiski izanalizēt minētā panta piemērošanas īpatnības, nosakot pārkāpuma sastāva pazīmes un administratīvā pārkāpuma procesā pierādāmos apstākļus.

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## **BAILES NO NOZIEDZĪBAS KĀ KRIMINOLOĢISKS FENOMENS**

Viena no būtiskākajām sabiedrības vērtībām ir drošība. Drošības jēdziena daudzveidīgām izpausmēm ir nozīmīga loma indivīda dzīvē, kopienas, valsts, Eiropas Savienības un pasaules mērogā. Ne velti noziedzības izplatība pamatoti vērtējama kā nopietns drauds nacionālajai drošībai. Sabiedrības drošības vārdā valsts nosaka, kas ir noziedzīgs nodarījums, reglamentē atbildības mērus par noziedzīgu nodarījumu izdarīšanu un vainīgās personas saukšanu pie kriminālatbildības. Valstij ir tiesības un pienākums aizsargāt sabiedrību no noziedzīgajiem nodarījumiem (Teivāns-Treinovskis J., Jefimovs N, 2012). Tādēļ kriminoloģijas ietvaros īpaša uzmanība tiek veltīta savdabīgai tēmai – “bailes no noziedzības” (*Fear of Crime*).

Gandrīz visas mūsdienu pasaules sabiedrības satrauc noziedzība. “Lai gan noziedzīgu nodarījumu skaits dažādās valstīs ievērojami atšķiras, noziedzīga rīcība vienā reģiona atstāj iespaidu uz citu reģiona iedzīvotājiem. Līdz ar to lielākajai sabiedrības daļai rada pamatu nemieram un bailēm. Bailes no viktimizācijas var radīt postošu psiholoģisku ietekmi uz daudziem cilvēkiem.” (Ainsworth, 2001). Piemēram, Nacionālā viedokļu izpētes centra (*National Opinion Research Center*) dati parādīja, ka 55% amerikāņu norādīja uz bailēm no noziedzības (*Criminology Criminology. A. Contemporary Handbook*).

Latvijā realizētā pilotprojeta “Talsu policijas iecirknī – uz sabiedrību vērstu policijas darbu” ietvaros veiktās aptaujas rezultāti parādīja, ka iedzīvotājus uztrauc vairākas vietējās drošības problēmas: apgaismojuma neesamība; jauniešu kompānijas; alkohola reibumā esošu personu atrašanās sabiedriskās vietās; Ceļu satiksmes noteikumu pārkāpšana; klaiņojoši dzīvnieki; zādzības (Bērziņa, Avota, Grūbis, Tošovskis 2012).

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## **FAKTORI, KAS IETEKMĒ LIECĪBU VEIDOŠANOS**

Kriminālisti un psihologi konstatējuši, ka liecību veidošanas etapos pastāv daudzi objektīvi un subjektīvi apstākļi un faktori, kuri var visai būtiski ietekmēt liecības pilnīgumu un patiesumu, respektīvi - atbilstību īstenībai, sakarā ar ko tos jānoskaidro un jāievēro pratināšanas gaitā. Liecinieka liecības veidošanās pirmajā posmā, kad notiek faktu jutekliska uztvere un iegaumēšana, liela loma ir kā objektīvajiem apstākļiem, kādos uztvere noris, tā arī subjektīvajiem faktoriem, kas saistās ar paša liecinieka personību. Nav noliedzams, ka liecinieka liecību psihisko procesu noskaidrošanā lietderīgi ir uzsvērt arī tos momentus, ar kuriem šī shēma atšķiras no tradicionālās: ne vien informācijas iegūšanu, bet arī uzkrāšanu un apgūšanu liecinieka apziņā; ne vien informācijas iegaumēšanu, bet arī tās modifikāciju saglabāšanas procesā; beidzot ne vien informācijas reproducēšanu, bet arī tās modifikāciju liecinājuma gaitā un procesuālajā fiksācijā (protokolā). Liecinieka godīgums pats par sevi negarantē, ka viņš sniedz objektīvu informāciju par notikušo. Nedrīkst neievērot arī praksē samērā reti sastopamu parādību- kvazi vai māņu uztveri un māņu atceri vai paramnēziju, kura novērojama dažu psihes novirzes, kā arī īpašu psihisko stāvokļu gadījumos.

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## **GENESIS AND ROLE OF THE DOCTRINE IN LOCO PARENTIS IN THE LEGAL SYSTEM OF OTHER COUNTRIES AND IN THE LATVIAN**

**Key words:** in loco parentis, parents, education, school, legal relationship between parents and school.

**Introduction.** In Latvian law, the legal relationship between parents and education institution has not been studied sufficiently. At the same time, this is an important aspect of the right to education. In fact, the analysis of the content of the legal relationship between school and parents is indispensable, which would help both lawyers and educators understand the legal nuances of the realization of educational rights. In contrast, the doctrine of the in loco parentis (in stead of parent) includes the above mentioned aspects of parental and school responsibility.

**Aim.** To find out the content and importance of doctrine in loco parentis, the impact on the legal relationship between the pupil's parents and school.

**Materials and methods.** The author, by using the intrepertation methods adopted in science and law interpretation methods, will reveal in loco parentis content, meaning and its impact of the law systems of Latvia and other countries.

**Conclusion.** Doctrine in loco parentis means that school staff have an obligation and the right to be responsible for the safety, health, development and education of a child, as a responsible parent would do. At the same time, for example, the teacher is not a substitute of parental power, i.e. he does not overwhelm the power of parents. This aspect is important as much as it describes the extent of rights and obligations of a rightholder who stands in stead of parents(in loco parentis). Respectively, when a pupil (child) is in an educational institution, the teacher is responsible for the safety, health, education, rearing of the child, but parents do not lose their power over the child, but it is limited until the pupil leaves the school or school event.

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## **HISTORICAL DEVELOPMENT OF THE LEGAL INTERPRETATION OF HUMAN HEALTH**

Historical development of the legal interpretation of human health brings out the most significant factors that affect it. These are the following – society, legal philosophy, religion, medicine, and the legal system. Each stage of its history shows different domination of these criteria in the legal interpretation of human health.

At the historical stages the method of abstraction was replaced with the causal approach to legal interpretation of human health. Furthermore, the modern course shows the growth of the level of specification in the legal interpretation of human health.

In the modulation of future development trends in relation to the legal interpretation of human health, two courses of the most important change can be predicted in such interpretation. Firstly, more convincing consolidation of the necessary legal criteria is predicted in the legal interpretation of human health, and secondly, the expansion of the legal understanding of health itself as a nonmaterial benefit is expected, testified to by the change trends observed in the legal system.



*Vladas Tumalavičius*

## **ISSUES OF MILITARY SECURITY: MAIN DANGERS, THREATS, CHALLENGES AND PERSPECTIVES**

**Key words:** military security, threats, challenges, causes of threats, Baltic region.

**Abstract.** Ensuring of military security and coordinated actions to implement its administrative-legal mechanism is the most important activity of any state. The main goal of ensuring state military security is forecasting, preventing, localizing and neutralizing military threats. Any state should consider ensuring its military security in the context of building a democratic legal state, implementing socio-economic reforms, mutually beneficial cooperation and good neighborliness in international relations, the consistent formation of a common and comprehensive system of international security for the preservation and strengthening of global peace.

The aim of the work is to analyze the main threats to the military security of the Baltic region and the factors of their occurrence, to consider the current state of the elements of the administrative-legal mechanism for military security ensuring and determine possible directions for its improvement.

The article analyzes the main threats to military security, considers the existing structure of the region's military security system and the state of its main elements, analyzes the development prospects and directions for improving the administrative-legal mechanism of the military security system.

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## **IZMEKLĒŠANAS TIESNESIS KRIMINĀLPROCESĀ**

Pētījumā autors analizēs izmeklēšanas tiesneša funkcijas cilvēktiesību ievērošanā kriminālprocesā ar mērķi identificēt būtiskākās problēmas šajā jomā un izteikt priekšlikumus tiesiskā regulējuma pilnveidošanai.

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## **KRIMINĀLLIETU IZTIESĀŠANAS ROBEŽU NOTEIKŠANAS PRAKTISKIE JAUTĀJUMI**

Raksta autore savā pētījumā vērš uzmanību uz to, ka kriminālprocesā tiesvedības vispārīgo noteikumu kontekstā ir jānošķir divi jēdzieni, proti, pierādīšanas robežas un krimināllietas iztiesāšanas robežas. Pierādīšanas robežas ir saistītas ar visu lietā noskaidroto apstākļu esamības vai neesamības novērtēšanu un pamatošanu. Savukārt iztiesāšanas robežas varētu definēt kā no Kriminālprocesa likuma netieši izrietošos materiāli tiesiskos un procesuālos ietvarus, kuros jānotiek tiesas izmeklēšanai. Tiesas izmeklēšanas materiāli tiesiskās robežas izpaužas apsūdzētajam inkriminētā noziedzīgā nodarījuma krimināltiesiskajā raksturojumā. Iztiesāšanas robežu procesuāli tiesiskais aspekts izpaužas, nosakot procesuālo formu jeb procesuālo kārtību, kas garantē robežu ievērošanu visos tiesas izmeklēšanas etapos.

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## **LEGAL FRAMEWORK FOR MICRO-RESERVES OF SPECIALLY PROTECTED SPECIES – BETWEEN OWNERSHIP AND ENVIRONMENTAL INTERESTS**

The legitimate aim of the formation of a micro-reserve is the interests of the environmental protection society, which are protected by the territory of the micro-reserve, evaluating natural, economic and social considerations. Proportionality of harm to interests; case law. Compensation mechanism.

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## **LIMITATIONS ON THE RIGHTS OF EMPLOYER RELATING TO THE TYPE, AMOUNT, TIME AND PLACE OF EMPLOYMENT OBLIGATION UNDER THE EMPLOYMENT AGREEMENT IN CASE OF EMERGENCY SITUATION**

**Key words:** employment relationships, fulfilment of the obligations of the employee, emergency situation, Covid-19.

Within the framework of the article, an opinion of the author is given on whether and how the Cabinet of Ministers Order No. 103, 12<sup>th</sup> March 2020 “Declaration of Emergency Situation” in relation to the spread of the Covid-19 virus in the territory of Latvia has an impact on the employment relationship in the context of the fulfilment of the obligations of the employee (type, amount, time and place). In the light of the actual situation, it becomes clear that, in the age of globalization, the countries of the world as a whole are exposed to an unprecedented epidemiological threat in terms of the rapidity of the spread. It is also understandable that none of the countries has a pre-established action plan for this type of situation, that is why there is no clear legal framework in most areas of public life, including employment relationships. Figuratively speaking, the regulations of "peace time" must be applied in "war" conditions. Under these circumstances, the understanding, knowledge and competence of the person applying the law, not only from a legal point of view, but also of a general understanding of the nature of the emergency situation, has got particular importance.

The purpose of the article is to ascertain whether employers and employees have an understanding of the application of the law, given that it was not possible to anticipate the emergence of such a global threat as Covid-19 at the time the Labour Law was drafted.

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## **PERSONAS TIESĪBAS UZ TAISNĪGU TIESU CAUR TIESNEŠU NEATKARĪBAS UN LIKUMPADOTĪBAS PRIZMU**

1918. gada 18. novembrī proklamētā Latvijas valsts ir izveidota, balstoties uz latviešu nācijas negrozāmo valstsgribu, lai nodrošinātu Latvijas tautas un ikviena brīvību un sekmētu labklājību. Latvijas valsts tauta ir paudusi savu gribu dzīvot tiesiskā valstī, un tās priekšstāvji šo tautas gribu ir nostiprinājusi Latvijas Republikas Satversmē.

Likumdevējs tiesību normās ir iestrādājis personas, sabiedrības grupas un sabiedrības kopumā uzvedības noteikumus tiesiskajās attiecībās, kā arī garantējis, ka valsts nodrošinās šo noteikumu ievērošanu. Ja skaidri zināmi „spēles” noteikumi un tie tiek ievēroti, konfliktiem nevajadzētu būt.

Tomēr tie pastāv. Likumdevējs šādu iespējamību ir paredzējis un noteicis procesuālo kārtību aizskarto un ar likumu aizsargāto tiesību aizsardzībai. Primāri tiesiskās attiecības ir risināmas dialogā. Ja dialogā kompromiss netiek panākts, tad situācijas taisnīgs tiesiskais risinājums tiesiskā valstī ir jārod tiesā.

Valsts ir garantējusi taisnīgu tiesu ikvienam, kas vērsies tiesā, lai aizstāvētu savas tiesības un likumīgās intereses. Tiesību normas paredz tiesneša neatkarību, tai pat laikā nosakot, ka tiesnesis ir likumam padots jeb pakļauts likumam. Līdz ar to valsts vara ir strikti aprobežojusi tiesneša neatkarību, imperatīvi nosakot, ka tiesneša lēmumam konkrētas situācijas tiesiskam noregulējumam ir jāatbilst tiesiskajam regulējumam.

Darbā skatītas prakses aktuālās problēmas, tiesiskais regulējums un tiesu prakse valsts garantēto tiesību īstenošanā. Tiek aplūkota taisnīgas tiesas principa korelācija ar tiesneša neatkarības un likumpadotības principu, kā arī to piemērošana Latvijā. Analizējot personas tiesības uz taisnīgu tiesu īstenošanu, sniegts ieskats attiecināmajās tiesību normās un nepieciešamajiem grozījumiem Latvijas Republikas tiesiskajā regulējumā. Pielietojot salīdzinošo un analītisko metodi, ir analizēta likumdevēja izvirzītie mērķi un to atbilstība valsts politikai taisnīgas tiesas nodrošināšanā.

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## **PIEVIENOTĀS VĒRTĪBAS NODOKĻA KRĀPŠANAS APKAROŠANAS PROBLĒMAS LATVIJĀ SAISTĪBĀ AR APSARDZES PAKALPOJUMIEM**

Darba mērķis ir izpētīt un analizēt Latvijas tiesu praksi par komersanta iesaistīšanos krāpnieciskās darbības ar nolūku gūt fiskālās priekšrocības atskaitāmā nodokļa veidā darījumos saistībā ar apsardzes pakalpojumiem. Analizējot Latvijas tiesu praksi, autors konstatēja, ka komersanti noformē dokumentus par neesošu pakalpojumu (fiziskā apsardze) saņemšanu no apakšuzņēmējiem, proti, deklarē apsardzes pakalpojumus no komersantiem, kuri nav veikuši fizisko apsardzi ģenerālpasūtītāja objektos. Šādus darījumus raksturo licences neesamība apsardzes darbības veikšanai, kā arī nav iespējams identificēt, kura komersanta darbinieki faktiski veic fizisko apsardzi, kā arī minētajām personām nav apsardzes sertifikāta. Šie apsardzes pakalpojumi ir noformēti tikai dokumentāri, un apakšuzņēmēji tiek iesaistīti darījumu ķēdē ar mērķi mākslīgi radīt vairākus darījumu ķēdes posmus fiskāla labuma pievienotās vērtības nodokļa veidā iegūšanai. Atbilstoši Augstākās tiesas Administratīvo lietu departamenta judikatūrai ir svarīgs vērtējums, kāda rīcība būtu sagaidāma no komersanta kā rūpīga saimnieka, slēdzot darījumus, tostarp attiecībā uz darījuma partnera izvēli konkrētajos faktiskajos apstākļos, lai šādus darījumus varētu atzīt par ticamiem, iespējamiem un notikušiem. Ņemot vērā minēto, autors analizēja tiesu praksi attiecībā uz pievienotās vērtības nodokļa krāpšanas apkarošanas problēmām Latvijā saistībā ar apsardzes pakalpojumiem.

