FACULTY OF MEDICINE

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RESEARCH AREAS

- Healthy people, disease prevention, diagnosis and treatment
- Human genome diversity, its origins and phenotypic realisation
- Human and public health, quality of life and environment
- Etiopathogenesis, diagnostics, treatment of diseases: fundamental and clinical research, innovative technologies

RESEARCH INTERESTS

- Genetic structure and variation in the Lithuanian population
- Genomics of intellectual disability and congenital anomalies and rare genetic disorders
- Genetic analysis of hereditary phenotypes – genetic characterisation of human phenome, genome and regulome
- Exercise genetics and genomics, the biology of healthy ageing, molecular biology of physical activities, OMICS technologies
- Drug utilisation Research
- Pharmacokinetics studies of oncological drugs
- The role of the pharmacist and the importance of pharmacy services in controlling the treatment of chronic diseases
- Development, creation and implementation of pharmaceutical services
- Renal pathology, digital pathology image analysis, pathology informatics, health information systems, standards, testing of cancer biomarkers in tissue, multi-resolution analysis of biomarkers
- Inflammatory cardiomyopathy: prognostic biomarkers of heart failure
- Cancer immunology: T-lymphocytes, macrophages
- Environmental and metabolic mechanisms in the pathogenesis of atherosclerosis.
- Human cytomics: the search for and analysis of markers and assays for the diagnosis, prognosis and response to therapy of cells and their diseases
- Basic, clinical and epidemiological studies of pathogenic and relatively pathogenic micro-organisms involved in the pathogenesis of human diseases
- Creation of new functional and anatomical imaging techniques and evaluation of effectiveness for diagnostics of cardiovascular, abdominal and oncological diseases
- Estimation of iron overload in the liver and heart
- Physical properties *in vitro* of metabolites using high resolution 9.4T NMR spectrometer
- AI and deep learning applications in diagnostic imaging
- Ethical legal and social issues of biobanking
- Biobank quality management
- Prevention, diagnosis and treatment of a wide range of serious illnesses
- New scientific discoveries that benefit people's health
- Personalised medicine
- National and International Scientific Collaboration

- Phenotypic variety of Lithuanian and other populations in a changing environment
- Health of mother and foetus: physiology and pathology
- Impact of perioperative and psychosocial risk factors on long-term mortality, quality of life, stress reactions after cardiac surgery
- Organ dysfunction in critically ill oncohaemathological patients
- Early changes in cognitive functioning in patients undergoing general anaesthesia
- Spinal bupivacaine baricity and dose in day-case surgery
- Development of new methods of opioid detoxification for illicit and prescription opioid-dependent patients
- Metabolism and amino acid homeostasis in critical care patient
- Diagnostic, treatment and prognostication challenges in critical care patients with COVID-19
- Estimation of the influence of morphology and clinical peculiarities of otorhinolaryngological and ophthalmological diseases to results of the application of novel diagnostic methods and treatment.
- Minimally invasive surgery of abdominal organs, development and improvement of new procedures and devices for the performance of minimally invasive procedures, especially of abdominal malignancies
- Research of liver and pancreas transplantation techniques (listing and preparing patients for liver, pancreas, or kidney transplantation)
- Research of liver and pancreas transplantation techniques
- Study of dietary treatment of enteropathies
- Minimal hepatic encephalopathy
- Gut microbiota in health and disease
- Extrahepatic complications of liver cirrhosis
- Diagnostic/prognostic markers for prediction of HCC
- Novel treatment for the GI bleeding
- Contemporary diagnostic analysis of ascitic fluid
- Epidemiology and novel treatment of viral hepatitis
- Patients with chronic hepatitis C quality of life study during DAA therapy
- Urological cancer
- Kidney stone disease
- Urinary incontinence
- Primary glomerular diseases
- Resistant hypertension
- Peritoneal dialysis
- Medical kidney transplant management
- Pathogenesis, diagnostics, treatment and prevention of infectious diseases: assessment of the current diagnostics, treatment and prevention methods; search of a new diagnostics, treatment and prevention methods; study of the mechanisms of infectious diseases pathogenesis; study of the safety and efficacy of new vaccines and drugs for the treatment and prevention of infectious diseases
- Effectiveness, feasibility and impact of latent tuberculosis treatment for the prevention of active tuberculosis among HIV-positive individuals
- Incidence, aetiology and pathogenesis of inflammatory chronic dermatosis (acne, hidradenitis suppurativa, rosacea, psoriasis, dermatitis, eczema, vitiligo): basic and clinical research, implementation of innovative technologies
- Dermatooncology in Lithuania: epidemiology, pathogenesis, diagnostics, treatment
- Evaluation of the efficacy of the diagnostic and treatment methods in obstructive, interstitial, neoplastic and allergic lung diseases: diagnosis and management of interstitial lung diseases.

- Diagnosis and management of COPD and bronchial asthma; sensitivity to various kinds of disinfectants among the medical staff.
- Development of new technologies, methods of early cancer detection and treatment interventions
- Improvement of the quality of life of cancer patients.
- Pleural disease, diagnostic procedures, pleural biopsy; diagnosis, epidemiological and clinical research on drug hypersensitivity.
- Allergen immunotherapy: selection of patients, efficacy of different methods and long-term treatment results.
- Drug hypersensitivity diagnostic peculiarities.
- Contact allergy to cosmetics, textiles, and heavy metals.
- Study of interactions between allergic rhinitis and bronchial asthma, application of new technologies in allergic and respiratory diseases.
- Strategy and approaches of the surgical management of patients with different thoracic pathology.
- Role of mobile technologies in diagnostic and management of allergic diseases.
- Cognitive disorders in neurodegenerative, cerebrovascular, demyelinating diseases and epilepsy.
- Diagnostic evaluation and treatment of cerebrovascular disorders, demyelinating diseases, headache, dizziness, and degenerative spinal diseases.
- Pharmacogenomics, impact of COVID-19, electroencephalographic changes during the different stimulations, prognostic implications, antiseizure medications in epilepsy.
- Research on cerebral autoregulation disorders in traumatic injury and subarachnoidal bleeding, deep brain stimulation and blood pressure control, intratumoral genetic heterogeneity in brain gliomas, and blood-brain barrier pathology *in vitro*.
- Historical research on the prevalence, diagnosis and treatment of nervous diseases in the Grand Duchy of Lithuania, 19th century and interwar Lithuania.
- Evaluation of functioning and quality of life of patients with psychiatric disorders
- Analysis of outcome variables of the treatment of developmental, neurotic, affective and psychotic in children and adults
- Transition processes in young people, medical students
- Different approaches to psychosocial rehabilitation and assertive outreach for comprehensive, integrated community care for people with mental disorders in the community settings
- Evaluation of services for people with mental illness and their families
- Suicidal behaviour and psychiatric and somatic disorders
- Outcomes of early undifferentiated arthritis
- Associations between genetic, epigenetic factors, rheumatoid arthritis etiopathogenesis and clinical course
- Outcomes of systemic sclerosis
- Musculoskeletal ultrasound
- The role of nailfold videocapillaroscopy in diagnosing other systemic diseases
- Epidemiology of rheumatic diseases
- Reconstructive surgery: clinical applications of free and pedicled flaps, results
- Autologous breast reconstruction – key methods, clinical results
- Implant-based breast reconstruction – clinical analysis of complications
- Breast reduction: methods, clinical results, factors contributing to choosing the best technique

- Pelvic trauma, hip and knee arthroplasty, foot surgery, wrist surgery
- Gait analysis
- Bone infection treatment
- Investigation of arterial wall functional and structural disorders in Atherosclerosis and Metabolic Syndrome
- Primary and secondary prevention of cardiovascular diseases. The development of high-risk strategies in the prevention of cardiovascular diseases
- Studies of multidisciplinary heart failure care, novel biomarkers, telemonitoring and physical training
- Rare cardiovascular diseases: searching for mechanisms and new methods of diagnostics and treatment technologies
- Fundamental and clinical research on cardiac arrhythmias. Improvement of methods of the complex treatment of atrial and ventricular tachyarrhythmia
- Complex multimodality imaging assessment of left and right ventricular function in coronary artery disease, hypertension and heart failure
- Congenital heart disease and cardiac surgery in infants.
- New possibilities of hybrid (interventional and surgical) and minimally invasive technologies in cardiovascular medicine
- Assessment of cardiac structural changes by applying novel imaging technologies and methodologies
- Air pollution and child health
- Allergic rhinitis and its impact on bronchial asthma in children
- Health care of mother and child: physiological and social aspects and research on natural development of the child
- Studies on functional development of organs and systems in newborns and children
- Studies on neonatal pathology and perinatal mortality in Lithuania
- Non-invasive analysis of immunological markers in amniotic fluid to predict fetal inflammatory response syndrome and outcomes of preterm neonate
- Investigations of the significance of genetic factors for adaptive suitability in the cohort of preterm infants in Lithuania
- Studies on the effects of gestational diabetes on neonatal health
- Studies on peculiarities in chronic inflammation as diagnostic markers and targets for early therapeutical intervention in children with asthma and cystic fibrosis
- Peculiarities of central and peripheral hemodynamics in premature and sick newborns
- Studies on electric impedance tomography as a new diagnostic tool in neonatal pulmonology
- Development of diagnostics, therapeutic and prophylaxis methods in acute, chronic and newly emerging infectious, immune, allergic and metabolic diseases
- Progression and outcomes in pediatric renal disorders
- Studies in immunoprophylaxis and vaccination
- Diagnostics and treatment of inherited metabolic diseases
- Diagnostics, treatment and prophylaxis of children's abuse and trauma
- Gut microbiota and gut-brain axis

- Studies on childhood cancer aetiology and predisposition, identification of new therapeutical targets and criteria for treatment risk-group stratification to further improve treatment individualisation and reduce treatment burden and long-term side effects
- Research in childhood acute leukaemias, including research in leukaemia aetiology, pharmacokinetic and pharmacodynamic studies for chemotherapy drugs, investigations in acute and late toxicities;
- Studies on antimicrobial stewardship in paediatrics
- Studies for improving the quality of care for children and young adolescents in health facilities
- Aetiology and long-term outcomes in inherited and acquired pediatric kidney diseases (cystic kidney diseases, glomerulopathies, chronic kidney disease, vesicoureteral reflux)
- Early vascular ageing, left ventricular abnormalities, and neurocognition in hypertensive children
- Cardiovascular disease and kidney function impairment in children with a solitary functioning kidney
- Health, shared decision making and other modern technologies for the management of chronic noncommunicable disease (CNDs)
- Healthy ageing through the early diagnostics and prevention of CNDs
- Human ecology
- Development of the methods in diagnostics, the treatment and prophylaxis of acute and chronic pediatric neurological and developmental disorders, research on immune, genetic, metabolic and other factors, as well as the application of digital technologies, research on distance education of children during the COVID-19 pandemic
- Studies on the long-term impact of exposure to screens on children's physical and mental health
- Studies on diagnostic accuracy of allergological tests and optimal management of pediatric patients with allergic conditions
- Etiopathogenesis, diagnostics, treatment of diseases: fundamental and clinical research, innovative technologies
- Early diagnostics and the prevention of non-infection diseases in family practice and gerontology
- Biomarker research in hematology and oncology
- Investigation of etiopathogenetic risk factors and quality of patients' life with internal diseases
- Emergency medicine
- Acute cardiac care
- Resuscitation
- Polytrauma
- Triage
- Acute coronary syndromes
- Sudden death
- Acute heart failure
- ECMO
- Biomarkers in the Emergency Department
- Single-cell diagnostics
- Intraoperative visualisation
- Non-invasive biomarkers
- "Organ-On-A-Chip" models

- Microbiome
- Artificial intelligence
- Genetics and proteomics
- Individualised pancreas, liver and stomach cancer treatment
- Etiopathogenesis, diagnostics, treatment, rehabilitation and prevention of stomatognathic system disease: fundamental and clinical research
- Environmental and social factors and public health
- History of medicine
- Epidemiology of non-infectious and infectious diseases
- Scientific basis of health care management
- Assessment of health care activities and biostatistics
- Health and quality of life
- Medical ethics
- Public mental health, social determinants of population health, health services research
- Epidemiological and public health implications of the relationship between rheumatic diseases, tuberculosis and malignant tumours
- Biopsychosocial model
- Effectiveness of rehabilitation, physical and sports medicine
- Components of physical capacity
- Prevention of disease and injury
- Innovations in nursing science, research and studies
- Nursing and midwifery policymaking
- Quality of nursing care
- Ethics in nursing care
- Professional competency of nurses
- Nursing and patient education
- Research of nurses' working environment
- Needs and features of perioperative nursing care
- Patient safety and the role of nurse
- Physical activity and nursing care
- Advanced nursing practice
- History of medicine
- History of public health
- Medical ethics
- A comprehensive study of human vision
- Vision correction
- Recognition of eye diseases
- Use of modern innovative technologies

MAIN SCIENTIFIC ACHIEVEMENTS IN 2022

Assoc. Prof. R. Matuzevičienė. Lead publication with photographs of the authors on the cover of the publication Cytometry Part B: Clinical Cytometry (Impact factor (2021) 3,248) Vol. 102B Number 2 March 2022 https://onlinelibrary.wiley.com/toc/15524957/2022/102/2

Novel prognostic models based on computational pathology assessment of immune response at the tumour-stroma interface were obtained for patients with hepatocellular carcinoma and non-muscle invasive papillary urothelial carcinoma (both studies submitted for publication). They add to the previous findings in other solid tumours evidence that density profiles of infiltrating lymphocytes (immunogradient) across the tumour interface are strong and independent predictors of patient survival.

Lithuanian Science Award. Five scientists, Prof. Dr (HP) Vaidutis Kučinskas, Prof. Dr Eglė Preikšaitienė, Assoc. Prof. Dr Laima Ambrozaitytė, Prof. Dr (HP) Loreta Cimbalistienė, and Prof. Dr (HP) Algirdas Utkus were awarded the Lithuanian Science Prize in the field of biomedical and agricultural sciences for the cycle of studies 'Genome Rearrangements in Congenital Developmental Disorders of the Central Nervous System: Origins, Genomic Mechanisms, Functional and Clinical Consequences' (2007–2020).

Publication in prestigious *Nature* journal. Trubetskoy V, ... Kučinskas V et al. Mapping genomic loci implicates genes and synaptic biology in schizophrenia // Nature. Berlin: Nature Research. ISSN 0028-0836. eISSN 1476-4687. 2022, Vol. 604, No. 7906, p. [1-24]. DOI: 10.1038/s41586-022-04434-5.

Dr Alina Urnikytė is nominated by the Lithuanian Radio and Television Annual Awards Nomination in the section "Discovery of the Year" for the dissemination of research achievements in the research of the Lithuanian genome. Presentations on the uniqueness of the genome and the particularity of Lithuanian origins on Lithuanian TV channels LNK and LRT, and radio interviews on the LRT radijas and Žinių radijas).

Research Assistant L. Lukavičiūtė, Assoc. Prof. Dr R. Gancevičienė. 1st place in the competition for the most interesting clinical case, "Cutaneous B cell lymphoma". International Scientific-Practical Conference of the Lithuanian Society of Dermatovenerology "Modern Dermatovenerology: looking forward to tomorrow". 29th April 2022. Vilnius, Lithuania.

Research assistant, Senior researcher Dr Karolis Ažukaitis was elected Junior Member of the Lithuanian Academy of Sciences.

Prof. Arūnas Valiulis reached H=40 and published 17 WoSCC articles (16 in Q1 journals) in 2022, as well establishing and leading two new research groups at Vilnius University Medical Faculty: the Quality of Life Research Group and the Human Ecology Research Group.

RESEARCH INTERESTS

Phenotypic variety of Lithuanian and other populations in a changing environment

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

The phenotypic variety of Lithuanian inhabitants, its prenatal and postnatal factors in a changing environment. Supervisors: Prof. J. Tutkuvienė, Prof. R. Jankauskas (2019–2023).
Bioarcheological investigations. Results of paleopathological and paleoodontological analysis of remains of victims of the 2nd World War, buried at Zokniai (part of the city of Šiauliai) and Armalėnai (Šilutė County) were analysed and presented at the International Congress of the PPA. Results of new data on nutrition and pathologies, migration and stature variation of past populations (stable isotope and paleogenomic data) were summarised and published.

Experimental (growth programming) investigations.
The data of aged rat retinas from the experimental study of two generations of rat offspring, whose mothers were nutritionally deprived, were analysed and summarised, and a scientific article was prepared and published in "Histology and Histopathology". Some of the retinal wholemounts of this experiment were stained with GFAP, Iba1, and isolectin.
The experimental study of the impact of maternal obesity on the retinal morphology of offspring was ongoing: eyeballs and retinal wholemounts were prepared for staining, retinal sections were stained with hematoxylin and eosin and immunostained with GFAP, Iba1 and RBPMS. The thickness of the retina layers was measured. Microglial and ganglion cells were counted, and macroglia were evaluated. The results of the analysis were presented in a poster.
Investigation of the viability of periodontal ligament cells in different media was continued, and results were analysed and summarised for publication.
Analysis of the micronuclei and chromosomal aberrations in bone marrow cells and evaluation of embryos of two generations of Long-Evans clone rats that drank fluoridated and/or boron-saturated water was completed and presented at the local scientific meeting and international scientific conference; an article was prepared for the publication.

Investigations of the physical status of contemporary inhabitants.
An article on the head circumference of newborns was published, and a manuscript on the weight and height of newborns was prepared for publication. The analysis of data for a longitudinal study of preterm newborns (n=450) in Lithuania was continued: the results on the incidence and timing of different diseases in relation to sub-categories of prematurity until adolescence were reported at an international conference. The studies on body image were continued: the questionnaire for investigation of body image in the elderly was developed; results on changes in body size, body image and self-esteem of Lithuanian adolescents in 2011–2021, including the COVID-19 pandemic period, were reported at an international conference, the study of body image and self-esteem in men with gynecomastia was performed, the associations between usage psychotropic substances and body image were analysed and published in the national journal. Materials on premenstrual syndrome study were prepared for publication, and results were reported at an international conference. The manuscript on female breast morphology was prepared for publication. Studies about the peculiarities of the perimenopausal period in women were continued: the meta-analysis of recent publications on menopause was made, and an original questionnaire was developed. Materials of the study of age dynamics of facial indices during puberty (longitudinal study) were prepared for publication; the results were presented at an international conference. A study on the most attractive facial features was performed: more than 150 persons (18-40 y.o.) were questioned online, and the results were analysed and presented at an international conference. Associations of anthropometric

parameters and body flexibility with eye size and degree of myopia in a study of Lithuanian adolescents' data were reported at an international conference and prepared for publication. The study on the relation between malnutrition in the early developmental periods and ophthalmologic status in ageing individuals was continued; the results on the relationship between retinal parameters and female body size, shape, and proportions were presented at an international conference. The data collection on anatomical variants of cerebral arteries in relation to cerebral vascular pathologies was finished: in total, 175 patients were included in the investigation, and the results of the analysis of the prevalence of different anatomical variations of the cerebral arterial circle in acute stroke were presented at an international conference. The anatomical variations of the superior sagittal sinus and its tributaries were analysed, and the results were published. The results of other anatomical studies (nutrient foramina in bones, tributaries of portal veins) were reported at an international conference.

National Research Projects

Anthropological investigations of remains of participants of anti-Soviet resistance in 1944–1953 (Leipalingis, Alytus district). Grant from the Genocide and Resistance Research Centre of Lithuania. Prof. R. Jankauskas (leading scientist), Dr J. Kozakaitė (researcher), Assoc. Prof. Ž. Miliauskienė (researcher), 2019–2022. During historical, archaeological, and anthropological investigations in Leipalingis (Alytus district), the remains of 33 participants in the anti-Soviet resistance movement (1944–1953) were uncovered. At least 14 individuals were identified. The investigation is still ongoing.

International Research Projects

The health, development and social identity of children afforded mummification in the Capuchin Catacombs of Palermo, Sicily (AHRC-funded). D. Piombino-Mascali (2021–2023) (https://gtr.ukri.org/projects?ref=AH%2FV014331%2F1)

Alliance4Life_ACTIONS. (No. 964997). Horizon-2020 Prof. J. Tutkuvienė (member of the Steering and Scientific Committee, Board member) 2021–2023.

Alliance4Life is a bottom-up initiative of twelve leading Life Science institutions and universities from eleven countries of Central and Eastern Europe that aim at closing the divide in European health research and innovation. In 2022, the *Early Stage Researchers' Retreat* for PhD students and postdocs was organised, and a white paper on combining research, teaching, and medical practice was finalised.

Developing a new Network of Researchers on Contemporary European Motherhood (MotherNet). Horizon 2020 project: Research and Innovation Framework Programme, Activity: WIDESPREAD-05-2020 – Twinning (between Vilnius University, Uppsala University, and the National University of Ireland Maynooth), 2020–2022. Teaching assist. R. Morkūnienė – ESR's representative member of the Consortium management Committee; Leader of the working group cluster on developing a collaborative research project on Mothers of Preterm Newborns from the perspective of the medical humanities.

Contractual Research

Anthropological investigation of remains buried at the territory of Samogitian Diocese Museum in Varniai. The investigation has been completed.

Anthropological investigation of remains buried at several historical cemeteries in Vilnius city and some rural sites. Some investigations are in progress, and others have been completed.

RESEARCH INTERESTS

- Ethical legal and social issues of biobanking

- Biobank quality management

- Prevention, diagnosis, and treatment of a wide range of serious illnesses

- New scientific discoveries that benefit people's health

- Personalised medicine

- National and international scientific collaboration

National Research Projects

Human Biological Resources Center (HBRC) (CPVA-V-701-16-0001). Dr Violeta Mikštienė, Prof. Algirdas Utkus, Dr Jurgita Songailienė, Dr Tautvydas Rančelis, Dr Ramūnas Dzindzalieta grant for 2019–2022.

The aim of the project is to join the international research infrastructure BBMRi-ERIC by creating a modern national biobank infrastructure in Lithuania. The objective of the project is to establish a National Center for Human Biological Resources (HBRC) with a unified system for the collection, processing, storage, and data management of biological samples and related health information.
In 2022, the common IT system for data management was coordinated, and the documents for biobank licensing were prepared.

RESEARCH INTERESTS

- Genetic structure and variation in the Lithuanian population
- Genomics of intellectual disability and congenital anomalies and rare genetic disorders
- Genetic analysis of hereditary phenotypes – genetic characterisation of human phenome, genome and regulome
- Exercise genetics and genomics, the biology of healthy ageing, molecular biology of physical activities, OMICS technologies

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

CRISPR-Cas13 Technology Application to Investigate Resistance to Chemotherapy Agents (No. MSF-JM-2/2021). PhD student G. Petraitytė. 2021–2022.

Gene expression manipulation using genome editing technology CRISPR-Cas or RNA interference (RNAi) are the most promising approaches to investigate the genotype and phenotype changes of cells and the relationships (or networks) of these changes at the gene level. Applying these approaches in studying a specific target protein could potentially reveal important cellular mechanisms of resistance to chemotherapy agents. CRISPR-Cas13 system is new in gene expression studies and has a strong advantage in these experiments: the target of Cas13 is RNA molecule. This

characteristic eliminates the possibility of the off-targets. Moreover, CRISPR-Cas13 is more effective in the long term and does not cause nonspecific target cleavage compared to RNAi (using siRNA molecules). In this study, the characteristics of the CRISPR-Cas13 system for expression studies of long-living protein serpin B5, located both in the cell cytoplasm and nucleus, were evaluated, and transcriptomes were sequenced.

Fundamental Research of Human Genome Architecture: Characterisation of Phenome, Genome and Regulome Markers of the Lithuanian Population. Prof. Dr A. Utkus. 2019–2023.

The fundamental human population study on genomic variation and microevolutionary processes with the clinical and medical genetic research on the genetic variation in rare and complex disorders (phenotypes) was performed. The results analyse distinct population genetic structure, origin, and evolution with the inferences on phenotype and genotype heterogeneity and their complex interaction.

Analysis of Biomarkers for Suicidal Tendencies and Depression, and Validation of the Prognostic Model in Lithuania. Prof. Dr A. Utkus. 2020–2023.

Three groups of suicidal, depressive, and control individuals are collected for the analysis of methylation, transcriptome, and biochemical markers (e.g. cortisol, IL6, TNFalpha, and others). An extensive questionnaire is filled in for every participant. The project is a collaborative initiative between Vilnius University, the Faculty of Medicine, the Institute of Biomedical Sciences, the Department of Human and Medical Genetics, and the Korea Research Institute of Bioscience and Biotechnology, the Republican Vilnius University Hospital (Respublikinė Vilniaus universitetinė ligoninė), the public institution Vilnius City Mental Health Center (VšĮ Vilniaus miesto psichikos sveikatos centras) and Vilnius University Hospital Santaros Klinikos. Individuals from all three groups have undergone methylation sequencing, and the data is being analysed. The RNA samples have been prepared for transcriptome sequencing.

Main publication:

"Significantly elevated phosphatidylethanol levels in recent suicide attempters, but not in depressed controls and healthy volunteers: possible role of CRP and inflammation", submitted for possible publication in European Archives of Psychiatry and Clinical Neuroscience
Complete list of authors: Robertas Strumila; Aiste Lengvenyte; Linas Zdanavicius; Robertas Badaras; Edgaras Dlugauskas; Sigita Lesinskiene; Eimantas Matiekus; Martynas Marcinkevicius; Lina Venceviciene; Algirdas Utkus; Andrius Kaminskas; Tomas Petrenas; Jurgita Songailiene; Laima Ambrozaityte.

National Research Projects

Ancient and New Alleles in Lithuanian's Genome: Mutations, Selection and Adaptation (ANELGEMIA). (No. S-MIP-20-34). The Research Council of Lithuania. Prof. Dr (HP) V. Kučinskas. 2020–2022.

The main objective of the study is to analyse microevolutionary forces: mutations and signatures of adaptive positive selection of the Lithuanian population from whole genome sequencing data. The main research question is how commonly mutations are under selection in modern humans and how humans evolve from generation to generation. This research will contribute to the progress of scientific knowledge and is of special importance in clarifying the relationship between natural selection and disease and improving our understanding of the evolutionary mechanisms observed at individual and population levels.

Adaptive Genetic Mechanisms – a Comprehensive Study of Whole Genome Variation in the Group of the Lithuanian Chernobyl Catastrophe Liquidators (ADAPT). (No. S-MIP-20-35). The Research Council of Lithuania. L. Ambrozaitytė, PhD. 2020–2022.

The aim of the study is to characterise the genome variation of the Chernobyl catastrophe liquidators in the context of the general Lithuanian and other populations. The object of the study is the microevolutionary processes, which will be evaluated by investigating the adaptive mechanisms of genomes.

The obtained results will be important and have an impact on the fundamental science of population and evolutionary genomics, personal and preventive medicine, and the application of genomic editing tools.

Main publications:

Submitted to the *Balkan Journal of Medical Genetics*: "Putative protective genomic variation in the Lithuanian population"

Submitted to the *Annals of Human Genetics*: "Genomic signatures of adaptation in the cohort of Lithuanian clean-up workers of the Chornobyl nuclear disaster"

Under review in *PLoS ONE*: "DNA Mutation Prediction in the Irradiated Population Group: Neural Networks Approach".

Integrative Research for Genetic Causes of Rare Inherited Diseases (ATGC). (No. S-MIP-21-15). The Research Council of Lithuania. E. Preikšaitienė, MD, PhD. 2021–2024.

The main idea of the project is to continue the study of rare genetic diseases beyond the DNA level in order to better understand the origins of the diseases and to provide valuable insights into the biological processes underlying their development. To implement this idea, young researchers with expertise in programming and in different biomedical fields such as clinical genetics, molecular genetics, cytology, bioinformatics, and functional genomics (transcriptomics, proteomics) will analyse the exome/genome sequencing data and will pursue the investigation of identified variants of uncertain clinical relevance at the level of the RNA and proteins by transcriptome sequencing, functional assays, and computational analysis of the modelling of the proteins and the assessment of their properties.

Impact of Genetic Markers of the Myokine Signalling Pathway on Human Metabolism and Muscle Function. (No. 09.3.3-LMT-K-712-25-0200). The Research Council of Lithuania. V. Ginevičienė, PhD student A. Bortkevič. 2021–2022.

The project is designed to carry out research-based practical activities that provide students with higher education qualifications in line with modern technology and cognition and to develop a fully educated, ethically responsible and creative personality.

The Research Council of Lithuania. **Significance of genetic markers for energy metabolism during physical activity**, No. P-SV-22-62. V. Ginevičienė, PhD student G. Anikevičiūtė, 2022.

Genetic markers of energy metabolism and molecular adaptation to exercise, No. P-ST-22-183. The Research Council of Lithuania. V. Ginevičienė, PhD student G. Anikevičiūtė. 2022–2023.

The project aims to improve the student's scientific qualifications by conducting molecular genetic research and bioinformatic and biostatistical analysis of the obtained results in order to identify the significance of the genome markers of Lithuanian elite athletes for energy homeostasis and physical capacity. In addition, the aim is to promote students' scientific communication: the formation of scientific ideas, research results and reports, and the preparation of conference thesis and research work.

International Research Projects

The Impact of Natural Selection on Infectious Diseases in Lithuanian Population. (No. 09.3.3-LMTK-712-23-0104). The European Social Fund under the programme Development of Competences of Scientists, other Researchers and Students through Practical Research Activities. Dr A. Urnikytė, Prof. Dr V. Kučinskas. 2021–2023.

The project aims to identify the areas of the genome affected by natural selection in the Lithuanian population to explain their adaptation to infectious diseases and to carry out comparison analysis with archaic genomes by analysing the data of the next generation of sequencing and to present the results of these studies at international conferences and publications.

