Vilnius University Hospital
SANTAROS KLINIKOS

RESEARCH AND INNOVATION 2024

VILNIUS

CONTENTS

DATA AT A GLANCE: RESEARCH AT SANTAROS KLINIKOS IN 2024

One of the main goals of Santaros Klinikos is to develop and foster a progressive and leading institutional complex of healthcare, education and research in Lithuania. Santaros Klinikos is continuously conducting biomedical and clinical research and training a new generation of healthcare professionals and medical researchers.

292 research works recognised by the Research Council of Lithuania

117 research works among the Top 10 most cited worldwide

10 articles in research journals with impact factor over 20

625 biomedical studies and clinical trials conducted in 2024

59 newly-initiated biomedical studies

#3 in Lithuania by Research assessment points received during annual evaluation of the Research Council of Lithuania (medicine and health sciences)

#2 in Lithuania by funds received through international research programs and private entity-funded R&I projects (medicine and health sciences)

615 530 EUR – funds received through private entity orders in 2024

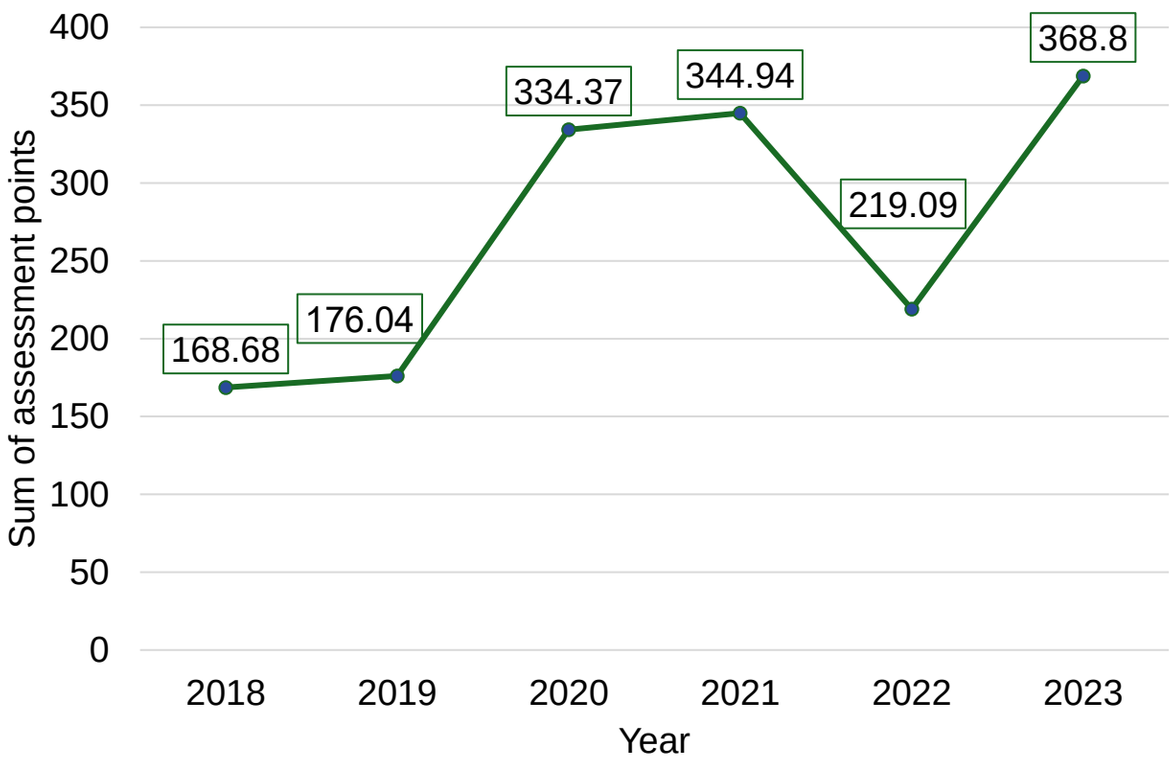
436 040 EUR – funds received through international research programs in 2024