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## **PROBLEMS OF INTERACTION BETWEEN CRIMINAL INTELLIGENCE AND CRIMINAL PROCEEDINGS**

In 2003, when amendments were made to Article 118 of the Constitution of Lithuania, which abolished the post of investigator in criminal proceedings. It should be recalled that as far back as inter-war Lithuania in 1933, the Code of Criminal Procedure included the position of a judicial investigator. The investigator was a man whose task was to collect all data objectively and impartially about the crime or incident. Lithuania has adopted a new Code of Criminal Procedure. It was adopted before Lithuania joined the European Union. Therefore, many legal innovations were adopted from the old countries of the European Union.

Since 2003, the investigator has been replaced by a pre-trial investigator. The functions of the pre-trial investigation officer were combined: criminal intelligence, investigator, interrogator, police policeman and even specialist functions. All these functions were in one person. The status of the auditor as a specialist in economic issues was canceled. The specialist and the expert remained in the process, but their functions were remarkably similar, but there was strong competition between them.

More than 15 years later, looking soberly at the results of the reform, we found that there are two processes in Lithuania: the criminal intelligence process and the criminal process. The criminal intelligence process is enshrined in the Criminal Intelligence Act. The criminal process is enshrined in the Code of Criminal Procedure. In practice, a paradoxical situation has arisen when proving in a criminal case occurs to a greater extent with the methods of criminal intelligence than with criminal procedural actions. Only now we can understand that the investigator was a kind of shield of criminal proceedings. The investigator was a shield from the direct penetration of criminal intelligence into the criminal process. Today, one can clearly predict the death of criminal proceedings. The criminal process in the pretrial stage, which we knew so far, no longer exists. The cause of death is that the methods and actions of criminal intelligence directly change the process of generating evidence. Information obtained by criminal intelligence competes with information obtained by public means during a criminal investigation. So, a public criminal case die. Justice is carried out based on non-public information that the lawyer and the accused cannot verify and challenge.

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## **PROBLĒMU RISINĀŠANAS METODE UN TĀS ATTĪSTĪBAS PERSPEKTĪVAS UZ SABIEDRĪBU VĒRSTĀ POLICIJAS DARBA MODELĪ**

Noziedzības novēršanā un apkarošanā, kā arī ar to saistīto problēmu risināšanā tiek izmantotas vairākas pieejas un metodes, tomēr efektīvas metodes ir tā saucamā "SARA" metode un problēmu analīzes trijstūris, kuras var sasaistīt tieši uz sabiedrību vērstā policijas darbā.

Problēmu risināšanas metodes "SARA" (izpēte, analīze, reakcija, novērtējums) un problēmu analīzes trijstūra izmantošana liek policijai pārslēgties no reaģēšanas uz notikumu uz pasākumu veikšanu, lai novērstu likumpārkāpuma izdarīšanas iespēju. Tomēr, lai to veiksmīgi īstenotu, nepieciešama konstruktīva policijas darbinieku apmācība, bet atrisinātajām problēmām ir jāklūst par vienu no policijas darba vērtēšanas kritērijiem.

Policija ir pieradusi apsvērt un risināt problēmas, attiecinot tās uz iesaistītajiem likumpārkāpējiem, un parasti problēmas risinājuma mērķis ir vienīgi likumpārkāpēju identificēšana un aizturēšana. Tomēr otrā problēmu risināšanas metode – problēmas analīzes trijstūris – paredz, ka jāizpēta plašāks cēloņu loks, un šādai analīzei ir nepieciešama informācija par iesaistītajiem cietušajiem un vietām.

Problēmu analīzes trijstūris ir vērtīgs ar to, ka noziedzīga nodarījuma noskaidrošanai un savlaicīgai atklāšanai ir nepieciešams pētīt daudz apjomīgāku apstākļu kopumu, respektīvi, nepieciešams iegūt informāciju gan par vietām, kurās tiek veikti noziedzīgie nodarījumi, gan arī par cilvēkiem, kas tajos ir tikuši iesaistīti.

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## **REGISTRATION PROBLEMS OF THE DURATION OF AUTHORITIES OF MEMBERS OF THE BOARD OF THE PUBLIC PERSON'S LIMITED LIABILITY COMPANY IN THE REGISTER OF ENTERPRISES OF LATVIA**

The Board is an executive body of a company. Its main function is the organisation of operational activities of the company in order to get profit. A key responsibility of the board members is the implementation and fulfillment of the strategic objectives and medium-term operational strategy, accepted by the owners or by the council. The term of authorities of board members in private limited liability companies is established by the Commercial law and it is established without any time limitation, unless the owners have agreed otherwise. On the other hand, the term of authorities of the members of the board of state or municipal owned companies is determined by the Law on Governance of Capital Shares of a Public Person and Capital Companies and it is limited by the period of 5 years. The Register of enterprises of Latvia has a responsibility to record and publish data on the election and revocation of members of the board in the limited liability company without any reference to the term of authorities.

*Santana Gudena*

## **REGULATION OF RELEASING NATURAL PERSON FROM DEBT**

It must be considered that it is a great threat that nearly one fourth of Latvian Republic's population in 2020 is at the risk of poverty. One of the main reasons to the high poverty risk are obligations that the individuals are not capable of carrying out. The "Law of releasing natural person from debt" is expected to come into force in January of 2021. It is important to highlight this mechanism's differences from bankruptcy process. Since year 2015 minimum wage in Latvia has grown by 19,44%, but minimum amount of indebtedness for declaring bankruptcy has decreased by 29,72%. Research includes reasons for need of an easier way for natural person to be released from debt and the most important provisions in "Law of releasing natural person from debt" which is an easier and more affordable mechanism than bankruptcy.

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## **SCIENTIFIC CONCEPTS OF UNDERSTANDING INTELLECTUAL PROPERTY LAW**

**Key words:** intellectual property, personality theory, utilitarian theory, social planning theory, proprietary theory, social planning theory.

The history of the formation of laws on the protection of intellectual rights clearly shows that their purpose was and still remains mainly the protection of property interests. And if the need to protect the property interests of producers and traders was initially recognized, then for some time now – also the interests of authors who create works, inventions and other protected objects. But the recognition, consolidation and development of intellectual property rights have always been opposed, based on the idea of free competition and the public interest to get wide access to the products of creative work. Such a clash of private and public interests led scientists to look for socio-economic, ideological or

general legal justifications of intellectual rights in order to explain the reasons why public interests should still be more or less infringed in order to protect the property interests of copyright holders. Based on these trends, scientific interest in this field has increased dramatically recently. In legal studies, as well as in philosophical and economic publications, articles appeared that analyzed the theory of intellectual property. This article describes these theories, examines their characteristics, and analyzes the role they play and should play in legislative activity.

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## **TERORISMA TIESISKĀ REGULĒJUMA PROBLĒMAS**

Terorisma draudi pēdējos gados ir pieauguši un kļuvuši daudzpusīgāki. Terorisma akti ir viens no visnopietnākajiem universālo vērtību – cilvēka cieņas, brīvības, līdztiesības un solidaritātes, cilvēktiesību un pamatbrīvību – pārkāpumiem un viens no visnopietnākajiem uzbrukumiem demokrātijas un tiesiskuma principiem. Teroristiskās vardarbības akti ir noziegumi pret sabiedrisko drošību un mieru. Saut pie atbildības par tiem var saskaņā ar vispārējām krimināltiesiskām normām par slepkavību, sprādzienu organizāciju un citiem vardarbīgiem noziegumiem, bez nepieciešamības pierādīt speciālo teroristisko nodomu – tieši iebaidīt iedzīvotājus vai ietekmēt valdību veikt vai neveikt noteiktas darbības. Daudzas personas, kuru izdarīto noziedzīgo nodarījumu pazīmes dod iespēju saskatīt vēlmi ietekmēt valdību vai iebaidīt iedzīvotājus, sekmīgi notiesātas, nepiemērojot speciālos antiteroristiskos likumus. Speciālās normas tiek pieņemtas, lai dotu iespējas saukt pie atbildības visu ar teroristisko darbību saistīto personu loku: organizatorus, vadītājus, vervētājus, atbalstītājus. Laika gaitā katra pasaules valsti ir izveidojusies sava krimināltiesību un kriminālprocesuālo tiesību sistēma. Kā nozīmīgākos krimināltiesību attīstību ietekmējošos faktoros jāmin: valsts ģeogrāfisko stāvokli, vēsturi un sabiedrības attīstību, valstu nacionālās īpatnības un specifiskās iezīmes, noziedzības struktūru un tās jaunās izpausmes. Krimināltiesību attīstības virzienus ietekmē starptautisko un reģionālo organizāciju izveide un darbība, politisko procesu attīstības tendences pasaulē. Ir svarīgi izveidot pienācīgus instrumentus, lai aizsargātu ES pilsoņus un visus ES iedzīvotājus un novērstu šādus pārkāpumus efektīvā un samērīgā veidā, kas ir pietiekams, lai risinātu apdraudējumu, ar ko saskaras ES, vienlaikus saglabājot sabiedrības modeli, kurā valda plurālisms, nediskriminācija, tolerance, taisnīgums, solidaritāte un līdztiesība.

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## **IDENTIFICATION OF CHALLENGES OF THE MARITIME SPATIAL PLANS' IMPLEMENTATION IN THE BALTIC STATES\***

Maritime/marine spatial planning (MSP) is a general term that designates integrated sea governance through balancing the demands of development and the need to protect the environment. Through the application of the ecosystem-based approach, MSP is the most commonly accepted management framework for the promotion of long-term sustainability and Blue Growth of the marine environment globally. The MSP process has several main phases, among which the implementation phase can lead to the revision, adapting the MSP process.

The paper analyses the implementation performance of the maritime spatial plans (maritime or marine plans, used interchangeably) in three Baltic Sea basin countries, i.e., Latvia, Lithuania, and Estonia, considering the status quo of the MSP in each country. In 2014, Directive 2014/89/EU of the European Parliament and of the Council establishing a framework for MSP (MSP Directive) was adopted. Following two pilot marine plans (the area around Hiiumägi Island and Pärnu Bay area), at the moment, in Estonia, the initial outline for the maritime plan is prepared, and additional public display of the draft is provided. In turn, in Latvia, on May 14, 2019, the maritime plan until 2030 was approved by the Government. In Lithuania, the marine plan was prepared in 2014 and adopted by the

Parliament in 2015. In the study, the evaluation of the maritime plans' implementation performance will be achieved by

1. examining the principles used in national MSP,
2. exploring the influence of existing regulation and soft law tools on an international, national, regional and local level,
3. taking into account the compliance with the minimum requirements set out by the MSP Directive,
4. clarifying opportunities and threats resulting from the adoption of the maritime plans, li>exploring best practice examples.

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## **FIZISKĀS PERSONAS MAKSĀTNESPĒJAS ĪPATNĪBAS UN PROBLEMĀTIKA, KAD KREDITORI VAR PRASĪT SEV APMIERINĀJUMU NO DĀVANAS - ATDĀVINĀTĀS MANTAS**

Maksātnespējas likuma mērķis ir veicināt finansiālās grūtībās nonākušā parādnieka saistību izpildi un, ja iespējams, maksātnespējas atjaunošanu, piemērojot likumā noteiktos principus un tiesiskos risinājumus.

Ne reti vien tiek konstatēts apstāklis, ka Parādnieka maksātnespējas procesa ietvaros tika konstatēts, ka Parādnieks īsi pirms maksātnespējas procesa pasludināšanas ir uzdāvinājis sev piederošo nekustamo īpašumu savam kādam radniekam, pielīgšot, piemēram, sev un savai laulātajai dzīvokļa tiesības pirms tam piederošajā nekustamajā īpašumā, kas bija nostiprinātas zemesgrāmatā neilgu laiku pirms maksātnespējas pasludināšanas. Administratoram šajā gadījumā principā ir jārikojas un rīkojoties saskaņā ar Maksātnespējas likuma 97. panta pirmās daļas un Civillikuma 1927. panta noteikumiem, jāceļ tiesā prasību, lūdzot piedzīt no Parādnieka radnieka konkrētajā procesā paredzamo naudas summu, kas pielīdzināma maksātnespējas procesā pieteikto un nesegto kreditoru prasījumu kopumam, kas ietver sevī arī Administratores atlīdzība 10 % apmērā. Lielākoties tiesu prakse jau ir izveidojusies tāda, ka izskatot lietu, ja ne pirmās instances tiesā, tad apgabaltiesā, atkārtoti izskatot lietu apelācijas instancē, nolēmj Parādnieka maksātnespējas procesā vērst piedziņu uz Parādnieka radniekam uzdāvināto nekustamo īpašumu, protams, par apgabaltiesas nolēmumu var sniegt kasācijas sūdzību, taču pieredze lielākoties rāda, ka Augstākās tiesas rīcības sēdēs šādu jautājumu izlemšanas gadījumā parasti tiek nolēmts atteikt ierosināt kasācijas tiesvedību, līdz ar ko spēkā stājas apgabaltiesas spriedums par piedziņas vērsanu uz uzdāvināto mantu. Secināms, ka, ja ar tiesas spriedumu ir atzīts, ka Parādnieks ir noslēdzot dāvinājuma līgumu apzināti ir radījis zaudējumus kreditoriem, Parādnieka maksātnespējas procesā pastāv Maksātnespējas likuma 153. panta 1. punktā minētais ierobežojums Parādnieka saistību dzēšanas procedūras pasludināšanai, līdz ar ko Administratorei, iesniedzot tiesai pieteikumu par Parādnieka bankrota procedūras pabeigšanu, saskaņā ar Maksātnespējas likuma 149. panta septīto daļu vienlaikus jālūdz tiesu izbeigt Parādnieka fiziskās personas maksātnespējas procesu, jo Parādniekam konstatēti ierobežojumi saistību dzēšanas procedūras piemērošanai.

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# MATEMĀTIKA

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# MATHEMATICS

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## LIMIT CYCLES IN 2D GRN - SYSTEMS

We consider the Hopf bifurcation for two - dimensional GRN - system of ordinary differential equations.

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## ON SOLUTIONS OF DUFFING SYSTEM WITH TWO DEGREES OF FREEDOM

We consider an autonomous coupled Duffing system with two degrees of freedom. We are looking for the solutions of constant norm in dependence on the coefficients of the system and discuss an existence of bounded solutions of this system. Results of numerical experiments are presented.

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## THE NUMBER OF SOLUTIONS TO THE BOUNDARY VALUE PROBLEM WITH THE QUINTIC ORDINARY DIFFERENTIAL EQUATION

The differential equation with quintic nonlinearity  $x'' = -a x + c x^5$  is considered together with the Neumann type boundary conditions. The exact number of solutions is obtained. The equation for the initial values of solutions to the Neumann boundary value problem is derived using representation by Jacobian elliptic functions. Some example is analyzed.

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## THE OPERATOR METHOD FOR SOLVING SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS

The differential operator method and its techniques are considered, solving systems of ordinary linear differential equations with variable coefficients. The method of reducing systems of differential equations to linear differential equations are proposed. The examples of solving systems using the operator method are described.



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# MŪZIKA

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# MUSIC

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*Skaidrīte Ērliha, Jeļena Kaļniša*

## ANATOLIJA BELOŠICKA KONCERTPARTITAS NR. 3 DAŽU INTERPRETĀCIJU APSKATS UN SALĪDZINĀJUMS

**Atslēgvārdi:** Anatolijs Belošickis, žanrs koncerts, interpretācija, partita.

Māksliniekam (mūziķim-interpretam) ir nozīmīgas mākslinieciskās spējas, kas sevī ietver estētisko un māksliniecisko darbību skaņdarba tēla atspoguļošanā, kas notiek jaunā formā kā radošs process. Fiksētā formā, atveidojot vienu un to pašu parādību, katrs mākslinieks zemapziņas līmenī izpauž savu individualitāti, visdziļāko dzīves patiesību, paša autora dabu.