Bioinformatic Implementation and Automatisation of Genome Data Associated with Human Risk Behaviour. **(**No. 09.3.3-LMTK-712-23-0119). The European Social Fund under the programme Development of Competences of Scientists, other Researchers and Students through Practical Research Activities. Dr T. Rančelis, Prof. Dr A. Utkus. 2021–2023.

The project aims at improving existing and acquiring new skills as well as implementing high-level R & D activities through planning and conducting high-level research in the field of genetics and genomics, participating in international traineeships and presenting research results at international conferences and scientific publications.

Genetic Background of Overgrowth Syndromes in Polish and Lithuanian Populations: Basis for Rapid Genetic Testing to Prevent Neoplasias (GOSPL), No. S-LL-21-5. Prof. A. Utkus. 2021–2024.

Overgrowth syndromes (OGs) are a highly heterogeneous group of conditions which show a common feature of excessive growth. This project aims to determine the genetic background of OGs in Polish and Lithuanian populations to develop diagnostic algorithms and optimise healthcare strategies for neoplasia prevention. We hope that the whole genome analysis of identified novel and previously documented mutations and variants related to OGs will be a starting point to develop and implement personalised follow-up plans for these patients, in particular, to facilitate neoplasia prevention or timely treatment. This is the first collaborative study on overgrowth conditions between Lithuania and Poland.

RESEARCH INTERESTS

- Drug utilisation research

- Pharmacokinetics studies of oncological drugs

- The role of the pharmacist and the importance of pharmacy services in controlling the treatment of chronic diseases

- Development, creation, and implementation of pharmaceutical services

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Drug Utilisation Research and Treatment Management in Hypertensive Patients. I. Trečiokienė. 2019–2022.

In 2022, we studied antihypertensive drug utilisation patterns and persistence in hypertensive patients and prepared and submitted a manuscript. A paper on persistence was published.

Drug Utilisation Research in Cardiovascular and Asthma Patients. Principal investigator: I. Trečiokienė, J. Gulbinovič, B. Wettermark. 2021–2024.

Research permissions No. 2021/2-1314-790 and No. 2021/2-1316-792. Two manuscripts were prepared for submission.

Development, Creation and Installation of Pharmaceutical Services. SAVIGLI-VA study. Principal investigator: J. Pečeliūnienė. 2022.

Research permission No. 2021/5-1341-817. Master theses prepared.

International Research Projects

ENABLE COST Action. J. Gulbinovič, I. Trečiokienė, K. Garuolienė. 2020–2024.

During 2022, the following actions were performed:
WG1. Two-part survey to examine how COST ENABLE countries implement medication adherence plans and which are the personal, healthcare professional, and health system barriers and facilitators of medication adherence performed. Results presented at EspaComp.
WG1. Protocol on systematic review about Interventions to improve medication adherence in chronic diseases (high prevalence, lifelong and high burden treatment) registered on OSF and submitted for publication.
WG3. Reimbursed Medication Adherence Enhancing Interventions in European Countries: Results of the EUREcA Study published.

RESEARCH INTERESTS

- Renal pathology, digital pathology image analysis, pathology informatics, health information systems, standards, testing of cancer biomarkers in tissue, multi-resolution analysis of biomarkers
- Inflammatory cardiomyopathy: prognostic biomarkers of heart failure
- Cancer immunology: T-lymphocytes, macrophages

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Development of the New Diagnostic and Prognostic Molecular Markers and Tools for Their Quantification in the Tissues. Diagnostic Value of Pathology Tests and Efficiency of Cancer Prevention Programs. Prof. Dr A. Laurinavičius. 2019–2022.

Research carried out by doctoral students contributed to the implementation of this research activity:

- modelling of immune response and microenvironment in renal cancer tissue by digital pathology methods (Doctoral student: Aušra Garnelytė, Academic supervisor: Prof. Dr Arvydas Laurinavičius, consultant: Prof. Dr F. Jankevičius);
- prognostic modelling of liver tumour pathology by artificial intelligence tools (Doctoral student: Rokas Stulpinas, Academic supervisor: Prof. Dr Arvydas Laurinavičius);
- collagen IV α345 nephropathy phenotype-genotype associations and prognostic factors (Doctoral student: Agnė Čerkauskaitė, Academic supervisor: Prof. Dr Arvydas Laurinavičius);

- modelling of urothelial carcinoma and its microenvironment by digital pathology and artificial intelligence methods (Doctoral student: Julius Drachneris, Academic supervisor: Prof. Dr Arvydas Laurinavičius);
- morphometry of kidney tissue based on artificial intelligence (Doctoral student: Renaldas Augulis, Academic supervisor: Prof. Dr Arvydas Laurinavičius).

Development of the Predictive, Preventive, Personalised and Prognostic Biomarkers of the Diseases. Prof. Dr V. Grabauskienė, Prof. Dr D. Characiejus, Dr V. Baltrūnienė. 2020–2022.

Research carried out by doctoral student I. Kažukauskienė analysed the performance of myocardial and systemic inflammation biomarkers as predictors of mid-term and long-term outcomes in patients with non-ischemic dilated cardiomyopathy. The prevalence and prognostic relevance of cardiotropic viruses in the myocardium of patients with dilated cardiomyopathy were assessed. Myocardial deformation parameter global longitudinal strain was evaluated as a prognostic tool in patients with advanced heart failure due to dilated cardiomyopathy. (Doctoral student: Ieva Kažukauskienė, Academic supervisor: Prof. Dr Virginija Grabauskienė)

Genesis and Gnoseology of Violence. Assoc. Prof. Dr J. Stasiūnienė. 2020–2022.

The aim of the project is to investigate the peculiarities of physical violence in Lithuania – to be able to track the rates of violence, ascertain the sociodemographic profile of victims and suspects, and identify risk factors, as well as define health impairments. To achieve the aims, data from the Information Technology and Communications Department under the Ministry of the Interior of the Republic of Lithuania and The State's Forensic Medicine Service are collected and analysed.

National Research Projects

Assessment of Glomerular Patterns of Injury by Using Artificial Intelligence Methods. (No. 09.3.3-LMT-K-712). Under the measure *Educating society and strengthening the potential of human resources* activity Development of Competences of Scientists, Other Researchers and Students Through Practical Research Activities. The Research Council of Lithuania. Project leader: Prof. A. Laurinavičius, researcher: J. Besusparis. 2020–2022.

We performed a cross-validated comparison of three modifications of a convolutional neural network (CNN)-based approach for recognition and intraglomerular quantification of nine main glomerular patterns of injury. Reference values provided by two nephropathologists were used for validation. For each glomerular image, visual attention heatmaps were generated with a probability of class attribution for further intraglomerular quantification. The quality of classifier-produced heatmaps was evaluated by an intersection over union metrics (IoU) between predicted and ground truth localisation heatmaps.

Main results (publications, presentation):

1. Oral presentation "18th European Congress on Digital Pathology", Berlin, Germany, 2022. "Assessment of glomerular patterns of injury by machine learning methods".

2. Manuscript entitled "A spatially guided machine learning method to classify and quantify glomerular patterns of injury in histology images" was submitted to *Scientific Reports*; preprint version available at: https://www.researchsquare.com/article/rs-2337818/v1 A spatially guided machine learning method to classify and quantify glomerular patterns of injury in histology images | Research Square

Artificial Intelligence-Driven Prediction of BCG Immunotherapy Response in Patients with Non-Muscle Invasive Papillary Urothelial Bladder Carcinoma (AI4BCG). 3rd competition of

the 10th call for the implementation of researcher groups projects. Principal investigator: Prof. Dr F. Jankevičius, primary project implementers: Dr A. Laurinavičius, Dr A. Čekauskas, Dr M. Morkūnas, J. Drachneris. 2021–2024.

The objective of the proposed study is to develop independent predictive models based on machine vision and learning of TME architectural patterns and immune response properties in NMIPUC patients treated with BCG vaccine.

Main results:

1. Submitted poster presentation. **Julius Drachneris**, **Allan Rasmusson**, Mindaugas Morkūnas, Mantas Fabijonavičius, Albertas Čekauskas, Feliksas Jankevičius, **Arvydas Laurinavičius**: Indicators of CD8+ Cell Gradients across the Tumour Epithelium-Stromal Interface of Non-Muscle Invasive Papillary Urothelial Carcinoma predicts Relapse-free Survival after BCG immunotherapy. 9th Digital Pathology & AI Congress: London, Europe, 2022/12/7–8.
2. Submitted Article. **Julius Drachneris**, **Allan Rasmusson**, Mindaugas Morkunas, Mantas Fabijonavicius, Albertas Cekauskas, Feliksas Jankevicius, **Arvydas Laurinavicius**: CD8+ Cell Density Gradient across the Tumor Epithelium-Stromal Interface of Non-Muscle Invasive Papillary Urothelial Carcinoma predicts Recurrence-free Survival after BCG Immunotherapy. Cancers, Manuscript ID: cancers-2144575, submitted: 2022/12/21.

The Research Council of Lithuania. No. P-MOR-22-58 under the measure "Grant for scientific events". Vilnius Vascular Symposium 2022. Project leader Dr T. Baltrūnas. 2022/10/13–2022/10/14

A conference dedicated to vascular disease diagnostics and treatment was held on 2022/09/29–30. It is the biggest conference in the Baltic states of the kind. The symposium was accredited with Ethical Med Tech and 12 CME credits. More than 200 participants, from which more than 100 were from abroad, took part in the conference. During the symposium, there were workshops for residents. Meetings for scientists regarding the new and already started projects were held. The conference was also live-transmitted via a YouTube channel. The conference material is planned to be freely accessible in the future.

The positive feedback from the participants and conference speakers is a testament to the success of the event. The 4th Vascular Symposium is planned for the Autumn 2024.

Deep-Context Tissue Analytics for Integrated Pathology Modeling in Tumours and Kidney Allografts. The Research Council of Lithuania. Project leader Prof. Dr A. Laurinavičius, other participants: Dr A. Laurinavičienė, Dr A. Rasmusson, Dr B. Plancoulaine, Dr R. Levenson, Dr M. Shribak, Dr K. Y. Jen. 2014–2021.

The aim of the study is to develop novel tissue-based analytical assays for integrated modelling of tumour and kidney allograft pathology. Objective 1 is to explore tissue processing/data extraction approaches to discover unique digital signatures of tissue components and integrated pathology indicators. Objective 2 is to design and validate the "deep-context" tissue assays for selected analytical and clinical tasks to enable robust and affordable multidimensional modelling of tissue pathology.

RESEARCH INTERESTS

- Environmental and metabolic mechanisms in the pathogenesis of atherosclerosis.

- Human cytomics: the search for and analysis of markers and assays for the diagnosis, prognosis and response to therapy of cells and their diseases.

- Basic, clinical and epidemiological studies of pathogenic and relatively pathogenic micro-organisms involved in the pathogenesis of human diseases.

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Comparison of the Effect of Different Gallic Acid Esters on the Ability to Inhibit *Streptococcus mutans* Biofilm Formation and Acidogenicity. International Joint Project with the Al-Qasemi Research Center, Israel. Assoc. Prof. Dr Tomas Kačergius, Assoc. Prof. Dr Agnė Kirkliauskienė, Assist. Vika Gabė, Prof. Dr Anwar Rayan (Israel). 2021–2022.

The aim of the study was to investigate the efficacy of different gallic acid esters (alkyl gallates: methyl, ethyl, octyl, lauryl gallates), which are found naturally in plants, against *S. mutans* biofilm formation and acidogenicity *in vitro* conditions. Results revealed that the highest concentrations of studied gallic acid esters significantly reduced S. *mutans* biofilm biomass as well as prevented a decrease in pH level, as compared to controls ($p<0.05$). This investigation showed that gallic acid esters containing longer alkyl chains produce up to ~27.6-fold stronger inhibitory activity against *S. mutans* biofilm formation and acidogenicity. Due to the capacity to effectively inhibit *S. mutans* biofilm formation and the acidogenicity, gallic acid esters with longer alkyl chains might be used as anticaries agents for oral formulations to reduce the prevalence of dental caries.

Association of Hair Steroid Hormones with Chronic Stress Level and Cardiovascular Disease Risk Factors in Middle-aged and Elderly Women. Assoc. Prof. Dovilė Karčiauskaitė, Assist. Prof. Eglė Mazgelytė. 2020-2022.

One hundred forty-five apparently healthy females (50–64 y.o.) participating in the national cardiovascular disease prevention program were enrolled in the project. During the project, hair steroid hormone (cortisol, cortisone, dehydroepiandrosterone) levels were measured using the HPLC-MS/MS technique. Also, anthropometric data, glucose and lipid metabolism biomarkers, and the SCORE2 risk prediction algorithm were used to estimate CVD risk. The results of the project revealed that higher hair glucocorticoid levels were associated with the increased prevalence of conventional CVD risk factors and metabolic syndrome, as well as a higher SCORE2 risk prediction algorithm, which estimates the 10-year fatal and non-fatal cardiovascular disease risk.

Value of Biological Markers for Paraproteinemia. Leader of the project: Assoc Prof. V. Pečeliūnas, Prof. L. Griškevičius. Others: Assoc Prof. R. Matuzevičienė, doctoral student M. Radzevičius. 2019–2023.
During the project, the following were implemented: expression of myeloma disease immunoassay markers and their predictive value in the treatment with immunomodulators. Compilation of myeloma register and data analysis in collaboration with foreign researchers. Harmonisation of normal and pathological plasma cell research methods in collaboration with foreign researchers. Analysis of clinical prognostic markers in patients with AL amyloidosis. Analysis of clinical prognostic markers in patients with AL amyloidosis.

Joint project with State Research Institute, Center for Innovative Medicine, Department of Biomodels (Lithuania). Stress impact on the changes of platelet membrane and platelet function in diabetic rats. Assist. Prof. Dr I. Bikulčienė, Assoc. Prof. Dr V. Kašėta. 2022–2025.
Patients with metabolic disorders (i.e., type I or type II diabetes mellitus), often complicated by cardiovascular diseases and experiencing psychological stress, use drugs that correct platelet aggregation and the composition and level of lipids in the blood serum. Therefore, only the processes taking place in the animal model will reveal and evaluate the real changes in the composition and activation of the platelet membrane under the influence of psychological stress.

Investigation of the Mechanisms of Extracellular Microparticles (Exosomes) Involvement in the Cellular Response to Oxidative Stress. Researcher V. Žėkas. 2020–2021.

Work carried out in 2021: 1) A study of the reactive oxygen forms in HUVEC cell culture using a flow cytometry method using fluorescent antibodies (MitoSox, H2DCFDA) that marks reactive oxygen forms; 2) Western blot analysis of proteins important for cell survival and generation of oxidative stress: NADPH Oxidases NOX1, NOX2, NOX5, ERK 1/2, Akt B; 3) Preparation and submission of manuscript, currently under review. Title: "Changes in the amount and oxidative properties of human blood-derived extracellular vesicles after myocardial infarction". Results show that despite the inflammatory origin of post-MI EVs, which was determined by showing a higher level of MDA in post-MI patients' blood, and as they carried pro-oxidant enzymes NOX1, NOX5, and NOX2, post-MI EVs caused less oxidative stress in endothelial cell culture experiments. We conclude that there are quantitative and qualitative differences between the EVs of healthy vs post-MI individuals. Healthy control EVs, as well as post-MI patient EVs, carry both pro-oxidant and anti-oxidant enzymes, but post-MI EVs have a stronger anti-oxidative effect on the endothelium, which could help improve the post-MI condition.

National Research Projects

Platform for Non-Invasive Methods for Early Diagnosis and Prognosis of Severe Acute Pancreatitis. Project funded by the European Regional Development Fund according to the supported activity Research Projects Implemented by World-class Researcher Groups under Measure No. 01.2.2-LMT-K-718-01-0025. Assoc. Prof. Dalius Vitkus. 2018–2022.

An in-depth analysis of biochemical processes was conducted in order to construct a platform for non-invasive methods to be used for early diagnosis and prognosis of severe acute pancreatitis. It demonstrated the dependence of an amount of HSP70 and HSP90 in serum vs. severity of acute pancreatitis (AP) in a cohort of 49 patients. Tethered bilayer lipid membranes (tBLMs) have been developed to investigate HSPs' interactions with tBLMs that can be probed by electrochemical impedance spectroscopy.

Applying innovative non-invasive biomedical research methods to managing stress in group dynamics: the case of military conscripts in Lithuania. (No. S-MIP-20-59). The Research Council of Lithuania. Assoc. Prof. A. Mažeikienė, Assoc. Prof. Dr D. Karčiauskaitė, PhD student E. Mazgelytė. 2020–2022.

Stress in the groups during compulsory military service was conceptualised. Psychological and physical stress and the stress experienced during service at the individual, small and large group level was distinguished.

It was found that there was a statistically significant association between endogenous steroid hormones in the hair as reliable biological markers of individual stress levels, on the one hand, and socio-environmental factors experienced in the group during compulsory military service on the other. The results of this study suggest that subjective estimates of social factors may be successfully associated with changes in steroid hormone levels in hair, which objectively indicate the magnitude of stress experienced by conscripts during compulsory military service.

Studies on the Virulence Potential of Meningococcal Isolates: Implications for an Improved Molecular Diagnostics of Invasive Meningococcal Disease. (Nr. 01.2.2-LMT-K-718-03-0036). The Research Council of Lithuania. Research leader: M. Plečkaitytė. Member of research: Assist Prof. Silvija Kiverytė. 2020/09/16–2023/09/01

During the project, the following were implemented: expression of myeloma disease immunoassay markers and their predictive value in the treatment with immunomodulators; the compilation of a myeloma register and data analysis in collaboration with international researchers; the

harmonisation of normal and pathological plasma cell research methods in collaboration with international researchers; the analysis of clinical prognostic markers in patients with AL amyloidosis; and the analysis of clinical prognostic markers in patients with AL amyloidosis.

Personalised Upper Respiratory Tract Microbiome Testing – A New Diagnostic and Healthcare Tool (YourAirwayMicrobiome). (No. 01.2.2-LMT-K-718-03-0079). The Research Council of Lithuania. Member of the research team: Assist. Prof. S. Kiverytė. 2022–2023

In 2022, 24 subjects were tested in this project. Subjects underwent bronchoscopy, and bronchial aspirates were collected and subjected to the following tests:
- microscopic examination
- microbiological culture, the quantity of micro-organisms cultured in the microbiological culture was semi-quantitatively assessed.
- PCR test
- determination of the antibiotic susceptibility of the micro-organisms cultured in the microbiological culture.

International Research Projects

Recognition and Education in Violence, Abuse and Neglect for Medical and Healthcare Practitioners – REVAMP, 2019-1-UK01-KA203-061608. The Project was funded by the British Council. The consortium countries: UK (coordinator), Lithuania, Germany, France, Norway, Iceland, and Greece. Prof. V. Hendrixson: Coordinator of the project of the Lithuanian team. 2019–2022

The REVAMP project addresses the under-resourced and under-developed problem of identifying and responding to victims of domestic violence and abuse (DVA)/domestic violence and abuse (DVA) in healthcare settings. The project aims to propose a major innovation based on directly improving the health status of victims of violence throughout their lives by increasing the capacity of doctors and health professionals to identify the problem in a timely manner. Four learning modules have been developed: orientation; covering IPV/DVA against children and young people; against adults; and against the elderly. The learning platform consists of online and engaging training for doctors and other healthcare professionals to help them better identify and understand IPV/DVA. The modules have been translated/are in the process of being translated (as the process is still ongoing) into all languages of the partner countries. The REVAMP platform will be available to the user in the near future.

Simulation in Undergraduate MEDical Education for Improvement of SAFEty and Quality of Patient Care (SAFEMED+), 618812-EPP-1-2020-1-GE-EPPKA2-CBHE-JP. The project is funded by EC. The consortium countries: Italy, Spain, Lithuania, Georgia, Armenia, and Ukraine. Prof. V. Hendrixson. Coordinator of the project of the Lithuanian team. 2020-2023

Ongoing project: a plan for integrating clinical competencies into medical studies has been developed, and consultations and training sessions have been provided to non-EU project partners on integrating clinical practice/internship into the medical curriculum and on complementing the curriculum with general competencies, in particular, patient communication skills. Training on how to properly prepare for the OSCE examinations was attended. A SAFEMED training book is currently being prepared.

ALLTogether1– A Treatment Study Protocol of the ALLTogether Consortium for Children and Young Adults (1–45 years of age) with Newly Diagnosed Acute Lymphoblastic Leukaemia (ALL). Assoc. Prof. R. Matuzevičienė. 2019–2023.

In 2021, study groups from the five Nordic countries, Estonia and Lithuania (NOPHO), the UK (UKALL), the Netherlands (DCOG), Germany (COALL), Belgium (BSPHO), Ireland (SHOP), and France (SFCE) have designed a common treatment protocol as the new standard of care for children and young adults with ALL. The risk-stratification is based on a novel, personalised algorithm using clinical characteristics, genetic changes in the leukaemia and response to therapy. More than 50 ALL trials have been performed in 2022 on the A2G protocol in pediatric and adult patients. Data collection, collation and analysis continue.

RESEARCH INTERESTS

- Creation of new functional and anatomical imaging techniques and evaluation of effectiveness for diagnostics of cardiovascular, abdominal and oncological diseases
- Estimation of iron overload in the liver and heart
- Physical properties *in vitro* of metabolites using high resolution 9.4T NMR spectrometer
- AI and deep learning applications in diagnostic imaging

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Possibilities of Low Dose Computed Tomography and Nuclear Medicine Applications in Medical Diagnostics. Dr A. E. Tamošiūnas, Dr J. Dementavičienė, Dr A. Samuilis, D. Jocius. 2014–2023.

The objective for 2022 was to implement newly created protocols to reduce radiation exposure for patients and personnel during PET/CT, SPECT/CT and CT imaging studies. Those protocols were evaluated on how Lithuanian DRL could be improved.

New Non-Invasive Imaging Methods for the Diagnostics of Chronic Liver Diseases. Dr A. E. Tamošiūnas, Dr J. Dementavičienė, Dr A. Samuilis, D. Jocius, R. Komiagienė. 2014–2026.

In 2022, we evaluated preliminary study data and implemented AI applications for ultrasound elastography to replace conventional liver biopsies.

OTHER RESEARCH ACTIVITIES

RESEARCH INTERESTS

Health of mother and foetus: physiology and pathology

RESEARCH PROJECTS CARRIED OUT IN 2022

Project Supported by University Budget

Peculiarities of Women's Health Care. Prof. Dr D. Ramašauskaitė. 2019–2023.

The significance of specific dietary and behavioural recommendations for the prevention of haemorrhoids during pregnancy was studied. The intervention aimed to modify dietary and behavioural habits significantly reduces the rate of haemorrhoids after pregnancy and can be safely recommended to pregnant women.

Successful uterus transplantation, a potential treatment method for women suffering from absolute uterine infertility, is negatively affected by ischemia-reperfusion injury (IRI). The protective effect of relaxin (RLX) or/and erythropoietin (EPO) on experimental uterus IRI was investigated. Pretreatment with RLX, EPO or a combination of both EPO and RLX significantly alleviates uterine tissue damage caused by IRI.

National Research Projects

Noninvasive Immunological Analysis of Amniotic Fluid in Preterm Birth, (No. P-MIP-19-66). The Research Council of Lithuania. Prof. D. Ramašauskaitė. 2019–2022.

The significance of various biomarkers (TNF-α, MMP-8, suPAR, EGF, IL-6, IL–10, IL–17, S100b protein, defensins, surfactant protein A, RANTES, toll-like receptors 2 and 4, TGFβ) in non-invasively obtained amniotic fluid was evaluated for prediction fetal inflammatory response syndrome and neonatal outcomes in patients after preterm premature rupture of membranes before 34 weeks of gestation. MMP-8 and TNF-α showed the highest diagnostic characteristics prognosticating fetal inflammatory response syndrome. TNFα and EGF in non-invasively collected amniotic fluid are reliable predictors for bronchopulmonary dysplasia in preterm neonates.

RESEARCH INTERESTS

- Impact of perioperative and psychosocial risk factors on long-term mortality, quality of life, stress reactions after cardiac surgery
- Organ dysfunction in critically ill oncohaemathological patients
- Early changes in cognitive functioning in patients undergoing general anaesthesia
- Spinal bupivacaine baricity and dose in day-case surgery
- Development of new methods of opioid detoxification for illicit and prescription opioid-dependent patients
- Metabolism and amino acid homeostasis in critical care patient
- Diagnostic, treatment and prognostication challenges in critical care patients with COVID-19

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Perioperative Patient Optimisation and Management of Critical States. Prof. Dr J. Šipylaitė. 2019–2023.

Research on organ dysfunction in critically ill oncohaemathological patients and the effects of postoperative immunonutrition on immune responses and outcomes was completed.
COVID-19 patients hospitalised in ICU were analysed with a focus on respiratory drive and systemic inflammatory response.
The effectiveness of detoxification was investigated with the intention of ceasing the patient's prescription opioid use.
Chronic lead poisoning in Lithuanian shooting range workers was investigated.

The needs of paramedics in prehospital stroke care were analysed.

National Research Projects

Biosensor Platform for Fast, Cheap and Accurate Quantification of Amino Acids in Patients Undergoing Renal Replacement Therapy (DIALSENS). (No. 01.2.2-LMT-K-718). The Research Council of Lithuania. Participants: J. Sipylaite, D. Ringaitiene, M. Serpytis, I. Lisauskiene, V. Vicka, A. Vickiene, I. Kvietinskaite. 2020–2024.

Recruitment of the patients was continued, reaching 60 patients at the end of the year. Midterm analysis was performed and accepted by the Lithuanian Research Council. The midterm results were presented in the ESICM LIVES 2022 in Paris and finalised in a manuscript submitted to the Journal of Renal Nutrition (now undergoing the 1st round of review). Additionally, documents for the extension of the bioethics permission were submitted for review.

Contractual Research

Developing and Validation of a Prototype Innovative Lung Ventilation Device. Industry (Teltonika Telemedic) ordered a research project (20210804-02 // (1.57) 15600-INS-127). Audrius Andrijauskas (PI), and expert-consultants: Tomas Jovaiša, Darius Činčikas, Saulė Švedienė. 2021–2022.

A feasibility study using the State of Art (SoA) analysis to investigate the viability of remote monitoring and partial control of mechanical lung ventilation.
Recommendations for the development of remote monitoring and partial control of mechanical lung ventilation, as well as consulting during the development process.

RESEARCH INTERESTS

Estimation of the influence of morphology and clinical peculiarities of otorhinolaryngological and ophthalmological diseases to results of the application of novel diagnostic methods and treatment.

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Influence of Morphological and Clinical Peculiarities of Otorhinolaryngological and Ophthalmic Diseases on the Adapting New Diagnostic Systems and on Treatment Outcomes. Prof. E. Lesinkas, Lect.A. Morozas, Assist. Prof. R. Ašoklis, A. Kadziauskienė, Doctoral student E. Jašinskienė. 2014–2023.

In 2022, the project moved forward. There was a presentation at the European Congress of Otorhinolaryngology and Head and Neck Cancer in Milan in October 2022 on the impact of post-cochlear implantation on music understanding. We are planning to continue the study and present further results at the Baltic Congress in spring/summer 2023.
The ophthalmological team published a review study of the long-term experience of dacryocystorhinostomies and collaborated in publishing articles on the genetics of Alport syndrome, glaucoma prevention and artificial intellect in glaucoma diagnosis.

National Research Projects

Effectiveness of Internet-based Interventions for Tinnitus: A Comparative Study. The Research Council of Lithuania. Prof. Dr E. Lesinskas, Dr J. Eimontas. 2022–2024.

The research just started in October 2022; thus, there are no results from that year yet.

RESEARCH INTERESTS

- Minimally invasive surgery of abdominal organs, development and improvement of new procedures and devices for the performance of minimally invasive procedures, especially of abdominal malignancies
- Research of liver and pancreas transplantation techniques (listing and preparing patients for liver, pancreas, and kidney transplantation)
- Research of liver and pancreas transplantation techniques
- Study of dietary treatment of enteropathies
- Minimal hepatic encephalopathy
- Gut microbiota in health and disease
- Extrahepatic complications of liver cirrhosis
- Diagnostic/prognostic markers for prediction of HCC
- Novel treatment for the GI bleeding
- Contemporary diagnostic analysis of ascitic fluid
- Epidemiology and novel treatment of viral hepatitis
- Patients with chronic hepatitis C quality of life study during DAA therapy
- Urological cancer
- Kidney stone disease
- Urinary incontinence
- Primary glomerular diseases
- Resistant hypertension
- Peritoneal dialysis
- Medical kidney transplant management

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Investigation Efficiency of Traumatic – Restorative, Minimally Invasive Surgeries and Transplantation Methods in Visceral Surgery. Prof. K. Strupas, Prof. G. Brimas. 2019–2023.

For the first time in Lithuania and the Baltic States, a liver transplant from a non-beating heart donor was performed at the Santaras Clinics of the Vilnius University Hospital. On 2022/05/30, at Vilnius University Hospital for Santara Clinics, the liver transplantation team performed the first liver transplantation operation in the Baltic States using a donor organ perfusion machine to maintain the organ – the donor's liver was connected to a hypothermic oxygenated perfusion machine. The results of the research were presented at national, regional and international meetings and published in peer-reviewed journals.