Results of Annual Research Assessment

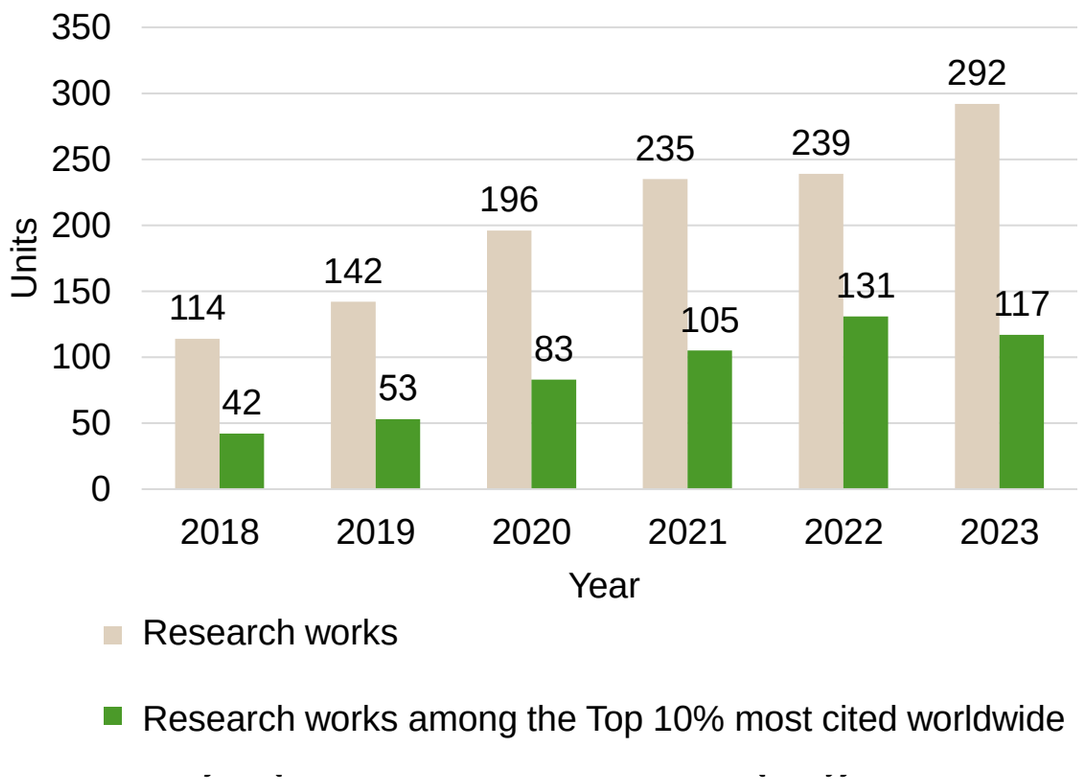
Research and experimental development (R&D) results for 2023: research papers

The 2023 results of the annual research and experimental development (R&D) evaluation of universities and research institutes (data from October 2024) revealed a weighted sum of points for science dissemination units (research papers) of Vilnius University Hospital Santaros Klinikos in 2023 to be 368.8 points, Figure 1. Santaros Klinikos remained the third institution in Lithuania in terms of the number of points scored in the field of medicine and health sciences. In 2023, the number of scientific papers credited to Santaros Klinikos continued to increase, with more and more publications being among the top 10% most cited in the world (Figure 2).