Anatolijs Belošickis ir viens no izcilākajiem 20. gadsimta Ukrainas komponistiem, pedagogiem, diriģentiem. Instrumentāls skaņdarbs koncertpartita Nr. 3 atspoguļo dažādas noskaņas mūzikā. Pētījumā noteikti koncertpartitas Nr. 3 atskaņotāju kritēriji, analizētas un salīdzinātas dažādu atskaņotājmākslinieku interpretācijas, kas sniedz arvien jaunas iespējas profesionālajā darbībā pēc individuāla stila meklējumiem, pašrealizējoties, izprotot savas personības muzikālo unikalitāti, bagātinot savu un sabiedrības muzikālo pieredzi, to transformējot kultūras telpā. Zinātniski pamatots interpretācijas jēdziens.

*Skaidrīte Ērliha, Kristina Tiško*

## CERLINAS ARIA BATTI, BATTI, O BEL MASETTO FROM THE OPERA DON GIOVANNI BY WOLFGANG AMADEUS MOZART

Only singers who can open both the spiritual and emotional world can get professional singing. The singer's task is to develop his voice, get the beauty of his timbre and emotionally convey the musical content, transform the informative multicultural society. Also find and reduce your individuality, develop your style. Wolfgang Amadeus Mozart one of the most famous centuries of classicism of Avtsrian composers, the representative of the School of Vine Classics.

Opera Don Giovanni one of the best works in Mozart's work. Cerlinas aria Batti, batti, o bel Masetto displays adventures in the lives of girls. In research work, the concept is an interpretation, in Cerlina's Aria, the performer criteria: analyze and compare different interpretations in order to understand the style, vocal technique and professional skill that any vocalist needs in professional work.

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## HENRIKA VEŅAVSKA (1835–1880) DAIĻRADES STILISTIKAS ĪSS RAKSTUROJUMS

Henriks Veņavskis ir viens no 19. gadsimta vidus spilgtākajiem poļu vijolniekiem virtuoziem un komponistiem romantiskās mākslas jomā. Poļu vijolnieka daiļrades pamatā ir poļu tautas mūzika. Mākslinieciskās izpausmes veicināšanai viņš izzinājis F. Šopēna, K. Ļipinska un S. Moņuško daiļradi. Viņa sacerētās melodijas viegli raisās, nemanāmi pāraugot figurācijās un pasāžās. Virtuozī apgūstot vijoles tehniku – dažādus štrihus, dubultnotis, akordus, glissando, akcentus u. c., Veņavskis prasmīgi

pielietoja to kā loģisku muzikālās izteiksmes veidu un muzikālā tēla veidošanas līdzekli. Visos žanros, kuros rakstījis Veņavskis, ir jūtams poļu nacionālais kolorīts, īpaši mazurkās un polonēzēs. Tautas dziesmu un deju intonācijas organiski iekļaujas šajos skaņdarbos, piešķirot tiem tautisku raksturu. Labākie Veņavska skaņdarbi ir sacerēti viņam raksturīgā miniatūras žanrā ar deju elementiem. Vijolspēle ir pārpildīta ar tehniskajiem paņēmieniem (it īpaši Remažora polonēze) un ir diezgan sarežģīta. Šeit ir gan dubultās notis, gan akordi, flažoleti un stakato, lociņa pārmešana caur stīgām un izcilas pasāžas. Tajā pašā laikā vijoles partiju caurvij slāvu dziesmas un poļu deju ritmi. Kopumā viņš ir sacerējis vairāk kā 50 skaņdarbu (koncerti, fantāzijas, mazurkas, polonēzes, variācijas, romances bez vārdiem, etīdes). Vairums komponista sacerējumu ir mākslinieciski spilgti skaņdarbi un ir iekļauti daudzu vijolnieku repertuārā.

*Svetlana Blaževiča, Ēvalds Daugulis*  
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## **INTERPRETATION OF THE JEAN SIBELIUS VIOLIN CONCERTO IN D MINOR, OP. 47, 1<sup>ST</sup> MOVEMENT (ARRANGEMENT FOR VIOLIN AND PIANO)**

Characteristic of the music of the 20<sup>th</sup> century, marked by art style features the composer Jean Sibelius. Completed musical theoretical analysis of a musical work *Violin Concerto in D minor, Op. 47*, as well as identified and described in instructional techniques of performance of a musical work.

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## **INTERPRETATIONS OF FRANZ SCHUBERT SONG AN SILVIA: WAS IST SILVIA, SAGET AN**

Romanticism existed from the end of the 18<sup>th</sup> century until the beginning of the 20<sup>th</sup> century as a cultural-historical direction. The main thematic directions of Romantic music were the inner world of feelings of a person, his personality, something mysterious, nature and its portrayal.

Franz Schubert is one of the first musicians in the Romantic style. The solo genre became the main genre of his work, because it is through the solo song that the deepest soul experiences are revealed.

Due to Franz Schubert's song *An Silvia: Was ist Silvia, saget an* belonging to vocal chamber music, the performance of this song requires vivid emotionality, as well as the need for several technical and expressive nuances. This difficulty lies in the simplicity of its form, as it requires the artist's mastery of displaying different characters and emotional states in one song.

The following examples of performance have been used to compare the interpretation of the song *An Silvia: Was ist Silvia, saget an* by F. Schubert:

Interpretation of opera singer Dietrich Fischer-Dieskau and pianist Gerald Moore;

Interpretation of vocalist Barbra Streisand and arranger Claus Ogermann;

Interpretation of the opera singer Matthias Goerne and Berlin Philharmonic Orchestra.

Dietrich Fischer's-Dieskau and Gerald Moore's interpretation of colour is distinguished by its dynamism and the vivid contrasts revealed in each song. In this interpretation, the melody of the song and the piano accompaniment are equally revealed.

In the interpretation of Barbra Streisand and Claus Ogermann, the song's poetic image is revealed through a lyrically luminous sound that follows a moderate and leisurely pace. Overall, these musicians perform the song as a single, uninterrupted stream of melody.

The interpretation of Matthias Goerne and the Berlin Philharmonic Orchestra contrasts strikingly with previous examples with the artist's individual performance and the rich accompaniment of the orchestral sound.

***Diāna Pilate***

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## **THE CREATIVE MUSIC WORKS FOR WIND INSTRUMENTS BY CARL MARIA VON WEBER**

Romantic period music is presented in a historical order, the place and the importance of Carl Maria von Weber in the history of music are mentioned. The work of the composer in Romantic period was the manifestation of subjective emotions. Attached a great importance to dramatic call through the richness of harmony and colors of instruments. It can be all seen from the works Weber composer that clarinet was one of the most favorite wind instruments, but the second was horn. He excelled in smaller scale instrumental music, as exemplified the wind concertos - clarinet, bassoon and horn. Perhaps inevitably, they often betray the profound influence of Weber beloved opera, but that only adds to the pieces richness, bringing a freedom and expressivity to their melodic lines that are seldom found in confemporay works by other composers.

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# PEDAGOGIJA

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# PEDAGOGY

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## A SOCIO EMOTIONAL WELL-BEING OF THE PRIMARY SCHOOL PUPILS IN LATGALE REGION

**Key words:** well-being of basic school children, case study, primary school age children.

The issue of a socio-emotion well-being of the primary school children is topical for Latvia and becomes quite pressing issue due to emotional violence among pupils in Latvia and in the society as a whole. Numerous studies have proved that by paying a closer attention to an issue of pupils' emotional well-being, they improve their academic achievements, have fewer disciplinary issues, and they focus more on their studies. The methodology employed in this study was a questionnaire filled in by the teachers with the aim to evaluate a well-being of primary school children. 17 pupils who took part in the questionnaire in the age group from 6 until 12 and seventeen parents filled in a questionnaire on a voluntarily bases with the aim to evaluate a well-being of their children. The authors evaluated the following factors such as social, cognitive, and psychological well-being of their primary school children. It was concluded that by incorporating socio emotional learning in the classroom, pupils develop resilience that leads to better academic achievement. By knowing their emotions, pupils develop their social competence and can better manage their behavior.

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## A. VALTNERIS COMPETITION FOR STUDENTS “KNOW YOUR ORGANISM”: ANALYSIS OF THE FIRST ROUND RESULTS 2017–2019

**Key words:** competition, “Know Your Organism”, student, human physiology, anatomy, first aid, 1th round, tasks, answers, results.

The competition for the pupils of Latvia: “Know Your Organism” was initiated in 1998 by the professor of human physiology A. Valtneris from Riga Medical Institute.

Since 2003, the competition named by A. Valtneris has been organized by the Department of Anatomy and Physiology of Daugavpils University. The aim of the competition is of great interest for the pupils for learning about their organism, as well as for teaching young people to accept their organism as a value. The competition is still popular and gathers a lot of participants. Every year, students from 9-12th grades from many regions and cities of Latvia participate in the competition “Know Your Organism” on human physiology, anatomy and the questions about the first aid. The aim of the research was to find out in which competition tasks or questions the students had the correct answers and in which – there were mistakes or no answers.

The results of 157 participants of the 1st round of the 2017, 2018 and 2019 competitions, their answers in the theoretical tasks were analyzed. Students' responses in human physiology, anatomy and first aid were evaluated. 9th, 10th and up to 12th grade students competed separately in this competition. Both, 9th grade and 10th-12th grade students provided good answers to the first aid tasks, but the

anatomy task was the most difficult. The 10th up to 12th grade students have better knowledge of human physiology as compared with the 9th grade students. This may be due to the younger participants' less life experience in competitions, as well as shorter studies about the physiology topics.

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## ADULT EDUCATION IN THE CONTEXT OF THE SUSTAINABLE DEVELOPMENT GOALS

**Key words:** lifelong learning, adult education, sustainable development, flexibility, quality education.

**Topicality of the study** is related to Adult education in Latvia that has not been considered to be a part of sustainable development policy and has been and build without a national vision and coordination. Contemporary vision of adult education does not meet the needs of adults in the conditions of a rapid societal change. Thus, the problem relates to the the contradiction between external factors (changes in social life, changing social roles for adults, new demands in a workplace, changing professions and a lifelong learning) and organization of adult learning. The government tries to build the system of a contemporary adult education with the perspective of reaching sustainable development goal four.

**The aim of the research:** to analyse the legislation regarding adult education and the data related to adult education in the Latvian vocational education institutions. It reveals several problems in the organization of adult education and the need to develop new directions of adult education, which enable one to improve the education system, its flexibility and ability to respond to changes in the labour market.

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## AMBITIONS AND PERSPECTIVES IN THE ERASMUS+ STRATEGIC PARTNERSHIP PROJECT: INNOVATION AND TRANSFORMATION IN EDUCATION

**Key words:** innovation, transformation, sustainable perspective, international partnership.

The presentation reveals the ambitions and perspectives of the Erasmus+ Strategic "Partnership Project for School: Education Innovation and Transformation in Education" (2019-1-TR01-KA201-076605). The main objective of the project is to introduce innovative experience in education by introducing changes in teaching approaches, integrating ICT technologies in teaching in a more meaningful way, developing students' competencies, and training teachers for introducing innovations in their teaching. The project will also seek to explore difficulties in introducing innovative practice by designing a questionnaire for the teachers. The answers to those questions will be explored in the comparative international perspective. The leading partner of the project is Turkey. Among the institutions involved in this project are the following: Bilecik İl Milli Eğitim Müdürlüğü, Merkez/Bilecik, Gmina Mikolow, Uniwersytet Slaski (Poland), Comune di Santeramo in Colle, Università degli Studi di Bari Aldo Moro (Italy) and Daugavpils city's Educational Department and Daugavpils University (Latvia).

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## **BECOMING A COMPETENCY-BASED TEACHER: TEACHERS' PERCEPTIONS, SELF-EFFICACY BELIEFS AND ATTITUDES REGARDING THE IMPLEMENTATION OF COMPETENCY-BASED EDUCATION REFORM IN LATVIA**

**Key words:** competency-based education, education reform, belief, attitude.

In recent years, interest in competency-based education has risen dramatically. Starting with the year 2018, the implementation of competence-based curriculum started also in Latvia. The successful implementation of the reform requires and is largely dependent on teachers' ability and readiness to adopt new roles, fulfill new tasks and be equipped with new skills and competencies. Moreover, in order to reshape the traditional approach to education and to move beyond the traditional paradigm, teachers' will be required to shift their mindset, beliefs, and attitudes, that underpin their pedagogical practices.

Therefore, this study aims to investigate Latvian school teachers' views on their role in competency-based education and their self-perceived ability and preparedness to ensure competency-based education, as well as their attitude to this paradigm shift in education. The sample of the study included 23 school teachers who were randomly selected from six public schools located in Riga.

In order to understand how the changes in beliefs and pedagogical behavior occur, the paper starts with exploring the following questions: 1) What is the purpose of competency-based education? and 2) What traditional beliefs and values does competency-based education challenge? What core assumptions about the teaching profession must be confronted and shifted if we want to transform it? Further, the paper seeks to explore specific changes necessary to actually shift professional beliefs, culture, and practices, and answer the question: 3) What support do teachers need to be provided and what changes should be put in place in schools to support a paradigm shift in teaching practice? 4) What steps should be taken to enable construction of a new professional identity as a competency-based educator?

The results indicate that the factors affecting teachers' perceptions, self-efficacy beliefs and attitudes regarding the competency-based education can be divided into two major groups, namely, first-order (e.g. lack of adequate professional training, lack of materials and time, insufficient support, unclear expectations) and second-order (e.g. teacher's pedagogical and philosophical beliefs, willingness to change) factors. Each of these groups of factors require further exploration.

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## **IMPORTANCE OF AUDIO MATERIALS FOR TEACHING ENGLISH WITHIN CONTINUING PROFESSIONAL TRAINING PROGRAM WITH QUALIFICATION OF DISPATCHER (MINISTRY OF THE INTERIOR)**

**Key words:** audio materials, dispatcher (Ministry of the Interior), listening skills according to the specification of the field, use of English language, teaching methodology.

The Continuing Professional Training Program with qualification of Dispatcher (Ministry of the Interior) is specific in the context of the English language skills to be acquired and used in the future, significantly related to the professional competencies and characteristics of third-party (caller) levels of English language knowledge. The English language classes and content are unique in that they are based on the acquisition of learning topics, that enable to accomplish the tasks, that ensure the

achievement of the course primary objective - sufficient skills, knowledge and competence to communicate with persons (callers) using English language and adapting to the caller's English language proficiency.

Responsibilities of the dispatchers, connected with English language, include accepting and analysis of the calls to the single emergency number "112". Communicating with the caller, finding out the necessary information (ask questions and understand the answers received, even if the caller's level of English language is low, or if the "style" of English language is influenced by the caller's ethnicity) providing follow-up information, adjusting the type of conversation (word choice and speaking rate) to the caller's English language proficiency and psychological condition. Undoubtedly, due to the nature of the field, there are specific difficulties in receiving the information and communication, such as poor telephone connection, increased background noise, caller's accent, pronunciation, English language knowledge and emotional condition. That is why one of the most important linguistic skills developed within the curriculum is listening skills.

The choice and usage of audio materials depend on a number of influential quantitative and qualitative factors: an initial level of English of the target audience, the duration of the curriculum, and the professional experience of the audience in the field.

In a selective way created such a content of the curriculum (range of situations), which enables the learner to work in a variety of real-world situations and develop the necessary English language skills and competences, and, in the author's opinion, is most important in understanding the specifics of the language, including foreign language communication with people in extreme situations. The combination of all the linguistic, pedagogical and methodological components involved and their interactions are potentially the basis for a qualitative and productive increase in English language knowledge with the aim to improve the conversational and listening skills of dispatchers (Ministry of the Interior) answering telephone calls in their daily work, in such way providing the society with qualitative service of public administration.