Chronic Liver Diseases Genomic and Proteomic, These Diseases Pathogenetic Relationship with Other Abdominal Disease, Optimisation of Therapeutic and Surgical Treatment. Prof. J. Valantinas, Ass. Prof. E. Kazėnaitė, Ass. Prof. G. Sadauskaitė, Ass. Prof. I. Stundienė, Dr V. Liakina, Dr L. Mašalaitė, Dr I. Savlan, Dr E. Gavėlienė, Dr R. Vaicekauskas, A. Aleknaitė. 2019–2023.

The main research efforts in 2022 have been focused on analysing the impact of COVID-19 infection on the liver. In this study, the frequency of liver damage and its effect on the severity of SARS-CoV-2 pneumonia in hospitalised patients has been analysed.
Associations of malignant diseases with gastrointestinal disorders, as well as difficult-to-diagnose cases, have also been further analysed, and this year, we presented a clinical case of metastatic multifocal melanoma of multiple organs. We also continued research on the NAFLD clinical management. A comprehensive review of the impact of gut microbiota on the manifestation of hepatocellular carcinoma in patients with NAFLD was prepared this year.

In 2022, the clinicians were also involved in a large international clinical study focused on the Etrolizumab therapy of patients with ulcerative colitis who were previously non-responders to the tumour necrosis factor inhibitors (HICKORY) therapy. The results of the phase 3 of this trial were presented in two publications.

Diagnostic Investigation of Urinary Tract Cancerogenous Tissue by Infrared Spectroscopy. Assoc. Prof. A. Želvys, Prof. F. Jankevičius, G. Platkevičius. 2019–2023.

In 2022, tissue samples were analysed, and articles were prepared by Zacharovas, E; Velicka, M; Platkevicius, G; Cekauskas, A; Zelvys, A; Niaura, G; Sablinskas, V. Toward a SERS Diagnostic Tool for Discrimination between Cancerous and Normal Bladder Tissues via Analysis of the Extracellular Fluid. ACS OMEGA Volume 7 Issue 12 Page 10539-10549 DOI10.1021/acsomega.2c00058 Published MAR 29 2022. This study shows the possible application of the label-free SERS for the discrimination between the 29 cancerous and normal human bladder tissues via analysis of the extracellular fluid of the tissues. The proposed 30 method is not suitable for the identification of cystitis-affected bladder tissue since the chemistry of both not cancerous 31 cell types is similar.

The Role of Locally Administered Antifibrotic and Anti-inflammatory Agents (Mitomycin, Triamcinolone, Pirfenidone) in Improving the Postoperative Results of Urethral Stricture Surgical Treatment. Prof. F. Jankevičius, A. Grybas. 2021–2025.

The project "Artificial urethra for the treatment of hypospadias and urethral strictures" has been started. The project involves cooperating with the Biochemical Institute at the Life Sciences Center, Vilnius University. The aim of the project is to create and test in an animal model a functional artificial urethral tissue, which would be manufactured using 3D-bioprinting technology. The main task is to create a functional, antifibrotic artificial tissue fragment and analyse its capabilities for urethral stricture treatment in an *in vivo* model. During the period of attestation, we produced cultures of cells from human and rabbit adipose tissue, buccal mucosa, and healthy and fibrotic urethra. The markers for these cells were determined, and their proliferation and differentiation potential were evaluated. To analyse the mechanism of action of a common antifibrotic drug and its potential to be used in the construction of artificial tissue, toxicity and effective dose determination tests were carried out on primary myofibroblast cells and WPMY human myofibroblast cell line. Employing 3D bioprinting, the polymers and bio-ink were selected and tested to manufacture a model of an artificial scaffold for urethral reconstruction. The surgical procedures to create a stricture model in rabbits were performed.

The publications are still in progress.

The Role of Non-invasive, Minimally Invasive and Molecular Methods in the Diagnosis of Congenital Obstructive Uropathies. V. Kazlauskas. Supervisor: Prof. G. Verkauskas. 2018–2022

The research was conducted from 2018 until 2022 at Vilnius University Santaros Klinikos. Together with retrospective analysis of available data, all patients who had unilateral or bilateral hydro- or ureterohydronephrosis and patients of the control group were prospectively included in the study. The efficacy of diuretic-enhanced renal ultrasonography in the diagnosis of congenital hydronephrosis was analysed retrospectively. The value of urinary obstruction biomarkers and ultrasound findings to predict renal scan results and operative management was done prospectively. Biopsy material was studied by the analysis of the expression of fibrosis-related genes in strictured ureteral tissue and in ureteral tissue without obstruction. These findings were correlated to perioperative ultrasonography findings and urinary obstruction biomarkers. Based on published results, the doctoral thesis is prepared and ready for defence on 2023/03/24.

The Influence of Immune System Senescence to Kidney Transplant Survival and Choice of Immunosuppression. E. Mačionienė, Prof. M. Miglinas. 2015–2022.

The Study started in 2016 and is performed in collaboration with the Life Sciences Center. The study focuses on the identification of molecular biomarkers of kidney transplant rejection. Additional clinical data has also been collected, and patient enrolment is continued. This Study is paused in 2022 due to the maternity leave of PhD Student E. Macioniene and will be continued in 2023.

Comparison of "Endoscopy First" and "Laparoscopic Cholecystectomy First" Strategies for Patients with Gallstone Disease and Intermediate Risk of Choledocholithiasis. Prof. G. Simutis, doctoral student A. Aleknaitė. 2018–2021.

In 2021, a randomised clinical study enrolling adult patients undergoing laparoscopic cholecystectomy for symptomatic gallbladder stones with an intermediate risk of choledocholithiasis was completed. A total of 74 participants were included and randomised into two groups. Analysis of collected data was performed, and a doctoral dissertation, "The preoperative prediction and management of choledocholithiasis before planned laparoscopic cholecystectomy based on individual risk of choledocholithiasis", was prepared and defended on 2021/09/21.

Analysis of Factors Influencing Extracorporeal Lithotripsy Efficiency and Their Optimisation. Assoc. Prof. A. Želvys, M. Snicorius. 2018–2022.

Extracorporeal lithotripsy and endourology are the methods used for surgical treatment of kidney stone disease: age, gender, location, skin-to-stone distance, maximum stone length, stone volume, stone surface area, mean stone Hounsfield units (HU) and highest HU score were explored in uni- and multivariate regression analysis. For stone composition, FTIR-ATR spectroscopy was used. The recommendations for treatment choice are expected at the end of the scientific work.

Dynamics of Changing Nutritional Status and Related Factors in Patients after Kidney Transplantation. D. Sukackiene, L. Rimsevicius, Prof. M. Miglinas. 2017–2022.

Comparative Study of Renal Function and Factors Influencing Kidney Dysfunction after Radical and Partial Nephrectomies. J. Makevičius, Prof. M. Miglinas, Prof. F. Jankevicius. 2016–2022.

The aim of the study is to identify the acute kidney injury and chronic kidney disease incidence after renal surgery due to renal lesions and determine the predictor factors of those conditions among patients with high, normal or mild decreases in glomerular filtration rate with no presence of abnormal albuminuria.

Personalisation of renal replacement therapy with novel predictive markers of collagen imaged with polarimetric second harmonic generation microscopy and artificial intelligence optimisation. V. Samsonė, Prof. M. Miglinas, Dr L. Rimševičius. 2022-2026.

The Study started in October 2022 and is performed in collaboration with the University of Toronto (Canada), the National Center of Pathology and the Laser Research Center, Faculty of Physics, Vilnius University. The study aims to investigate arteriovenous fistulae histopathological parameters and, based on the results, to offer personalised treatment for end-stage renal disease patients. Additional clinical data has also been collected. Ten patients were included in the Study, and patient enrolment is continued.

Assessment of Sodium Intake in Lithuanian Population and Its Relationship to Arterial Hypertension and Kidney Damage Markers. U. Žakauskienė, Prof. M. Miglinas. 2019–2023.

The aim of this study is to evaluate salt intake and its effect on blood pressure and kidney damage. This study is approved by the Vilnius Regional Bioethics Committee. Data collection and participant enrolment were finished in 2020. More than 1000 subjects participated in the study. Data analysis was performed in 2021-2022. The results of the research were presented at national, regional and international meetings and published in a peer-reviewed journal.

Molecular microscope diagnostic system for kidney transplantation. M. Miglinas, A. Vickienė, E. Mačionienė. 2022-2024.

The Molecular Microscope Diagnostic System (MMDS) uses gene chips (similar to computer chips) to read molecules in renal graft biopsies. Researchers at the Nephrology Center, in collaboration with the Alberta (Canada) Centre for Transplantation Applied Genomics, isolated iRNA from kidney tissue biopsies and measured donor-derived cell-free DNA (dd-cf DNA) in the blood of kidney transplant recipients. Machine learning algorithms then translated the expression measurements into diagnostic probabilities to detect rejection reactions in transplanted kidneys and correlated (dd-cf DNA) with active molecular and histological rejection reactions in transplanted kidney biopsies with the potential to reduce the need for the invasive technique of kidney graft biopsies.

National Research Projects

Artificial Urethra for the Treatment of Hypospadias and Urethral Strictures. R&D Implementation scheme (SMART) funded under Measure 01.2.2-LMT-K-718 Targeted Research in SMART Specialisation Areas and managed by the Ministry of Education, Science and Sport of the Republic of Lithuania and the Research Council of Lithuania. In cooperation with Vilnius University Life Science Center and Vilnius University Hospital Santaros klinikos. A. Grybas, Assoc.Prof. Dr A. Želvys, Prof. Dr G. Verkauskas. 2020–2023.

During the course of the project, we produced cultures of cells from human and rabbit adipose tissue, buccal mucosa, and healthy and fibrotic urethra. The markers for these cells were determined, and their proliferation and differentiation potential were evaluated. Cells with the easiest isolation and cultivation conditions were selected. Using healthy and strictured tissue cells, as well as other tissue samples collected, the mechanisms of fibrosis under profibrotic conditions in the urinary tract were evaluated, mainly by gene expression analysis.
Toxicity of antifibrotic drug and effective dose determination tests were carried out on primary myofibroblast cells and WPMY human myofibroblast cell line. Biocompatible polymers were chosen for the manufacture of the artificial tissue, and the dynamics of antifibrotic drug release from these polymers were investigated. Employing 3D bioprinting, these polymers and bio-ink were used to manufacture a model akin to urethral tissue. Surgery to create a stricture model in rabbits, as well as implantation of different artificial urethra samples, was done to compare effectiveness.

International Research Projects

International Project on Hepatitis B and C Epidemiology "Polaris Observatory". Coordinator: CDA Foundation, USA. Prof. J. Valantinas, Dr V. Liakina. 2014–2025.

In 2022, the research was focused on analysing the progress made by countries toward the goal of eliminating or reducing the burden of HCV infection. The data on the prevalence of HCV (viraemic infection, defined as HCV RNA-positive cases) and the cascade of care among people of all ages (age ≥0 years from birth) for the period between 2015/01/01 and 2020/12/31 were analysed. We estimated a global prevalence of viraemic HCV infection of 0·7% (95% UI 0·7–0·9), corresponding to 56·8 million viraemic HCV infections globally. Although this number represents a decrease from 2015, our forecasts suggest we are not currently on track to achieve

global elimination targets by 2030. As countries recover from COVID-19, these findings can help refocus efforts aimed at HCV elimination

Contractual Research

Apex-Pedi study sponsored by Shionogi/Syneos-Health: II phase open-label multicenter study in subjects with complicated urinary tract infection; 2020-2023 Prof. Gilvydas Verkauskas, principal investigator

RESEARCH INTERESTS

- Pathogenesis, diagnostics, treatment and prevention of infectious diseases: assessment of the current diagnostics, treatment and prevention methods; search of a new diagnostics, treatment and prevention methods; study of the mechanisms of infectious diseases pathogenesis; study of the safety and efficacy of new vaccines and drugs for the treatment and prevention of infectious diseases
- Effectiveness, feasibility and impact of latent tuberculosis treatment for the prevention of active tuberculosis among HIV-positive individuals
- Incidence, aetiology and pathogenesis of inflammatory chronic dermatosis (acne, hidradenitis suppurativa, rosacea, psoriasis, dermatitis, eczema, vitiligo): basic and clinical research, implementation of innovative technologies
- Dermatooncology in Lithuania: epidemiology, pathogenesis, diagnostics, treatment

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Biomarkers of Hidradenitis Suppurativa. Assoc. Prof. Dr Rūta Gancevicienė, Assoc. Prof. Dr Jurate Grigaitienė, PhD Student Tadas Raudonis. 2019–2024.
The objective of this study is to evaluate biomarkers of hidradenitis suppurativa and their associations with disease severity and comorbidities. Biomarkers are planned to be evaluated in skin samples from the affected and unaffected areas. In addition, saliva samples will be used for genotyping. Biological sample collection (skin samples) was underway in 2022; they will be transferred overseas for immunohistochemistry studies in 2023. The first publications are planned in 2023–2024.

Analysis of epidemiological, risk and preventive factors of atopic dermatitis, impact of inflammatory and genetic markers on disease type, clinical appearance and course. Prof. Dr Matilda Bylaitė-Bučinskienė, PhD Student Inga Kisielienė. 2020-2022.
The objective of this study is to establish the prevalence of atopic dermatitis in the Lithuanian population, to analyse potential risk factors for the development of atopic dermatitis in children of atopic and non-atopic parents, to analyse inflammatory markers associations with disease severity, clinical appearance and course and to evaluate associations between severity of atopic eczema and child behaviour problems. The investigation is a population-based, single-centre prospective with a one-year follow-up. Data are collected from physical examination, questionnaires (evaluation of risk factors, disease severity, the child behaviour checklist) and patients' blood serum. The first publication is planned for 2023.

Evaluation of quality of life and correlation between facial anthropometric parameters, cancer worry, scar appearance distress and self-esteem in patients with facial basal cell carcinoma. Prof. Dr Ligita Jančorienė, Prof. Dr Janina Tutkuvienė, PhD Student Domantas Stundys. 2020-2024
The perspective single-centre study focuses on the evaluation of facial skin cancer patients starting right after the skin cancer diagnosis was established, continuing during the perioperative period, with an extended follow-up until full scar healing is achieved. The objective of this study is to

evaluate the quality of life, cancer-worry-related distress and body image self-esteem of facial skin cancer patients considering already existing facial and body anthropometric parameters as well as their changes post-surgery.

The manuscript, "**The Quality of Life in Surgically Treated Head and Neck Basal Cell Carcinoma Patients: A Comprehensive Review**", was submitted for review to the Journal "Cancers" on 2022/12/17. Authors: Domantas Stundys, Gintare Ulianskaite, Ieva Stundiene, Jurate Grigaitiene, Ligita Jancoriene.

Effectiveness, Feasibility and Impact of Latent Tuberculosis Treatment for the Prevention of Active Tuberculosis among People Living with Human Immunodeficiency Virus. Prof. Dr Raimonda Matulionytė, PhD Student Elžbieta Matulytė. 2018–2022.

Scientific activities in 2022: 1) the dynamics of morbidity, socio-demographic and clinical characteristics, and outcome-related risk factors of active TB diagnosed in 2008-2020 (n=345) in people living with HIV (PLHIV) in Lithuania were evaluated by performing a retrospective cohort analysis (publication submitted to PlosONE after the second peer review); 2) to compare the prevalence of LTBI and LTBI-related risk factors between PLHIV and HIV-negative population, 390 PLHIV and 443 HIV-uninfected individuals were screened with TST and (or) IGRA, and the data was analysed.

Key Risk Factors for Hcv Infection in Lithuania: Case-Control Study. Prof. Dr L. Jančorienė, Research Assist., PhD Student S. Grubytė. 2021–2022.

The study comprised 119 chronic hepatitis C cases and 119 controls. Case and control distributions of gender, age group, education, marital status, occupation, and household income: most of the participants were males (63.9%), mostly belonging to two age groups – 35-50 years (38.2% of all the males) and 51+ years (37.5% of all the males). The median age of study participants was 44 (IQR 35-55.25) years. It is important to highlight that cases and controls had the same gender and age group distribution to control the potential confounding factors. The results of the cross-sectional study suggest that potential future health problems due to untreated chronic HCV infection and the likely efficacy and safety profile of CHC therapy may influence patients' decisions about starting and ending CHC treatment. Stigma was identified as a major barrier to CHC treatment in our study. We also need to address barriers to treatment initiation related to lack of knowledge about HCV infection and lack of financial resources to treat CHC and to take into account socioeconomic factors when planning strategies to prevent HCV infection. The results of the study were presented in the thesis.

Samanta Grubytė wrote her academic dissertation on "**Epidemiological patterns and risk factors of hepatitis C infection in Lithuania**". Academic supervisor Prof. Dr Ligita Jančorienė (Vilnius University, Medical and Health Sciences, Public Health – M 004, Medicine – M 001). Defence date: 2022/11/25.

The Characterisation of Genetic Diversity and Association with COVID-19 Disease Indicators in the Lithuanian Population (COVID-19_LT). Prof. Dr Ligita Jančorienė, Assoc. Prof. Dr Birutė Zablockienė, Lect.Mindaugas Paulauskas, PhD student Ieva Kubiliūtė. 2021–2026.

The aim of this study is to identify host genomic factors increasing susceptibility or resistance to the SARS-CoV-2 infection and COVID-19 infection severity in the Lithuanian population. More than 500 participants were included in this study in 2021-2022. This biomedical study is being conducted in collaboration with Finnish researchers and is part of the international *COVID-19 Host Genetics Initiative*, which aims to bring together researchers from around the world to study genetic factors relevant to the pathogenesis of COVID-19. Preliminary data of collected information from the questionaries and data from the study database were presented at an international conference.

Direct Self-Sampled Gargle Water LAMP as a Screening Method for the Detection of SARS-CoV-2 Infections. Prof. Dr L. Jančorienė, Assoc. Prof. Dr B. Zablockienė. 2020-2022.

The indirect RT-PCR of oro-nasopharyngeal swab samples is currently considered the gold standard method for detecting SARS-CoV-2 infections, yet as the method is technically complex and time-intensive, it is generally not suitable for the rapid testing and stratification of patients. We assessed whether the direct LAMP (Loop-Mediated Isothermal Amplification) of gargle water samples is sensitive enough to serve as a more rapid and affordable alternative to the gold standard.

Medical Technologies to Improve SARS-CoV-2 Testing: Development and Testing of an Innovative Saliva Sampling System and Testing Method. Prof. Dr L. Jančorienė, Assoc. Prof. Dr Birutė Zablockienė, Lect. Mindaugas Paulauskas. 2020–2022.

Comparison of the clinical value of RT-qPCR-based SARS-CoV-2 tests performed on saliva samples (SSs) and nasopharyngeal swab samples (NPSs) for prognosis of the COVID-19 disease severity. Methods: Three paired SSs and NPSs of 100 hospitalised COVID-19 patients were analysed by RT-qPCR and compared to 150 healthy controls. Cases divided into mild and moderate disease (Cohort I) and severe disease (Cohort II) cohorts were compared by demographic, clinical and laboratory profiles and Ct values. Results: Ct values of SSs were lower than those of NPSs (P=0.002). Although the Ct values of the Ist SSs were significantly lower in Cohort I than in Cohort II (P=0.04), they became negative earlier (mean 11.7 *vs*. 14.8 days, P=0.005). There was a strong positive correlation between the number of days since the onset of symptoms and Ct values in both SSs and NPSs (P<0.001). Multivariate Cox proportional hazards regression analysis showed that Ct value ≤30 from SSs was the independent predictor for severe COVID-19 (HR=10.06, 95% CI: 1.84-55.14, P=0.008). Conclusion: Salivary RT-qPCR testing is suitable for early SARS-CoV-2 infection detection, while simple measurement of Ct values can assist in predicting severe COVID-19 outcomes. The manuscript **"Sars-Cov-2 Rt-Qpcr CT Values in Saliva and Nasopharyngeal Swab Samples for Disease Severity Prediction"** was recently submitted to the ISI medical journal and is currently under review.

Patients with COVID-19 Infection and Hospitalised in Vilnius University Hospital Santaros Klinikos, Clinical Course and Medical Care Study. Prof. Dr L. Jančorienė, assoc Prof. Dr B. Zablockienė, PhD student Ieva Kubiliūtė, Lect.M. Paulauskas. 2020–2023.
The study aims to identify the infection course of COVID-19-infected inpatients, as well as the complications, prognosis, and effectiveness of the patients' medical care. Depersonalised data were retrieved from electronic VUH SK medical records. The manuscript, "Clinical Characteristics and Risk Factors for In-Hospital Mortality in Adult COVID-19 Patients: A Retrospective Single-Centre Cohort Study of 2794 Patients in Vilnius, Lithuania", is in the final stage of preparation.

The Analysis of COVID-19 Pneumonia Long-Term Sequelae to the Respiratory System and Quality of Life, the Identification of Possible Prognostic Immunologic and Genetic Markers. Prof. Dr Ligita Jancoriene, Prof. Dr Laura Malinauskiene, **Assoc. Prof. Dr B. Zablockienė,** PhD student E. Strumiliene. 2021–2025.
The aim of this study is to analyse the long-term consequences of COVID-19 pneumonia in the group of moderate and severe COVID-19 disease survivors, analyse the sequelae to the respiratory system and quality of life, and identify the possible prognostic factors. This follow-up research was started in 2021 and is being continued by collecting the follow-up data from radiological lung examination, pulmonary function tests and quality of life questionnaires. The blood samples for analysis of possible prognostic markers to the severity of COVID-19 disease and long-term lung injury are being collected. The publication is in the stage of preparation.

Research on COVID-19 Disease Predictive and Prognostic Indicators. Prof. Dr Ligita Jančorienė, Assoc. Prof. Dr Violeta Mikštienė, PhD Student Ieva Kubiliūtė. 2021–2025.
The preliminary aim of the thesis is to identify risk factors and prognostic indicators for severe COVID-19 disease and death due to COVID-19 infection, as well as the possible predictive and prognostic association of genetic factors with the form of COVID-19 infection.

Preliminary objectives of the thesis: to systematically evaluate the demographic, anamnestic, epidemiological, clinical, laboratory and radiological characteristics of hospitalised patients with COVID-19, to identify risk factors, combinations of risk factors and prognostic indicators for the severe form of COVID-19 in the hospitalised patient population, to identify risk factors, combinations of risk factors and prognostic indicators for death from COVID-19 in the hospitalised patient population, to determine the predictive and prognostic associations of genetic factors with the likelihood of SARS-CoV-2 infection and the severity of COVID-19 disease. The first publications are planned for 2022.

Study of the Aetiology and Long-Term Residual Effects of Acute Infectious Encephalitis. Assoc. Prof. Dr Daiva Radzišauskienė. A total of 22 patients with infectious encephalitis were included in 2022. A total of 20 patients were observed for residual effects after discharge from the hospital. 2019–2023.

Association of Clinical Syndrome of Lyme Disease With Characteristics of the Pathogen Vector. Assoc. Prof. Dr Daiva Radzišauskienė**.** A total of 170 patients were included in the retrospective part of the study. A total of ten patients were included in the prospective part of the study. 2019–2023.

National Research Projects

Impact of Blood Plasma From COVID-19 Patients for Blood-Brain Barrier. (No. 13.1.1-LMT-K-718-05-0005). The Research Council of Lithuania. Principal investigator and chief researcher: Prof. Dr L. Jančorienė, investigator: Assoc. Prof. Dr B. Zablockienė. 2021-2023.

On 2022/02/15, the project was approved by the Vilnius Regional Biomedical Research Ethics Committee. In 2022, 61 subjects were enrolled, blood samples were tested, and Mini-Mental Questionnaires were evaluated. Researchers at the Centre for Innovative Medicine assessed the effect of plasma from COVID-19 patients, survivors and healthy controls on the blood-brain barrier using an *in vitro* human cerebrovascular endothelial cell model, as well as assessed changes in inflammatory and anti-inflammatory cytokines and chemokines in the plasma of COVID-19 patients, survivors and healthy controls.

The Proof of Concept of a Cutting-Edge Solution Dedicated to Monitoring COVID-19 Patient's Health at Home (PIOAS), funded under the EIT Health RIS Innovation Scheme (Grant Agreement No. 2021-RIS_Innovation-059). Principal Investigator Prof. Dr L. Jančorienė, investigators: Assoc. Prof. Dr B. Zablockienė, research assistant, PhD student E. Strumilienė, D. Naumovas, D. Juozapaitė, 2022.

Led by the start-up MB Hadroneda, the project aimed to bring a new device to the medical technology market that will help to reduce the number of patients with COVID-19 and other lung diseases in hospitals and allow home monitoring. The project sought to achieve a proof of concept for a PIOAS (hardware/software) solution and take a step towards commercialisation.

Ten clinical settings were tested in 2022. The regulatory clarification, regulatory pathway, extended risks and hazards analysis were performed. Thirty hospitals were interviewed in the EU regarding the clinical workflow of solution and value. Technical improvements to prototypes were made. 130 COVID-19 patients interviewed. Project coordination and report preparation/ submission tasks accomplished. Deliverables: Improved business creation model, Regulatory classification report, Initial freedom to operate analysis/summary, Regulatory roadmap, Risk and hazard analysis sheet and a report, Clinical workflow document with tests (+10 settings) in model results.

Investigation of the prevalence of SARS-CoV-2 infection in Lithuania using serological methods. (No. S-REP-22-8). Lithuanian Research Council. Senior Researcher Prof. Dr L. Jančorienė. September – December 2022.

Preparation for the involvement of the volunteers and study protocol was submitted to the Lithuanian Bioethics Committee in 2022.

SARS-CoV-2 serological antibody test dynamics and protective significance in health care workers vaccinated with COVID-19 vaccine. (No. P-ST-22-60). Lithuanian Research Council, sub-activity *Development of students' abilities by conducting research during the semester*. Principal Investigator and Research Supervisor in a research project Prof. Dr L. Jančorienė, student T. Alčauskas. September 2022 – March 2023.

The project was approved by the Vilnius Regional Biomedical Research Ethics Committee in 2021, No.2021/11-1395-870. In 2022, 1808 healthcare workers were enrolled in the study, with periodic blood sampling to assess the dynamics of COVID antibodies and to collect information on cases of COVID-19 infection.

International Research Projects

EuroSIDA/RESPOND, ongoing since 2015.
Prof. Dr R. Matulionyte (steering committee member, PI), PhD student E. Matulyte (investigator).
https://www.chip.dk/Research/Studies/EuroSIDA/Study-group

EuroSIDA study is a prospective observational cohort study following adult people living with HIV (PLHIV). The study aims to follow the long-term clinical prognosis for the general population of HIV-infected patients living in Europe and to assess the impact of antiretroviral therapy on these patients. EuroSIDA was one of the cohorts to establish the International Cohort Consortium of Infectious Disease (RESPOND) cohort consortium on infectious diseases in 2017.

Euroguidelines in Central and Eastern Europe Countries (ECEE) Network Group, ongoing since 2018. Prof. R. Matulionytė, country coordinator/representative, expert. https://www.eceenetwork.com

The aim of this Network group is to review the implementation of EACS guidelines across Central and Eastern European and neighbouring countries and to discuss national strategies for the timely initiation of antiretroviral therapy in response to changing guidelines. The network creates consensus statements and conducts meaningful research, with results being published in international journals, which should then inform further actions by governmental agencies and support local activism.

Activity in 2022 related to the main topics reflected in publications: dynamics of HIV and hepatitis epidemiology, late presentation in care, access to cART and its components, hard-to-reach population and addressing the gaps of HIV continuum of care, laboratory monitoring instruments, new ART strategies, prophylaxis and vaccination, HIV care during COVID-19 pandemic and the war in Ukraine.

Co-funded by the 3rd Health Programme of the European Union Joint Action on integrating prevention, testing and linkage to care strategies across HIV, viral hepatitis, TB and STIs in Europe **(INTEGRATE)**, Grant Agreement No. 761319, in partnership with Vilnius University Hospital Santaros Klinikos (EU project 761319). Assoc. Prof. Dr J. Grigaitiene, PhD student T. Raudonis. 2016–2021. https://webgate.ec.europa.eu/chafea_pdb/health/projects/761319/summary

The project ended in 2021, and the project results are to be finalised in Eurosurveillance in 2022.

Hidradenitis Suppurativa Genomics: Decoding Pathogenesis as Requirement for Targeted Treatment. European Hidradenitis Suppurativa Foundation. Assoc. Prof. Dr Ruta Ganceviciene, PhD student Tadas Raudonis, Prof. Dr Christos C. Zouboulis. 2022-2024.

This multicenter, real-world, European study with international participation will recruit 2000 patients with HS and 2000 sex- and age-matched healthy controls. This new, cutting-edge, EADV-

supported project has the potential to significantly enhance our understanding of its aetiology, lead to the development of new therapies and also promote personalised medicine. In 2022, we started patient recruitment and biological sample collection. Patients' demographics, clinical signs, lifestyle habits and severity classification will be documented by the updated first-visit protocol of the European Registry for Hidradenitis Suppurativa (ERHS). DNA isolation from buccal cotton swabs of patients and controls, as well as blood samples and skin biopsies from selected healthcare providers, will serve for disease gene identification through next-generation DNA sequencing by a high-throughput automated approach to prepare high-quality genomic DNA for exome capture.

COVID-19 Surveillance and Risk Factors Research (I-MOVE-COVID-19 LTU). Biomedical research of European hospital surveillance, risk factors and vaccine effectiveness I-MOVE-COVID-19 Network – Multidisciplinary European network for research, prevention and control of the COVID-19 pandemic. Prof. Dr Ligita Jančorienė, Assoc. Prof. Dr Birutė Zablockienė, PhD student Ieva Kubiliūtė, investigator: F. Majauskaitė. 2020–2023

Biomedical research of European hospital surveillance, risk factors and vaccine effectiveness I-MOVE-COVID-19 Network - Multidisciplinary European network for research, prevention and control of the COVID-19 pandemic. The aim of this study is to describe the clinical epidemiological characteristics of hospitalised patients with COVID-19 or influenza and determine the main risk factors associated with severe disease and death due to COVID-19 or influenza. Until the end of 2021, 487 participants with COVID-19 disease were included. Since the influenza season of 2022, the study of the effectiveness of the influenza vaccine has continued. The protocol was updated and renamed: COVID-19 European Hospital Surveillance, Risk Factors and Vaccine Effectiveness. Patients with influenza, Vilnius University Hospital Santaros Clinics are involved in the study.