[1] Formal assessment results in the field of medicine and health sciences



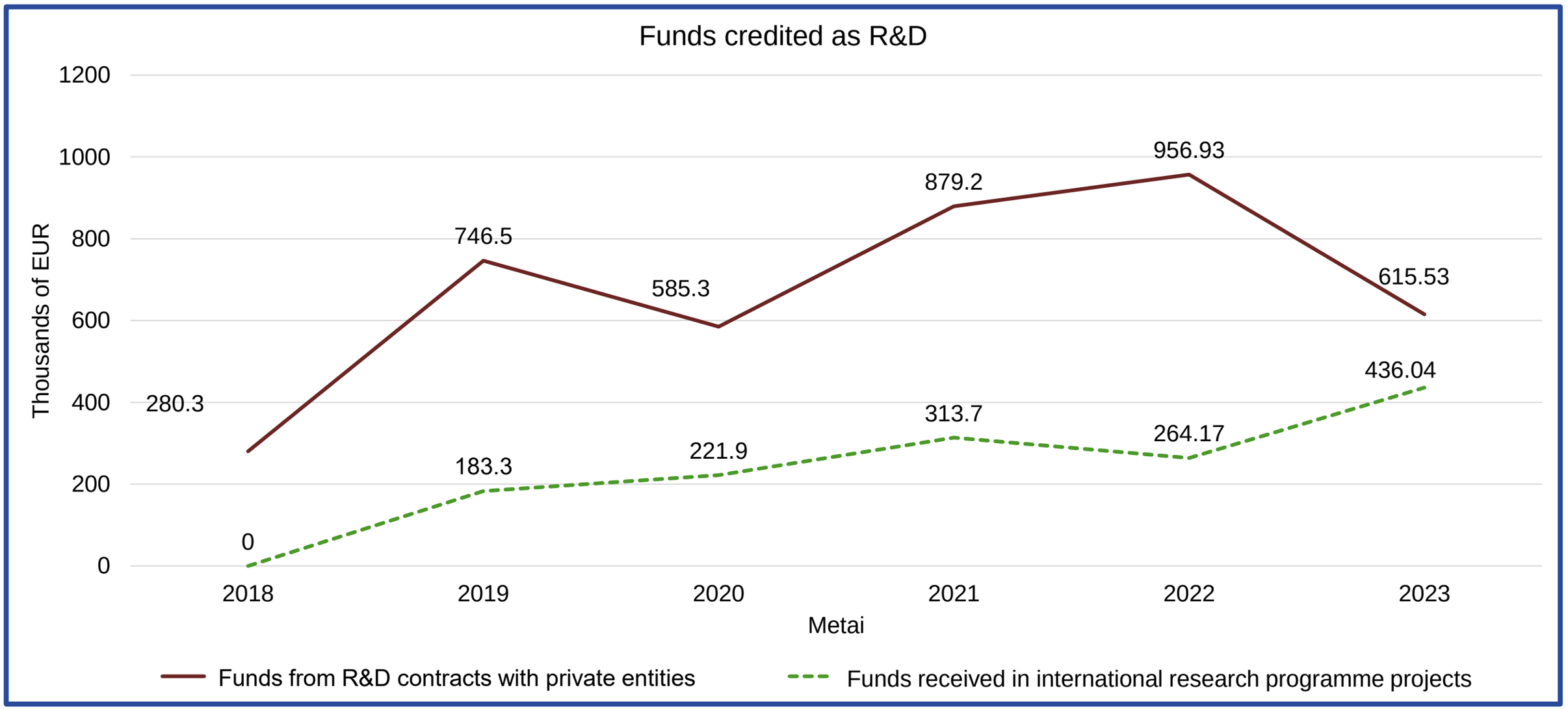
[2] Number of research papers in the medical and health sciences



↑Results of the Lithuanian Research Council's expert evaluation of research and experimental development (R&D) at universities and research institutes and the number of research papers credited to Santaros Clinics in 2018-2023

In the field of medicine and health sciences – #3 in Lithuania

Research and experimental development (R&D) results for 2023: funds credited



↑Santaros Klinikos formal evaluation results: credited funds for research and experimental development (R&D) contracts in the field of medicine and health sciences for the period 2018-2023.

In the field of medicine and health sciences:

 # 2 in Lithuania by funds received in international research programme projects

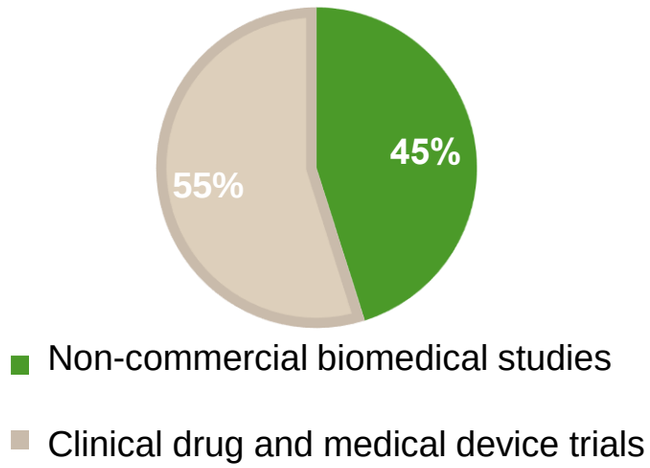
 # 2 in Lithuania by funds from R&D contracts awarded to private entities

Biomedical Studies

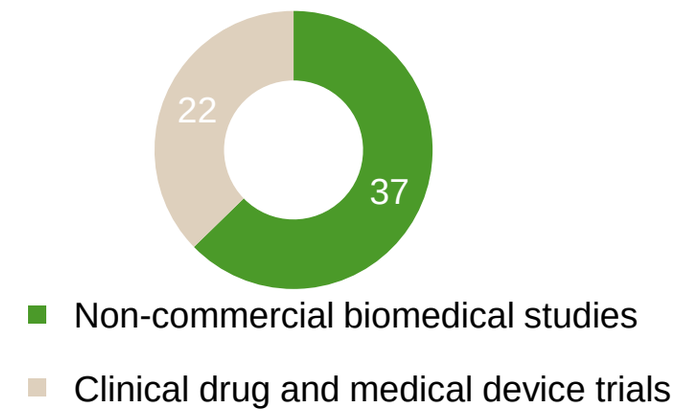
Biomedical studies at Vilnius University Hospital Santaros Klinikos