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## **INCLUSION OF PRIMARY SCHOOL PUPILS WITH LANGUAGE DEVELOPMENT DISORDERS IN THE GENERAL EDUCATION CLASS**

**Key words:** Pupils with language disabilities; inclusion; support material.

Central government statistical data (2019) show that in 2017/2018. There were 2,660 children with language development disorders in Latvian pre-school educational institutions.

In 2015, the procedure for the integration of learners with language development disorders in general education institutions was determined (Cabinet Regulation No. 591) and in 2018 was clarified (Cabinet Regulation No. 543). As of September 1, 2020, requirements are set for general education institutions (Cabinet Regulation No. 556), which must be ensured when admitting learners with special needs, including learners with language development disorders.

At the same time, educators, heads of educational institutions and specialists in the field point out in the discussions that the readiness of general education schools to admit these students is insufficient. There is a lack of speech therapists, teachers have not acquired the necessary skills, there is a lack of support team work, and a system of cooperation with parents has not been fully developed (2019). Therefore, it is necessary to identify the most important problems that teachers, speech therapists, the learners themselves and their parents may face when integrating learners with language development disorders in general education institutions.

An interview and a survey were used in the study to find out the opinion of speech therapists and teachers. The data obtained in the study show that speech therapists consider the following to be the most significant problems in integrating learners with language development disorders in general education institutions: assigning inappropriate tasks to children with language disabilities, such as talking a lot in front of the class, reading aloud texts that the child cannot read; find access to each

child using appropriate support materials; learning and behavioral disorders due to the child's speech development deficiencies. Educators mainly emphasize that the self-esteem of these children is largely determined by the attitude of the parents, the children have a small vocabulary and they are not able to express their opinion precisely enough, which hinders the involvement of these students in communication.

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## **PRAGUE SPRING AT PRIMARY SCHOOLS IN CZECHOSLOVAKIA BY TEACHERS POINT OF VIEW**

Authors will focus in their proposal on the everyday operation of primary schools (ISCED 1 and ISCED 2) in Czechoslovakia during the so-called Prague Spring and the subsequent communist political clampdown after the invasion by the Warsaw Pact forces in 1968. The authors will focus primarily on the experiences of teachers, how events in this complex period affected their professional lives, and how the renewal of totalitarian power was reflected in their work. The research is based on oral history as a method which enabled us to acquire unique knowledge concerning the work and life of teachers in the period under study. Findings from extensive archival research are also an important part of the research. These show that during the Prague Spring, as in Czechoslovak society as a whole, the socio-political climate in primary schools relaxed and communist power weakened, as reflected both in school operation and in-class instruction. After the Warsaw Pact invasion in August 1968, the régime became stricter again in schools and elsewhere (similar to before the onset of the Prague Spring). This was manifested especially in the constant control of teachers' activities during the Prague Spring, in their persecution, and through the increasing emphasis on ideological aspects of teacher training and pupil formation through instruction.

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## **THE ASPECTS OF A CAREER DECISION MAKING PROCESS BY THE BASIC SCHOOL PUPILS IN THE CONTEXT OF THE CHANGING JOB REQUIREMENTS**

**Key words:** career planning skills, basic school pupils, adaptability, 21st-century skills.

The topicality of the career choice is determined by the changing job requirements and increased demands that the young person needs to be prepared and adjusted. Changing the situation in the labor market and in society makes pupils adapt to changing situations and to be educated throughout their lives. Career planning in this article is seen as a spiraling and dialectic process that is influenced by multiple factors, the process that involves planning, generating options, evaluation of options and making decisions. For the purpose of this study, the authors chose a pilot questionnaire in order to explore the career path of the 8th-grade pupils. The questionnaire includes demographic and the study of the factors that influence the career choice of pupils as well as the main sources of gaining information. It was concluded that parents still play a significant role in the career choice of teenagers, although the internet and siblings play not the least significant role in the career choice of teenagers. The career guidance process needs to be planned in the way that it is an adaptive and context-bound



process where pupils become more attuned to their needs, interests, and values, seeking to learn more about themselves and the job market around.

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## **THE POSSIBILITY OF USING DIGITAL LEARNING TOOLS TO ASSESS THE RESEARCH SKILLS OF STUDENTS IN CHEMISTRY**

**Key words:** digital learning tools (DLT), chemistry education, research skills.

Nowadays technologies are developing faster than we can imagine. In school modern technologies are used by everyone – starting from students’ to teachers. More and more digital learning tools are being used in the learning process. Since everything new is perceived critically, it is necessary to find out the effectiveness of using digital learning tools in the learning process.

Currently the education system is in a state of change, the National Center for Education project “Competency based curriculum” or *Skola2030* is implemented with the aim of introducing education content in Latvia, in which students’ would acquire the main competencies necessary for life. In the project *Skola 2030* in secondary school all natural science subjects are focused on developing and strengthening research skills. The aim of research is to investigate and evaluate the level of development of students' research skills at secondary school using digital learning tools. Data collection methods include analysing obtained results from diagnostic tests in chemistry subject from 2015./2016. and 2017./2018. school years. In both years’ students’ were offered the opportunity to perform diagnostic test on paper or online, using the digital learning platform *uzdevumi.lv*.

The results show that students improve their results solving tasks in digital learning platform year by year. In the first year results obtained from digital learning platform were slightly lower than results obtained from paper format, but in the second year students’ results were equal in both cases.

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## **THE SCREEN VERSION OF A FEATURE TEXT AS A MEANS OF FACILITATING CULTURAL BACKGROUND IN THE SFL LEARNING**

In the article, with reference to the screening of M. Bulgakov’s play *Ivan Vasilievich*, the feasibility of utilizing film-intertexts in a foreign language course – particularly in Russian classes for foreign learners – is corroborated, and the principles of selecting them for educational purposes are determined. Hence, the object of the research is a screen version of a feature text as a means of facilitating cultural background in the second foreign language learning. Therefore, the aim of the article is to facilitating cultural background in the second foreign language learning through the screen version of a literary text, which also familiarizes students learning the second foreign language with authentic understanding a foreign culture via mutual interaction between native and target languages.

With the absence of speaking environment – wherein the learner may apply his knowledge gained during his language classes and interact naturally – learning a foreign language has remained an urgent issue of linguadidactics by foregrounding the need to artificially recreate the conditions of real communication in the target language.

Furthermore, in the article it is significant technologizing and computerizing all the spheres of social activity as well as developing an individual's sustainable skills of perceiving information through an audio-visual image on television has, on the other hand, made it indispensable to write teaching aids encompassing an audio-visual aspect as a substantial element of classes in Russian as a foreign language at any level of learning. Such is an approach that makes classes be oriented toward real life situations familiar to young learners. In this regard, methodically developed materials of a film become an integral part of any Russian language course and are used as irreplaceable teaching resources enabling learners to be immersed into the realm of actual communication in the target language. Thanks to the films, not only do learners get acquainted with language facts necessary to communicate in Russian, but they also comprehend such cultural realities as Russian literature, history, traditions, and customs, acquire the peculiarities of Russians' speech behavior, learn to understand their facial expressions and gestures, and apprehend that a film-intertext being a finished product of spoken or written communication (discourse) is an idiosyncratic text wherein visual and auditory images, verbal and non-verbal means of information transfer are harmoniously intertwined. And a communicative situation is represented in its full capacity as close as possible to real life situations.

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# FILOLOĢIJA

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# PHILOLOGY

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## THE WORD BRACK AND ITS RELATED MEANINGS IN SOME GERMANIC LANGUAGES

**Key words:** concept, meaning, semantic relationships, semantic fields, sets.

On the basis of a theoretical study of a theory of meanings by different schools from Plato till recent days the author of the present research has collected some empirical material and investigated a word *Brack* in Germanic languages such as English, German, Danish, Norwegian, and Swedish. A structural approach and comparative method as well as applying elements of synchronic and diachronic analysis are used here what revealed all the meanings of the word *Brack* in the analyzed languages) with the central meaning "worthless" in old Dutch (the language of origin, 1510, *brak*) and later meanings of the word *Brack* in Germanic languages.

The aim of this research is to compare a semantic field created by the word *Brack* in the Dutch language with semantic fields of the related words in the analyzed Germanic languages. The comparative analysis of their meanings in different languages has revealed the idea that a shared component of meaning - "worthless" - is present in all the analyzed languages and new additional numerous meanings in investigated languages are related.

The new meanings that pertain only to the word of one definite language are connected with culture and reveal its peculiarity.

The database collected consists of 27 meanings of the word *Brack* within 5 languages, thus the analysis of the related meanings shows close semantic relationships between these words in the selected Germanic languages.

*Phillip Freeman*

## CLADISTICS IN LITERARY ANALYSIS

Although cladistics is a method of classifying animals and plants according to shared-common characteristics (paleontology, biology, anthropology and cultural studies uses this system for measurement and classification) Cladistics can also be used in philology, comparative literature, formalism literature theory and semiotics. Created by Willi Hennig and remember for his PROGRESSION RULES in cladistics, this paper will apply the same principles of Hennig's Progression Rules to literary analysis: a relationship--whether hypothetical or not--can be established and measure using a cladogram.

Although there are many approaches to "mining textual" information, nature is our best teacher; and Hennig's outline for the theory of phylogenetic systematics can be a practical and flexible systematic approach to analyzing history and literary studies.

*Marija Sprūde*

## **CAREER COMPETENCIES FOR TRANSLATORS: STUDENTS' OPINIONS AND PROFESSIONAL STANDARDS**

The relevance of the research theme is determined by the growing demand for highly skilled labour. Although unemployment is still an urgent issue in Latvia, there is a tendency towards a shortage of skilled labour. In this regard, it is necessary to form a clear understanding of professional standards set for by students-philologists. The aim of the research is to determine students' understanding of necessary career competencies for translators' professional standards, as well as to evaluate the opportunity to form these competencies in the Bachelor programme of English Philology in the University of Latvia.

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## **REPRESENTATION OF WOMEN IN SHIRLEY JACKSON'S NOVEL "WE HAVE ALWAYS LIVED IN THE CASTLE"**

Nowadays it is difficult to imagine that the "first wave" of feminism, hypothetically, could have been its last and that the fight for women's rights could have been over after its first notable victories. Fortunately, it was only the beginning. After the American suffragettes achieved the signing of the 19<sup>th</sup> Amendment to the United States Constitution in 1920, a new "wave" started to form. The "second wave" of feminism began in the U.S. sometime after the Second World War and lasted through several decades. The scholars and critics who have attempted to determine the starting point of the new era of feminist movement frequently single out the publication of *Feminine Mystique* by Betty Friedan in 1963 as its most likely trigger. Shirley Jackson's novel *We Have Always Lived in the Castle* (1962), which is the central focus of the present paper, was published just one year prior to the famous work on female oppression and anticipated a somewhat similar sentiment. The *Castle* is widely recognized as its author's most comprehensive and developed work. Despite the fact that S. Jackson's writings, unlike B. Friedan's, are not usually labeled as feminist due to their seeming apoliticality, the novel in question has a lot to offer in regard to the topic of female oppression as well as the overall representation.

The present paper considers the representation of women in Shirley Jackson's novel *We Have Always Lived in the Castle* in juxtaposition with the image of the ideal American woman of the post-2<sup>nd</sup> World War period.

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## **VISUAL METAPHORS THAT WERE MADE TO SHOCK YOU**

**Key words:** cognitive linguistics, metaphor, visual metaphors, social issue printed advertisements

The aim of this article is to analyse visual metaphors, which are classed as shocking in various printed social issue advertisements. The article discusses the use of visual metaphors in non-commercial printed advertisements, which have been randomly chosen from various Internet sources. The concept of visual metaphor and its types are viewed, in order to classify, which type of visual metaphor is mostly used. Michael T. Bendixen has analysed the effectiveness of advertisements, and developed conceptual frameworks, models and practical sets in order to be able to watch consumers' reactions and behaviours in the long-term. The study aims at learning how shockvertising, particularly the visual metaphors present in social issue adverts, is used to spread awareness and get the audiences talking about important issues and messages by gaining and keeping attention with horror and disgust.

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# FIZIKA

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# PHYSICS

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## METAL OXIDE NANOSTRUCTURE-BASED GAS SENSOR FOR CARBON DIOXIDE DETECTION

Currently, due to the increased level of environmental pollution, the creation of highly sensitive gas sensors is an important task.

Nanostructured metal oxides as a material for a gas sensor are widely used due their physical properties.

As is known, a nanostructured coating can be characterized by an increase in surface area and in the number of active bonds, which, in turn, leads to an increase in the sensitivity of a nanostructured sensor in comparison with smooth coatings.

One of the most common methods for producing nanostructured electrodes is the screen printing method. This method has a significant drawback, namely, the need to use binders, which prevents the creation of a highly porous coating and limits the diffusion of gas in the volume of the working electrode layer.

In order to increase the sensitivity and efficiency of the sensor, nanostructured ZnO, CuO, and Co<sub>2</sub>O<sub>3</sub> layers were obtained by hydrothermal synthesis directly on the electrode surface avoiding the use of binders.

SEM images show that the resulting nanostructured coatings are characterized by good adhesion to the surface and high porosity which opens up the possibility of their further use in the process of developing a gas sensor.

To determine the effectiveness of the obtained nanostructured coatings, their sensitivity to various concentrations of CO<sub>2</sub> was studied. The resistance curves of the samples were obtained as a function of the gas concentration in the chamber for ZnO, CuO, and Co<sub>2</sub>O<sub>3</sub> nanostructures.

This study was supported by DU internal research grant No. 14-95/20 "Development of a gas sensor based on cobalt oxide nanostructures".

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## **SELECTIVE CREATION OF METAL AND METAL OXIDE MICROSTRUCTURED COATINGS USING ELECTRODEPOSITION METHOD**

It is commonly known, that during the development of electrochemical sensors metals and/or metal oxides can be used as sensitive layers, usually in form of electrode coatings. The sensitivity of such coating can be significantly improved by creation of microstructures, because of increased surface volume. Another way of improving sensors' sensitivity is so-called multisensor approach, when separate electrodes are coated with different active layers. Mathematical analysis of simultaneous response from various composites can be used to increase sensors' selectivity for specific chemical compound. A technology that allows selective deposition of metal and/or metal oxide microstructures is required in order to create such sensor. This can be achieved by electrodeposition, a method of creation of coating using electric current. Electric current could be guided to flow through specific parts of targeted surface, thus making the deposition selective. Also, it is possible to control resulting structures' morphology and chemical composition by varying the current density and deposition time.

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## **TAPERED OPTICAL FIBER SENSOR DEVELOPMENT WITH METAL OXIDE NANO-STRUCTURE COATING IN TAPERED REGION**

The development of reliable, affordable and efficient sensors is a key step in providing tools for efficient monitoring of critical environmental parameters. In recent years, tapered optical fibers (TOFs) have attracted increasing interest and developed into a range of devices used in many practical applications ranging from optical communication, sensing to optical manipulation.

Tapered fibers allow access to the evanescent wave of the propagating mode, which can be exploited to facilitate chemical sensing by spectroscopic evaluation of the medium surrounding the optical fiber, by measurement of the refractive index of the medium. Compared with conventional optical fibers, TOFs possess a range of unique features, such as large evanescent field, strong optical confinement, mechanical flexibility and compactness.

Semiconductor metal oxides are widely used for the detection in various fields like selective sensing of chemical compounds and biological sensing. Metal oxides possess such advantages as low cost, compact size and relatively simple acquisition technology. Performance of these sensors is significantly affected by their morphology and structure. Sensors based on nanomaterials represent a significantly growing trend to increase the sensitivity, selectivity, and speed of response.

Recently in literature started to appear technologies of sensors based on combination of tapered optical fibers and metal oxide nanostructures where tapered region of fiber was covered by nanostructures. This technology gives possibility to enhance already known sensor types as gives opportunity for development of sensors in new fields of application.