VACCELERATE European Corona Vaccine Trial Accelerator Platform. H2020-IBA-SC1-CORONAVIRUS-2020-4 (EU-wide COVID-19 vaccine trial network). National coordinator for Lithuania: Prof. Dr L. Jančorienė, Project researcher: Assoc. Prof. Dr B. Zablockienė. 2021–2024.

VACCELERATE is a pan-European network set up to boost phase 2 & 3 COVID-19 vaccine trials. CONSORTIUM consists of 26 partners from 21 countries.
During May 2022, the questionnaire was made available in 12 countries and 14 languages. To date, more than 36,000 volunteers have registered, mainly from Germany. Within the first year since its establishment, the VACCELERATE Volunteer Registry has matched more than 15,000 volunteers to clinical trials. The VACCELERATE Volunteer Registry is an active single-entry point for European residents interested in COVID-19 clinical trials participation in 12 countries (i.e., Austria, Cyprus, Germany, Greece, Ireland, Lithuania, Norway, Portugal, Spain, Sweden and Turkey). The registry is currently in the implementation phase in 5 additional countries (i.e., Belgium, Czech Republic, Hungary, Israel and the Netherlands).

European Cohorts of Patients and Schools to Advance Response to Epidemics (EuCARE). Funded by HORIZON-HLTH-2021-CORONA-01-02 (COVID19 - HERA Incubator). Project researchers: Prof. Dr L. Jančorienė and Assoc. Prof. Dr B. Zablockienė, research assistant: PhD student E. Strumilienė. 2022–2026

The EuCARE project brings together a multidisciplinary team of clinicians, virologists, epidemiologists, statisticians and top AI experts to reveal the impact of the SARS-CoV-2 variants on key public health sectors, as outlined in the call. Started three biomedical research studies: 1. Hospitalised COVID-19 patients cohort study in the EuCARE project [EuCARE-HOSPITALIZED] 2022-05-10 approved by Vilnius Regional Biomedical Research Ethics Committee, No.2022/5-1423-903; 2. Health care workers cohort study in the EuCARE-HCW] 2022-04-12 approved by Vilnius Regional Biomedical Research Ethics Committee, No.2022/4-1427-898. 3. Assessment of post-COVID-19 manifestations in a multicentre cohort study (EuCARE-POSTCOVID study]

2022/05/10 approved by the Vilnius Regional Biomedical Research Ethics Committee, No.2022/5-1424-904.

Contractual Research

SOLIDARITY TRIAL and SOLIDARITY TRIAL PLUS World Health Organisation **An International Randomised Trial of Additional Treatments for COVID-19 in Hospitalised Patients Who Are All Receiving the Local Standard of Care**. Prof. Dr L. Jančorienė (steering committee member, PI), Assoc. Prof. Dr B. Zablockienė, Lect.M. Paulauskas. 2020-ongoing.

WHO helps evaluate drugs by randomising their effects on important outcomes. The WHO Solidarity trial involves collaboration between hundreds of hospitals in dozens of countries. It began by evaluating four repurposed drugs and now, under the guidance of an independent Expert Group, is now evaluating additions to the local Standard of Care of other potential drugs.

A Multinational, Phase 2, Randomised, Adaptive Protocol to Evaluate the Immunogenicity and Reactogenicity of Different COVID-19 Vaccines Administration in Older Adults (≥75) Already Vaccinated Against SARS- CoV-2 (EU-COVAT-1_AGED). Principal investigator: Assoc. Prof. Dr Birutė Zablockienė, investigators: Prof. Ligita Jančorienė and Augustė Jelinskaitė. 2022–2023.

There are currently not enough data on the optimal timing of revaccination in the elderly. Furthermore, there is no reliable clinical evidence of immune responses with heterologous vaccine strategies in the age group over 75 years. Therefore, this study will aim to evaluate the effects of different mRNA-based vaccines as a booster in the elderly population of 75 years and older. The results of the study would be valuable in shaping vaccination programs in Europe and the world.

A Multicenter, Double-Blind, Randomised Withdrawal Extension Study of Subcutaneous Secukinumab to Demonstrate Long-Term Efficacy, Safety and Tolerability in Subjects with Moderate to Severe Hidradenitis Suppurativa. Assoc. Prof. J. Grigaitienė, T. Raudonis. 2021–2025.

Extension study to assess effects of non-interrupted versus interrupted and long-term treatment of two dose regimens on efficacy and safety in subjects with moderate to severe hidradenitis suppurativa. The purpose of this extension study is to evaluate the maintenance of HiSCR response at Week 104 in either continuous or interrupted therapy (using a randomised withdrawal period) of two dose regimens and to assess long-term efficacy, safety and tolerability of secukinumab in subjects with moderate to severe hidradenitis suppurativa (HS) completing either of the two Phase III studies, CAIN457M2301 or CAIN457M2302, both 52 weeks in duration. In addition, this study will provide long-term access to the study medication.

A Randomised, Double-Blind, Placebo-Controlled Trial to Evaluate the Efficacy and Safety of Lebrikizumab in Patients with Moderate-to-Severe Atopic Dermatitis. Assoc. Prof. J. Grigaitienė, R. McGlone, teaching assistant T. Raudonis, I. Gylienė. 2020–2022.

This is a randomised, double-blind, placebo-controlled, parallel-group study which is 52 weeks in duration. The study is designed to confirm the safety and efficacy of lebrikizumab as monotherapy for moderate-to-severe atopic dermatitis, utilising a 16-week induction treatment period and a 36-week long-term maintenance treatment period. Eligible adult and adolescent patients with moderate-to-severe atopic dermatitis for at least one year, defined according to the American Academy of Dermatology Consensus Criteria, an Eczema Area and Severity Index Score (EASI) of ≥16, an Investigator Global Assessment (IGA) score of ≥3 and a body surface area (BSA) of ≥10% will be enrolled. Efficacy will be measured through the IGA, EASI, BSA, SCORAD, Pruritus and Sleep-loss scores.

Long-Term Safety and Efficacy Study of Lebrikizumab (DRM06-AD07/J2T-DM-KGAA) in Participants with Moderate-to-Severe Atopic Dermatitis (Adjoin). Assoc. Prof. J. Grigaitienė, R. McGlone, I. Gylienė. 2021–2024.

A long-term study to assess the safety and efficacy of Lebrikizumabin patients with moderate-to-severe atopic dermatitis. This is the extension of the previous lebrikizumab study. Primary endpoint – describe the proportion of patients discontinued from study treatment due to adverse events through the last treatment visits.

A Randomised, Double-Blind, Placebo-Controlled Study to Assess the Efficacy and Safety of Nemolizumab in Subjects with Moderate-to-Severe Atopic Dermatitis. Assoc. Prof. J. Grigaitienė, R. McGlone. 2020–2024.

This is a randomised, double-blind, placebo-controlled, multicenter, parallel-group study in adult and adolescent subjects with moderate-to-severe AD. The study is designed to confirm the safety and efficacy of nemolizumab in subjects with AD when the disease is not adequately controlled with topical medications. Eligible subjects must have a documented history of inadequate response to topical AD medication(s). The study consists of 4 periods over approximately 60 weeks: screening (including run-in), initial treatment, maintenance, and follow-up. A long-term extension of up to 3 years in duration is foreseen. Eligible adult and adolescent patients with moderate-to-severe atopic dermatitis for at least two years, defined according to the American Academy of Dermatology Consensus Criteria, an Eczema Area and Severity Index Score (EASI) of ≥16, an Investigator Global Assessment (IGA) score of ≥3 and a body surface area (BSA) of ≥10% will be enrolled. Efficacy will be measured through the IGA, EASI, BSA, SCORAD, Pruritus and Sleep-loss scores.

A Phase 3, Multicenter, Randomised, Double-Blind Study Evaluating the Efficacy and Safety of ABP 654 Compared with Ustekinumab in Subjects with Moderate to Severe Plaque Psoriasis. Assoc. Prof. J. Grigaitienė, T. Raudonis, I. Gylienė, L. Lukavičiūtė, L. Martinelė. 2021–2022.

The study is designed to investigate the efficacy, safety, and immunogenicity of ABP 654 compared with ustekinumab in subjects with moderate to severe plaque psoriasis. During the approximately 56 weeks of total study participation, each subject will receive a total of either 5 or 6 doses, based on the one group to which they are assigned, as described below. Subjects will receive an initial three doses of either ABP 654 or ustekinumab at weeks 0, 4, and 16. From week 28, subjects will receive either ABP 654 or ustekinumab every eight weeks (Q8W) or every 12 weeks (Q12W). Subjects with a PASI 75 response or better improvement will continue on the study and will be re-randomised in a blinded fashion such that subjects initially randomised to Group A (ABP 654) will continue to receive ABP 654 and those in Group B (ustekinumab) will be re-randomised 1:1 to either continue on ustekinumab (Treatment Group B1) or switch to ABP 654 (Treatment Group B2). Subjects will receive the investigational product at week 28 and the last dose of the investigational product at week 40.

A Phase III, Randomised, Double-Blind, Multicentre Clinical Study to Evaluate the Efficacy, Safety, Tolerability, Pharmacokinetics, and Immunogenicity of SB17 Compared to Stelara® in Subjects with Moderate to Severe Plaque Psoriasis. Assoc. Prof. J. Grigaitienė, Teaching Assistant T. Raudonis, I. Gylienė, L. Lukavičiūtė, L. Martinelė. 2021–2022.

This is a randomised, double-blind, multicentre clinical study to evaluate the efficacy, safety, tolerability, PK, and immunogenicity of SB17 compared to Stelara® in subjects with moderate to severe plaque psoriasis. Subjects will be randomised in a 1:1 ratio to receive either SB17 or Stelara® via subcutaneous injection. Investigational products (IPs) (SB17 or Stelara®) will be administered at Week 0, 4, and then every 12 weeks up to Week 40, and the last assessment will be done at Week 52. At Week 28, subjects who achieved a PASI50 response will enter the transition period. In the transition period, subjects receiving Stelara® will be randomised again in a 1:1 ratio to either

continue on Stelara® (Stelara®/Stelara®) or be transitioned to SB17 (Stelara®/SB17) up to Week 40. Subjects receiving SB17 will continue to receive SB17 up to Week 40, but they will follow the randomisation procedure in order to maintain blinding.

A Phase IV, Randomised, Double-blind, Parallel-group, Multiple-dose, Active Comparator, Multicentre Clinical Study to Evaluate the Pharmacokinetics, Efficacy, Safety, and Immunogenicity of SB5 Versus Humira® in Subjects with Moderate to Severe Chronic Plaque Psoriasis. Assoc. Prof. J. Grigaitienė, T. Raudonis, I. Gylienė, L. Lukavičiūtė, L. Martinelė. 2022–2023.

This is a Phase IV, randomised, double-blind, parallel-group, multiple-dose, active comparator, multicentre clinical study to evaluate the PK, efficacy, safety, and immunogenicity of SB5 versus Humira® in subjects with moderate to severe chronic plaque psoriasis. All entered subjects will be treated with Humira® during a lead-in period of 13 weeks, where the last dose occurs at Week 11. All subjects will receive an initial dose of Humira® 80 mg at Week 0, followed by Humira® 40 mg every other week starting one week after the initial dose via subcutaneous (SC) injection. At Week 13, subjects who achieved at least a 50% reduction in Psoriasis Area and Severity Index (PASI50) response will be randomised in a 1:1 ratio to either be switched between Humira® and SB5 (G1) or continue on Humira® (G2).

OTHER RESEARCH ACTIVITIES

Research assistants PhD student Ieva Kubiliūtė and teaching assistant PhD student Elžbieta Matulytė attended EACS closed meetings by personal invitation:
1. **EACS Young Investigators Conference 2022**, held in Brussels, Belgium on 2022/07/01–2
   This two-day event included presentations, plenary sessions, and workshops organised by a scientific committee composed of young experts. The YING educational project aims to foster deeper and more frequent exchanges among young HIV experts across Europe.
2. **EACS Standard of Care for HIV and Co-infections in Europe**, held in Brussels, Belgium, on 13-14 October 2022
   This closed meeting gathers around a hundred HIV experts, community representatives and institutional partners from the WHO European region. It is a 1 ½ day meeting consisting of plenaries and information-sharing discussions on the current European situation. This meeting provides a unique opportunity to monitor progress and pitfalls in care for people living with HIV throughout Europe.

Research assistant PhD student Laura Lukavičiūtė participated in the fellowship "Psoriasis and psoriatic arthritis masterclass: from theory to practice" on 2022/11/24–25 in Ghent, Belgium.

Assoc. Prof. Dr Birutė Zablockienė, participant at ESCMID Antimicrobial Stewardship Certificate 2022-2024.
This 2-year study programme covers a broad range of topics in Antimicrobial Stewardship. Basic, advanced and elective courses should be completed, followed by exams and developed and implemented AMS project executed throughout the 2-year study period. The basic module in Nijmegen, Netherlands, and advanced modules in Rome, Italy and Belgrad, Serbia, have already been completed.

Prof. Dr L. Jančorienė –
- member of the European Adult Immunization Board (AIB), http://www.adultimmunizationboard.org
- member of the WHO International Steering Committee of Solidarity Trial
- member of the International Society of Travel Medicine, www.istm.org

- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org
- board member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the Lithuanian Society of Gastroenterology, www.gastroenterologija.lt
- member of the working group for preparation of the Action Plan for Viral Hepatitis Prevention and Control 2019–2022, Lithuania
- member of the Coordination Group for the Control of National HIV/AIDS and Sexually Transmitted Infections action plan under the Lithuanian Ministry of Health
- member of Independent Experts (advisors, consultants) group for the National Immunoprophylaxis programme for 2019–2023
- member of the working group for the concept of infectious diseases management and control, Ministry of Health of The Republic of Lithuania
- member of the Expert group under the Lithuanian Ministry of Health for the preparation of National guidelines for the rational use of antimicrobials and for the preparation of a draft version of guidelines for the selection of the recommended first-line and reserve antimicrobials
- member of the Antibiotic Resistance Prevention Expert Group, Ministry of Health of The Republic of Lithuania
- member of the National Health Council (Nacionalinė sveikatos taryba), appointed on 2021/09/30 by the Seimas of the Republic of Lithuania (Resolution No. XIV-544 "On the appointment of Members of the National Health Council")
- member of the Doctoral Committee on Public Health at Medical Faculty, Vilnius University
- member of the editorial committee of the journal "Internistas" supplement "Infekcinės ligos"
- member or lead of organising committee of national scientific-practical conferences: "Resistance of microorganisms and choice of antimicrobial drugs and other relevant issues of infectious diseases", "Parasitic liver diseases"; September 22, 2022, "Actual topics in the epidemiology, treatment and prevention of infectious diseases"; October 12, 2022, "What's new in infectology: impressions from international scientific conferences in 2022"; December 21, 2022
- member of the organising committee of the international scientific-practical conference "Infectology 2022"; June 3-4, 2022

Prof. Dr R. Matulionytė –
- board member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the editorial committee of the journal "Internistas" supplement "Infekcinės ligos"
- Lithuanian delegate in the European Union of Medical Specialists (UEMS) – Infectious Diseases section
- steering committee member of the multi-centre prospective observational cohort study group EuroSIDA/RESPOND
- member of the HIV Euroguidelines in Central and Eastern Europe (ECEE) Network Group
- member of the European Society of Clinical Microbiology and Infectious Diseases (ESCMID), www.escmid.org
- member of the European AIDS Clinical Society, www.eacs.ws
- member of the Monitoring Network for Drugs and Drug Addiction at the Drug, Tobacco, and Alcohol Control Department of the Republic of Lithuania
- member of the Antibiotic Resistance Prevention Expert Group, Ministry of Health of The Republic of Lithuania
- member of Independent Experts (advisors, consultants) group for the National Immunoprophylaxis programme for 2019–2023

Prof. Dr M. Bylaitė-Bučinskienė –

- board member of the European Association of Dermato Oncology, www.eado.org
- board member of the Baltic Association of Dermatovenereologists, www.badv.org
- member of the European Academy of Dermatology and Venereology (EADV), www.eadv.org
- member of the European Dermatology Forum, www.euroderm.org
- member of the European Society for Pediatric Dermatology (ESPD), www.espd.info
- member of the International Society of Dermatology, www.intsocderm.org
- editorial board member of the *Journal of Health Sciences*
- editorial board member of the *Journal of Lithiania's Obstetrics and Gynecology*
- editorial board member of the journal *Sveikatos mokslai* (*Health Sciences*), www.sam.lt/lt/sam/moksliniai/straipsniai/

Assoc. Prof. Dr R. Gancevičienė –

- President of the Lithuanian Society of Dermatovenereology, www.ldvd.lt
- member of the European Academy of Dermatology and Venereology, www.eadv.org
- member and board member of the local Euromelanoma Committee
- editorial board member of the *Journal of Dermato-Endocrinology*, *Landes Biosciences*
- member of the Scientific Technical Committee *Cosmetics* of the Lithuanian Department for Standardisation
- Member of the scientific committee of:

-11th Conference of the European Hidradenitis Suppurativa Foundation e.V.; https://www.ehsf 2022.com

-Chair and board member: 35th Nordic Congress of Dermatology & Venereology, NCDV 2022; 2022/04/22, ncdv2022.org;

-International Scientific-Practical Conference of Lithuanian Association Of Dermatovenereologists, 2022; 2022/04/29, Vilnius

-Scientific-practical dermoscopy workshop, 2022/04/28; Vilnius

-Scientific-practical symposium "Harmonising Age-Related Facial Changes: combining synergistic non-surgical techniques"; 2022/09/14

-Scientific - practical seminar "A practical approach to acne and the consequences that accompany the disease"; 2022/03/07, Vilnius

Assoc. Prof. Dr J. Grigaitienė –

- board member of the Lithuanian Society of Dermatovenereology, www.ldvd.lt,
- member of the European Academy of Dermatology and Venereology, www.eadv.org
- member of Lithuanian Society of Allergology and Clinical Immunology, www.alergologudraugija.lt
- member of the Lithuanian Society of Lasers
- national representative and board member of the Dermato-Venerology Section of European Union of Medical Specialists (UEMS), www.uems.net

Assoc. Prof. Dr B. Zablockienė –

- board member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org
- member of Lithuanian Society of Pulmonologists, http://www.chest.lt
- member of Lithuanian Ultrasound Association, http://www.ultragarsas.lt

- member of organising committee of national scientific-practical conferences: "Resistance of microorganisms and choice of antimicrobial drugs and other relevant issues of infectious

diseases" and "Actual topics in the epidemiology, treatment and prevention of infectious diseases"; 12th October 2022

- ESCMID Antimicrobial Stewardship Certificate 2022-2024 participant. It is a 2-year study programme with a broad range of topics in Antimicrobial Stewardship. Basic, advanced and elective courses should be completed, followed by exams and developed and implemented AMS project executed throughout the 2-year study period. The basic module in Nijmegen, Netherlands, and advanced modules in Rome, Italy and Belgrad, Serbia, are completed already.

Assoc. Prof. Dr D. Radzišauskienė –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt

Assist. Prof. Dr R. Valintėlienė –
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org
- member of the editorial committee of the journal "Internistas" supplement "Infekcinės ligos"

Teaching assist. I. Kisielienė –
- member of the Lithuanian Society of Dermatovenereology, www.ldvd.lt

Teaching assist. T. Raudonis –
- board member of the Lithuanian Society of Dermatovenereology, www.ldvd.lt
- member of the European Academy of Dermatology and Venereology, www.eadv.org
- member of the European Hidradenitis Suppurativa Foundation, www.ehsf.eu
- specialist in the EU project 761319 (partner - Vilnius University Hospital *Santaros Klinikos*) - Joint Action on integrating prevention, testing and link to care strategies across HIV, viral hepatitis, TB and STIs in Europe (INTEGRATE)

Teaching assist. E. Matulytė –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org
- member of the European AIDS Clinical Society, www.eacs.org

Teaching assist. D.Stundys –
- member of the Lithuanian Society of Dermatovenereology, www.ldvd.lt

Research assist. I. Kubiliūtė –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org
- member of the European AIDS Clinical Society, www.eacs.org

Research assist. E. Strumilienė –
- member of Lithuanian Society of Pulmonologists, http://www.chest.lt/
- member of Lithuanian Society of Pulmonologists and Allergologists, www.pulmoalerg.lt
- member of Society of Vilnius Region Allergologists and Immunologists, www.vaki.lt
- member of European Respiratory Society, https://www.ersnet.org/

Research assist. L. Lukavičiūtė –
- member of the Lithuanian Society of Dermatovenereology, www.ldvd.lt

- member of the European Academy of Dermatology and Venereology (EADV), www.eadv.org

Lect. M. Paulauskas –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org

Lect. L. Svetikas –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org

Lect. O. Aliancevič –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org

Lect. K. Žvirblytė-Skrebutėnienė –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt

Lect. A. Marcinkutė –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt
- member of the European Society of Clinical Microbiology and Infectious Diseases, www.escmid.org

Lect. M. Macejevska –
- member of the Lithuanian Society of Dermatovenereology, www.ldvd.lt
- member of the European Academy of Dermatology and Venereology, www.eadv.org

Research Assist. S. Grubytė –
- member of the Lithuanian Society of Dermatovenereology, www.ldvd.lt

Investigator F. Majauskaitė –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt

Investigator K. Vagoraitė –
- member of the Lithuanian Society of Infectious Diseases, www.lid.lt

MOST IMPORTANT PARTICIPATION CASES OF RESEARCHERS IN WORKING GROUPS OR COMMISSIONS SET UP BY STATE AUTHORITIES, STATE AND MUNICIPAL INSTITUTIONS AND ORGANISATIONS, AND BUSINESS ENTITIES

- Prof. Dr L. Jančorienė: member of European Adult Immunisation Board (AIB), http://www.adultimmunisationboard.org

- Prof. Dr L. Jančorienė: member of the Council of Health Experts initiated by the President of the Republic of Lithuania.

- Prof. Dr L. Jančorienė is a member of the National Health Board. member of the National Health Council (Nacionalinė sveikatos taryba) – appointed on 2021/09/30 by the Seimas of the Republic of Lithuania (Resolution No. XIV-544 "On the appointment of Members of the National Health Council")

MOST IMPORTANT RESEARCH DISSEMINATION ACTIVITIES

- Prof. Dr L. Jančorienė delivered an oral presentation, "Significance of COVID-19 vaccination in the heat of spread of SARS-CoV-2 Omicron strain", a clinical practical conference for pharmacists, 2022/02/10, Vilnius, Lithuania.

- Prof. Dr L. Jančorienė delivered the presentation "Ilgasis COVID-19 ir pokovidinis sindromas [Long-COVID-19 and post-COVID-19 syndrome]" at the Roundtable discussion "COVID-19 akualijos [COVID-19 actualities]" at Lithuanian Academy of Sciences, 2022/04/05, Vilnius, Lithuania.

- Prof. Dr L. Jančorienė moderated one part of a discussion at the Health Forum "Lessons from health crises and preparedness for threats" on 2022/06/27, Presidential Palace, Vilnius.

- Prof. Dr L. Jančorienė delivered the presentation "Hepatito C viruso eliminacijos perspektyva Europoje [Hepatitis C virus elimination perspective in Europe]" at World Hepatitis C Day Forum, Lithuanian Academy of Sciences, 2022/07/21, Vilnius, Lithuania.

- Prof. Dr R. Matulionytė participated in programs related to AIDS Day on Lithuanian National (LRT) TV, Delfi TV, and "Žinių" radio.

- Research assistant L. Lukavičiūtė gave an oral presentation on the "Treatment of mild forms of skin psoriasis. Psoriasis: when a systemic disease requires a systemic approach" at the Skin Academy [Odos akademija] online Seminars: 2022/10/03–2022/12/05.

- Research assistant L. Lukavičiūtė. Organising and lecturing in an educational project on skin diseases and their prevention – Skin Academy.

- Prof. Dr J. Grigaitienė, research assistant L. Lukavičiūtė, I. Gylienė, J. Pamedys, S. Tulytė, N. Fatkulina, J. Kesienė, M. Kliukas are the authors of the methodological document "Melanoma of the skin: prevention, diagnosis and treatment" prepared for the Ministry of Health of the Republic of Lithuania. (Project No. 10.1.3-ESFA-V-918-01-0009). "Improving the quality of services through the development of standards for integrated health care for the main causes of death and health disorders".

- Educational material (lectures) uploaded in the leading Baltic's online education platform for healthcare professionals **EVISIT** for registered healthcare specialists. Those who listened to lectures and answered test questions earned CME points or credit points:

  Prof. Dr L. Jančorienė "Chronic viral hepatitis, liver cirrhosis, HIV infection: what are the features for such co-infection, principles of diagnostics and treatment and sequela". This course covers hepatitis C and HIV confection in liver cirrhosis patients, its diagnostics, treatment and surveillance. Uploaded in July 2022

- Scientific popularisation on TV, radio and Internet broadcasts (Prof. Dr L. Jančorienė, Prof. Dr R. Matulionytė, Prof. Dr M. Bylaitė-Bučinskienė, Assoc. Prof. Dr J. Grigaitienė, Assoc. Prof. Dr R. Ganceviciene, Assoc. Prof. Dr D. Radzišauskienė, Assoc. Prof. Dr B. Zablockienė, Assist. Prof. Dr R. Valintėlienė, Teaching Assistant T. Raudonis, Teaching Assistant E. Matulytė, Lecturer L. Svetikas, Lecturer A. Marcinkutė).

- On 2022/01/01, the Lithuanian public broadcaster, Lithuanian Radio and Television (LRT) published the Awards of the Year 2021: State Creator of the Year – Ligita Jančorienė (For her tireless work at the epicentre of the pandemic) [The creator of the state of the year is the person, collective or organisation that has contributed the most to the growth of the Lithuanian state]. Read more:
  https://www.lrt.lt/mediateka/irasas/2000192875/lrt-metu-apdovanojimai-2021-metu-valstybes-kurejas-ligita-jancoriene

- On the evening of Vilnius' 699th birthday, ten Vilnius residents were presented with Christopher statuettes for ideas and works for Vilnius, fostering and glorifying the city. St. The Christopher Awards have been awarded since 1998. Nominations for merit in science,

law enforcement, education, culture and art, Vilnius historical memory, sports, business, tourism development, charity, and architecture are offered by Vilnius residents; other nominations proposed by Vilnius residents are also possible. On 2022/01/25, Ligita Jančorienė was awarded the Christopher statuette: *Prof. L. Jančorienė, Head of the Centre of Infectious Diseases, has focused her professional knowledge on acute and chronic viral hepatitis, HIV infection, other viral infections, infectious diseases and their prevention, vaccination and travel medicine*. Read more: https://www.vz.lt/laisvalaikis/akiraciai/2022/01/26/sv-kristoforo-statuleles--mokslininkams-gydytojams-menininkams

RESEARCH INTERESTS

- Evaluation of the efficacy of the diagnostic and treatment methods in obstructive, interstitial, neoplastic and allergic lung diseases: diagnosis and management of interstitial lung diseases.
- Diagnosis and management of COPD and bronchial asthma; sensitivity to various kinds of disinfectants among the medical staff.
- Development of new technologies, methods of early cancer detection and treatment interventions
- Improvement of the quality of life of cancer patients.
- Pleural disease, diagnostic procedures, pleural biopsy; diagnosis, epidemiological and clinical research of drug hypersensitivity.
- Allergen immunotherapy: selection of patients, efficacy of different methods and long-term treatment results.
- Drug hypersensitivity diagnostic peculiarities.
- Contact allergy to cosmetics, textiles, and heavy metals.
- Study of interactions between allergic rhinitis and bronchial asthma, application of new technologies in allergic and respiratory diseases.
- Strategy and approaches of the surgical management of patients with different thoracic pathology.
- Role of mobile technologies in diagnostic and management of allergic diseases.

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Diagnosis and Treatment of Interstitial Lung Diseases. Prof. E. Danila. 2014–2022.

The study aims to evaluate the significance of bronchoalveolar lavage fluid examination in sarcoid patients and patients with rare interstitial disorders (eosinophilic pneumonia, hypersensitivity pneumonitis). Clinical symptoms, cell differentials, and distribution of lymphocyte subgroups in BALF, chest X-ray, spirometric indices, blood gases, and biopsy material were evaluated.

Predictors of noninvasive respiratory support failure in COVID-19 patients. Assoc. Prof. R. Zablockis. 2017–2022.

Patients who required NIV exhibited a higher prevalence of treatment failure and had higher mortality than patients who received high-flow nasal cannula (HFNC). Using logistic regression, the respiratory rate oxygenation (ROX) index at 24 h and the Charlson Comorbidity Index (CCI) were found to be predictors of HFNC efficacy. It was the ROX index at 24 h and the CCI optimum cut-off values for HFNC outcome that were 6.1 and 2.5, respectively. Serum ferritin level and lymphocyte count were confirmed as predictors of NIV failure. Serum ferritin level at a cut-off value of 456.2 ng/mL and lymphocyte count lower than 0.70 per mm^3 were associated with NIV failure with 70.5% sensitivity, 68.7% specificity and sensitivity of 84.1%, specificity of 56.2%, respectively.

Chronic obstructive pulmonary disease and comorbidities. Prof. E. Danila. 2014–2022.

Various comorbidities and multimorbidities frequently occur in chronic obstructive pulmonary disease (COPD), leading to an overload of healthcare systems and increased mortality. The cross-sectional analysis of the nationwide Lithuanian database was performed; 321,297 patients aged 40-79 years were included; 4834 of them had COPD. A significantly higher prevalence of cardiovascular diseases (CVD), lung cancer, kidney diseases, and the association of COPD with six-fold higher odds of lung cancer (OR 6.66; $p < 0.0001$), a two-fold of heart failure (OR 2.61; $p < 0.0001$), and CVD (OR 1.83; $p < 0.0001$) was found. Six clusters in COPD males and five in females

were pointed out in patients without COPD-five and four clusters accordingly. The most prevalent cardiovascular cluster had no significant difference according to sex or COPD presence, but a different linkage of dyslipidemia was found. The study raises the need to elaborate on adjusted multimorbidity case management and screening tools to enable better outcomes.

Drug Hypersensitivity Diagnostic Peculiarities. Prof. L. Malinauskienė. 2014–2022.

In 2022, we analysed data on the vaccination with the COVID-19 vaccine in the suspected hypersensitive patient population and rare adverse reactions to drugs.

Strategy and approaches of the surgical management of patients with different thoracic pathology. Assoc. Prof. R. Janilionis. 2017–2022.

Work on spontaneous pneumothorax is in progress, and 23 new patients were included in the prospective study part during the year. Collecting retrospective data is in progress. Collected and analysed data about spontaneous pneumothorax and mediastinal or subcutaneous emphysema in patients with COVID-19 infection.
Updated and supplemented data on surgical treatment of myasthenia gravis.
Updated and supplemented data on the result of surgical treatment of postintubation tracheal stenosis.

National Research Projects

. **Seasonal Peculiarities of Indoor Air Pollution and Its Impact on Respiratory Morbidity and Allergy of Primary School Children** (LMT, P-MIP-20-404). The Research Council of Lithuania. Dr V. Kvedarienė. 2020–2025.

The project aims to quantify the impact of air pollution on child morbidity as a result of respiratory and allergic respiratory diseases and to assess the main sources of indoor air pollution. This idea will be implemented through complex measurements of air quality, statistical data analysis of children's health status and cases of respiratory tract inflammations and allergic testing. The results of the project will allow recommendations to be made relating to the improvement of school indoor air quality for national health organisations, making a better environment for children.
In 2022, the air pollution levels of aerosol particles in the school environment were assessed, and the main pollution sources were determined. The diagnosis of allergic diseases in primary school children started.

International Research Projects

Obstructive Sleep Apnea. The SADA Network (European Sleep Apnea Database) supports the project. Assoc. Prof. R. Zablockis. 2017–2022.

Twenty-six countries (36 sleep centres) representing 20 ESADA and six non-ESADA countries participated in the project, performing OSA diagnostic procedures as well as treatment and titration procedures. In 2022, the study data was analysed, and the article was prepared and published.

Contact allergy to textiles. The project is supported by the Edvard Welander-Finsen (Sweden) grant. Prof. L. Malinauskienė. 2014–2022.
A. Patch-testing with a textile dye mix not containing DO 3
In 2022, consecutive patients in Vilnius and Malmo were tested with a new TDM 7.0%. Data were analysed, and the results were published.
B. Patch testing patients with the textile extracts and isolated dyes
   In 2022, TDM 6.6% pet. positive individuals were patch tested with the extracts of synthetic fibre clothes that do not contain any of the pure DDs present in the TDM 6.6% to study the reactivity pattern. The results were analysed and published.

Allergic Rhinitis and Its Impact on Asthma (ARIA) in collaboration with the leading French scientists Prof. Pascal Demoly (Montpellier University, France) and Prof. J. Bousquet (INSERM 1168, France) and cooperation with 70 centres of science worldwide. Prof. R. Dubakienė, Dr V. Kvedarienė, 2002–2025.

In 2022, the data were analysed, and the results were published.

Integrated Care Pathways for Airway Diseases (AIRWAYS-ICPs).
AIRWAYS ICPs was initiated in 2014 in collaboration with the leading French scientists: Prof. Pascal Demoly (Montpellier University, France) and Prof. Jean Bousquet (INSERM 1168, France) and 23 collaborating centres. Dr V. Kvedarienė. 2014–2025.

The practical consideration of the organisational allergy department on COVID-19 was created by a panel of international experts. The data were analysed, and the results were published.

European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) in collaboration with the leading French scientists: Prof. P. Demoly (Montpellier University, France) and Prof. J. Bousquet (INSERM 1168, France) and 74 collaborating centres. Dr V. Kvedarienė. 2014–2025.

The data were analysed, and the results were published.

Study of Interactions between Allergic Rhinitis and Bronchial Asthma, Application of New Technologies in the Program (MASK-air/MASK: MACVIA-ARIA Sentinel Network) in collaboration with the leading French scientists: Prof. P. Demoly (Montpellier University, France) and Prof. J. Bousquet (INSERM 1168, France) and cooperation – 23 centres of science worldwide. Dr V. Kvedarienė. 2014–2025.

The data were analysed, and the results were published.

TWINNING (Transfer of Innovation) Research Project. Since 2014, in collaboration with the leading French Prof. J. Bousquet (INSERM 1168, France) and cooperation – with 23 centres of science worldwide. Dr V. Kvedarienė. 2014–2025.

The aim of this study was to transfer innovation from an app developed by the MACVIA-France EIP on the AHA reference site (Allergy Diary) to other reference sites. The research data of a few years was summarised, and the article in the course of writing.

Contractual Research

The benralizumab retrospective study has been commissioned to describe real-world patient characteristics, treatment patterns, and outcomes in Central Eastern Europe and the Baltics (BREEZE) (Study Code D3250R00108). Assoc. Prof. V. Šileikienė. 2022.

OTHER RESEARCH ACTIVITIES

Prof. E. Danila –
- member of European Respiratory Society (ERS), http://www.ersnet.org/;
- vice-chair and member of the Lithuanian Society of Pulmonologists, http://www.chest.lt/;
- editorial board member of the journal *Vaikų pulmonologija ir alergologija (Children's Pulmonology and Allergology).*
- editorial board member of the journal *Pulmonology News*, http://www.chest.lt

Affil. Prof. R. Dubakienė –

- member of the Lithuanian Academy of Sciences;
- chair of the Allergology Commission of the Lithuanian Academy of Sciences;
- expert of the Research Council of Lithuania;
- expert of MITA;
- editor-in-Chief of the journal *Alergologija ir klinikinė imunologija (Allergology and Clinical Immunology);*
- editor-in-Chief of the on-line journal *Alergologija ir klinikinė imunologija (Allergology and Clinical Immunology);*
- editorial board member of the journals: *Acta Medica Lithuania*, http://www.lmaleidykla.lt/ojs/index.php/actamedicalituanica; *Revue of Allergology and Clinical Immunology; Medicinos teorija ir praktika (Theory and Practice in Medicine);*
- member of the Lithuanian Immunology Society;
- member of the European Academy of Allergy and Clinical Immunology;
- head of online websites: www.alergo.lt, www. rutadubakiene.com.

Prof. L. Malinauskienė –

- member of the European Academy of Allergy and Clinical Immunology (www.eaaci.org);
- board member of the Lithuanian Society of Allergology and Clinical Immunology;
- President of the Vilnius Regional Society of Allergologists and Clinical Immunologists;
- national representative of the International Hereditary Angioedema Organisation (https://paelietuva.haei.org/);
- editor-in-chief of the journal *Alergija, astma, imunologija* (*Allergy Asthma Immunology*) (https://www.medpraktika.lt/leidiniai/zurnalai/internisto-priedai) and editorial board member of the journal *Pulmonologija ir alergologija (Pulmonology and Allergology)* (https://www.pulmoalerg.lt/wp-admin/admin-post.php?action=preview_document&post_id=2096).

Assoc. Prof. R. Zablockis –

- chair of the Lithuanian Society of Pulmonologists, http://www.chest.lt/;
- member of the European Respiratory Society (ERS), http://www.ersnet.org/;
- editor-in-chief of the journal *Pulmonology News*, http://www.chest.lt/;
- editorial board member of the journal *Pulmonology and Allergology*, http://www.pulmoalerg.lt/.

Assoc. Prof. Dr (HP) R. Janilionis –

- member of the Lithuanian Society of Cardiothoracic Surgery, www.lkscd.lt;
- board member of Vilnius Surgical Society;
- member of the European Respiratory Society (ERS), www.ersnet.org;
- member of the European Association for Cardio-Thoracic Surgery, www.eacts.org;
- editorial board member of the journal *Medicina*, www.medicina.kmu.lt;
- editorial board member of the journal *Lithuanian Surgery*, http://www.chirurgija.lt0.

Assoc. Prof. V. Gruslys –

- member of the Lithuanian Society of Thoracic and Cardiac Surgeons, www.lkscd.lt;
- member of the European Respiratory Society (ERS), www.ersnet.org;
- board member of the Lithuanian Society of Minimal Invasive Surgery, http://www.mic.lt;
- member of the Lithuanian Respiratory Society, http://www.chest.lt.

Assoc. Prof. A. Chomičienė –

- member of the European Academy of Allergy and Clinical Immunology, http://www.eaaci.org/;

- member of Lithuanian Society of Allergology and Clinical Immunology, http://www.aai.mf.vu.lt/alerimun/draugija.htm;
- editorial board member of the journal *Alergija, astma, imunologija* (*Allergy Asthma Immunology*);
- board member of Vilnius Regional Society of Allergologists and Clinical Immunologists: http://vaki.lt.

Research professor V. Kvedarienė –

- editorial board member of the journal *Pulmonologija, imunologija ir alergologija (Pulmonology, Immunology and Allergolgy);*
- vice-chair of the reviewer board of the journal *Vaikų pulmonologija ir alergologija (Children's Pulmonology and Allergology);*
- chair of the Lithuanian Allergy and Asthma Association;
- member of the Allergology Commission of the Lithuanian Academy of Sciences;
- member of the European Academy of Allergy and Clinical Immunology;
- member of UCB Institute of Allergy, http://www.theucbinstituteofallergy.com/Home;
- member of the Lithuanian Society of Allergology and Clinical Immunology;
- member of Allergic Rhinitis and its Impact on Asthma (ARIA);
- member of the European Network on Drug Allergy (ENDA);
- member of Integrated Care Pathways for Airways Diseases (AIRWAYS-ICPs);
- medical advisor of the Lithuanian Asthma Patients Association.

Assoc. Prof. V. Šileikienė, Lect. G. Cincilevičiūtė, Lect. V. Kumpauskaitė, Lect. G. Šlekytė, Lect. E. Bagurskienė –

- members of the European Respiratory Society (ERS), http://www.ersnet.org/;
- members of the Lithuanian Society of Pulmonologists, http://www.chest.lt/.

Assist. Prof. Ž. Jagelavičius –

- board member of the Lithuanian Society of Thoracic and Cardiac Surgeons, www.lkscd.lt;
- member of the European Society of Thoracic Surgeons (ESTS), www.ests.org;
- member of the European Respiratory Society (ERS), www.ersnet.org.

Lect. K. Kėvelaitienė –

- member of the European Respiratory Society (ERS);
- member of the Lithuanian Society of Pulmonologists.

Teaching assistant R. Gauronskaitė –

- member of European Respiratory Society (ERS), http://www.ersnet.org/;
- member of the Lithuanian Society of Pulmonologists, http://www.chest.lt/;
- member of the World Sleep Society, http://worldsleepsociety.org/.

Assist. Prof. K. Linauskienė –

- member of the Lithuanian Society of Allergology and Clinical Immunology (LAKID);
- member of the European Academy of Allergy and Clinical Immunology (EAACI);
- member of the European Society for Immunodeficiencies (ESID).

PhD stud. R. Vėbrienė –

- member of the European Academy of Allergy and Clinical Immunology;
- member of the Lithuanian Society of Allergology and Clinical Immunology.

MOST IMPORTANT PARTICIPATION CASES OF RESEARCHERS IN WORKING GROUPS OR COMMISSIONS SET UP BY STATE AUTHORITIES, STATE AND MUNICIPAL INSTITUTIONS AND ORGANISATIONS, AND BUSINESS ENTITIES

- R. Dubakienė prepared *Lithuanian names of food allergens* for the Bank of Terms of the Lithuanian State Commission.
- E. Danila and R. Zablockis participated in: 1) the Intensive Pulmonology Task Force of the Ministry of Health of the Republic of Lithuania; 2) the Hospital Pulmonology Services Task Force of the Ministry of Health of the Republic of Lithuania.
- E. Danila is a member of the Lithuanian Group of Independent Experts (Advisers, Consultants) at the National Immunoprophylaxis Programme.
- A. Chomičienė participated in the Hospital allergology services task force of the Ministry of Health of the Republic of Lithuania.
- Malinauskiene L. Participated in the Bronchial asthma task force of the Ministry of Health of the Republic of Lithuania.

CONSULTATIONS PROVIDED BY THE UNIT TO THE PUBLIC OR ECONOMIC ENTITIES

- E. Danila, R. Zablockis, L. Malinauskiene – regular consultations for Lithuanian State Ministry of Health.
- E. Danila, R. Zablockis, L. Malinauskiene, V. Šileikienė, V. Kvedarienė – advisory board for several pharmaceutical companies.

MOST IMPORTANT RESEARCH DISSEMINATION ACTIVITIES

- E. Danila – Participation in radio and TV interviews about lung diseases for the public. Press publications on lung diseases for the general public.
- L. Malinauskienė – Interviews on national TV and Facebook about allergic diseases.
- R. Zablockis – Press publications on lung diseases for the general public (www.delfi.lt/sveikata).
- V. Kvedarienė - Participation in radio and TV interviews about allergic diseases for the public. Press publications on allergies for the general public. Allergy school medical advisor and lecturer for allergic patients.
- A. Chomičienė – Interviews on national TV and radio about allergic diseases.

RESEARCH INTERESTS

- Cognitive disorders in neurodegenerative, cerebrovascular, demyelinating diseases and epilepsy.
- Diagnostic evaluation and treatment of cerebrovascular disorders, demyelinating diseases, headache, dizziness and degenerative spinal diseases.
- Pharmacogenomics, impact of COVID-19, electroencephalographic changes during the different stimulations, prognostic implications, antiseizure medications in epilepsy.
- Research on cerebral autoregulation disorders in traumatic injury and subarachnoidal bleeding, deep brain stimulation and blood pressure control, intratumoral genetic heterogeneity in brain gliomas, and blood-brain barrier pathology *in vitro*.
- Historical research on the prevalence, diagnosis and treatment of nervous diseases in the Grand Duchy of Lithuania, 19th century and interwar Lithuania.

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Cognitive Disorders in Neurodegenerative, Cerebrovascular, Demyelinating Diseases and Epilepsy. Prof. G. Kaubrys. 2014–2022.

Research in the field of Alzheimer's disease has been continued to evaluate the potential of computerised cognitive tests to predict early response to treatment and to search for new markers of very early Alzheimer's disease (study of cognitive, olfactory and visuoperceptive functions). The cognitive features of multiple sclerosis were investigated; neurofilament light chain and optical coherence tomography have been studied as differential markers for various clinical forms of multiple sclerosis. Cognitive and psychometric assessments of patients with epilepsy were continued.

Diagnostic Evaluation and Treatment of Cerebrovascular Disorders, Neurodegenerative and Metabolic Brain Disorders, Epilepsy, Headache, Dizziness, Traumatic Brain Injuries, Degenerative Spinal Diseases and Cerebral Neoplasms. Prof. D. Jatužis. 2014–2022.

Clinical research focussed on epidemiological findings, clinical characteristics, diagnostics, treatment, and prognostic factors of different neurological and neurosurgical disorders (stroke, migraine, dizziness and vertigo, multiple sclerosis, Parkinson's disease, epilepsy, traumatic brain injury, cerebral neoplasms) has been continued. New methods of endovascular treatment of cerebrovascular disorders, innovative monitoring devices for traumatic brain injury, and new modalities in minimally invasive degenerative spinal disease management were investigated.

Historical Research on the Prevalence, Diagnosis and Treatment of Nervous System Diseases in the Grand Duchy of Lithuania, 19th Century and Interwar Lithuania. Prof. D. Jatužis and E. Sakalauskaitė-Juodeikienė. Prof. D. Jatužis and E. Sakalauskaitė-Juodeikienė. 2020–2023.

The study aims to reveal the origins of neurology in Grand Duchy of Lithuania, the first half of the 19th century in Vilnius, and interwar Lithuania: to show how the basic medical systems influenced the perception of nervous system diseases and treatment options, to evaluate the perception of aetiology, pathogenesis, symptoms, prophylaxis and treatment methods of nervous system diseases, to discover the origins of neurosurgery, to reveal the principles of the human cognition research.

National Research Projects

Cognitive Functions in Patients With Generalised Epilepsy and Their Relationship With Demographic and Clinical Characteristics. (No. 09.3.3.-LMT-K-712-24-0199). The Research Council of Lithuania. Prof. R. Mameniškienė. 2021-2022.

Analysis of data from a two-point cross-section study was performed; cognitive functions of patients with generalised epilepsy and their links to demographic and clinical characteristics were described, and the difference in cognitive functions that occurred over several years of the disease was assessed.

The Research Council of Lithuania. **Risk of Suicidal Ideation in Patients With Epilepsy**. No. 09.3.3-LMT-K-712-25-0202). Prof. R. Mameniškienė. 2021-2022.

Desk research was performed, the database of patients with epilepsy was created, a questionnaire was developed, and analysis started.

International Research Projects

Implementation Research Network in Stroke Care Quality – IRENE COST ACTION. Participants: Assoc. Prof. A. Vilionskis, Teaching Assist. R. Masiliūnas, Prof. D. Jatužis. 2018–2023.

Collaborative project with other stroke centres from Eastern, North and Central Europe aimed to alleviate disparities in stroke care and improve outcomes after stroke. The IRENE COST Action is conducted mainly in European countries where the burden of stroke is higher, while the quality of stroke care is lower, and resources for healthcare are less developed compared to other European countries. In 2022, the issues of pre-hospital care, the prevalence of stroke risk factors and the treatment of acute stroke in Lithuania were investigated.

Safe Implementation of Treatment of Stroke (SITS – MOST) Project. Participants: Assoc. Prof. A. Vilionskis, Prof. D. Jatužis. 2009-2022.

Collaborative project with other stroke centres from Eastern and Central Europe: a prospective international database of all acute stroke patients treated with reperfusion treatment. The aim of the project is to collect demographic, clinical, radiological, and treatment details of all acute ischemic stroke patients treated with reperfusion treatment as a three-month follow-up as well. In 2022, the important results of intravenous thrombolysis and mechanical thrombectomy for the treatment of acute ischemic stroke were analysed and published.

European Stroke Organisation: Enhancing and Accelerating Stroke (ESO-EAST project). National representative: Assoc. Prof. A. Vilionskis. 2015–2022.

ESO-EAST (European Stroke Organisation: Enhancing and Accelerating Stroke Treatment) is the first comprehensive programme of improving stroke care in Europe. ESO-EAST Programme is initiated by the European Stroke Organisation and implemented in Eastern European countries through the participation of stroke professionals, professional organisations, and local authorities. In 2022, important results of comprehensive national stroke patient care policy in Lithuania 2014-2019 were finalised and published.

The Neuro-POCUS working group. Participants: Assoc. Prof. J. Valaikienė. 2022.

The Neuro-POCUS working group, a joint project by the European Academy of Neurology Scientific Panel Neurosonology, the European Society of Neurosonology and Cerebral Hemodynamics, and the European Reference Centers in Neurosonology (EAN SPN/ESNCH/ERcNsono Neuro-POCUS working group) is working on the task of creating a concept for point-of-care ultrasound in neurology called "Neuro-POCUS".

Searching for Explanations for Cryptogenic Stroke in the Young: Revealing the Etiology, Triggers, and Outcome (SECRETO). Participants: Assoc. Prof. K. Ryliškienė, Prof. D. Jatužis, Teaching Assist. R. Masiliūnas, Teaching Assist. A. Ekkert. 2018-2022.

Collaborative project with other stroke centres from Europe. The aim of the project is to decipher transient triggers, chronic subclinical and clinical risk factors, and genetic factors underlying early-onset cryptogenic ischemic stroke after comprehensive diagnostic work-up, as well as to study long-term prognosis after such events.

MOST IMPORTANT PARTICIPATION CASES OF RESEARCHERS IN WORKING GROUPS OR COMMISSIONS SET UP BY STATE AUTHORITIES, STATE AND MUNICIPAL INSTITUTIONS AND ORGANISATIONS, AND BUSINESS ENTITIES

Participation in working groups and committees established by the Ministry of Health of the Republic of Lithuania: Prof. D. Jatužis, Assoc. Prof. A. Vilionskis. Stroke Integrated Healthcare Management Committee.

CONSULTATIONS PROVIDED BY THE UNIT TO THE PUBLIC OR ECONOMIC ENTITIES

- D. Jatužis. Expertise in State Health Care Accreditation Agency under the Ministry of Health of the Republic of Lithuania.
- A. Ekkert, D. Jatužis. Expert opinion and consultations for UAB "Zive" (development of a portable device for long-term ECG monitoring).
- A. Vilionskis. Expertise in the Commission for the Determination of Harm to Patients under the Ministry of Health of the Republic of Lithuania, member of the Board of Lithuanian Bioethics Committee.
- I. Slautaite. Expertise for Commission for the Determination of Harm to Patients under the Ministry of Health of the Republic of Lithuania.

MOST IMPORTANT RESEARCH DISSEMINATION ACTIVITIES

- Scientific popularisation of TV, radio and Internet broadcasts (Prof. D. Jatužis; Prof. R. Mameniškienė, Assoc. Prof. K. Ryliškienė, Assoc. Prof. A. Vilionskis, Teaching Assist. R. Masiliūnas, researcher E. Sakalauskaitė-Juodeikienė).
- Epilepsy, Parkinson's disease, Multiple Sclerosis, Stroke, Migraine, Alzheimer's Day - informative events for the public.
- Lectures on stroke for the academic community of Vilnius University and Medard Čobotas University of the Third Age (D. Jatužis, R. Masiliūnas, K. Ryliškienė).
- "Stroke club" – an organisation for stroke victims and those who want to know more about stroke. Information in the social media: Facebook group (Insulto klubas), Instagram account (@doctor_ekkert), internet website (www.insultoklubas.lt) (A. Ekkert).
- Scientific information in the Lithuanian journals "Internistas", "Nervų ir psichikos ligos", and others.

RESEARCH INTERESTS

- Evaluation of functioning and quality of life of patients with psychiatric disorders
- Analysis of outcome variables of the treatment of developmental, neurotic, affective and psychotic in children and adults
- Transition processes in young people, medical students
- Different approaches to psychosocial rehabilitation and assertive outreach for comprehensive, integrated community care for people with mental disorders in the community settings
- Evaluation of services for people with mental illness and their families
- Suicidal behaviour and psychiatric and somatic disorders

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Mental, Behavioural, Developmental and Dependency Disorders: Clinical Features, Possibilities of Prevention and Treatment during the Life Span. Assist. Prof. Dr E. Dlugauskas. 2019–2023.

The importance of patient pharmacogenetics in the choice of individualised treatment has been investigated, and scientific articles have been published. The influence of mental illness on cognitive functions and the association of somatic diseases with mental disorders were investigated. Scientific publications of case descriptions emphasising the individual comorbid expression of the patient's clinic and the peculiarities of appropriate treatment were prepared. The patterns of ADHD, autism spectrum and addictive disorders and the introduction of evidence-based therapies into clinical practice were investigated. The analysis of the development tendencies of psychiatric outpatient and inpatient services was started, and the preparation of recommendations for day inpatient activities while working with children and adults was initiated.

Research of Analysis of Self Harmful and Suicidal Behaviour and of Effective Current Treatments. Assoc. Prof. A. Navickas. 2019–2023.

The project is focused on researching COVID-19 and mental health; cardiology and suicidal behaviour; oncological diseases and suicidal behaviour; clarifying the causes of homeless death; schizophrenia clinic analysis; research on addictions and suicidal and violent behaviour; analysis of dermatological diseases and emotional disorders; digital psychiatry.

In 2022, the main research was conducted:

- Participation in two World Psychiatric Association International Projects on the Impact of the COVID-19 Pandemic on Mental Health (Prof. A. Navickas, Head of the VU Research Group):

  The first project was "Estimating the effect of COVID-19 outbreak on mental health among the general population across 40+ countries (COMET-G study)". Two articles were published in international journals.

  The second project, "Estimating the effect of COVID-19 outbreak on mental health among students (COMET-S study)", has been completed, and an article is ready for publication.

- Doctoral student Aistė Lengvenytė (supervisor Prof. A. Navickas) conducts research on suicidal behaviour and bipolar affective and metabolic and cognitive disorders in collaboration with the University Clinic of Montpellier (France). The article was published in an international journal.

- Continued work in oncology and suicidology. Two articles were published in international journals.

Survey of Burning out Syndrome and Mental Health of Medical Specialists. Project leader: Prof. S. Lesinskienė. 2019–2023.

Active involvement of lecturers and medical students in the research and actuality of the topic. Preparation and implementation of the Transitions projects in cooperation with Prof. Andre Sourandr and his team at Turku University (Finland). Survey and Transitions program was successfully implemented in teaching of the 1st year medical and odontology students.

Research of the Attachment, Emotional and Behavioural Disorders in Children: Investigation of the Impact of the Therapeutical Interventions. Prof. S. Lesinskienė. 2019–2023.

Background and methodology investigating attachment and behavioural emotional aspects have been elaborated. Divorce, family situation and mental health of children were analysed and published. Breastfeeding and psychotropic medication aspects were reviewed and published.

Various aspects of academic achievements, bullying, birth rank, gender, etc., were analysed and published, continuing cooperation from the participating in the large international epidemiological study of primary school children (CAMHEE).

CONSULTATIONS PROVIDED BY THE UNIT TO THE PUBLIC OR ECONOMIC ENTITIES

Employees of the Clinic of Psychiatry periodically serve as consultants for the Ministries of Health, Education and Sport, and Social Affairs and are members of ongoing working groups dealing with various mental health and service provision issues.

BEST REPORTS DELIVERED AT CONFERENCES ABROAD

Lesinskiene Sigita, Lapinskaite Auguste, Karaliene Virginija. A study of the impact of the war in Ukraine on psychosomatic health of preschool children in Lithuania: parents' and children's perspective. Poster presentation at the 25th World Congress of the International Association for Child and Adolescent Psychiatry and Allied Professions (IACAPAP 2022): "Child and adolescent mental health: shaping the future", 2022/12.05–09, Dubai (UAE).

MOST IMPORTANT RESEARCH DISSEMINATION ACTIVITIES

Employees of the Clinic of Psychiatry periodically participate in TV and Radio discussions with journalists and society about various aspects of mental health and psychiatric disorders.

One example: 2022/12/03 13:59 Kalbos anatomija. Kaip kalbos suvokimas susijęs su smegenimis, emocijomis ir patyrimu? https://www.lrt.lt/mediateka/irasas/2000245466/kalbos-anatomija-kaip-kalbos-suvokimas-susijes-su-smegenimis-emocijomis-ir-patyrimu

RESEARCH INTERESTS

- Outcomes of early undifferentiated arthritis
- Associations between genetic, epigenetic factors, rheumatoid arthritis etiopathogenesis and clinical course
- Outcomes of systemic sclerosis
- Musculoskeletal ultrasound
- The role of nailfold videocapillaroscopy in diagnosing other systemic diseases
- Epidemiology of rheumatic diseases
- Reconstructive surgery: clinical applications of free and pedicled flaps, results
- Autologous breast reconstruction – key methods, clinical results
- Implant-based breast reconstruction – clinical analysis of complications
- Breast reduction: methods, clinical results, factors contributing to choosing the best technique
- Pelvic trauma, hip and knee arthroplasty, foot surgery, wrist surgery
- Gait analysis.
- Bone infection treatment.

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Associations of Rheumatoid Arthritis Etiopathogenesis and Clinical Course with Genetic and Epigenetic Factors. Prof. I. Butrimienė, PhD student E. Puncevičienė. 2015–2022.

The aim of the study was to investigate the association between genetic and epigenetic factors in the pathogenesis of rheumatoid arthritis, disease activity and clinical course. The doctoral dissertation was defended at a public meeting of the Dissertation Defence Panel (2022/03/25).

Diagnostics of Rheumatological Diseases and Morphological Evaluation of the Effectiveness of the Treatment Using High-Performance Ultrasound Research. Prof. I. Butrimienė, PhD student G. Šeškutė. 2019–2025.

The aim of this project is to check the benefits of superb microvascular imaging in diagnosing arthritis to evaluate the effect of the treatment. Another point is to understand the scoring system and its applicability in daily practice. These years of the study are dedicated to collecting and analysing data. A systemic review of the topic is under preparation.

Research on Early Arthritis and its Outcomes. PhD student R. Sakalyte, Assoc. Prof. S. Stropuviene, Prof. A. Venalis. 2019–2022.

The aim of this study is to analyse certain gene expression dynamics in the pathogenesis of chronic inflammatory arthritis. In 2020, DNA has been extracted from collected samples. Now, all data is being processed, and after statistical analysis will be performed, a manuscript will be prepared.

Bone Infection Treatment Using Bone Substitutes. PhD student Evelina Kondrusevičienė. 2022--ongoing.