In this work will be presented current status of studies. Following topics will be discussed: evaluation of TOFs with different geometries acquired by different production technologies, development of technology for metal oxide nanostructure deposition on surface of tapered region by hydrothermal method, literature review.

## THE THERMAL EFFECT OF PULSE LASER IMPACT ON MULTILAYERED STRUCTURES

The classical problem of heat flux in multilayer film structures has long been of great interest in connection with a variety of practical applications - for example, in the fields of optoelectronics, laser annealing of semiconductor materials, electron beam lithography and ion implantation. Essential for all these processes is the determination of the thermal effect upon heating of multilayer systems and its role in structural and other changes observed when samples are irradiated with external energy sources.

An analytical solution to the problem of pulsed laser heating of a three-layer system "coating - thin photosensitive film - substrate" [1] was considered, a developing approach applied in [2] to a two-layer system.

In the framework of the proposed thermal model of structural transformations under laser irradiation, expressions were obtained for the kinetics of heating and cooling films both during the operation of a rectangular laser pulse with a duration of  $\tau$  and after it was turned off. The cases of weak and strong absorption of radiation by a film were studied [1,3].

It is shown that for small times ( $0 < t \leq t_1$ , where  $t_1 \ll d^2/a_1$ ,  $d$  is the film thickness,  $a_1 = K_1/c_1\rho_1$  is the thermal diffusivity,  $K_1$  is the thermal conductivity,  $c_1$  is the heat capacity and  $\rho_1$  is the density of the film material) when the fraction of heat transferred to the coating and substrate is significantly lower than that remaining in the film, the temperature on the film surface increases linearly according to the law  $\Delta T = It/c_1\rho_1d$  (here  $I = I_0(1-R)$  is the absorbed light intensity on the film surface ( $x = 0$ ),  $I < 10^8$  W/cm<sup>2</sup>). With an increase in the fraction of heat transferred from the film to the substrate and coating (for times  $t \gg d^2/a_1$ ), we obtain the temperature dependence on time of the form  $\Delta T \sim I\sqrt{t}$ .

In the case of a thin coating and sufficiently large times (long pulses, if  $b \ll \sqrt{a_3t}$ , where  $b$  is the thickness of the coating,  $a_3 = K_3/c_3\rho_3$  is its thermal diffusivity), the fraction of heat transferred to the coating during heat transfer will be much less than heat, reported from the film to the heated substrate layer during the same time, the influence of the coating can be neglected and instead of a three-layer system a two-layer system can be considered. It was also shown that, when exposed to long pulses at the final stage of irradiation, the total fraction of the energy remaining in the film becomes significantly small and the film heating  $\Delta T$  is practically independent of its thermo-physical properties and is mainly determined by the substrate and (thick) coating:  $\Delta T(t) = 2I\sqrt{t} / \sqrt{\pi a_e}$  (where  $a_e$  is the effective thermal diffusivity of the substrate + coating).

It was shown that immediately after the end of the pulse action (as  $t \rightarrow \tau$ ), a linear cooling of the film is observed:  $\Delta T(t) = \Delta T(\tau) - I(t - \tau) / \rho_1c_1d \sim It$ , and for times  $t - \tau \gg d^2/a_1$  film cooling is characterized by the following dependence:  $\Delta T(t) \sim I\sqrt{t}$ .

The results were confirmed experimentally by researching *amorphous - crystalline* ( $a \rightleftharpoons c$ ) photo-structural transitions in Sb-Se- (In) films [4].

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# PSIHOLOĢIJA

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# PSYCHOLOGY

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## APPROBATION OF THE THEORETICAL MODEL OF CONTEMPORARY STUDENT'S EPISTEMOLOGICAL ATTITUDE TOWARDS THE SOURCES OF KNOWLEDGE

The present study aims to approbate the theoretical model of contemporary students' epistemological attitude towards the sources of knowledge, and its research method, the Epistemological Attitude Questionnaire (EAQ). Epistemological attitude is an instrument of research of the knowledge objects and their content in the scientific and educational environment. It is based on the epistemological approaches and strategies, philosophical principles in explaining the activity of scientific cognition subject, psychological states of a cognition subject, educational and social contexts of scientific cognition and knowledge acquisition. The content model of the epistemological attitude is constructed as four dimensions of evaluation for measuring the meanings of knowledge object. The model is able to reflect the construct of meanings of the source of knowledge and its significance.

To achieve the aim of the study, twenty lecturers as experts have participated in a focus group study. Approbating the epistemological attitude model the study carried out testing of the psychometric properties of the EAQ, processing and correction of the content of EAQ. As a result, the model and the research method of epistemological attitude towards the sources of knowledge were empirically tested. Further research is focused on improving the model and the EAQ, increasing the degree of validity and reliability, with the possibility to perform a pilot study with graduate and undergraduate students

**Key words:** epistemological attitude, epistemological attitude questionnaire, model of epistemological attitude, sources of knowledge.

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## ES KONCEPCIJAS VEIDOŠANA PIRMKLASNIEKIEM, IZMANTOJOT PASAKU TERAPIJAS METODI

**Darba mērķis:** Izpētīt pasaku terapijas metodes "Pasaku lādīte" ietekmi uz pirmklasnieka Es koncepcijas veidošanos.

Sava "Es", personības pašapzināšanās un Es koncepcijas jautājumi psiholoģijā ir pētīti daudz. "Es" koncepcijas teorētiskais pētījums balstās uz V. Džeimsa, K.G. Junga, G. Olporta, K. Rodžersa, G.S. Sallivana, K. Rodžersa, R. Bernsa, V.V. Stoļona u.c. teorijām. Kā teoriju apkopojums tiek izmantots T.V. Arhireevas (2008) izstrādātais "Es" koncepcijas sistēmiskais (kubiskais) modelis.

Analizējot pašapzināšanās un Es koncepcijas attīstību no dzimšanas līdz pusaudžu vecumam, var uzskatīt, ka šajā periodā bērnam tā attīstās divos līmeņos, pašapzināšanās – pašuztvere un pašcieņa. Vairāki autori (R. Berns, K. Rodžers, L.S. Vigotskis, E. Ēriks, G. Kraiga, V. Glassers) uzsver, ka noteicošais Es koncepcijas attīstībai ir jaunākais skolas vecums. Jo tieši šis dzīves posms ir visjūtīgākais personības iekšējās un ārējās pasaules apjēgšanai, jūtu un attieksmes pret sevi pašu attīstībai. Balstoties uz vairāku autoru (G. Kraiga, T.V. Arhireeva) viedokli, var secināt, ka jaunākā



skolas vecuma bērniem pašvērtējums lielākoties ir saistīts ar pārliecību par savām zināšanām, kas saistītas ar sasniegumiem skolā.

Pētījums balstās uz autores izstrādātās metodikas "Pasaku lādīte" aprobāciju sākumskolas skolēnu izlasē. Tā ietver 12 nodarbību ciklu 1. klases skolēniem, kuru laikā bērniem tika lasītas Es koncepcijas attīstīšanai atbilstošas latviešu tautas pasakas. Izstrādātā metodika balstīta uz T.J. Zinkevičas, I.V. Sokolova, M.L. Fon Franc, H. Dikmana un citu autoru darbiem. Pētniece T.V. Arhireeva, veicot jaunākā skolas vecuma bērnu Es koncepcijas pētījumus, secina, ka pasaku terapija ir viena no metodēm, kas vislabāk atbilst jaunākā skolas vecuma bērnu psiholoģiskajām īpatnībām. Tā izmanto pasaku formātu personības integrācijai, radošo spēju attīstībai, apziņas paplašināšanai un mijiedarbības uzlabošanai ar apkārtējo pasauli.

Metodika tika īstenota Liepājas Katoļu pamatskolas 1. klasē. Pirms un pēc īstenotās programmas respondenti tiek testēti ar R. Bernsa testu "Autoportrets".

## *Vineta Priekule*

# VĒRTĪBU SISTĒMAS SAISTĪBA AR RELIĢIOZITĀTES ASPEKTIEM

**Atslēgvārdi:** vērtības, reliģiozitāte, reliģiozitātes aspekti.

Pētījuma mērķis bija izpētīt, vai pastāv saistība starp vērtībām un reliģiozitātes aspektiem Latvijas iedzīvotājiem. Tā kā iepriekšējos pētījumos, pasaulē un Eiropā, tika konstatēts, ka pastāv saistība starp vērtībām un reliģiozitātes aspektiem, bija svarīgi izpētīt, kāda ir šī saistība Latvijas iedzīvotāju izlasē.

Pētījumā piedalījās 400 Latvijas iedzīvotāji vecumā no 18 līdz 77 gadiem ( $M=43,95$ ,  $SD=11,40$ , 57,8% sievietes). Datu vākšanai tika izmantota Portreta vērtību aptauja (PVQ; Schwartz, Melech, Lehmann, Burgess, & Harris, 2001), Reliģijas centralitātes skala (CRS-5, Huber, 2012), Reliģiozās orientācijas skala (ROS; Allport & Ross, 1967), Reliģiozitāte kā meklējums - "Quest" skala (Quest scale; Batson & Schoenrade, 1991) un sociāli demogrāfisko datu aptauja. Dati tika vākti, izmantojot elektronisku tiešsaistes aptauju.

Pētījumā iegūtie korelāciju analīzes rezultāti atklāja, ka indivīdiem, kuriem ir vairāk izteikti reliģiozitātes aspekti, kā lūgšana un dievkalpojumu apmeklēšana, ir mazāk svarīga orientācija uz personiskā fokusa vērtībām, varu un sasniegumiem, savukārt tiem, kam reliģija ir kā līdzeklis, personiskā fokusa vērtības stimulācija un hedonisms, ir svarīgākas. Visiem reliģiozitātes aspektiem, izņemot reliģiozitāti kā meklējumus, ir konstatēta pozitīva saistība ar sociālā fokusa vērtībām (drošība, tradīcijas, konformisms, universālisms, labvēlība), ko raksturo orientācija uz sociālo taisnīgumu un sociālo labumu, pakārtojot savu uzvedību citu labumam. Multiplās regresiju analīzes rezultāti ļāva secināt, ka indivīdiem, kas interesējas par reliģiskiem jautājumiem un reliģiju izmanto personiskā labuma gūšanai, būtiskākas ir personiskā fokusa vērtības (pašrealizācija, vara, sasniegumi, stimulācija), bet indivīdiem, kas biežāk apmeklē dievkalpojumus un lūdzas, personiskā fokusa vērtības ir mazāk svarīgas. Sociālā fokusa vērtības ir būtiskākas sievietēm ar iekšējo reliģiozitāti.

Pētījuma rezultātus var izmantot psihologi, sociologi, mācītāji, pedagogi, politiķi, lai izprastu Latvijas iedzīvotāju vērtību saistību ar reliģiozitātes aspektiem un potenciālu, ko sniedz iekšējā reliģiozitāte, kurš ir viens no faktoriem, lai rīkotos sociāli atbildīgi, domājot par līdzcilvēkiem un sabiedrību kopumā.

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## **WHAT DETERMINES UNIVERSITY GRADUATES' DECISION TO STAY IN THE REGION OF RESIDENCE FOR PROFESSIONAL SELF-REALIZATION?**

**Key words:** university graduates, self-realization, motives, values, region of residence.

The progress in economical and sociocultural development of the region to a great degree depends upon its human resources and specifically upon young professionals - recent university graduates. This research seeks to identify psychological factors of university graduates' decision to stay for professional self-realization in the region of their residence. The study method is a questionnaire survey of graduate students of different areas of professional training (N=60) at Pskov State University, Russian Federation. A questionnaire has been developed including several sections of questions aimed at obtaining data on students' anticipation of their first professional placement. The data was analyzed according to Pierson correlation coefficient that resulted in revealing the relationship between students' preferences in different fields of activities, their awareness of the region's resources, their motives and personal values underpinning their choice. Gender and marital status of the respondents have also been taken into consideration. The analysis of the survey data detected some psychological factors of the graduates' preferences for the placement in the region of residence. The factors hindering their professional self-realization in Pskov region were also highlighted thus disclosing the reasons for departure of the university graduates outside the region.

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## **YOUNG ADULTS' PSYCHOLOGICAL NEEDS OF COMMUNICATION IN SOCIAL NETWORK**

Social networks are a relatively new way of communicating, but the rapidly growing number of users who are unable to imagine their daily lives without the use of social networks indicates that they have learnt how to meet their psychological needs in a virtual environment.

According to the *Kantar Latvia Digital* research date (2018), the most popular social media platforms in Latvia are Facebook, Instagram, Whattap and the most active group of users are the young people.

**The aim** of the research is to study young adults' psychological needs of communication in Social Networks (*Facebook, Instagram and WhatsApp*).

The study has analyzed the results of a survey of 260 respondents to obtain the answers to the questions:

What are the main goals (needs) of young people in social networking? Are there any interactions between them (communicating, keeping in touch with people).

Are there differences in the hierarchy of needs of different groups of young people - women / men and 16-21g / 22-35 yrs. age groups?

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## **YOUTH'S SELF-PRESENTATION IN THE COURSE OF LIFE**

**Key words:** youth, self-presentation, course of life, self-presentation tactics.

The modern life put pressure on youth to learn modern life strategies and make extraordinary decisions throughout the course of their lives.

Nowadays, a constructive choice of self-presentation tactics contributes to the success of young people in the learning process, professional activities and personal life.

Self-presentation is an ability of young people to prove themselves in a new environment and new conditions.

Self-presentation is considered to be one of the most important aspect of a young person's social adaptation process.

In the process of social adaptation increases the willingness of young people to present and prove themselves by application of different strategies.

The topic of this study is relevant to all areas of young people's lives, since the need for self-presentation is demonstrated in different ways based on specific circumstances.

In the life of young people self-presentation (such as work environment, job search, networking) is a key element, because the effectiveness of it has a direct impact on the success of young people in their lives.

Self-presentation can be considered as a special mechanism of human's integration into society, as well a resource that allows a person to improve his/her abilities.

The objective of the study is to learn on youth's self-presentation during their lives.

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## **THE PECULIARITIES OF THE CULTURAL DIMENSIONS OF THE REPUBLIC OF LATVIA AND THE REPUBLIC OF KOREA: EARLY ADULTHOOD CITIZENS' ATTITUDES TOWARDS POLITICAL PARTICIPATION**

**Key words:** political participation, Hofstede's cultural dimension model, cross-cultural relations, Republic of Latvia, Republic of Korea.

In recent years, there has been a trend towards a reduction in political participation by citizens of the Republic of Latvia. Where, in turn, the participation of Korean citizens in the political life of the country is growing.

The aim of the study is to study the attitudes of Latvian and Korean citizens towards politics and participation in the context of the Hofstede model.

The study has been developed and empirically tested on the basis of the six-dimensional cultural model of Hofstede (2011), using the modified Schwartz, Hofstede and Inglehart's cultural value scales (Schwartz, 2004).

The sample consisted of 200 respondents: 100 representatives of the Republic of Latvia and 100 representatives of the Republic of Korea, aged 18-25, men and women in both groups of respondents 50/50 %.

The study shows that there are statistically significant differences between culture in political participation between the Republic of Latvia and the Republic of Korea: citizens of the Republic of Latvia participate less in politics; citizens of the Republic of Latvia do not trust political power; The citizens of the Republic of Latvia do not see the need to vote.

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# SPORTS

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# SPORT

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## LATVIJAS JAUNO HOKEJISTU FIZISKĀ SAGATAVOTĪBA

Hokejs ir sporta veids, kas fiziski attīsta ķermeni un nostiprina veselību, tāpēc daudzi vecāki un paši bērni izvēlas šo sporta veidu. Bērnu un jauniešu hokejā fiziskajām īpašībām ir viena no svarīgākajām nozīmēm sporta veidā. Hokejs ir daudzpusīgs sporta veids gan fiziski, gan emocionāli, un sportistiem ir jāapgūst daudz iemaņu un jāpilnveido tās. Fizisko īpašību attīstībai ir liela uzmanība jāpievērš tieši bērnu vecumā. Profesionālu treneru un speciālistu vadībā var pilnveidoties dotajā sporta veidā un būt drošam par pozitīviem rezultātiem hokeja spēlē.

Darba mērķis: konstatēt fiziskās sagatavotības līmeni Latvijas jaunajiem hokejistiem no 7 g. v. līdz 18 g. v. Izanalizēt Latvijas jauno hokejistu fizisko sagatavotību, ņemot oficiālus pirms sezonas fiziskās sagatavotības testu rezultātus, kurus ir piedāvājusi LHF (Latvijas hokeja federācija). Fiziskās sagatavotības testos piedalījās kopā 39 komandas, 749 bērni, 11 vecumu grupām. Vispārējās fiziskās sagatavotības testi bija: lēciens tālumā no vietas, piecēlieni, kāriens ar saliektām rokām, skrējiens 60m, skrējiens 300m, 1000m, 1500m, 3000m. Katrā vecumā ir sava vērtēšanas skala, kuru var pārvērst ballu sistēmā. Augsts līmenis – 5 balle, virs vidējā – 4, vidējs – 3, zem vidēja – 2, zems – 1. Pozitīvu vērtējumu hokejists saņem, ja katrā testā rezultāts tiek novērtēts ar trim ballēm. Zemāks rezultāts norāda uz nepilnībām fiziskajā sagatavotībā. Pēc iegūtajiem rezultātiem var secināt, ka hokejistu fiziskā sagatavotība atbilst vidējam līmenim. Testēšanas rezultāti labi parādīja komandas, kuras pievērš uzmanību bērnu vispārējai fiziskajai sagatavošanai un rezultāti bija augsti, bet kopējā vērtējumā tas gandrīz vai neatspoguļojas. Problemātiski izskatās izturības attīstīšana, jo praktiski visās vecuma grupās, izņemot 15 – 16 g.v., sagatavotības līmenis ir zem vidēja.

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## STUDENT'S MOTIVATION TO ENGAGE WITH THE NORDIC WALKING

**Key words:** nordic walking, students, motivation, physical activity.

Nordic Walking is a type of physical activity that applies to any physical fitness and has many positive effects on health and quality of life. During healthy and biomechanical correct movement, 600 muscle groups, or 90% of body muscle, are employed uniformly. Nordic Walking is a particularly friendly type of physical activity for human health. Classes take place in a "natural gym" and become more popular in Latvia and abroad. Nordic Walking is a type of physical activity for the development of a variety of biological capabilities that helps to get healthy away from negative stress, overweight and improve self-harm. Nordic Walking activates metabolism and increases energy exchange. Webbing is becoming more and more popular among students from different faculty, particularly among student who study in health-care-related programs. Objective of the research. The objective of the research is to find out the motivation of doing Nordic walking among the RSU students of

different faculties and different genders. Methods used in the study: Survey of socio-demographic and closed-type issues that address issues such as the organisation of nordic walking training: frequency, duration, habits, etc. A Likert scale of 15 statements, motivating factors, dealing with detection nordic walking. Nordic walking has become popular type of the physical activity important motivating factors that contributes to the desire to engage with the Nordic walking for the medical students and beeing in the fresh air "natural gym", gaining pleasure, improving mental and physical health.

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# VIDES ZINĀTNES

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## ENVIRONMENTAL SCIENCES

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### A STUDY ON THE APPLICATION OF SHALLOW GEOPHYSICAL SURVEY BY GPR FOR IDENTIFICATION OF DIFFERENT BURIED OBJECTS

The shallow, non-invasive survey by ground penetrating radar (GPR), which is a very popular tool for underground geophysical imaging, is also widely used for the detection of different buried objects due to its ability to identify the contrast in the electromagnetic properties of the surveyed media. This technique does not disturb sediments and allow to visualize the structure of the subsurface, thus an application of GPR is a very suitable method for detecting buried objects in such areas, where direct probing or excavations is risky or even hazardous, e.g. in the military polygons managed by former USSR army. Hence the aim of the study was to evaluate the applicability of GPR survey to detect buried objects near the surface, in the depths up to several meters using 500MHz and 300MHz shielded antennas. For this purpose, GPR profiles were collected along the preliminary marked transect lines in the "Lāču Sils" military polygon, Alūksnes district, Alsviķi municipality. For GPR profiling georadar Zond 12-e Advanced was employed. A portable PANASONIC tablet Toughpad FZ-G1 connected to the GPR unit allows the direct recording of profile surveys and visualization of radargrams in the field. After that, geophysical survey data were processed by software Prism 2.60 and converted into \*.sgy format radargrams. In radargrams, GPR signal propagation changes were analysed in order to identify potential buried objects. According to scientific literature, the resolution of the GPR radargram is proportional to the central frequency of transmitter antennae. Hence, the most detailed images of subsurface could be obtained by using the 500MHz antennae. However, due to dissipation and attenuation of electromagnetic waves in wet sand, GPR signal of such frequency do not penetrate deep enough, allowing to obtain the data only from small depths. Hence, the first stage of GPR studies allows to ascertain, that 300MHz antennae could be more useful for identification of buried objects.

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### ANALYSIS OF ARRANGEMENT OF DOME-SHAPED CONTAINERS IN DAUGAVPILS

**Key words:** dome-shaped containers, domestic waste, domestic waste sorting, waste management.

Waste has become a global issue with tendency to increase every year. Waste sorting and adequate management is the solution of waste amount decrease. Actually, waste sorting and its separate collection was started around 2000/2001 and since then this system is constantly developing. Less than 5% of waste was processed. Today, the sorted waste amount is 26%. In 2035, Latvia needs to reach the amount of domestic waste, which is 85%.

LLC "Atkritumu apsaimniekošanas Dienvidlatgales starppašvaldību organizācija" (hereinafter - LLC "AADSO") started waste management of Daugavpils administrative territory on October 1, 2017. In summer of 2018, city had special dome-shaped ("bells") containers arranged, which were meant for

glass packing collection. These specialized containers are located in 29 places. Aim of the study is to evaluate correct container arrangement in public places and, considering the survey performed, to make corrections for dome-shaped container arrangement.

These bell-like containers are placed in the largest micro-districts of the town to collect glass packing. Aim of the thesis is to study the current situation regarding glass domestic waste sorting dome-shaped containers. To implement work, statistical data of LLC "AADSO" were used, photo-fixation and surveys were performed, as well as GPS-TRIMBLE and GIS ArcMap 10.6 software was applied.

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## **ASSESSMENT OF THE IMPACTS OF AGRICULTURAL LAND ON WATER BODIES IN NATURE RESERVE "PILSKALNES SIGULDIŅA"**

Water quality in water bodies can be a good indicator of whether there is any negative anthropogenic impact on the ecosystem, such as pollution. It is also particularly useful in various protected nature areas with water bodies and high anthropogenic impact. The site of the study is a nature reserve "Pilskalnes Siguldina", which is one of Natura 2000's areas.

Right now one of the priorities is to clarify the impact of intensive management of the surrounding agricultural lands on the water bodies of the nature reserve "Pilskalnes Siguldina".

Whereas there are managed agricultural lands around the nature reserve "Pilskalnes Siguldina" which may lead to the release of polluting substances, there is possibility that agricultural land situated around the nature reserve "Pilskalnes Siguldina" has caused contamination of substances in the waters of nature reserve. Aim of this study is identification of physical and chemical parameters of water quality in nature conservation water bodies and comparison of the results with previous studies to find out if there are any significant changes that indicate pollution.

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## **ASSESSMENT OF GEOMORPHODIVERSITY INDEX IN A GIS ENVIRONMENT: A CASE STUDY IN PROTECTED LANDSCAPE AREA "AUGŠDAUGAVA"**

Evaluating the diversity of abiotic nature components in certain territory involves the necessity to define indices which can be used to compare with one another areas different in respect of their physiogeographic characteristics. Therefore, during the last two decades, the scientists and experts have been developed the concept of geodiversity index (GI), which is aimed to express quantitatively the diversity of the abiotic components. In such a context, among other variables of abiotic components needed for calculation of GI, geomorphological characteristics are very complex to be represented and included in calculations due to a large amount of data and their heterogeneity. However, in the recent years application of new digital techniques for analysing, mapping and assessment of geodiversity in a GIS environment allowed to develop a procedure that exploits GIS and DEMs to obtain a mathematical expression for the morphological variable of GI - the geomorphodiversity index (GMI). Considering that, authors performed a case study in the protected landscape area "Augšdaugava" (PLA) with the aim to assess GMI applying the approach described by Meelli et al. (2017). For this purposes, raster format DEM with spatial resolution 1 m was created from filtered \*.LAS data by ArcGIS 10.6 tool 'LAS DatasetToRaster'. From this DEM new raster layers representing different terrain parameters, e.g. drainage density diversity factor etc. were derived. In addition, for calculation of GMI, raster map of geological diversity factor was generated. All these

raster format variables were analysed and processed in the ArcGIS environment, by using the 'MapAlgebra' tool of Spatial Analyst extension. The results show that several areas of high GMI values within PLA recently are not sufficiently protected despite their geoconservation significance. Therefore the proposals have to be elaborated for improving protection regulations which will provide conservation of geodiversity elements too.

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## **SCOTS PINE (PINUS SYLVESTRIS L.) NATURAL REGENERATION FIVE YEARS AFTER SELECTIVE LOGGING AND CLEAR CUT**

**Key words:** Scots pine, clear felling, selective cutting, natural regeneration.

Scots pine is the most widespread pine species in Latvia. Natural regeneration of pine occurs only from self-sown seeds. The best natural regeneration results have been achieved in areas with poor and medium rich sandy soils. Scots pine grows best in sand soils with sufficient moisture content and low density. The scots pine is a sun-loving tree and are not considered shade tolerant plant. Pine forests are the most common on dry soils in Latvia, scots pine is the dominant tree species in the forest site types as Sl (Cladinoso-callunosa), Ln (Myrtillosa), Mr (Vacciniosa), Mrs (Vaccinoso-sphagnosa), Gs (Callunoso-sphagnosa) and Pv (Sphagnosa) (Gavrilovs, 1998).

Forest stands where main types of final felling (clear felling or selective cutting) was performed in 2013 were selected for this study. 'Clear felling - the basal area of a forest stands is reduced, within a year from its commencement, to the extent that it becomes smaller than the critical basal area. Selective cutting - the basal area of a forest stand is not reduced within a year from its commencement to the extent that it becomes smaller than the critical basal area' (Law on Forests, 2000). Regulations of the Cabinet of Ministers, No.308, May 9, 2012 states that forest restoration should be carried out during the 5 calendar years, thus, the regeneration process of pine can be more optimally evaluated. Forest stands managed by JSC "Latvia's State Forests" and forest stands of private forest owners were selected for the study.

Measurements were made in 42 plots. The number of plots and their location were selected according Regulations of the Cabinet of Ministers, No.384, June 21, 2016. The size of the plots was chosen according The Regulation of the Cabinet of Ministers, No.935, December 18, 2012 Annex 5.

The obtained results show that after clear felling the regeneration rate of deciduous trees is higher than after selective cutting.

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## **DEVELOPMENT OF THE PROTOCOL OF EX-SITU BREEDING AND KEEPING OF THE NATTERJACK TOAD EPIDALEA CALAMITA IN A HERPETOCULTURE FOR ITS WILD POPULATION OPTIMIZATION IN LATVIA**

The Natterjack Toad (*Epidalea calamita*) is a rare and protected species in Latvia, Ukraine, and Europe. Only small populations of this species are known in Latvia, and the Dviete population is the farthest to the east (Dviete parish, Ilukste district, Latvia).

Natterjack toads in Latvia are limited by the cold climate, threatened by overgrowing and degradation of habitats, predators and invasive species, population decline and fragmentation. Strengthening



amphibian populations with released specimens is an effective method for the conservation of amphibians in Latvia: there were successfully restored wild populations of *Hyla arborea* by J.Zvirgzds-Zvirgzdins, *Bombina bombina* by A.Pupina. The protocol is developed in accordance with the document of the Latvian Environmental Protection Fund project 1-08/40/2017: Čeirāns A. (2018): "Vadlīnijas smilšu krupja vairošanai nebrīvē" and to be used in conjunction with it. The protocol consists of 6 Sub-protocols that describe the algorithm of the specified actions. Sub-protocols 1A, 1B, or 1C must be selected, followed by Sub-protocols 2, 3, and 4 sequentially.

The study was conducted in accordance with legislation of Latvia. This study was supported by Latvian environmental protection fund project Nr. 1-08/40/2017 „Metodikas izstrāde un pielietošana smilšu krupja populācijas uzlabošanai izmantojot ex situ metodi”. We thank for cooperation Latvian – Ukrainian VAAA project No. LV-UA/2018/6 “The ecological and biological triggers of expansion of the invasive fish, Chinese sleeper (*Percottus glenii*), in Eastern Europe”.

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## **EVALUATION OF DAUGAVPILS CITY TRANSPORT INFRASTRUCTURE AND SUSTAINABILITY OF URBAN MOBILITY THROUGH A SOCIAL SURVEY**

One of the climate change drivers is considered to be the active use of road transport, which causes congestion problems on the streets, affects human health and worsens the quality of the environment. The concept of sustainable urban mobility means the creation of appropriate infrastructure to ensure the availability of good quality urban areas, including aspects of technological development and environmentally friendly principles. Daugavpils City Council has developed the Sustainable Energy Action Plan and implemented an energy management system according to which one of the goals for the development of the city energy system is to reduce the public transport energy consumption by 5% by 2020 compared to 2015, but by 2030 to reduce its CO<sub>2</sub> emissions by 40% compared to 2010.

In the framework of the study, an assessment of the current situation of urban transport infrastructure, identifying its strengths and weaknesses is done. The survey of local population mobility habits is conducted, involving 200 respondents. The results of the survey show that the most of the city inhabitants daily travel by car as a driver or passenger, local inhabitants use public transport less than two/three times a month, while 65% of the local population never use bicycle at all, because they feel unsafe due to inadequate infrastructure. The local inhabitants of the Daugavpils city the most negatively evaluate the availability of parking places in residential areas and near municipal educational institutions, as well as 48% of local inhabitants negatively evaluate the availability of cycle paths in a city. That highlights the need for implementation of the activities that will improve transport infrastructure, making it safe, reliable and sustainable for the citizens and visitors.

## **FACTORS INFLUENCING ECO-FRIENDLY CHOICES AND ENVIRONMENTALLY SUSTAINABLE ACTION TAKING REGARDING CHEMICAL POLLUTION IN RIGA, LATVIA: A PILOT STUDY**

**Key words:** chemical products, sustainable consumption, infrastructure accessibility, household chemical pollution, environmental behaviour.

With growing concern towards environmental problems and chemical pollution, it is important that more environmentally sustainable choices are made. With the increasing consumption of goods and services, more strain is put on the ecological systems and earth's capability to restore its resources, therefore pollution, global warming, decline in flora and fauna, as well as other issues occur. Consumers have the ability to better or worsen the situation by purchasing eco-friendly products, however the decision making process is complex and can be influenced by different factors.

The aim of this study is to determine factors that influence the choices and actions of citizens of Riga, Latvia regarding chemical consumption and taking environmentally sustainable actions.

Data collection was made using focus group interviews. A total of 5 focus group interviews were made during October – November 2019 and February of 2020, gathering the opinions of 36 individuals living in Riga, Latvia and its peri-urban area.

Efficiency, product cost, the assessibility of infrastructure and/or service, the simplicity if the approach and product's impact on environment and health were the most mentioned aspects while impact of marketing, peer/expert example or recommended action/choice and country of manufacture/origin of the product were less mentioned. The importance of the effectiveness and getting the expected result, as much as the accessibility of the infrastructure or service was admitted by the majority of respondents.