In 2022, the course of the study was planned, a plan was prepared, data analysis was started, and the preparation of the documents for obtaining permission from the Biomedical Research Ethics Committee was initiated.

Analysis of Gait Characteristics of Individuals With Hip and Knee Osteoarthritis Using Wearable Feet Pressure Sensors. Prof. Valentinas Uvarovas. 2022.

Pressure-sensitive sensors are currently being designed and manufactured. In parallel, the documents for obtaining permission from the Biomedical Research Ethics Committee are being prepared.

Short and Long-Term Functional and Radiological Outcomes of Surgical Treatment of Complex Fractures of the Distal End of the Radius (ao2r3 C Type) Using 3D Printed Models for Preoperative Planning. PhD student Aleksandr Grinčuk, Prof. Valentinas Uvarovas. 2022.

The aim of the study is to evaluate and compare the clinical and radiological results of patients operated on at the Republican Vilnius University Hospital (RVUL) for complex fractures of the distal end of the radius 2R3 C type according to (AO/OTA nomenclature) using preoperative planning in 3D. At the moment, manuscript corrections are being made before submitting research to publishers.

Accuracy of Postoperative Risk Calculators and Laboratory Markers in Predicting Early Postoperative Complications and Mortality in Patients With Proximal Femur Fractures. PhD student Povilas Masionis, Prof. Valentinas Uvarovas. Scientific consultant: Assoc. Prof. Igoris Šatkauskas. 2022.

The study objective was to assess the accuracy of postoperative risk calculators in predicting early postoperative complications and mortality in patients with fractures of the proximal femur. In 2022, the course of the research was planned, and the documents have been prepared for the Biomedical Research Ethics Committee. Currently, subjects are being questioned, and data are being collected.

A Randomised Prospective Study of the Long-Term Functional Outcomes of Surgical and Conservative Treatment of Pelvic Insufficiency Fractures. Assoc. Prof. Igoris Šatkauskas. 2022–ongoing.

In 2022, the course of the research was planned, and the documents have been prepared for obtaining the permission of the Biomedical Research Ethics Committee, which will be submitted at the next meetings of the Vilnius Regional Biomedical Research Ethics Committee.

Gait Analysis After Total Hip Replacement Using Inertial Sensors Shimmer 2R. Prof. Valentinas Uvarovas. 2022–ongoing.

Shimmer sensors are currently being tested, and in parallel, the documents for obtaining permission from the Biomedical Research Ethics Committee are being prepared.

Perineal Reconstruction: Clinical Evaluation of Methods. Assist.Prof. Dr N. Jakutis, PhD student K. Baužys. 2020–2024.

The collection and analysis of statistical data has been in progress since 2022.

Autologous Breast Reconstruction Using Free Tram and Diep Flaps. Analysis of the Clinical Experience of the Center. Assist. Prof. Dr N. Jakutis. 2019–2023

The analysis of the data has been ongoing since 2022.

Common Methods of Breast Reduction: Evaluation of Patient Self-esteem and Objective Postoperative Results. Assist. Prof. Dr G. Stundžaitė-Baršauskienė, Assist. Prof. Dr N. Jakutis, 2019–2023.

Validation of the Breast-Q questionnaire (by the University of British Columbia) has been completed, and , papers for the Bioethics have been prepared.

Analysis of Implant-Associated Infection after Mastectomy and Implant-Based Reconstruction. Assist. Prof. Dr N. Jakutis, PhD student K. Baužys. 2019–2023.

The analysis of the data has been in progress since 2022. K. Baužys started his doctoral thesis on this subject.

TRAM and DIEP Flap Based Autologous Breast Reconstruction after Mastectomy: Analysis of the Clinical Experience in the Vilnius University Hospital Santaros klinikos. Dr N. Jakutis, K. Baužys. 2019–2023.

An oral presentation was given at the international conference "Baltic Congress of Plastic and Reconstructive Surgery" 2022/08/19–20, Jurmala, Latvia. The continued collection and analysis of statistical data is ongoing.

International Research Projects

From Undifferentiated Arthritis to Rheumatoid Arthritis: The Need for a Precision Medicine Approach to Treatment. PhD student R. Šakalytė, Assoc. Prof. S. Stropuvienė, Prof. A. Venalis. 2019–2023.

The project was developed in partnership with Children's Hospital Oakland Research Institute (CHORI). Funded by National Institutes of Health (NIH), USA.
The aim of this study is to analyse certain gene expression dynamics in the pathogenesis of chronic inflammatory arthritis. In 2022, a statistical analysis of data was performed.

RESEARCH INTERESTS

- Investigation of arterial wall functional and structural disorders in atherosclerosis and metabolic syndrome.
- Primary and secondary prevention of cardiovascular diseases. Development of high-risk strategy in the prevention of cardiovascular diseases.
- Studies of multidisciplinary heart failure care, novel biomarkers, telemonitoring and physical training.
- Rare cardiovascular diseases: Searching for mechanisms and new methods of diagnostics and treatment technologies.
- Fundamental and clinical research in cardiac arrhythmias. Improvement of methods of complex treatment of atrial and ventricular tachyarrhythmia.
- Complex multimodality imaging assessment of left and right ventricular function in coronary artery disease, hypertension and heart failure.
- Congenital heart disease cardiac surgery in infants.
- New possibilities of hybrid (Interventional and surgical) And minimally invasive technologies in cardiovascular medicine.

Assessment of cardiac structural changes by applying novel imaging technologies and methodologies.

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Prevention of Atherosclerosis, Diagnosis and Treatment of Induced Diseases. Leaders: Prof. Dr (HP) A. Laucevičius, Assoc. Prof. J. Badarienė. Researchers (main): Prof. Dr (HP) Ž. Petrulionienė,

Prof. S. Glaveckaitė, Research Prof. L. Ryliškytė, Senior researcher A. Laučytė – Cibulskienė, Senior researcher E. Rinkūnienė, Senior researcher R. Navickas. 2019–2023.

We continued with data processing and database management. From the study data, three theses were prepared and presented at international conferences: 1) European Atherosclerosis Society Congress 2022, Milan, Italy; 2) 31st European Meeting on Hypertension and Cardiovascular Protection, Athens, Greece; 3) 7th Baltic and North Sea Conference on Physical and Rehabilitation Medicine, Tartu, Estonia. One paper about the changes in psychoemotional condition after individualised aerobic training among subjects with metabolic syndrome was published in the Hellenic Journal of Cardiology". The primary database for artificial intelligence-based prediction model analysis has been finalised, and two project proposals have been submitted for additional funding to carry out epigenetic research and analysis based on artificial intelligence. The outcome of the proposal evaluation is still pending.

New Technologies for Management of Structural Heart Diseases. Leaders: Prof. Dr (HP) A. Aidietis, Prof. Dr (HP) K. Ručinskas. Researchers (main): Prof. G. Davidavičius, Research Prof. D. Zakarkaitė, Prof. S. Aidietienė, Prof. S. Glaveckaitė, Assoc. Prof. V. Janušauskas, Senior Researcher R. Malickaitė, Senior Researcher L. Jurgauskienė, Researcher A. Zorinas, Research Assistant A. Podkopajev. 2019–2023.

In 2022, the first patient, as a part of the ENRAPT-MR Trial, was selected for treatment. The procedure was performed on 2022 11 25. In 2022, 9 patients with end-stage heart failure were treated with a continuous-flow left ventricular assist device implantation (HeartMate III, Abbott Cardiovascular, Plymouth, MN). Some data is used in an international multicentre (12 European countries) registry (PCHF-VAD registry) and continuously added. Two new patients have been enrolled for treatment of functional tricuspid regurgitation with new Minimally Invasive Annuloplasty devices. In 2022, the installation of a hybrid operating theatre began.

Improvement and Evaluation of Congenital Heart Disease Surgery. Leader: Prof. Dr V. Tarutis. Researchers (main): Senior Researcher L. Gumbienė, Researcher A. Lipnevičius, Researcher D. Liekienė, Researcher V. Lebetkevičius, Researcher R. Sudikienė; Research Assist. K. Jonas, Research Assist. S. Sendžikaitė. 2019–2023.

During the year 2022, we continued our research in two major directions: evaluation and improvement of surgical treatment methods for critical congenital heart defects. The focus was directed to evaluating the impact of the COVID-19 pandemic on the prevalence of congenital heart defects, accessibility to surgical treatment for these defects, and the outcomes of said treatment. During this time, data from our research project was presented at local and international conferences, scientific publications and two doctoral dissertations. One of which was successfully defended in spring, and the other one is currently undergoing peer-review.

Cardio-Oncology Services: Organisation and Implementation. Leader: Prof. S. Aidietienė. Researchers (main): Prof. J. Čelutkienė, Dr J. Misiūra, PhD student E. Čiburienė. 2019–2023.

We performed a retrospective observational study reporting the 6-year experience of the first Cardio-Oncology service in Vilnius, Lithuania. The 447 patients who were referred to our service were studied, and the association of patient survival with age, gender, reasons for referral, cancer location and stage, cardiovascular risk factors, rates and stage of cardiotoxicity and treatment strategies were analysed. According to the research that elevated resting heart rate independently predicted mortality in patients with cancer, we investigate the protective effects of ivabradine in cancer patients with elevated heart rate undergoing cardiotoxic chemotherapy. Data were analysed, and the article "Ivabradine to prevent anthracycline-induced cardiotoxicity: a prospective randomised open-label clinical trial "is under preparation.

Assessment of Cardiac Structural Changes by Applying Novel Imaging Technologies and Methodologies. Leader: Prof. Sigita Glaveckaitė. Researchers (main): Prof. J. Čelutkienė, Prof. S.

Aidietienė, Research Prof. D. Zakarkaitė, Researcher Dr A. Drąsutienė, Dr G. Balčiūnaitė, Teaching Assist. R. Šerpytis, PhD students: E. Dvinelis, K. Čerlinskaitė – Bajorė, P. Navickas. 2022–2027.

The scientific project "Assessment of myocardial structural changes and their prognostic significance in patients with severe degenerative aortic stenosis" was successfully completed in July 2022. The primary hypothesis of the research is that severe structural changes in the myocardium are related to immediate (in-hospital) or long-term complications (MACE and all-cause mortality). The main goal of the project is to improve the qualification of researchers by mastering new imaging technologies for assessing myocardial structural changes. In 2022, the one-year follow-up of the surgical cohort was completed, and the results were published (1). Analysis of the two-year follow-up results of both (surgical and transcatheter) cohorts is ongoing, and two publications are planned for the year 2023.

The scientific research was initiated in the field of Computed tomography coronary angiography. The main goal of the research is to determine the diagnostic and prognostic value of anatomical and functional imaging in patients with suspected coronary artery disease. In the meantime, documents for the Bioethical Committee and technical infrastructure are under preparation.

The scientific research was initiated in the field of non-invasive assessment using Cardiovascular magnetic resonance of myocardial inflammatory changes in the setting of acute myocarditis. The main goal of the research is to evaluate myocardial structural changes in patients after COVID-19 disease using magnetic resonance T1 and T2 parametric mapping. In the meantime, documents for the Bioethical Committee and technical infrastructure are under preparation.

Novel Technologies in Treatment of Coronary Artery Disease. Leaders: Prof. Dr G. Davidavičius, Prof. Dr G. Kalinauskas. Researchers (main): Prof. (HP) Dr P. Šerpytis, Prof. Dr S. Glaveckaitė, Assoc. Prof. B. Petrauskienė, Assoc. Prof. V. Janušauskas, Researcher A. Baranauskas; Researcher D. Liekienė, Researcher A. Valaika, Researcher R. Sipavičius, Teaching Assist. R. Šerpytis, PhD student P. Budrys. 2021-2026.

Ongoing activities in clinical trials are enrolling patients with coronary artery disease. The supervision of ongoing research protocol on the treatment of long coronary lesions is performed by PhD student P. Budrys.
Implementation into clinical practice of novel non-invasive diagnostic methods for coronary artery disease.

Research of New Methods of Diagnosis and Treatment of Heart Arrhythmias. Leader: Prof. Dr (HP) Germanas Marinskis. Researchers (main): Prof. Dr (HP) Audrius Aidietis, Assoc. Prof. Gediminas Račkauskas, Assoc. Prof. Jūratė Barysienė, PhD student Justinas Bacevičius. 2022-2026.

Ongoing activities in clinical trials are enrolling patients with heart rhythm disorders. Implementation into clinical practice of novel non-invasive and invasive diagnostic and treatment methods for arrhythmia. Results were announced at international meetings and conferences.

Rare Cardiovascular Diseases – Research of new Mechanisms, Improvement of Diagnostics and Application of Novel Treatment Technologies. Leader: Assoc. Prof. J. Barysienė. Researchers (main): Prof. Dr (HP) A. Aidietis, Prof. Dr (HP) G. Marinskis, Prof. Dr J. Čelutkienė, Prof. Dr S. Aidietienė, Prof. Dr S. Glaveckaitė, Researcher Dr E. Sadauskienė, Researcher Dr D. Sudavičienė, PhD students N. Bileišienė, D. Žebrauskienė. 2021-2026.

Activities during the year 2022: ongoing collection of data concerning rare cardiovascular diseases under the clinical study "Observational study of patients suffering from rare diseases of heart, great arteries and lungs", expanding of the database and integrating of data into National Open Access Research Data Archive (MIDAS) for storing and analysing scientific data; continuing cooperation with health care professionals from ERN GUARD – Heart (European Reference Network for Rare

and low prevalence complex diseases of the heart) in difficult clinical scenarios through CPMS (Clinical Patient Management System, an IT Platform for Clinical Consultations).

Scientific reports:

- European Human Genetics Conference, Vienna, Austria, 2022. Aortic disease and cardiomyopathy in a patient with a novel variant in the DNMT3A gene causing Tatton-Brown-Rahman syndrome". Dovile Jancauskaite, Ruta Masiuliene, Egle Sadauskiene, Jurate Barysiene, Violeta Mikstiene, Egle Preiksaitiene.
- 15th conference of young scientists of Lithuania. 2022, Vilnius, Lithuania. "Phenotype expression of pathogenic variants of MYPPC3 gene and genotype analysis of patients suffering from hypertrophic cardiomyopathy". Dovilė Žebrauskienė, R. Masiulienė, E. Sadauskienė, J. Barysienė, V. Mikštienė, E. Preikšaitienė.

Effect of Multidisciplinary Heart Failure Care, new Biomarkers, Remote Monitoring and Exercise Treatment Studies. Leader: Prof. J. Čelutkienė. Reseachers (main): Prof. Dr (HP) K. Ručinskas, Assoc. Prof. J. Barysienė, Professor assist. Dr G. Burneikaitė, Assoc. Prof. Dr V. Janušauskas, Researcher Dr A. Zorinas, Researcher Dr V. Maneikienė, PhD students: E. Palevičiūtė, K. Čerlinskaitė Bajorė. 2021-2025.

In the sub-population (N=437) of the Lithuanian Echocardiography Study of Dyspnoea (LEDA), the role of novel biomarker sCD146 in congestion was evaluated along with clinical and ultrasound parameters. We found that sCD146 concentration reflects the degree of peripheral and systemic congestion assessed by clinical and echocardiographic indices, with a prominent association in patients with low NT-proBNP.

The systematic literature review of eighteen studies showed hypotheses generating data on potential positive effects of exercise training on parameters of LV filling pressure (E/e'), left atrium size, cardiac output, and RV function.

The study of informal caregivers' experience highlights involving informal caregivers and persons with HF together in the implementation and future research of telemonitoring in HF care.

National Research Projects

EU Structural Funds. **Assessment of Myocardial Structural Changes and Their Prognostic Significance in Patients with Severe Degenerative Aortic Stenosis**. No. 09.3.3-LMT-K-712-01-0148. Assoc. Prof. S. Glaveckaite. 2018–2022.

The scientific project – a prospective, open, case-driven, multicentre study (Lithuania, Denmark) – was successfully completed in July 2022. The primary hypothesis of the research is that severe structural changes in the myocardium are related to immediate (in-hospital) or long-term complications (MACE and all-cause mortality). The main goal of the project is to improve the qualification of researchers by mastering new imaging technologies for assessing myocardial structural changes. In 2022, the one-year follow-up of the surgical cohort was completed, and results were published (1). Analysis of the two-year follow-up results of both (surgical and transcatheter) cohorts is ongoing, and two publications are planned for the year 2023.

EU Structural Funds. **Optimisation of Diagnosis and the Creation of Treatment Strategy for Type 2 Myocardial Infarction.** No. 09.3.3-LMT-K-712-01-0148. Prof. P. Šerpytis. 2018–2022.

The research paper was accepted and published in the American Journal of Medicine. Patient screening and randomisation of the study was continued. Type 2 myocardial infarction diagnosis and treatment guidelines have been prepared and reviewed.

Multiscale Mathematical and Computer Modelling for Flows in Networks: Application to Treatment of Cardiovascular Diseases. No. 09.3.3-LMT-K-712-17-0003. Principal research members from VU: Prof. Dr (HP) Audrius Aidietis, Prof. Sigita Aidietienė. 2020–2023.

It is an interdisciplinary project between applied mathematics and medicine. The idea of the research project is to provide a new, fast, and effective mathematically justified numerical strategy for multiscale modelling of the bloodstream in the network of vessels and for cardiac valves.

The Research Council of Lithuania. **Heart Rate Variability and Metabolic Syndrome**. Head researcher: Prof. Dr (HP) A. Laucevičius. Researchers (main): Research Prof. L. Ryliskyte, Research Assist. P. Navickas. 2019–2022.

In collaboration with the researchers at the State Research Institute Centre for Innovative Medicine, the study is conducted as a cross-sectional study carried out among subjects included in the Lithuanian High Risk (LitHiR) cohort. The study includes the assessment of 24-hour blood pressure monitoring, electrocardiogram, and actigraphy profiles. A subgroup of metabolic syndrome subjects also undergoes an aerobic exercise intervention study, which includes a comprehensive baseline and follow-up evaluation of cardiovascular risk factors and psychological status. In 2022, the 24-hour blood pressure and actigraphy profile data analysis was performed, and a novel adaptive noise elimination algorithm for long R-R interval sequences for heart rate variability analysis was proposed by the study team. The aforementioned method was successfully published in a well-regarded journal.

International Research Projects

COST Action No. CA18216. **Network for Research in Vascular Ageing**. Leader: Prof. Dr (HP)

A. Laucevičius. 2019–2023.

Arterial stiffness is an important component of vascular ageing and a potent CVD risk predictor, and as such, it is emerging as an appealing therapeutic target.

The tasks performed by Lithuanian scientists participating in this project: active participation in educational online meetings and working groups; preparation of different upcoming publications; contribution to CARTESIAN - COVID-19 effects on ARTErial StIffness and vascular AgiNg project, Lithuanian group, aiming to analyse COVID-19 influence on vascular ageing; examination of 50 patients at Vilnius University Hospital Santaros Klinikos was performed; participation in VIII Annual Congress of The European Society of Vascular Medicine in Stockholm, as VasAgeNet members with two poster presentations (Mykolaityte J et al.; Laucyte-Cibulskiene A et al.); participation in ARTERY22 in Nancy, France as VasAgeNet members and presenting a poster: Sex-specific association between the metabolic score for insulin resistance and arterial stiffness in middle-aged adults with metabolic syndrome (Mykolaityte J et al.).

COST Action 18216. **COVID-19 Effects on ARTErial StIffness and Vascular AgiNg (CARTESIAN) Study**. Network for Research in Vascular Ageing. Coordinator of the Lithuanian research group: Senior researcher Dr A. Laucyte-Cibulskiene. Principle Investigators: Professor Pierre Boutouyrie, Paris, France & Dr Rosa Maria Bruno, Paris, France (http://vascagenet.eu/cartesian-study-covid-19-arterial-stiffness-and-vascular-aging. 2020–2032.

In 2022, a study was performed to evaluate whether accelerated vascular ageing is associated with COVID-19, whether vascular ageing is further accelerated as a function of COVID-19 severity and pre-existing cardiometabolic disease and background treatments, and whether psychosocial factors play a role in COVID-19-induced accelerated vascular ageing process. The Rationale and Protocol of CARTESIAN were published in the Artery Research Journal. The first report on primary study results has been recently submitted. Lithuania has already enrolled 50 patients and submitted initial measurements in a RedCap database.

RESEARCH INTERESTS

- Air pollution and child health
- Allergic rhinitis and its impact on bronchial asthma in children
- Health care of mother and child: physiological and social aspects and research on natural development of the child
- Studies on functional development of organs and systems in newborns and children
- Studies on neonatal pathology and perinatal mortality in Lithuania
- Non-invasive analysis of immunological markers in amniotic fluid to predict fetal inflammatory response syndrome and outcomes of preterm neonate
- Investigations of the significance of genetic factors for adaptive suitability in the cohort of preterm infants in Lithuania
- Studies on the effects of gestational diabetes on neonatal health
- Studies on peculiarities in chronic inflammation as diagnostic markers and targets for early therapeutical intervention in children with asthma and cystic fibrosis
- Peculiarities of central and peripheral hemodynamics in premature and sick newborns
- Studies on electric impedance tomography as a new diagnostic tool in neonatal pulmonology
- Development of diagnostics, therapeutic and prophylaxis methods in acute, chronic and newly emerging infectious, immune, allergic and metabolic diseases
- Progression and outcomes in pediatric renal disorders
- Studies in immunoprophylaxis and vaccination
- Diagnostics and treatment of inherited metabolic diseases
- Diagnostics, treatment and prophylaxis of children's abuse and trauma
- Gut microbiota and gut-brain axis
- Studies on childhood cancer aetiology and predisposition, identification of new therapeutical targets and criteria for treatment risk-group stratification to further improve treatment individualisation and reduce treatment burden and long-term side effects
- Research in childhood acute leukaemias, including research in leukaemia aetiology, pharmacokinetic and pharmacodynamic studies for chemotherapy drugs, investigations in acute and late toxicities;
- Studies on antimicrobial stewardship in paediatrics
- Studies for improving the quality of care for children and young adolescents in health facilities
- Etiology and long-term outcomes in inherited and acquired pediatric kidney diseases (cystic kidney diseases, glomerulopathies, chronic kidney disease, vesicoureteral reflux)
- Early vascular ageing, left ventricular abnormalities and neurocognition in hypertensive children
- Cardiovascular disease and kidney function impairment in children with a solitary functioning kidney
- Health, shared decision making and other modern technologies for the management of chronic noncommunicable disease (CNDs)
- Healthy ageing through the early diagnostics and prevention of CNDs
- Human ecology

- Development of the methods in diagnostics, treatment and prophylaxis of acute and chronic pediatric neurological and developmental disorders, research on immune, genetic, metabolic and other factors, as well as the application of digital technologies, research on distance education of children during the COVID-19 pandemic
- Studies on the long-term impact of exposure to screens on children's physical and mental health
- Studies on diagnostic accuracy of allergological tests and optimal management of pediatric patients with allergic conditions

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

The role of lung ultrasonography and other non-invasive investigations in lung injury after hematopoietic stem cell transplantation. A PhD project. Prof. Jelena Rascon. 2019–2023.

In 2022, a total of 29 patients were included. According to the research plan, investigations were performed before and after hematopoietic stem cell transplantation in the early and late post-transplantation period.

Significance of Biochemical and Immunological Markers in Amniotic Fluid in Predicting Intrauterine Infection. Assist.Prof. Dr I. Pilypienė, PhD student V. Gulbinienė. 2017–2022.

Immunological markers were investigated by a non-invasive method, collecting amniotic fluid transvaginally. Amniotic fluid soluble Toll-like receptor 2 and 4, TNF-α, MMP-8, and cord blood IL-6 concentrations were determined. The results of the study showed that non-invasively obtained amniotic fluid immunological markers seem to be good predictors for fetal inflammatory response with a higher rate of major neonatal outcomes in preterm infants. The study showed that non-invasive amniotic fluid analysis could be an alternative method to invasive amniocentesis.

PhD project. **The significance of amniotic fluid immunological markers predicting fetal inflammatory response syndrome and outcomes of preterm neonates.** Supervisor Prof. Diana Ramašauskaitė, PhD student V. Gulbinienė. 2020-2022.

In 2022, the following main findings were revealed:
1. Noninvasively obtained amniotic fluid MMP-8, TNF-α, IL-6, IL-10, IL-17, suPAR, S100B, and defensins may predict FIRS in patients with PPROM before 34 weeks' gestation. MMP-8 and TNF-α showed the highest diagnostic characteristics prognosticating fetal inflammatory response syndrome.
2. Amniotic fluid EGF concentration is a biochemical indicator of functional lung maturity in preterm neonates, related to gestational age and reflecting the outcome of the respiratory system of preterm neonates after birth. An EGF cutoff concentration < 35 pg/ml significantly predicted the risk of severe neonatal respiratory outcomes: severe RDS, need for respiratory support for more than four days, need for surfactant, need for mechanical ventilation and BPD.
3. TNFα and EGF in non-invasively collected amniotic fluid are reliable predictors for bronchopulmonary dysplasia in preterm neonates.
4. The noninvasive amniotic fluid analysis may help stratify the risk of fetal inflammatory response syndrome and neonatal outcomes even before birth in patients after preterm premature rupture of membranes before 34 weeks of gestation.

Timely Diagnosis of Food Allergies and Optimal Monitoring of Allergic Child Nutrition Status. Prof. Dr O. Rudzevičienė, PhD student I. Adomaite. 2017–2028.

The prospective analysis of nutrition, quality of life in food-allergic children, parental self-efficacy, and patient enrollment is continuing. The analysis of retrospective data on oral food challenge outcomes and diagnostic value of *in vivo* and *in vitro* allergy tests is finalised, and the results are published.

Early Vascular Ageing and Arterial Hypertension in Children After Correction of Coarctation of the Aorta. PhD project. Prof. A. Jankauskienė, PhD student S. Sendžikaitė. 2017-2021.

The multicentre cross-sectional study was completed. Results were published in J Hypertens and J Hum Hypertens. PhD thesis successfully defended on 2022/03/24.

Evaluation of Brain and Renal Regional Oxygenation of Very Low Birth Weight Preterm Infants (<1500G) With Patent Ductus Arteriosus Measured by Near-Infrared Spectroscopy (NIRS). PhD project. Prof. A. Jankauskienė, PhD student J. Navikienė, 2017-2021.

This PhD thesis was successfully defended on 2022/09/21.
Conclusions. In preterm infants less than 32 weeks of gestational age and less than 1500 g weight at birth, blood shunt affects regional renal oxygenation and blood flow even in the presence of hemodynamically insignificant PDA. Regional cerebral oxygenation is not affected, but hemodynamically significant PDA impairs regional renal and cerebral oxygenation and medical hsPDA treatment results in reduced blood flow through the PDA. Improvement in renal oxygenation and unchanged cerebral oxygenation as measured by NIRS was demonstrated.

Evaluation of Lung Dynamic Function Using Electrical Impedance Tomography (EIT) in Very Low Birth Weight (<1500 g) Infants Who Need Respiratory Support. E. Viršilas, A. Liubšys, A. Valiulis. 2020–2023.

In 2022, an interim analysis was published. Continuing patient recruitment.

Analysis and Associations of Clinical, Laboratory, Neurophysiological, Imaging and Neuropsychologic Data in Children with Neurologic Diseases. Assoc. Prof. J. Grikinienė, Dr R. Samaitienė, Dr R. Praninskienė. 2015–2025.

In 2022, the implementation of project activities was continued; so far, no publications have been prepared.

National Research Projects

School AQR Seasonal Peculiarities of In-door Air Pollution and Its Impact on Respiratory Morbidity and Allergy of Primary School Children. (No. P-MIP-20-404). The Research Council of Lithuania Project. Project leader and Principal investigator: Prof. Dr (HP) Arūnas Valiulis, investigators: Prof. Dr Violeta Kvedarienė, Researcher: Dr Nina Prokopčiuk, PhD student Izabelė Juškienė. 2019–2022.

It is a prospective case-control study of air pollution in primary schools and its impact on respiratory allergens and atopic dermatitis in children. Gaseous and particulate pollutants, as well as bioaerosols such as mould and fungi, are measured seasonally in Vilnius schools from May 2020 until December 2022. Validated clinical questionnaires, quality of life and fatigue questionnaires, as well as NO concentration in the exhaled air of pupils, are recorded repeatedly.

Ancient and New Alleles in Lithuanian's Genome: Mutations, Selection and Adaptation. The Research Council of Lithuania. Asist.Prof. Dr I. Pilypienė, Teaching Assist. S. Dauengauer-Kirlienė. 2020–2022.

The main objective of the study is to analyse microevolutionary forces: mutations and signatures of adaptive positive selection of the Lithuanian population from whole genome sequencing data. The main question to answer is how commonly mutations are under selection in modern humans and how humans evolve generation after generation. The findings provide useful information on local human population genomic variation, especially for *de novo* variants and will be a valuable resource for further genetic studies.

Noninvasive Immunological Analysis of Amniotic Fluid in Preterm Birth. (No. S-MIP-19-57). The Research Council of Lithuania. Prof. D. Ramašauskaitė 2019–2022.

The study was completed in 2022. Final conclusions:

1. Assessing the accuracy of maternal blood inflammatory markers in the diagnosis of chorioamnionitis, the neutrophile-lymphocyte ratio has a higher diagnostic value than the leukocyte count and C-reactive protein, but there is no statistically significant difference between the NLR and CRP.
2. IL-6, TNF-α, MMP-8 and suPAR in non-invasively collected amniotic fluid are statistically significant diagnostic markers for histological chorioamnionitis and fetal inflammatory response syndrome, where TNF-α and MMP-8 have the highest diagnostic value for histological chorioamnionitis and FIRS
3. Amniotic fluid EGF concentration is a biochemical indicator of functional lung maturity in preterm neonates, which is related to gestational age and reflects the respiratory outcome of preterm neonates after birth. An EGF cutoff concentration < 35 pg/ml significantly predicted the risk of severe respiratory outcomes.
4. The noninvasive amniotic fluid analysis may be an alternative to invasive amniocentesis identifying histological chorioamnionitis and fetal inflammatory response syndrome after preterm premature rupture of membranes before 34 weeks of gestation.