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## **FIRST RESULTS OF OPERATION OF EXPERIMENTAL LAKE MONITORING STATION ON THE LAKE ŽELVA (LITHUANIA)**

Thanks to the ERASMUS+ staff mobility agreement between Daugavpils University and Vilnius University, an experimental floating Lake Monitoring Station was established on the lake Želva (Molėtai district, Lithuania) on July 11, 2019, during the summer field course in hydrology organized by the Institute of Geosciences, Vilnius University.

The Lake Monitoring Station was made from a maritime life-raft, which has been used as a drifting research platform on the Daugava River since 2007. It was equipped with a HACH multiprobe and other instruments designed for real-time monitoring of the lake's water column. It was anchored within the offshore zone at the site with more than 5 meters depth and used during daytime as a training and research platform for the Hydrology program's students, as well as for the repeated *in situ* measurements of various physical and chemical parameters at five different depths. Transportation, deployment and operation of the Lake Monitoring Station, including hourly measurements of selected hydrophysical and hydrochemical parameters of the lake's water column at various depths was supervised by the staff members of both universities.

During the observation period (09:30-18:00), the water temperature and pH level of the lake Želvos water column gradually increased while the dissolved oxygen concentration, conductivity, TDS and ORP gradually decreased at all depths simultaneously. The exception was the depth of 4 meters, where the average values of almost all parameters unexpectedly dropped between 16:00-17:00. Meanwhile, the conductivity and TDS sharply increased. These results probably indicate an intrusion

of some colder, mineral-rich deep-water masses to the central part of the lake Želva in late afternoon. Therefore, deployment and use of such experimental floating Lake Monitoring Station suited for real-time high frequency monitoring of the lake's water column may reveal a deep-water circulation system unobservable by other monitoring strategies/methods.

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## **FOREST MANAGEMENT IMPACT ON BLACK STORK (*CICONIA NIGRA* L.) HABITAT LANDSCAPE CHANGES IN THE FUTURE SCENARIO**

The Black Stork (*Ciconia nigra* L.) has a special protection status. In Latvia this species is protected, most often with a microreserve. Considering the fact that the black stork is a forest core species, the landscape of which is significant at least 3 km from the breeding site and the fact that active forestry is allowed outside the microreserves, a situation in which the habitat in the sense of the landscape has lost its role in protecting the species may arise.

The aim of the study is to identify potential changes and impacts of *Ciconia nigra* L. habitats landscape on representative indicators, taking into account the current forestry intensity. The following work objectives are (1) perform general analysis of the habitats landscape in area of microreserves that are identified over the last 5 years (n=32), (2) modelling the future landscape scenario for the next 100 years, using LANDIS-II model taking into account the current forest management, and (3) determined habitat landscape indicators and their impacts by comparing the results of Fragstats to randomly selected plots (n = 40).

In the 6x6 km landscape of the *Ciconia nigra* L. habitat were found that birch, pines, spruce stands with black alder are most common, grouping habitats according to tree species societies in the DCA ordination. On average, the eligible stands for habitats were found to be 18% of the total landscape area, which is half the size of the non-eligible stands(36%). The average distance of potential metapopulation is estimated to be 28 m with average area of 20 ha.

Were found that the existing forest management regime situation will lead to a statistically significant reduction in suitable stock areas over time, despite no significant changes in their diversity indexes. A number of potential metapopulation metrics have been identified to change statistically, but no significant change in diversity.

The analysis of habitats by the random sample did not identify any significant impacts of species, landscape or class metrics on the existence of the habitat. Areas of potential metapopulation were found to be less fragmented in randomly selected plots. It is identified that in the habitats of the black stork are statistically significantly more ditches and forest paths in the plots of general length and more spruce and birch stands under the age of 90 years.

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## **GEOCHEMICAL EVIDENCE OF AEOLIAN SAND PROVENANCE IN THE DVIETE INLAND DUNE FIELD**

The field of inactive inland dunes located to the north of Dviete has developed on the surface of the glaciolacustrine plain, where an event of glaciofluvial and glaciolacustrine sedimentation in the Nīcgale ice-dammed lake took place during the retreat of glacier ice, the Pomeranian phase (MIS 2) of the last glaciation. The expanding of the glacial lake along glacial uplands and its subsequent drainage exposed unconsolidated sediments to subaerial conditions, in addition, lack of vegetation cover and cold and dry climate favoured the transportation of fine sediment particles by wind and the formation

of aeolian landforms. However, the provenance and pathways of initial transportation of sediment still remain poorly understood. To elucidate that, data on aeolian sand geochemistry have been obtained by Olympus XRF instrument Vanta (M-Series). In order to identify the aeolian sand sources and their transport pathways in the study area, previously collected samples after drying were analysed following the procedure described by Chagué-Goff et al. (2012). For each sample analyses were repeated five times, each measurement was performed 90 s applying 4.5 keV – 18 keV beam for detection of low ionization energy elements and 18 keV – 35 keV beam for detection of high ionization energy elements. The standard GeoChem REE2 protocol included in the manufacturer's software was used. The results of geochemical analysis point out that elemental composition is rather typical for aeolian sediments, determined by the dominance of quartz and K-silicates. Among REE elements, only Y un Nb was identified in detectable concentrations. Similar geochemical signatures across the dune field suggest the provenance of sediments from one main source - possibly from the Augšzeme Upland. Hence pathways of sand initial transportation were associated with glaciofluvial streams, which once flowed from the already ice-free areas to the south and formed distal part of the Ilūkste river valley.

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## **GEODIVERSITY OF THE PILSKALNES TUNNEL VALLEY**

The Pilskalnes tunnel valley is located in NE part of the Augšzeme Upland and stretches from NW to SE along its northeast flank. This complex landform belongs to the features of subglacial origin. This area is recognized as an important site for its nature values; hence nature reserve “Pilskalnes Siguldiņa” is established in the south-eastern part of the tunnel valley. Besides the presence of protected species and habitats, abiotic nature values of the tunnel valley also have to be assessed in terms of geodiversity. Among others, one of the widely used methods for assessing the diversity of abiotic nature elements is based on calculations of geodiversity index (GI). According to data given in the literature, the procedure for GI assessment needs the following inputs: 1) data on elements that contribute to GI assessment and have continuous character regarding their geospatial distribution (geological data on the geographic distribution of Quaternary sediments; landform units; slope gradients and soils), 2) data on GI elements that have continuous character regarding their geospatial distribution (erratic boulders, springs, streams, geomorphic processes); 3) data on terrain roughness derived from DEM. The first two components for GI assessment were studied during field surveys and mapped by GPS. The last component – high accuracy DEM was generated from LiDAR data, provided by the Latvian Geospatial Information Agency. The calculations of GI were carried out in a ArcGIS environment using spatial analysis and map algebra tools, allowing to obtain data on the geographic distribution of GI values. The output data of GI in a format of the ESRI raster data were reclassified in five classes according to Jenks’ algorithm and relative values were attributed to provide the compatibility of the different parts of the tunnel valley. Finally, the map of GI spatial variants as an indicator of the diversity of abiotic nature elements of the Pilskalnes tunnel valley was elaborated.

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## **GEOMORPHOMETRY OF NUMERNES LATERAL SHEAR-MORaine RIDGE**

The assemblages of glacial landforms that are preserved in Latvia at the beds of paleo-ice streams are the indicators providing important data on the paleogeography of the ice masses during the last deglaciation. One of such geomorphological indicators is lateral shear-moraines (LSM). LSM are landforms of glaciotectonic origin and the geographic distribution of them is mainly controlled by the locations of ice margins. Hence the geomorphological studies of these relief features can provide insight into the spatial distribution of paleo-ice streams. Numernes ridge, located at the eastern edge of the Eastern Latvia lowland, is also classified as LSM. However, its geomorphological characteristics remain insufficiently studied, because previous analysis of this complex landform was performed using topographic map-derived DEM. In order to provide much more detailed insight into the issues on the shape, dimensions and morphology of the ridge, at the first phase of the research program the GIS-based geomorphometric analysis was applied. For this purpose DEM with high horizontal resolution and high vertical accuracy was generated from the LiDAR cloud point data provided by the Latvian Geospatial Information Agency. After that, the identification and delineation of Numernes ridge crest line, foothills and other geomorphological elements was performed by ArcGIS 10.6 software package tools using DEM and following the standard procedures described in the scientific literature. Subsequently, shape in planar view, the orientation of the LSM ridge, its hypsographic curve and other parameters were extracted during geomorphometric analysis. The obtained results indicate that the application of geomorphometry and using of high-resolution DEM in GIS environment provide more detailed data than those previously obtained from the analysis of topographic maps and manual digitizing of contour lines, particularly in terms of interpretation of surface morphology of glaciotectonic landforms.

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## **IMPACT OF FOREST MANAGEMENT REGIMES ON THE DEVELOPMENT OF FOREST SUCCESSIONS IN THE TERRITORY OF GAUJA NATIONAL PARK IN THE PERIOD FROM 2020 TO 2520**

The specially protected nature area, Gauja national park, was founded in 1973 to protect the unique natural values of the old river of Gauja and its surroundings. Since 2004, the national park has been included in the Natura 2000 network of nature protected sites of EU importance.

A natural conservation plan for the Gauja national park for the next 12-15 years shall be drawn up between September 2019 and January 2023. It is therefore appropriate to assess the impact of the existing regulatory framework on future development scenarios for the national park in order to consider its changes.

The aim of the study is to forecast the process of forest successions in the territory of Gauja national park for the period 2020-2520, taking into account management regimes arising from (a) the existing regulatory framework, (b) natural processes, (c) from alternative conditions.

The study uses LANDIS-II and Fragstat landscape models. Non-parametric T-test was used between scenarios over 500-year periods has been performed. It has been found that the *picea abies* in the process of natural succession is significantly tending to form pure stands, while the abundance of

the *pinus sylvestris* is decreasing in all scenarios. In the case of pioneer species such as *populus tremula*, *alnus incana*, *betula* spp. the disturbance, including felling, has a positive effect.

It is concluded that the area of the current GNP nature closure zone and its management conditions do not differ significantly from that of natural processes, while forest stands in the strict regime area are exposed to economic activity around them and are significantly affected. Overall, the existing management conditions differ significantly from the natural process scenarios. The conditions provided by the author generally correspond to the successions of natural processes. Forest management has been identified as contributing significantly to the diversity of tree species.

*Olga Ludzeniece*

## DENDROLOGICAL INVENTORY OF DUBROVINA PARK

**Key words:** Daugavpils city, Dubrovina park, trees, dendrological inventory.

There are significant differences between growing conditions of greenery in the city and natural growing conditions of woody plants in the forest. Urban greenery can be negatively affected by various types of anthropogenic pollution, also by different microclimatic conditions, as a result trees grow worse, trees do not absorb enough organic matter. Daugavpils can be considered as a green city (there are nine parks and 18 squares in the city), but appropriate management of green zones must be carried out. Dubrovina park is one of the largest parks located in the center of the Daugavpils city. Various city events and celebrations take place in Dubrovina Park every year. So, it is necessary to regularly inspect and maintain the park's greenery. Since the last inventory of Dubrovina Park in 2011, several trees have been cutted down due to poor tree health conditions, some trees felled by the wind. The park inventory carried out in 2019 shows that the currently required tree management measures are: cutting off dry twigs, cabling and bracing of the trees with a V-shaped trunk. Almost all chestnut trees growing in the park are infected with horse-chestnut leaf miner so the further control of this pest should be carried out. The overall health of the trees is good, there are many valuable trees in the park and some of the common oaks are potential venerable trees.

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## LIPIDS IN THE LIFE-CYCLE OF AMPHIPODS IN THE DAUGAVA RIVER

The Ponto-Caspian amphipods are one of the most successful invaders in the Central European freshwaters and also in the Baltic States. But its ecological and physiological studies comparing the species' physiological traits are insufficient, especially between indigenous and non-indigenous species. Particular attention was placed on the reproductive periods of amphipods (late spring and early summer) because lipids are known to be related to reproductive activity. Field studies provide a better insight into the natural variability of energy storage compounds and the physiological background of ecological processes. Qualitative samples of amphipods (non-indigenous *Pontogammarus robustoides*, *Gammarus varsoviensis* and indigenous *Gammarus pulex*) were collected in the four sites in the Daugava River (included Pļaviņas Reservoir) once or twice times in the month from April to June in 2019 in the depths up to 0.5 m using a hand net with a mouth opening of 25 x 25 cm (500 µm). The highest mean values of triglyceride concentration were observed in the early spring (April and May) for all species but decreased at the beginning of June (for example *G. varsoviensis* from 23.5 to 10.1 mg g<sup>-1</sup>\*FW). But at the end of June, the concentrations increased again (for example *P. robustoides* 39.0 mg g<sup>-1</sup>\*FW). Triglyceride concentration was higher in females than in males (p < 0.05) in all investigated species. Unfortunately, *G. pulex* was obtained only May in this period, therefore comparison with non-indigenous amphipods not significant, but in general, our investigation gives insight into the dynamics of lipids in the reproductive activities of amphipods (for

example new generation production). This research was supported by the DU Research Project No. 14-95/14 "Ecophysiological state and its changes of the alien amphipods in the Daugava River".

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## **PALEO GEOGRAPHIC SITUATION AND FACTORS CONTROLLING FORMATION OF THE DVIETE INLAND DUNE FIELD INFERRED FROM GRANULOMETRIC ANALYSIS OF AEOLIAN SANDS**

The Dviete inland dune field is the second largest local area of landforms of aeolian origin located in the southern part of the East Latvian lowland. Only several studies previously have been conducted in this area, hence there is a lack of data on paleogeographic conditions and factors controlling the formation of aeolian landforms in this region. Considering that, a two-year research programme was performed, including a sampling of aeolian deposits, identification of their granulometric composition, statistical and geospatial processing and analysis of obtained data. During eight field expeditions in total 94 samples of sand have been taken from the C horizon of the surface podzol in the crest parts of inland dunes. After physical treatment, the grain size distribution of these samples was analysed by laser diffraction method following the standard procedures. Data on the mean grain size and other Folk and Ward indicators, i.e. sorting, skewness and kurtosis were extracted from the results of granulometric analysis by applying GRADISTAT module. Finally, interpolation of data was done by Spatial Analyst extension of ArcGIS 10.6 software to visualize the geographic variability of granulometric indicators across the dune field. The results of interpolation were laid on high-accuracy DEM of the study area allowing to identify the possible provenance of sediments and to reveal the paleogeographic situation during the initial phase of dune field development. The results show that dunes in the Dviete forest are composed mainly of fine-grained sands with a mean size of particles ranging between 143 µm and 256 µm. Fining of dune-forming sediments across the dune field from S - SE to N-NW field suggest the provenance of sediments from one main source, possibly associated with glaciofluvial sediment transportation by extra-glacial water streams draining from the already ice-free parts of adjoining Augšzeme Upland through the Ilūkste valley to the Nīcgale ice-dammed lake.

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## **RARE AND PRESERVED HERPETOFAUNA SPECIES IN THE PROTECTED LANDSCAPE AREA AUGSDAUGAVA NATURA2000 (SOUTHEAST LATVIA): DISTRIBUTION AND THREATS**

For the sustainable conservation of protected southern herpetofauna in Latvia, it is important to research distribution of the species in the protected areas of the extreme south of the country in close proximity to Lithuania and Belarus because these populations are protected in the areas and can have genetic contact with the stronger populations in these more southern countries. Protected landscape area Augsdaugava Natura2000 (code LV0600400) is located on the border with Belarus (55.863450°N, 27.142637°E). *Triturus cristatus*, *Bombina bombina*, *Pelobates fuscus*, *Bufo viridis*, *Lacerta agilis* were registered here in earlier studies. Possible, *Emys orbicularis* can be found here too, because the nearest its finding (No 063) is placed very close (2 km) to the border of this area.