Integrated Primary, Secondary and Tertiary Health Care Model for Children. Grant from the Lithuanian Ministry of Health. Prof. V. Urbonas, Assoc. Prof. Dr V. Burokienė, Prof. A. Jankauskienė. 2021-2022.

Written recommendations for optimisation of children's health care. Prepared educational material.

The Impact of Longterm Screen Use on the Health of Children Mental and Physical Health**.** (No. (1.80 E) SU-2498). The Lithuanian Ministry of Health – the National Health Improvement Fund. Coordinator of the project: Prof. V. Urbonas 2020–2022.

The final results of the project were presented at the conferences. National recommendations were issued.

Biomarkers of the gut microbiota in autism spectrum disorders. (No. 01.2.2-LMT-K-718-03-0099). The Research Council of Lithuania. Coordinator of the project: Prof. V. Urbonas 2020-2023.

Fecal transplantations were performed for autistic children. Parallel studies with animals. Studies with smell biosensors.

Evaluation of Counseling on Fertility Preservation in Children Treated for Cancer. (No. P-ST-22-29). The Research Council of Lithuania. The student Eglė Stukaitė-Ruibienė, Prof. Jelena Rascon, 2022 –2023.

Student research work during the autumn-winter semester. The main results: analysis of the fact of fertility counselling in patients diagnosed and treated for childhood cancer is ongoing; more than 60 subjects were surveyed; the results are summarised in the publication. A publication is under preparation.

Implementation of Fertility Counselling of Children With Cancer Into Clinical Practice. (No. P-SV-22-252). The Research Council of Lithuania. The student Eglė Stukaitė-Ruibienė, Prof. Jelena Rascon. July – August 2022.

Student research work during a summer internship. The main results: an anonymous survey of pediatric oncologists and haematologists on the specifics of the infertility risk assessment methodology was conducted; two types of information leaflets on the risk of infertility have been produced: posters for information boards in the Center for Pediatric Oncology and Hematology and personalised leaflets for patients; an analysis of the fact of fertility counselling in patients diagnosed and treated for the oncological disease was performed during the summer internship. Publication in preparation.

Impact of Hypoxia and Immune Response on Outcomes of Pediatric Central Nervous System Tumours. (No. P-PAD-22-139). The Research Council of Lithuania. Prof. Jelena Rascon. 2020–2023.

The PhD project was started in November 2022. The research plan was elaborated in collaboration with the Life Science Center and the National Center of Pathology. One subject has been enrolled.

Prognostic Value of Biomarkers for Graft-Versus-Host Disease After Haematopoietic Stem Cell Transplantation. (No. KD-20180). The Research Council of Lithuania. Prof. Jelena Rascon. 2020–2023.

The PhD project was started in September 2020. Thirty-six subjects were enrolled. Data are collected at the National Open Access Research Data Archive (MIDAS).

Main publications:

A revised version of the manuscript on "Impact of percutaneous endoscopic gastrostomy on treatment outcomes after allogeneic hematopoietic stem cell transplantation in children" has been resubmitted to The Journal of Parenteral and Enteral Nutrition. Additional comments were received. The second revision is in preparation.

International Research Projects

European Pediatric Eosinophilic Esophagitis Information Database (E-pEEr). The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN). Principal investigator Prof. V. Urbonas. 2012-2030.

The inclusion of patients with eosinophilic esophagitis in the European eosinophilic esophagitis registry.

PIBD (Paediatric Inflammatory Bowel Disease) Safety Registry study. European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN). Principal investigator Prof. V. Urbonas. 2017–ongoing.

Collecting information about adverse events of patients with inflammatory bowel disease.

Autoimmune Liver Disease Among Children and Adolescents in the Nordic Countries; Differences and Similarities in Presentation, Disease Control and Treatment. Autoimmune liver disease group. Principal investigator Prof. V. Urbonas. 2019–2022.

LEukemia GEne Discovery by Data Sharing, Mining and Collaboration (LEGEND). COST Action (CA16223). National Coordinator: Assoc. Prof. G. Vatkevičienė. 2017–2022.

Strengthening the expertise in the areas of leukaemia/lymphoma aetiology, biology, epidemiology, treatment, toxicity risk management, counselling, and psychological impact in a highly significant manner through international collaboration. This international action is a first step in order to

promote these broad and critical activities that will be crucial for childhood leukaemia/lymphoma research and improved health care.

Contractual Research

Improvement of the quality of health care by preparing standards for integrated health care for diseases and health disorders causing the main causes of death in Lithuania. Funded by the European Union Structural Funds: project preparation of methodological document packages and training services for health care professionals (No. S-226). Leader of the expert group: Prof. R. Čerkauskienė. Project 2021–2022

Early Diagnosis and Emergency Care of Children Diseases. (No. 09.4-2-ESFA-V-715-06-0001). European Union Investment Project 2018–2023. Improvement of Competences and Qualifications of Vilnius University Doctors. R. Čerkauskienė is the Head of the Early Diagnosis and Emergency Care of Children Diseases programme.

Modern Pediatric Diagnostic and Treatment Possibilities. European Union Investment project 2018-2023. Improvement of Competences and Qualifications of Vilnius University Doctors. (No. 09.4-2-ESFA-V-715-06-0001). Prof. A. Jankauskienė is the Head of the ' Modern Pediatric Diagnostic and Treatment Possibilities' programme.

MOST IMPORTANT NATIONAL AND INTERNATIONAL AWARDS RECEIVED FOR R&D ACTIVITIES

- Prof. A. Jankauskienė was awarded the St. Christopher for promoting the name of Vilnius in the world medical community.

MOST IMPORTANT PARTICIPATION CASES OF RESEARCHERS IN WORKING GROUPS OR COMMISSIONS SET UP BY STATE AUTHORITIES, STATE AND MUNICIPAL INSTITUTIONS AND ORGANISATIONS, AND BUSINESS ENTITIES

- Group of Experts for Secondary and Tertiary Pediatric Oncology and Hematology Health Services in Lithuania at the Lithuanian Ministry of Health (Prof. J. Rascon);
- Board member of the National Cancer Control and Prevention Program 2015–2025 at the Lithuanian Ministry of Health (Prof. J. Rascon);
- Participation in a workshop for shaping Lithuanian Ecosystem 2050 organised by Government Strategic Analysis Center (2022/11/28), Assoc. Prof. K. Ažukaitis;
- Commission of Mother and Child of the Lithuanian Academy of Sciences (Chair: Prof. Arūnas Valiulis);
- Commission of Experts of National Programme of Immunoprophylaxis of Lithuanian Ministry of Health (Chair: Prof. Arūnas Valiulis);
- Participation at Commission of Experts of National Programme of Immunoprophylaxis of Lithuanian Ministry of Health (Prof. Arunas Valiulis – chair, members: Prof. V. Urbonas, Assist. Prof. I. Ivaskeviciene);
- Group of Experts of COVID-19 Diagnostics and Treatment of Lithuanian Ministry of Health (Assist. Prof. I. Ivaskeviciene);
- Member of the working group of the Lithuanian Ministry of Health for the proposals of improving the legal regulation of the costs of treatment of very rare human health conditions of the mandatory health insurance fund (Prof. R. Cerkauskiene)
- Working group Member of Commission on Reimbursement of Treatment for Very Rare Diseases of Lithuanian Ministry of Health (Prof. R. Cerkauskiene)
- Participation at the Commission of Experts of Pediatric Nephrology requirements (Lithuanian Ministry of Health (Prof. Augustina Jankauskienė)

CONSULTATIONS PROVIDED BY THE UNIT TO THE PUBLIC OR ECONOMIC ENTITIES

- Leader of the expert group Project 2021–2022 **Improvement of the quality of health care by preparing standards for integrated health care for diseases and health disorders causing the main causes of death in Lithuania**, funded by the European Union Structural Funds: project preparation of methodological document packages and training services for health care professionals (No. S-226). (Prof. R. Cerkauskiene).

- COST Action Proposal Reference OC-2022-1-25987 (Prof. A. Jankauskienė)

- Infectious disease prophylaxis for the foreigners who left Ukraine because of Russian federation war activities (Assist. Prof. I. Ivaškevičienė) **https://nvsc.lrv.lt/uploads/nvsc/documents/files/Rekomendacijos%2Bd%C4%97l%2Bu%C5%BEkre%C4%8Diam%C5%B3j%C5%B3%2Blig%C5%B3.pdf**

MOST IMPORTANT RESEARCH DISSEMINATION ACTIVITIES

- Open lectures for the European Society for Pediatric Nephrology, a young nephrologist's platform for research career development and performing systematic reviews (Dr K. Ažukaitis)

- Arts and Science Lab (LT-Meno ir mokslo laboratorija, MMLAB), from 2019 by decision of Vilnius Municipality MMLAB became Vilnius City Theatre.

- Projects in which faculty members participate as scientific consultants:
  - L. Kilaitė, A. Matulevičiūtė, J. Kuršis, "CARDIO". 2022 January–February, Vilnius
  - L. Kilaitė, S. Špakovska, S. Dovidauskas, M. Dirginčius, L. Jurgelis, G. Grinevičiūtė. "GENETIC ENGINEERING" 2022 November, Vilnius

- Participation in Lithuanian mass media (LTV, LNK, TV3, Delfi) and radio. Talks on diseases and nutrition (Prof. V. Urbonas).

- Lectures for parents at the national conference "Tėvystės kodas 2022" and the conference organised by the Lithuanian Prematurity Association. (Prof. V. Urbonas)

RESEARCH INTERESTS

- Etiopathogenesis, diagnostics, treatment of diseases: fundamental and clinical research, innovative technologies
- Early diagnostics and prevention of non-infection diseases in family practice and in gerontology
- Biomarker research in hematology and oncology
- Investigation of etiopathogenetic risk factors and quality of patients' life with internal diseases

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Detection of Optimal Diagnostic and Treatment Methods and Early Prevention of Non-infectious Diseases. Prof. Dr V. Šapoka, Prof. Dr V. Kasiulevičius, Assoc. Prof. V. Gaigalaitė, Assoc. Prof. Dr L. Vencevičienė, Assoc. Prof. N. Burokienė, Assist Prof. S. Varvuolytė, PhD student A. Bliudžius. 2022–2023.

The aim of this project is to assess the prognostic factors of good outcomes and complications in patients with a first-time stroke and suffering from atrial fibrillation.

Analysis of Biomarkers for Suicidal Tendencies and Depression, and Validation of the Prognostic Model in Lithuania. Investigator: Assoc. Prof. Dr L. Vencevičienė. 2020–2026.

The main aim of the study in 2022 years was to evaluate whether the objective measure of chronic alcohol use, phosphatidylethanol (Peth), could be useful as a biomarker in clinical practice when caring for suicidal patients. Subsequently, we aimed to prepare a publication based on this data. For the first time, the study showed that a recent suicide attempt is associated with significantly increased PEth levels in blood compared to both patients with MDD and individuals without psychiatric complaints. The study also revealed that MDD patients, in turn, have higher PEth levels than individuals without psychiatric complaints. Suicide attempters were also more likely to underreport their recent alcohol consumption in self-report measures, suggesting the particular interest of objective testing in this patient population. These findings suggest that PEth might be an interesting option to complement the clinical assessment of individuals at risk of SA.

Significantly Elevated Phosphatidylethanol Levels in Recent Suicide Attempters, but Not in Depressed Controls and Healthy Volunteers. The manuscript has been prepared and accepted for publication in the Journal of Psychiatric Research. Manuscript Number: JPSYCHIATRRES-D-22-00539R5

The Importance of Multimorbidity Patient's Healthcare Model and Innovative Diabetes Treatment and Monitoring for Patient Clinical Outcomes. Theme leader: Prof. Dr V. Kasiulevičius. 2019–2023.

Our study explores the use of Fitbit activity trackers to assess physical activity and its impact on prediabetic patient health. In total, 30 volunteers (9 males and 21 females), aged 32-65 years, with impaired glucose levels and without diabetes or moving disorders, received Fitbit Inspire activity trackers and physical activity recommendations. A routine blood check was taken during the first and second visits, and body composition was analysed. Physical activity variability in time was assessed using a Poincare plot. The count of steps per day and variability differed between patients and during the research period, but the change in total physical activity was not statistically significant. Significant positive correlations between changes in lipid values, body mass composition, and variability of step count, distance, and minutes of very active physical activity were observed.

Physical Activity Evaluation Using Wearable for the Patient with Prediabetes to Prevent Type 2 Diabetes. Theme leader: Prof. Dr V. Kasiulevicius. 2019–2022.

Our research aimed to analyse the potential of patient physical activity monitoring using Fitbit physical activity trackers and find solutions for possible implementation in the health care routine. Thirty patients with impaired fasting glycemia were randomly selected and participated for six months. Physical activity variability was evaluated, and parameters were calculated using data from Fitbit Inspire devices. Changes in parameters were found, and correlations between clinical data (HbA1c, lipids) and physical activity variability were assessed. Evaluation of physical activity variability is essential for patient health, and these methods used to calculate it are an effective way to analyse big data from wearable devices in future trials.

Computational Pharmacology: New Avenues for COVID-19 Therapeutics Search and Better Preparedness for Future Pandemic Crises. Theme leader: Assoc.Prof. Dr N. Burokienė. 2021–2022.

The COVID-19 pandemic created an unprecedented global healthcare emergency, prompting the exploration of new therapeutic avenues, including drug repurposing. We set out to explore and develop new strategies for drug repositioning by employing computational pharmacology, data mining, systems biology, and computational chemistry to advance shared efforts in identifying key targets, affected networks, and potential pharmaceutical intervention options. Our study revealed that formulating pharmacological strategies should rely on both therapeutic targets and their networks. We showed how data mining can reveal regulatory patterns, capture novel targets, alert about side effects, and help identify new therapeutic avenues. Importantly, our work bridged the interactome with the chemical compound space to better understand the complex landscape of COVID-19 drugs. Based on the gathered data, we strongly advocate taking this opportunity to establish robust practices for treating the infectious diseases of today and the future by preparing solid analytical frameworks.

Higher Levels of Stress-Related Hair Steroid Hormones Are Associated With the Increased CSORE2 Risk Prediction Algorithm in Apparently Healthy Women. Investigators: Assoc. Prof. N. Burokienė, M. Narkevičius. 2021–2022.

We aimed to investigate the association between long-term secretion of stress-related steroid hormones, including cortisol, cortisone and dehydroepiandrosterone, and the 10-year fatal and non-fatal CVD risk estimated by the $SCORE_2$ risk prediction algorithm, as well as traditional CVD risk factors in a group of apparently healthy women. A total of 145 women (aged 50-64 years) participating in the national CVD prevention program were enrolled in the study. Sociodemographic, lifestyle, health-related characteristics, stress, anxiety and sleep quality indicators were evaluated using specific questionnaires. Anthropometric and arterial blood pressure measures were assessed by trained personnel, lipid and glucose metabolism biomarkers were measured using routine methods, and hair steroid hormone levels were determined by ultra-high-performance liquid chromatography-tandem mass spectrometry. The results showed that higher levels of hair cortisol and cortisone are associated with increased $SCORE_2$ values. Moreover, significant associations between hair glucocorticoids and individual cardiovascular risk factors, including obesity, hypertension, dyslipidemia and hyperglycemia, were found. These findings indicate that stress-related hair steroid hormones might be valuable biomarkers for CVD prediction and prevention.

Genetic, Epigenetic Factors and Lifestyle Influence the Development of Diabetes Complications. PhD project at the Center of Life Sciences, Vilnius University. PhD student – Laura Šiaulienė, supervisor – Prof. Juozas Lazutka. 2022.

Patients are screened and recruited at Vilnius University Hospital Santaros Klinikos Endocrinology Department. So far, 190 patients with diabetes and healthy controls are involved in

the study. Clinical, instrumental, biochemical, genetic and epigenetic analyses are performed as per protocol. Interim data analysis is in progress.

Evaluation and FUP of Multimorbid Patients. PhD project at VU Faculty of Medicine. PhD student: Kristina Švaikevičienė, supervisors: Prof. V. Kasiulevičius. 2022.

A literature review was performed in the first part of the year. Currently, the project is on hold due to maternity leave.

Values of Oncological Diseases and Blood Biological Markers. Prof. Dr L. Griškevičius , PhD students: R.Pileckytė, S. Tulytė, A. Žučenka. 2022.

The prospective study of immune system parameters (circulating lymphocyte subsets and tumour microenvironment components) in pancreatic ductal adenocarcinoma patients *(PDAC)* was performed between February 2018 and April 2022. We analysed changes in some parameters during the time in the whole study population in the publication. The impact of circulating lymphocyte changes on the survival of patients with advanced cancer is evaluated but presented as a poster presentation. And the value of immune repertoire in early PDAC is still under evaluation.

National Research Projects

Genome, Epigenome and Telomere Length Features of Sarcopenia and Frailty. (No. P-MIP-22-126). Research Council of Lithuania. Prof. Dr V. Aleka 2022-2025.

Based on the project content and work schedule, several milestones were achieved. The establishment of standards for the collection of research participants was approved. Also, the questionnaire for the participants was finalised and agreed upon. Approval from the Vilnius regional branch of the Lithuanian Bioethics Committee has been obtained.

Lithuanian High Cardiovascular Risk Primary Prevention Program (LitHiR) - National Health Insurance Fund under the Ministry of Health. Assoc.Prof. V. Dženkevičiūtė. 2006 - ongoing Studies related to cardiovascular risk assessment and the creation of an individualised cardiovascular disease prevention plan for patients were conducted.

International Research Projects

The DEPRESSD project – is an international collaborative project funded by the Canadian Institutes of Health Research. The project involves experts in health policy, psychiatry and statistics as well as investigators who have collected depression screening data and developed rigorous methods for assessing depression screening tools. It is a unique and rigorous data platform for depression screening research. Researcher from VU: Jurate Pečeliūnienė. 2016– ongoing.

In 2022, the accuracy of the HADS Depression subscale was compared with the full HADS to screen for depression. Results were obtained, and conclusions were drawn regarding the accuracy of HADS-T and HADS-D. One article on HADS-D and Full HADS in Psychological Assessment has been accepted for publication (2022) (in press).

RESEARCH INTERESTS

- Emergency medicine
- Acute cardiac care
- Resuscitation
- Polytrauma
- Triage
- Acute coronary syndromes
- Sudden death

- Acute heart failure
- ECMO
- Biomarkers in the Emergency Department

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Evaluation Of Acute Medical Care Team Performance Using Simulated Resuscitation Scenarios. PhD student Aleksandras Briedis, Prof. Pranas Šerpytis. 2018-2024.

In 2022, the scientific data was presented at EUSEM Congress 2022, Berlin, Germany; oral presentation at CPR refresher course for healthcare providers: clinical experience and self-assessment of skills; E-poster prepared for Meducation in Lithuania: basic life support workshops for high school children.

Extracorporeal Life Support Impact On Critically Ill Elderly Patients' Outcomes. PhD student Nadežda Ščupakova, Prof. Pranas Šerpytis, Assoc. Prof. I. Jovaišienė. 2020-2024.

The aim of the research is to evaluate the impact of extracorporeal life support on critically ill elderly patient outcomes. In 2022, two posters were prepared and presented at international congresses:
- Extracorporeal membrane oxygenation support for postcardiotomy cardiac failure in octogenarians, presented in ECOS – TCS congress in Paris, June 2022.
- Postcardiotomy extracorporeal life support in octogenarians: single centre experience, presented in 37th EACTAIC congress, December 2022.

Also, the article "Extracorporeal life support for cardiogenic shock in octogenarians: single centre experience" was prepared and submitted for review in the Journal of Clinical Medicine.

Eye Injuries After Chemical Burns in the Emergency Department, Secondary Glaucoma, Characteristics and Future Perspectives. PhD student Justina Skruodytė, Prof. Pranas Šerpytis, Prof. Dr Claudia Grünauer-Kloevekorn (University of Leipzig). 2021–2025.

The aim of the research is to evaluate the structural and functional changes of the eye after chemical burns and the relationship with the hemodynamic parameters of the eye. In 2022, the generic competencies were developed, a conference called "Emergency medicine for children and adults: critical conditions. Eyes injuries, help for adults and children in the Emergency Department" was organised in Alytus, and a lecture on eyes injuries was given online with the training programme "First aid and treatment of persons with multiple injuries".

National Research Projects

Application of Extraordinary Membrane Oxygenation (ECMO) for the Treatment of Cardiogenic Shock in Elderly Patients. The Research Council of Lithuania. Prof. R. S. Samalavičius, Assoc. Prof. I. Jovaišienė, PhD student K. Urbonas. 2020–2024.

During 2022, the patients' database was created and data collected; preparations were made with partners for two non-doctoral articles.

MOST IMPORTANT PARTICIPATION CASES OF RESEARCHERS IN WORKING GROUPS OR COMMISSIONS SET UP BY STATE AUTHORITIES, STATE AND MUNICIPAL INSTITUTIONS AND ORGANISATIONS, AND BUSINESS ENTITIES

Prof. P. Šerpytis. Working groups of the Ministry of Health of the Republic of Lithuania:

- Lithuanian Health Ministry working group of law number V-208 (dated April 8th, 2004) "For the ratification of the emergency medicine care and emergency medicine service provision order and extent"; Working group of Emergency medicine service for traumas and other external conditioned injuries (Trauma cluster); Working group for the use of ECMO system in emergency medicine service.
- Member of the Health Council at Vilnius Municipality; member of the Research Council of Lithuania;
- A working group to coordinate and address issues related to improving access to innovative medicines and innovative treatments.

CONSULTATIONS PROVIDED BY THE UNIT TO THE PUBLIC OR ECONOMIC ENTITIES

- An online lecture for the employees of Vilnius University, "How to prevent myocardial infarction, treatment of myocardial infarction". Prof. P. Šerpytis, 2022/03/28.
- The importance of Physical Activity in heart disease. Prof. P. Šerpytis. 2022/04/26, Vilnius, 3rd Century University.
- The initiative "Student for One Day" lectures online to Secondary School pupils of Lithuania: "Physical activity and heart disease". Prof. P. Šerpytis, 2022/05/02.
- Tony Resort Elder Club, lecture- "Undesirable changes in body composition – the challenge for entrepreneurs of having a healthy circulatory system", 2022/10/11.
- Project "Tuk tuk heart - be healthy!" lectures about "Prevention of heart diseases. Clinical death. Primary resuscitation". Prof. P. Šerpytis. Lectures were held to 851 pupils in secondary schools of Vilnius during the year (2022).

MOST IMPORTANT RESEARCH DISSEMINATION ACTIVITIES

Prof. P.Šerpytis. Interviews for Lithuanian National Radio, National media websites and TV shows.
Main topics: Emergency Medicine, Cardiology, Preventive Medicine, COVID-19, Arterial Hypertension, Ischemic Heart Disease, Rhythm Disorders, Healthy Lifestyle, Risk Factors for Cardiovascular Diseases, Myocardial infarction, Sudden death, Prevention of Cardiovascular Diseases, Healthy Diet.

RESEARCH INTERESTS

- Single-cell diagnostics
- Intraoperative visualisation
- Non-invasive biomarkers
- "Organ-On-A-Chip" models
- Microbiome
- Artificial intelligence
- Genetics and proteomics
- Individualised pancreas, liver, and stomach cancer treatment

RESEARCH PROJECTS CARRIED OUT IN 2022

National Research Projects

Single-cell Transcriptomics and Genomics Parallel Computational Biology Laboratories. Funded under Measure 01.2.2-LMT-K-718 'Targeted Research in Smart Specialisation Areas'. European Regional Development Fund. Prof. K. Strupas, Prof. L. Mažutis, Assoc. Prof. Dr A. Gulla. 2020–2023.

Early diagnosis of liver cancer remains a challenge. Treatment of complex human diseases largely depends on the physiological response of the individual cells constituting a given tissue or organ. It is single cells rather than their populations that are driving tumorigenesis, metastasis and other human diseases. In 2022, the researchers initiated the development of microfluidics technology and single-cell genomics/transcriptomics data analytics of human samples, creating a liver cell atlas.

CAIX and Hypoxia Marker Detection and Intraoperative Application in Solid Tumors Visualisation. The Research Council of Lithuania. Prof. D. Matulis, Prof. K. Strupas, Assoc.Prof. Dr A. Gulla, Senior Researcher Dr J. Matulienė. 2020–2022.

A conjugated compound bearing CA IX-recognising and IR fluorescent parts to be used for the diagnosis and visualisation of tumours in optically guided cancer surgery, especially for pancreas and liver cancers. In 2022, the activities were focused on CAIX synthesis and *in vitro* experiments.

National Pathology Center. **The Value of "Preoperative Therapy" Before the Surgery of Stomach Cancer**. Prof. K. Strupas, Dr A. Baušys. 2021–2022.

International Research Projects

Eureka – Establishing a Liver-On-A-Chip Platform for Improved Diagnosis of Liver Function. Endorsed as a high-level research project. Partners: Graz University, Austria, "Femtika", Lithuania. Prof. K. Strupas, Prof. P. Schemmer, Assoc. Prof. Dr A. Gulla. 2021–2023.

The establishment of the microfluidic platform is currently studied with *in vivo* liver cells. The goal is to generate a model for liver regeneration while utilising different biopolymers.

CovidSurg – International Initiative – Lithuanian National Coordination Center. Funding: voluntary basis. Prof. K. Strupas, Prof. T. Poskus, Assoc. Prof. A. Zelvys. Researcher A. Čekauskas, Assoc.Prof. Dr A. Gulla. 2020–2022.

RESEARCH INTERESTS

Etiopathogenesis, diagnostics, treatment, rehabilitation and prevention of stomatognathic system disease: fundamental and clinical research

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Xerostomia, Autoimmune and Non-Autoimmune sicca Syndrome Epidemiology, Epigenetics and Neuroimmune Axis Relation with Oral Health. Prof. A. Puriene, PhD St. Indre Stankeviciene. 2019–2023.

The aim of this project is to understand xerostomia, autoimmune and non-autoimmune sicca syndrome epidemiology, epigenetics and neuroimmune axis relation with oral health. In 2022, the needed sample size of participants was examined, and the collection of samples for genetic analysis was completed and prepared for analysis. The analysis of cortisol concentration levels in saliva samples is in progress, and it is expected to be completed by the end of 2022.

Theory-Based Interventions for Improving Oral Self-Care of 15–16 Years Old Schoolchildren. Prof. V. Pečiulienė, Prof. V. Brukienė, PhD student. L. Džiaugytė-Eyeberdiyev. 2016–2022.

Targeting adolescent cohorts for health promotion is important due to the fact that adults who maintained their oral health lifestyle from adolescence through adulthood presented with better oral health than the ones who had a poorer health-related lifestyle in their adolescence. The main hypothesis of research done so far is that theory-guided interventions are superior to one-time conventional dental instruction for improving and sustaining oral self-care in adolescents. Research data has been analysed and published.

Epidemiological Oral Health Survey in Lithuania. Prof. A. Pūrienė, PhD student Indrė Stankevičienė, Assoc. Prof. R. Bendinskaitė, 2015–2022

The epidemiological oral health survey aims to collect data regarding the distribution of different oral conditions and their determinants in key age groups in different regions of Lithuania and to compare present findings with the results of the adult Lithuanian survey done in 1997/1998. The national oral health survey is a cross-sectional study which takes place in 15 geographic locations. In 2022, the preparation of manuscripts and conference presentations was in progress.

Web-Based Intervention for Solving Diet-Related Oral Health Problems. PhD student Indre Stankevičienė, Prof. Alina Pūrienė, Assoc. Prof. Rūta Bendinskaitė. Health foundation.

The study aims to explore the effectiveness of interactive training in addressing dietary and oral health problems among different dental risk groups to explore the effectiveness of interactive training in solving oral health problems among high-risk dental populations. Data were collected on the effectiveness of web intervention for oral health-related knowledge in various groups of the population. Data from adult groups of pregnant women, physically disabled people, the elderly and community members without special needs were collected. Sample collection was conducted according to the plan. Preparation of the manuscript presentations.

Immediate and Long-term Characterisation of the New Flowable Bioceramic Materials and Their Biological Properties. Assoc. Prof. Saulius Drukteinis, Goda Bilvinaitė, Prof. Dr Vilma Brukienė, 2021-2023.

The present study aimed: 1) to evaluate and compare the radiopacity and surface morphology of AH Plus Bioceramic Sealer (AHPB), Bio-C Sealer (BIOC), Biodentine (BD), BioRoot RCS (BR), Grey-MTAFlow (GMF), White-MTAFlow (WMF), TotalFill BC Sealer (TF), and TotalFill BC Sealer HiFlow (TFHF) at different time moments—30 min, 24 h, and 28 days by using a scanning electron microscope; 2) to assess biological properties of these materials *in vitro* on human dental pulp stem cells (hDPSC).

Biocompatibility and Efficacy of a HOCl-based Irrigating Solution. Assoc. Prof. Saulius Drukteinis, Goda Bilvinaitė, Dr Bukelskienė Virginija; Prof. Dr Cotti, Elisabetta, 2021-2023

The aims of this study were: 1) to assess the cytotoxicity of super-oxidised water on human gingival fibroblasts using MTT assay; 2) to evaluate its efficacy in debris and smear layer removal from root canal walls using a scanning electron microscope; 3) to compare the efficiency and performance of the irrigant to conventional irrigation solutions.

The Applicability of Dynamic Navigation in Endodontic Treatment and Retreatment Procedures. Jonaitytė, Eglė Marija; Bilvinaitė, Goda; Assoc.Prof. Drukteinis, Saulius; Torres, Andres; Prof. Vygandas Rutkūnas.

The aims of this study were: 1) to assess the accuracy of dynamic navigation for the localisation of calcified root canals; 2) to evaluate the accuracy of dynamic navigation for the removal of fibre-glass points from the root canal; 3) to evaluate the accuracy of dynamic navigation for the preparation of an endodontic cavity in a tooth, covered with a crown.

New Technology for Dental Pulp-Dentin Complex Regeneration. Biocompatibility of Flowable Hydraulic Calcium Silicate-Based Cements MTA Flow "Thick" Consistency on Human Dental Pulp Stem Cells *in vitro*. Paulius Tušas, Milda Alksnė, Egidijus Šimoliūnas, Josette Camilleri, Saulius Drukteinis, Eglė Marija Jonaitytė, Virginija Bukelskienė, Vygandas Rutkūnas, Vytautė Pečiulienė. 2019–2023.

The aim was to evaluate the biological properties of flowable hydraulic tricalcium-silicate-based cements (*MTA Flow Grey* and *White* "Thick" consistency, *Ultradent*) *in vitro* on human dental pulp stem cells (hDPSC). hDPSCs were thawed, *MTA Flow* eluates were prepared, and pH measurements, cytotoxicity, cell proliferation, cell morphology and hDPSCs apoptosis/necrosis with Annexin V FITC flow cytometry assay were analysed.

Evaluation of Procedural Errors Frequency during Endodontic Treatment and Their Influence on Tooth Prognosis. Prof. Dr Vytaute Peciuliene, Assoc. Prof. S. Drukteinis, Lect. G. Naujokaitytė. 2017–2023.

Successful root canal treatment is determined by many factors. Inappropriate root canal treatment procedures result in endodontic treatment errors. It is precisely they that become the main thrills that can determine not only the course of the treatment but also the further prediction of the treatment. The aim of this study is to evaluate the incidence of endodontic treatment errors, the impact of endodontic treatment outcomes, the prognosis and the possibility of correcting these procedural errors. Two-year follow-ups of 150 retreated teeth are done, and statistical analysis of data is done. Data is being prepared for the publication.

***In Vivo* and *in Vitro* Accuracy Evaluation of Digitally Made Impressions and Restorations on Dental Implants.** Assoc. Prof. V. Rutkūnas, PhD Student A. Gečiauskaitė. 2016–2022.

We aimed to improve the accuracy of digital workflow and to achieve aesthetic and functional restorations with minimal effort. Due to constant changes in intraoral scanner hardware and software, reliable methodology and clinical guidelines will be provided. Finalisation of *in vitro* experiment, data collection and analysis. Preparation and submission of papers to peer-reviewed journals with IF.

Auškalnis L, Akulauskas M, Jegelevičius D, Simonaitis T, Rutkūnas V. Error propagation from intraoral scanning to additive manufacturing of complete-arch dentate models: An *in vitro* study. J Dent. 2022 Jun;121:104136. doi: 10.1016/j.jdent.2022.104136. Epub 2022/04/20.

Comprehensive Evaluation of Factors Influencing the Accuracy of Digital Workflow. Prof. V. Rutkūnas, PhD student J. Pletkus, L. Auškalnis, J. Dirse, V. Bilius. 2019–2024,

The separate steps of the digital workflow have been analysed, trying to identify the steps most susceptible to the errors. This will help to identify better the clinical indications of fully digital and combined digital/analogue workflows. Based on the findings, the solutions helping to increase the potential of digital technologies in prosthodontics will be offered. Set up of the experiments. Clinical and laboratory study initiation. Data collection, analysis and preparation for the publication.

Effect of different prosthetic materials on human fibroblast cell cultures. Prof. V. Rutkūnas. 2017–2022

Completion of the experiments and collection and analysis of the data.

3D bioprinting for bone regeneration. Prof. V. Rutkūnas, Assist. Prof. I. Gendvilienė. 2017–2022

Influence of Implant Placement Depth and Soft Tissue Thickness on Crestal Bone Stability around Implants with and without Platform Switching. A comparative Clinical Trial. Prof. Dr Tomas Linkevicius, Dr Saulius Zukauskas**. 2016–2022.

The aim of our study was to investigate if implant placement depth in relation to soft tissue thickness has an influence on crestal bone stability around dental implants. The research hypothesis was that bone-level implants with platform switching, placed subcrestally when the surrounding gingiva is thin, would have similar bone resorption with bone-level implants without platform switching, placed in thick, soft tissue supracrestally.

Prospective Randomised Long Term Three Centre Study of the Baltic Cleft Network (Rostock, Germany; Ryga, Latvia and Vilnius, Lithuania): Appearance of Lip and Nose in Patients with Unilateral Clefts of Lip, Alveolus, and Palate. Assoc. Prof. L. Zaleckas. 2016–2022.

The aim of this study was to compare the long-term results of three different cleft treatment protocols treating patients with unilateral complete clefts of lip, alveolus and palate. Photographies were taken before surgery and at the age of 5 and 10 years. The evaluation of the function and aesthetics of the lip, as well as of symmetry and harmony, was carried out. The manuscript titled "Lips and noses in 10-year-old patients with repaired complete unilateral clefts of the lip, alveolus, and palate" was completed, outlining the first results from a prospective three-centre study of the Baltic Cleft Network.

Practice Characteristics and Views of Dental Hygienists in Lithuania. Prof. Alina Puriene, V. Berlin, Asist. Prof. Greta Aidukaitė

The study analysed practice characteristics, views, and employment possibilities of Lithuanian dental hygienists. The questionnaire asked about the demographics of dental hygienists, characteristics of practice, patient load, career intentions, opinions about the dental hygienist workforce, and the need for governmental workforce regulation.
This year, the data was analysed. Finalisation of the dissertation work.

***In vitro* and *in vivo* Research on the Influence of the Cement Type on Its Removal Quality From Zirconium Oxide Implant-Supported Restorations.** Assist. Prof. E. Vindasiute-Narbute, 2018-2023

The first stage was to implement an *in vitro* study. The idea was to compare two different cements (resin cement and glass ionomer resin-modified cement) and their excess removal quality after cementation on implant-supported zirconia restorations. The second stage involves organising an *in vivo* study with the same cements to check if the results of the *in vitro* and *in vivo* studies coincide.

Research on Implant and Restorative Treatment Options in Edentulous Patients. Assist. Prof. E. Vindasiute-Narbute, 2018-2023

Crestal bone stability after flapless placement of sloped implants. The purpose of this study was to evaluate crestal bone stability around sloped implants using the flapless procedure and compare it with conventional implants placed axially. Soft tissue augmentation stability in edentulous patients. It was shown that Connective Tissue Grafts (CTG) retrieved from the tuberosity tend to determine hyperplastic responses and may induce a beneficial over-keratinisation of non-keratinised mucosa. Clinically evaluate and compare CTG from tuberosity ability to increase soft tissue thickness and the keratinisation potential after the recipient area is either prepared using a split or full-thickness flap in the edentulous mandible.

Immediate Implant Placement and Restorative Outcome in the Esthetic Area. E. Vindašiūtė-Narbutė, T. Linkevičius

Immediate implant placement has become a treatment of choice to preserve remaining bone after tooth extraction and to predict final esthetic results. The idea of the study was to compare the esthetic outcome of the immediate implant placement procedure vs the early implant placement protocol. Also, to compare different methods for soft tissue augmentation: connective tissue graft vs porcine collagen matrix.

Non Odontogenic Maxillofacial Infections. Dr Rūta Rasteniene, G. Šimėnaitė, R. Raubaitė (2021–2023)
The aim of the study is to evaluate treatment outcomes in patients with severe maxillofacial non-odontogenic infections requiring hospital care during a 17-year period. The research will also evaluate the impact of the Covid lockdown on the treatment outcomes of maxillofacial infections.

Rapid Diagnosis of COVID-19 Virus and Other Infectious Agents Using CRISPR Technology. Prof. Alina Pūrienė, Adomas Rovas

The idea of the project is to improve the quality of personal healthcare services by creating fast and accurate COVID-19 virus and other infectious agents using CRISPR nucleases appropriate for the daily practice of medical institutions. Bioethics committee approval was obtained. Clinical examination and sample collection were conducted according to the plan. Clinical and laboratory tests are being analysed. Preparation of the manuscript.

Development of Artificial intelligence-based tool AI-CE1 Alina Pūrienė, Indrė Stankevičienė, Paulius Raškevičius, Lukas Naktinis, Gintarė Klimantavičiūtė

A model of the instrument for automatic DMFT index evaluation from orthopantomogramms based on machine learning techniques was developed, and its accuracy was evaluated.

Towards Closing the Evidence-Practice Gap in Management of Deep Carious Lesions. Prof. Vilma Brukienė, Prof. Alina Pūrienė, Dr Lina Štangvaltaitė-Mouhat, PhD student Indrė Stankevičienė

Three-Dimensional Non-destructive Examination of Teeth Microcracks Using X-Ray Micro-Computed Tomography and Machine Learning. Dr Irma Dumbryte

The aim of this study was to reveal the role of microcracks in the integrity and functionality of a healthy (undamaged) tooth (with or without visible microcracks on the outer surface) using X-ray micro-computed tomography in combination with convolutional neural network-assisted voxel classification and volume segmentation.

Evaluation of Material Composition in Verified Areas Around the Tooth Microcrack Using Photoluminescence. Dr Irma Dumbryte

The aim of the study is to evaluate the composition of the material in verified areas around the tooth microcrack using photoluminescence, e.g., with 325 nm and 266 nm laser. This would help to find out whether and to what extent structural changes to the tooth are occurring inside the microcrack compared to the areas of the enamel that are without cracks. Analysis of laboratory tests and preparation of the manuscript.

Lip Morphometry and Morphologic Pattern Variation by Ethnicity. Documentation and classification of common lip patterns and lip measurements for evaluation of their variations in the populations of Polish, Russian, and Lithuanian women.

European Student Wellness, Stress, Coping, Support and Perceptions About Remote Dental Training During COVID-19. Prof. A. Pūrienė, L. Stangvaltaite-Mouhat

National Research Projects

Accuracy of Digitally Planned Implant Placement and Cad/Cam Immediate Prosthesis. (Project No. KD-16137). Prof. V. Rutkūnas, PhD Student R. Borusevičius. 2017–2022.

The aim of this doctoral thesis is to evaluate the accuracy as well as biological, technical and clinical aspects of digitally planned dental implantation and immediate prosthodontics rehabilitation. Creation of the experimental models, implementation of the experiments and data collection.

Research agreement 15600-INS-132 between Vilnius University and UAB "Dantų inžinierija" company "Lazeriu padengto implanto paviršiaus techninės galimybės". V. Rutkunas, I. Gendviliene, R. Borusevičius

Research outline, analysis and recommendations prepared for the company.

Evaluation of microarchitecture and collagen coating of regular and irregular structure 3D polycaprolactone scaffolds for dental pulp tissue regeneration. (No. 09.3.3-LMT-K-712-16-0232). The Research Council of Lithuania. Prof. V. Pečiulienė, St. E.M. Jonaitytė, PhD Student P. Tušas. 2020–2022.

The aim of this project was to create a biodegradable 3D scaffold which mimics the chemical composition and physical morphology of the pulp and can be a promising method to aid pulp regeneration. Regular and irregular structure polycaprolactone 3D scaffolds were printed using a 3D printer melted electrospinning writing head. Scaffolds' mean pore size, pore area, pore circularity, and porosity were evaluated. Moreover, scaffolds were successfully coated with collagen. Human dental pulp stem cells were isolated from human third molar teeth pulp, which may be used in later *in vitro* studies.

The Association of Epigenetic Factors with the Etiopathogenesis and Clinical Status of Periodontal Diseases and Rheumatoid Arthritis. (No. 01.2.2-LMT-K-718-01-0023). The Research Council of Lithuania. Prof. A. Puriene, PhD Student A. Rovas. 2017–2022.

Clinical examination and sample collection were completed for all 240 participants according to the plan. Clinical and laboratory tests are being conducted and analysed. Finalisation of the dissertation work, defence of PhD thesis.

Application of Artificial Intelligence Systems to Evaluate the Diagnostic Efficiency of Sialolithiasis from Panoramic Radiograph. (No. S-SV-22-69). The Research Council of Lithuania. Student Paulius Raškevičius. The project is financed under the measure "Student research during a summer internship." Scientific Supervisor Prof. Alina Pūrienė. 2022.

The student's summer internship research was to develop a system for automated detection of salivary gland stones from panoramic radiographs using artificial intelligence technologies. The student managed to implement the set goals and tasks of the project, including data analysis and preparing presentations.

The use of artificial intelligence technologies for the identification of soft tissue calcification images in panoramic radiographs. (No. S-ST-22-85). The Research Council of Lithuania. Student Paulius Raškevičius. The project is financed under the measure "Student research during the semester". Scientific Supervisor: Prof. Alina Pūrienė. 2022–2023.

Students during the semester identified and annotated the quantitative and qualitative features of carotid artery calcification images from panoramic radiographs using artificial intelligence technologies for the improvement of the early diagnosis of cardiovascular diseases. Data collection and analysis are in progress.

BEST REPORTS DELIVERED AT CONFERENCES ABROAD

Rutkūnas V. Mapping a digital workflow for the full-arch implant-supported prostheses. October 13-15. ORIS symposium. Munich, Germany

MOST IMPORTANT NATIONAL AND INTERNATIONAL AWARDS RECEIVED FOR R&D ACTIVITIES

"Relationship between tooth loss and mandibular bone mineral density", 2021/09/03.
b) The best research at the dental students' international conference "Excelling through Evidence-Based Dentistry". Daniel Kules, research advisor: Alina Pūriene. "Age and sex-related changes of mandibular bone mineral density", 2021.10.16.

The most innovative abstract at Vilnius University Medical Faculty LXXIV Students' Conference, 2022/05/16. Daniel Kuleš, Research Advisor: Prof. Dr (HP) Alina Pūrienė "Relationship between the mandibular base cortical bone height and vertebral densitometric data."

RESEARCH INTERESTS

- Environmental and social factors and public health
- History of medicine
- Epidemiology of non-infectious and infectious diseases
- Scientific basis of health care management
- Assessment of health care activities and biostatistics
- Health and quality of life
- Medical ethics
- Public mental health, social determinants of population health, health services research
- Epidemiological and public health implications of the relationship between rheumatic diseases, tuberculosis and malignant tumours

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Assessment of Health Risk Factors and Sense of Coherence of Elderly People. Prof. R. Stukas. 2014–2024.

Conducted a study of the impact of the COVID-19 pandemic on the lifestyle, health-related quality of life and subjective well-being of the elderly. To date, there have been no representative studies conducted on the diet and the consumption of dietary supplements used by the country's elderly population during the COVID-19 pandemic; therefore, the aim of this study is to assess the impact of the COVID-19 pandemic on the use of dietary supplements in a representative sample of the country's elderly population. The survey was conducted using an anonymous questionnaire online. The study was expanded and surveyed residents of various ages, including the elderly. In all, 1600 males and females aged 16–64 of the country's population were interviewed. The χ^2 (chi-square) criterion was used to estimate the distribution of respondents according to categorical variables. Differences are considered statistically significant when $p \leq 0.05$. In this phase of the study, an analysis was conducted to ascertain the impact of the COVID-19 pandemic on the consumption of dietary supplements by the working-age population, including the elderly, of the country.

The study found that the COVID-19 pandemic led to an increase in the use of dietary supplements and an accelerating number of daily dietary supplements used by consumers. The other study data are being analysed.

International Research Projects

International multicenter study **CoMix** (Measuring Behavioural Change during COVID-19 Epidemic), which is a part of *H2020 EpiPose Project* **Epidemic Intelligence to Minimize 2019-nCoV's Public Health, Economic and Social Impact in Europe.** PI in Lithuania: Assoc. Prof. Dr M. Jakubauskienė. 2020–2023.

In 2022, the data collection stage was finalised. Data analysis is in progress, and data dissemination (writing research papers and policy briefs) is under preparation and revisions.

International multicenter study **COPER (Pandemic and its impact on mental health of men and women in the European Region**). PI in Lithuania: Assoc. Prof. Dr M. Jakubauskienė. 2020–2022.

An international longitudinal research instrument has been updated with vaccination data, and it has been validated in Lithuania. The second wave of research data was collected. Data analysis is in progress. The dissemination of the COPER research study results is in process by writing research articles and presenting research results at the scientific conferences:

The first data was presented at the international EUPHA conference.

RESEARCH INTERESTS

- Biopsychosocial model
- Effectiveness of rehabilitation, physical and sports medicine
- Components of physical capacity
- Prevention of disease and injury

RESEARCH PROJECTS CARRIED OUT IN 2022

National Research Projects

Genome, Epigenome and Telomere Length Features of Sarcopenia and Frailty. The Research Council of Lithuania. Prof. V. Alekna. 2022–2024

Strength Training and Skeletal Muscle–Brain Interaction. (No. S-MIP-21-37). The Research Council of Lithuania. Prof. N. Masiulis. 2021–2023

Development and Introduction of Effective Models to Promote Physical Activity in the Workplace. Assoc. Prof. R. Žilinskienė. 2020–2023

Biological Feedback Measurement and Analysis Technology Center for Personal and Public Health Promotion (Bio-MAC). A collaboration between VGTU, KTU, and Santaros Clinics. Prof. Dr J. Raistenskis.

Emotional (Psychological) Well-being of School Teaching Staff. (No. SU-1565/S-162). The Foundation for Strengthening Public Health, Administered by the Lithuanian Ministry of Health (39,969.00 EUR), Main Executor: B. Miežienė. 2022–2023

International Research Projects

Network on evidence-based physical activity in old age. (COST No. OC-2020-1-24443). Representative to Lithuania in the COST Operational Management Committee. Prof. N. Masiulis. 2021–2026

RESEARCH INTERESTS

- Innovations in nursing science, research and studies
- Nursing and midwifery policymaking
- Quality of nursing care
- Ethics in nursing care
- Nurse professional competencies
- Nursing and patient education
- Research of nurses' working environment
- Needs and features of perioperative nursing care
- Patient safety and the role of nurse
- Physical activity and nursing care
- Advanced nursing practice

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Health and Disease Research: Nurses' Competence and Education, Patients Teaching, Nursing Requirement and Quality. Prof. N. Istomina. 2019–2024.

In 2022, we studied the work motivation of anaesthesia and intensive care nurses and the factors that determine it. The results showed that motivation for work is determined by both external and internal factors. Job satisfaction depended on the nature of the job and the relationship with co-workers. Collaborators and communication with them were rated better by Seniors with Higher Education, working less than one post. As the length of service increased, nurses' satisfaction with their salaries decreased. We also assessed the psychosocial stress experienced by nurses and its impact on mutual cooperation, health and quality of life, the impact of the COVID-19 pandemic on nurses' burnout syndrome, non-compliance and adverse events of the healthcare facility.

Complex Assessment of Nurses' Professional Competence. Prof. N. Istomina. 2019–2024.

Investigation of the professional competency of nurses and identification of clinical, educational and social controlled and uncontrollable factors influencing the competency of nurses.

Prepared instrument EduCompNurs, which has passed the pilot testing and the main questioning starting from January 2023. The final-year nursing students from the Lithuanian institution of higher education will be participating.

Assessment of Care Needs and Quality of Life and Improving Health Care and Education. Prof. N. Istomina. 2019–2024.

In 2022, respondents' attitudes towards the effect of ultraviolet rays on the skin and their decision to use protection measures were analysed; nursing needs in taking care of children with a congenital heart defect were assessed; nursing needs of patients after spinal surgery were analysed. A review of the scientific literature on the concept and symptoms of occupational burnout, the causes and consequences of burnout in anaesthesia intensive care nurses, and the prevention of burnout syndrome was conducted. Analysed the professional motivation and job satisfaction of advanced practice nurses: a quantitative study was conducted using an anonymous questionnaire survey conducted in 2022 from January to March.

Ethics and Quality Assessment of Outpatient Palliative Care Services for Adults. Prof. N. Istomina. 2020–2024.

Literature related to the topic was identified. The search process was completed by using the Pubmed database. Search words were ethics, quality and palliative. The gathered literature is being analysed – the analysis process is in the final stage.

Assessment of Communication between Health Professionals. Prof. N. Istomina. 2020–2024.

In 2022, a survey was conducted on the communication of doctors and patients during consultations. The received data was processed with an SPSS package, and a publication was prepared. A literature review on social media representation of the nursing profession was compiled.

National Research Projects

Prevalence of High-Risk Drug Use and Coverage and Quality of Opioid Substitution Treatment and Needle and Syringe Programs in Lithuania: a Multi-Method Estimation Study. Prof. N. Istomina. 2022–2023.

The study aimed to estimate the size of high-risk drug-using populations in Lithuania and to apply these estimates in assessing the coverage and quality of opioid substitution treatment and needle and syringe programs. We will use indirect prevalence estimation methods to obtain annual prevalence estimates of the population of high-risk opioid users and of people who inject drugs in Lithuania in 2021. Planned activities performed in 2022: the research methodology was prepared, and the documents were prepared and submitted for obtaining the research permit of the Bioethics Committee.

Psychological Well-Being of School Teachers. Prof. A. Emeljanovas. 2022–2023.

Project goals: to collect and analyse indicators of the psychological well-being of Lithuanian school teachers. Based on the research results, the aim is to prepare recommendations for improving the psychological well-being of school teachers and to collect indicators of the perceived availability and need for psychological help of school teachers. Based on the analysis of these indicators, measures that increase the availability of psychological support will be planned, and recommendations will be prepared to contribute to the improved psychological well-being of school teachers and the greater availability of psychological support. The scientific study results will be shared within academic society by publishing the results in scientific databases and presenting them

at conferences. The main activities planned for 2022 are to carry out a study on the psychological well-being of school teachers and to investigate the perceived availability and need for psychological help of school teachers.

International Research Projects

Professional Competence in Nursing (PROCOMPNurse). Turku University, Finland. Prof. N. Istomina. 2017–2023.

In 2022, the data obtained were further analysed. Articles were published together with the project partners. Project activities and meetings continued.

Supporting Teachers to Maximize Enjoyable MVPA Minutes in Children and Youth: Project Enjoyable MVPA. European Commission Erasmus+ Programme: Sport. Prof. Dr A. Emeljanovas. 2019–2022.
Researchers from the Faculty of Medicine of Vilnius University (VU) participated in the Erasmus+ project "Supporting teachers to maximise enjoyable MVPA" (Project No. 2019-1-EE01-KA201-051595), which aims to improve the health of adolescents by creating modern sports games designed for developing motor skills.
The methodology consists of 100 video games for physical activity translated into 5 EU languages: Lithuanian, English, Estonian, Finnish and Slovenian. The games are intended to be used in physical education lessons or during sports training, and also during leisure time."
The project was implemented in conjunction with colleagues from Vytautas Magnus University in Kaunas (Lithuania), the University of Tartu (Estonia), the University of Ljubljana (Slovenia) and the Research Centre for Sports and Health Sciences – Likes (Finland). The project started in 2019 and ended in October 2022.
The project was supported by the Erasmus+ programme KA201 Strategic Partnerships for School Education.

Virtual Advice, Nurture and Guidance in Undergraduate Research and Development (VANGUARD). Erasmus+ Project. Prof. N. Istomina. 2020–2023.

Describing activities of the year 2022, would like to present the main results, goals and targets of the partner institutions. Lithuanian University of Health Sciences integrated project material into the 1st year of the Medical Study Program in the compulsory module "General Health Basics" and the study subject "Personal Health Education". During the academic year 2021/2022, a new optional subject of study was created at Klaipėda University for the students of the nursing study programme "Healthy Physical Activity" (3ECTS). The project material at Vilnius College has been integrated into two optional subjects, Physical Education and Principles of Regular Sport and four compulsory nursing college study programme subjects: Community Nursing, Physical Medicine and Rehabilitation, Pregnancy Care, and Gerontology. Siauliai State College decided to integrate project material into the study subjects of general practice nursing: Geriatric Nursing and Community Nursing and Health Promotion. Utena College provided the project material on the subjects of Physical Medicine and Rehabilitation, Emergency Care and Intensive Care. Also, college students were encouraged to explore the topics of physical activity in their final theses. Taking the challenge as Lithuanian collaboration partner leader, Vilnius University started the 2022 academic year with three lectures on the VANGUARD project material: "General Nursing and Practice" of the Nursing study programme, as well as three lectures in the module: "Development

of Practical Nursing Skills" of the University medical study program. The lectures were placed in the electronic space of Vilnius University, thus increasing the promotion of information. After the successful launch of the lectures, representatives of Vilnius University presented the survey tool, which was adjusted to get feedback from student participants. The survey results were presented to international partners in a one-year annual meeting and considered for scientific publication. The data of the survey were presented at the British Journal of Sports Medicine; at the beginning of the 2022/2023 academic year, the Manuscript was realised.

Developing Multi-professional Higher Education for Promoting Mental Health and Well-being at Schools (Well@School). Erasmus + programme. Prof. N. Istomina. 2020–2023.

The international project "Developing multi-professional Higher Education for promoting mental health and well-being at school. (Well@school)" started on 2020/09/01 and will end on 2023/08/31. There were two meetings in the year 2022. The first meeting, "Learning, Teaching, Training Activities (LTT)", was held on 2022.02.15, 16 and 18th remotely because of the COVID-19 pandemic. During the meeting, the presentation, evaluation and implementation methods of teaching were discussed. Each country has developed and presented its part of the material and its presenting ways in the H5P program. The discussion was started about the implementation guide as well. In Spring, work on the development of the program was initiated, and the pilot study was conducted in May of 2022. The transnational Project Meeting was held in Athens from 2022/06/14–16. During the meeting, the results of the pilot study were presented. The participants of the study had to answer questions about the relevance, usefulness, applicability, online training and benefits of these trainings. The program was altered and adjusted based on the answers provided. Another discussion was held In September 2022, the training program and evaluation questionnaire were established. In October 2022, the Well@school program was initiated. Each country is inviting school representatives (25 participants each) to try the new training program. The article "Competences and Methods for promoting mental health in primary school", submitted for consideration to Health Education Journal, was completed in November of 2022.

The Health and Social Services for Asylum Seekers research group. Prof. N. Istomina. 2022–2024.

The Health and Social Services for Asylum Seekers research group at Vilnius University, in collaboration with the University of Lleida (Spain), conducted research on the health status, social and healthcare needs of asylum seekers and war refugees from Ukraine. It also assessed the level of cultural competency and readiness of Lithuanian nurses to work with migrants.

RESEARCH INTERESTS

- History of medicine
- History of public health
- Medical ethics

RESEARCH PROJECTS CARRIED OUT IN 2022

Projects Supported by the University Budget

Legal and Institutional Aspects of Biomedical Research with Humans. Prof. E. Gefenas. 2019–2022.

Researchers of the Centre for Health Ethics, Law and History collected and analysed data on Research Integrity and Research Ethics training programmes and their efficiency. The team of the Centre has analysed ethical and legal issues emerging in research on human biological material, biobanks and "Big Data".

Medical science and studies in Vilnius. Assistant. Prof. Dr A. Žalnora. 2022–2024.

In 2022, archival materials were collected and systemised. Data on hygiene education at Stephen Báthory University and Kaunas Vytautas Magnus University were analysed and compared. Publications based on the collected data were prepared.

International Research Projects

INTEGRITY: Empowering Students through Evidence-based, Scaffolded Learning of Responsible Conduct in Research (RCR). Prof. E. Gefenas. 2019–2022.

The project aims to empower students in responsible research. The main strategy of the INTEGRITY's team is to build knowledge and set up tools aimed at supporting high school teachers and university professors, very often required to impart professional ethics and integrity training. In 2022, using the data from the 2020 survey of upper secondary students, the Vilnius University team, together with other project partners, co-authored a publication. In addition, VU representatives took part in organising a 'Diner Pensant' (tasteful conversations to empower good practices in science) for senior researchers from the universities representing the partners of the INTEGRITY project.

EU-STANDS4PM: A European Standardisation Framework for Data Integration and Data-driven *in silico* **Models for Personalised Medicine.** Prof. E. Gefenas. 2019–2022.

The so-called "Big Data" (combination of patient personal data such as electronic health records, patients' registries and databases, as well as lifestyle information) holds immense potential for clinical applications, especially for *in silico* personalised medicine approaches. A Pan-European Expert forum has the overarching aim to bundle transnational standardisation guidelines for *in silico* methodologies in transnational and clinical research to unfold the potential of PM. In 2022, the team of Vilnius University updated the recommendations.

iRECS: improving Research Ethics Expertise and Competences to Ensure Reliability and Trust in Science. Prof. E. Gefenas. 2022–2024.

The goal of the project is to scan and map existing needs raised by new and emerging technologies in European and global research ethics communities, to produce and implement training materials

for European and global audiences, to conduct research ethics training programmes, and to propose adaptations to the research ethics process in Europe. The project started in autumn 2022.

PREPARED: Pro-active Pandemic Crisis Ethics and Integrity Framework. Prof. E. Gefenas. 2022–2024.

The overall goal of the project is to develop an operational ethics and integrity framework which safeguards key ethical values, supports a rapid and effective research response to crises and improves overall pandemic preparedness. The project started in autumn 2022.

RESEARCH INTERESTS

- A comprehensive study of human vision
- Vision correction
- Recognition of eye diseases
- Use of modern innovative technologies