We have conducted field studies of the distribution of these 5 herpetofauna species in the area in 2017 - 2019, and we also processed earlier data by Andris Ceirans, Mihails Pupins and information from the DabasDati.lv database.

We conducted a visual survey from May to September, in warm sunny weather, on routes 2-4 m wide, laid in biotopes that meet the ecological needs of these species. We used audial survey for detection of vocalizing males of Anura and after-rain night survey with a car for detection of *B. viridis* on roads; detection of *T. cristatus* larvae by net in small waterbodies. An expert assessment of the nature and extent of possible threats to this population was carried out.

As a result of the research carried out, we recorded the findings of *T. cristatus* in 9 points, *B. bombina* in 13 points, *P. fuscus* in 21 points, *B. viridis* in 6 points, *L. agilis* in 45 points (some are located near to earlier findings) in Augsdaugava. The main threats to the amphibian species are invasive fish *Percottus glenii* and overgrowing of small waterbodies; to the *L. agilis* - overgrowing of open biotopes.

The research was conducted in accordance with legislation of Latvia. We are thankful to the European Commission Cohesion Fund Project "Priekšnosacījumu izveide labakai biologiskas daudzveidības saglabāšanai un ekosistēmu aizsardzībai Latvijā" Nr. 5.4.2.1/16/I/001 for the support of the study. We are thankful to the Latvian - Ukrainian VIAA project No. LV-UA/2018/6 "The ecological and biological triggers of expansion of the invasive fish, Chinese sleeper (*Percottus glenii*), in Eastern Europe" for cooperation.



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## 8. STARPAUGSTSKOLU PEDAGOĢIJAS UN IZGLĪTĪBAS ZINĀTNES MAĢISTRANTŪRAS LASĪJUMI „INOVĀCIJAS UN TRANSFORMĀCIJA SKOLOTĀJU IZGLĪTĪBĀ”

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## 8<sup>TH</sup> INTER UNIVERSITY PEDAGOGY AND EDUCATIONAL SCIENCE MASTER'S DEGREE READINGS „INNOVATIONS AND TRANSFORMATION IN TEACHER EDUCATION”

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### POSSIBILITIES FOR DETERMINATION OF HEALTHY LIFE STYLE HABITS AMONG YOUTH

**Key words:** healthy lifestyle, habits, students, questionnaire.

Nowadays one of the most topical problems among young people is the right approach of following a healthy lifestyle. As one of the main reasons for society the author could mention the rapid introduction of fast food services and new technologies into the life of young people. This generally could be reflected in youth healthy diet, physical activities and daily routine.

The aim of the research it self is to provide suggestions for the improvement of the content of the Rezekne Secondary School No.2 basic school curriculum (grades 7) in healthy lifestyle training.

During the development of the questionnaires, two pilot researches were conducted, where questionnaires were used to test questionnaires for young people's self-esteem, parents and educators' assessment of healthy lifestyle habits. The first pilot research was conducted in January 2020 and the second in February. Pilot researches were organized in Rezekne Secondary School No. 3. The first pilot research involved 5 pupils of 7th grade, 5 parents of these pupils and 5 teachers of this school. The second pilot research involved 10 pupils of grade 7, 10 parents and 10 teachers of this school. The content of the Healthy Lifestyle questionnaire for young people is based on scientific knowledge about healthy lifestyle. To obtain more accurate information, were made corrections of the questionnaires, which were based on the analysis of the obtained questionnaire results.

The results of the research indicate that after the first pilot research, it was necessary to make corrections to the questions and elaborate them with additional sub-questions in order to obtain more accurate information. The second pilot research indicated that young people had some difficulties in understanding the nature of the questions in order to answer more precisely. Therefore, some questions require minor corrections to make the question simpler and easier to understand.

The pilot researches carried out have created all the prerequisites for the final development of correct questionnaires. By implementing the developed questionnaires practically in Rezekne Secondary School No.2 it will be possible to determine healthy lifestyle habits of young people, which in Rezekne Secondary School No.2 will allow us to improve and supplement our knowledge about healthy lifestyle.

## POSSIBILITIES OF ESTABLISHING A PRIVATE PRE-SCHOOL EDUCATION SECTOR IN DAUGAVPILS

Daugavpils is the second largest city in Latvia. In Daugavpils there aren't any private pre-school education institution - only public pre-school educational institutions. In this study are combined public opinion about this situation and necessary in private pre-school institution and this situation from legislation side. Also author will explore parents satisfaction with public and private pre-school institutions.

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## AUDZĒKŅU PROFESIONĀLO KOMPETENČU UN UZŅĒMĒJSPĒJU PILNVEIDE PROFESIONĀLĀS IZGLĪTĪBAS PROGRAMMĀS

**Atslēgas vārdi:** uzņēmējspējas, profesionālās kompetences, audzēkņi, karjeras izglītība.

Latvijā aizvien biežāk dzirdami aicinājumi mācīties jauniešiem profesionālās izglītības iestādēs, jo profesionālā izglītība ir praktiskāka, pietuvināta darba tirgus pieprasījumam un bieži vien arī darba vidē balstīta. Pētot Nodarbinātības Valsts aģentūras statistiku, izrādās, ka 2019. gadā 36% no profesionālo skolu beidzējiem ir bezdarbnieki. Darba autorei ir pieredze profesionālās izglītības iestādē, tādejādi bija svarīgi izpētīt audzēkņu profesionālās kompetences un viņu uzņēmējspējas. Būtiski izpētīt profesionālās izglītības programmas, lai izvērtētu kādas kompetences un kādi ir mācību galvenie sasniedzamie rezultāti.

Maģistra darba autore izvēlējās gadījuma pētījumu, lai vienas konkrētas izglītības iestādes kontekstā veiktu audzēkņu un pedagogu aptauju un izvērtētu mācību programmas, kas gatavo noteiktu profesiju speciālistus. Kvalitatīvo un kvantitatīvo pētījuma dati palīdzēja izstrādāt ieteikumus profesionālo iestāžu mācību programmu pilnveidei, īpašu uzmanību veltot profesionālo kompetenču un audzēkņu uzņēmējspēju pilnveidei.

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## CAREER GUIDANCE FOR PRE-SCHOOL TEACHERS IN AN INCLUSIVE APPROACH

**Key words:** professional support, pre-school, teacher, inclusive approach.

Professional support for teachers is essential to implement an inclusive approach as professional support enhances teacher competence. Values and areas of competence reinforce the most important idea that inclusive education is an approach to the learning process of all learners, rather than one that targets only specific groups of learners who have specific needs. Initial teacher education is the base for the most important attitudes, knowledge and skills that must be built upon when starting work in an educational institution. Areas of competence are an integral part of continuous professional development.

Inclusive education is a major challenge for today's teachers, schools and students themselves. Successful inclusive education enables all children to have equal opportunities in the educational process, as well as being actively involved in social life. The educational institution and the teacher must ensure a child-friendly environment, a quality and meaningful learning process, taking into account their needs and interests. The teacher is the facilitator of the learning process, so she /he must

be competent in this field and confident in the work process. Peers are an important factor in the child's education process. Initially, it is a family, but when a child goes to pre-school, teachers are involved in their learning process. It is very important for everyone to feel belonging and a sense of equality. Inclusive education provides this opportunity for the learner.

The topicality of the theme is that the pre-school teacher does not always receive and does not always know how to get the professional support in order to implement the inclusive approach. A support mechanism is needed not only for learners but also for the teacher. Addressing these and other challenges requires a systemic approach from education authorities and teachers themselves, who need to constantly upgrade their skills and competences to work effectively and to meet expectations, and for teachers to feel confident in their work environment. A survey was conducted to find out what pre-school teachers think about career guidance in the context of implementing an inclusive approach.

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## **GRUPAS DARBA PRASMJU PILNVEIDOŠANA MATEMĀTIKAS STUNDĀS 4.-6. KLASĒ**

**Atslēgvārdi:** grupas darbs, mācīšanās organizācijas formas, darbības pētījums.

Pārmaiņas izglītības saturā un jaunu pieeju īstenošana izglītības iestādēs ir liels izaicinājums ikvienam skolotājam. Mācību procesa laikā tiek izmantotas daudzpusīgas un "dzīvas" metodes ar bagātu saturu, lai veicinātu izglītojamo iekšējo interesi mācīties, tādējādi attīstot skolēnu pozitīvu attieksmi pret mācību procesu – un pret matemātiku, kas pilnveido ikdienā nepieciešamās prasmes.

Teorētiskās literatūras avoti un dažādi pētījumi, piemēram, ko veikuši A. Sofroniou, K. Poutos, D. T. Kung, Z. F. Kocak, R. Bozan, O. Isik, N. Mercer, C. Sams, parāda, ka izglītojamie, kuri matemātiku apgūst grupu darbā, labāk izprot problēmas, izvirza jaunas idejas, kontrolē mērķus un mācās, piemērojot to ikdienas situācijās, tādējādi matemātika nav tikai formulas un pierādījumi, bet gan pašvadīts, radošs un dzīvei noderīgu prasmju pilnveidošanas process.

Apkopojot teorētisku literatūru un veicot darbības pētījumu, tika konstatēts, ka izglītojamiem ir grūtības strādāt komandā, sadalīt pienākumus, sekot laikam, trūkst prasmju, lai vadītu kopīgu darbību, argumentētu un veidotu diskusiju matemātikas aktivitātēs. Pamatojoties uz pētījuma rezultātiem, tika izstrādāta instrukcija darbam grupās, kas pilnveidotu grupas darba prasmes izglītojamiem un palīdzētu skolotājiem mācību procesu veidot radošāk un atbildīgāk.

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## **ROTAĻNODARBĪBU (ROTAĻAS, DIDAKTISKĀS SPĒLES) IZMANTOŠANA KĀ BĒRNU DZĪVESVEIDS PIRMSSKOLĀ**

**Atslēgvārdi:** rotaļnodarbība, rotaļas, didaktiskās rotaļas, spēles, pirmsskolas vecuma bērni.

Mērķis: izpētīt rotaļu ietekmi uz bērna dzīvesveidu. Rotaļa palīdz bērnam atcerēties pagātni, ieskatīties nākotnē. Rotaļā veidojas bērna raksturs, viņa vērtību orientācija. Tā ir brīnišķīga komunikācijas, domāšanas skola.

Galvenā mācību organizācijas forma ir bērna rotaļnodarbība visas dienas garumā. Rotaļas bērnu māca un attīsta, sekmē fizisko un psihisko attīstību.

**Layout of Manuscripts for the collection**  
**“Proceedings of the 62<sup>nd</sup> international scientific conference of Daugavpils University”**

“Proceedings of the 62<sup>nd</sup> international scientific conference of Daugavpils University” publishes original papers, based on the presentations at the international conference, held in Daugavpils, 28–29 May, 2020. Proceedings of the scientific international conference of Daugavpils University are published electronically on [www.dukonference.lv](http://www.dukonference.lv) since 2010. It is not issued in paperback.

**Language.** All submitted articles need to be written in English (Latvian, Russian, German, Spanish, French, Polish, Lithuanian, Swedish – in the corresponding linguistic work groups of the humanities).

**The rules for the paper setting:**

- The article should be written in a version of *MS Word*, adapted for the *Windows* operating system (DOC/DOCX file). If non-standard font is used, please send it along with the article by e-mail.
- **Structure of the article:**
  - the full Title of the article (font size – 16; **bold**; Caps Lock);
  - Author’s full name(s) (font size – 14; **bold**);
  - Institution, Address, e-mail (font size – 12);
  - Abstract in English and Latvian – 1500 characters (font size – 10; line spacing – 1);
  - Key words (5–6) should be in abstract language (font size – 10; *italic*);
  - Text of the article. The recommended length of submissions is 12 000 – 15 000 characters (font size – 12; line spacing – 1,5; margin – 2.0 cm). It is recommended to divide the body of the text into the following chapters (humanities and social sciences): *Introduction (the Aim of the Article, Material and Methods)*, *Discussion*, *Conclusions*, *Acknowledgement*, *References*. It is recommended to divide the body of the text into the following chapters (natural sciences): *Introduction*, *Material and Methods*, *Results*, *Discussion*, *Conclusions*, *Acknowledgement*, *References*.
  - Pictures, figures, charts and diagrams should be attached as jpg, gif or tif separate files, as well as must be included in the manuscripts text. Tables should comprise only vertical and horizontal lines. Tables, graphs, diagrams, charts and other illustrative materials should be presented indicating the source of the material and, if necessary, the methods applied to draw up tables, graphs, diagrams, charts (calculation, data summarizing and so on). All these materials should have a number and a heading;
  - Remarks and explanations should be placed at footnotes;
  - References (font – 12, line spacing – 1).
- References and remarks:
  - References should be indicated in the text by giving the author’s surname with the publication year, e.g., (Turner 1990), and if from concrete page, e.g., (Turner 1990: 12);
  - if abbreviations are used in references (e.g. titles of dictionaries, etc.) they must be deciphered in bibliography but in the text reference just the volume and page

numbers may be indicated without mentioning the year of publication, e.g. (LKV II: 81);

- all the sources referred to in the text must be included in the References in the alphabetical order, by the author's (authors') surname(s) or by the title (font size – 12; line spacing – 1).
- An electronic version of the article must be provided to the editor by e-mail (**konference@dukonference.lv**) until **June 30, 2020**.

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- 1) novelty of the theme and scientific level of manuscript;
- 2) style and compliance of key words and summary with the content of manuscript;
- 3) compliance with conventions for publication.

*Sample*

## IMPROVEMENT OF QUALITATIVE RURAL LIVING ENVIRONMENT IN LATVIA IN LEADER PROGRAM FRAMES

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**Abstract**

Improvement of qualitative rural living environment in Latvia in LEADER program frames

**Key Words:**

Abstract text.....

**Kopsavilkums**

Kvalitatīvas lauku dzīves vides uzlabošana Latvijā LEADER programmas ietvaros

**Atslēgvārdi:**

Kopsavilkuma teksts .....

**Body text.....**

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## SATURS / CONTENTS

MĀKSLA / ART.....	5
BIOLOĢIJA / BIOLOGY.....	11
EKONOMIKA UN SOCIOLOĢIJA / ECONOMICS AND SOCIOLOGY.....	27
MENEDŽMENTS / MANAGEMENT.....	39
ĶĪMIJA / CHEMISTRY.....	42
VESELĪBAS APRŪPES ZINĀTNE / HEALTH CARE SCIENCE.....	46
VĒSTURE UN KULTŪRAS VĒSTURE / HISTORY AND HISTORY OF CULTURE.....	121
TIESĪBU ZINĀTNE / LAW.....	126
MATEMĀTIKA / MATHEMATICS.....	136
MŪZIKA / MUSIC.....	137
PEDAGOĢIJA / PEDAGOGY.....	140
FILOLOĢIJA / PHILOLOGY.....	147
FIZIKA / PHYSICS.....	149
PSIHOLOĢIJA / PHILOLOGY.....	152
SPORTS / SPORT.....	156
VIDES ZINĀTNES / ENVIRONMENTAL SCIENCES.....	158
8. STARPAUGSTSKOLU PEDAGOĢIJAS UN IZGLĪTĪBAS ZINĀTNES MAGISTRANTŪRAS LASĪJUMI „INOVĀCIJAS UN TRANSFORMĀCIJA SKOLOTĀJU IZGLĪTĪBĀ” / 8 <sup>TH</sup> INTER UNIVERSITY PEDAGOGY AND EDUCATIONAL SCIENCE MASTER'S DEGREE READINGS “INNOVATIONS AND TRANSFORMATION IN TEACHER EDUCATION”.....	169
Layout of manuscripts for the collection “Proceedings of the 62 <sup>nd</sup> international scientific conference of Daugavpils University”.....	172

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