One of the many activities of Vilnius University Hospital Santaros Klinikos is biomedical research. The development of biomedical research is continuously promoted at Santaros Klinikos, contributing to the development of Lithuanian and European Union (EU) health policy, and carrying out EU joint actions and biomedical projects. In 2024, the following biomedical research studies were carried out at Santaros Klinikos: epidemiological, retrospective, prospective, clinical drug and medical device trials, research and experimental development projects in collaboration with other academic institutions. Resulting outputs from these studies were reports at international conferences, research works of PhD students and students, and data for follow-up research projects. An emphasis is put on drug and medical device clinical trials, research on chronic non-infectious and infectious diseases. Santaros Klinikos have a modern infrastructure for Phase I-IV clinical drug and medical device trials as well as other biomedical studies.

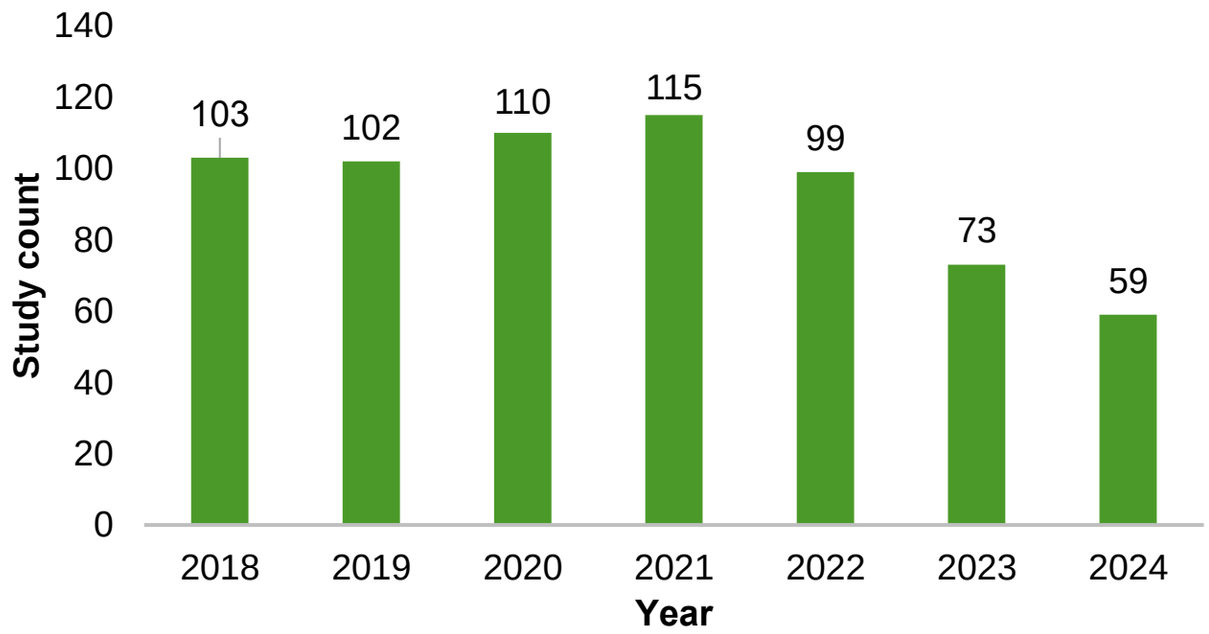
In 2024, Santaros Klinikos were carrying out a total of 625 biomedical trials in various therapeutic areas – 282 non-commercial trials and 343 clinical drug and medical device trials. Twelve new preliminary contracts were signed for the conduct of clinical trials on drugs and medical devices. Twenty-seven research centre validation forms were signed, and 20 cooperation agreements were signed with other Lithuanian and foreign scientific institutions for research purposes. In 2024, Santaros Klinikos initiated a total of 59 new biomedical trials in various therapeutic areas, including 37 non-commercial scientific trials and 22 clinical trials of drugs and medical devices.



↑ Biomedical studies at Santaros Klinikos in 2024 by study type

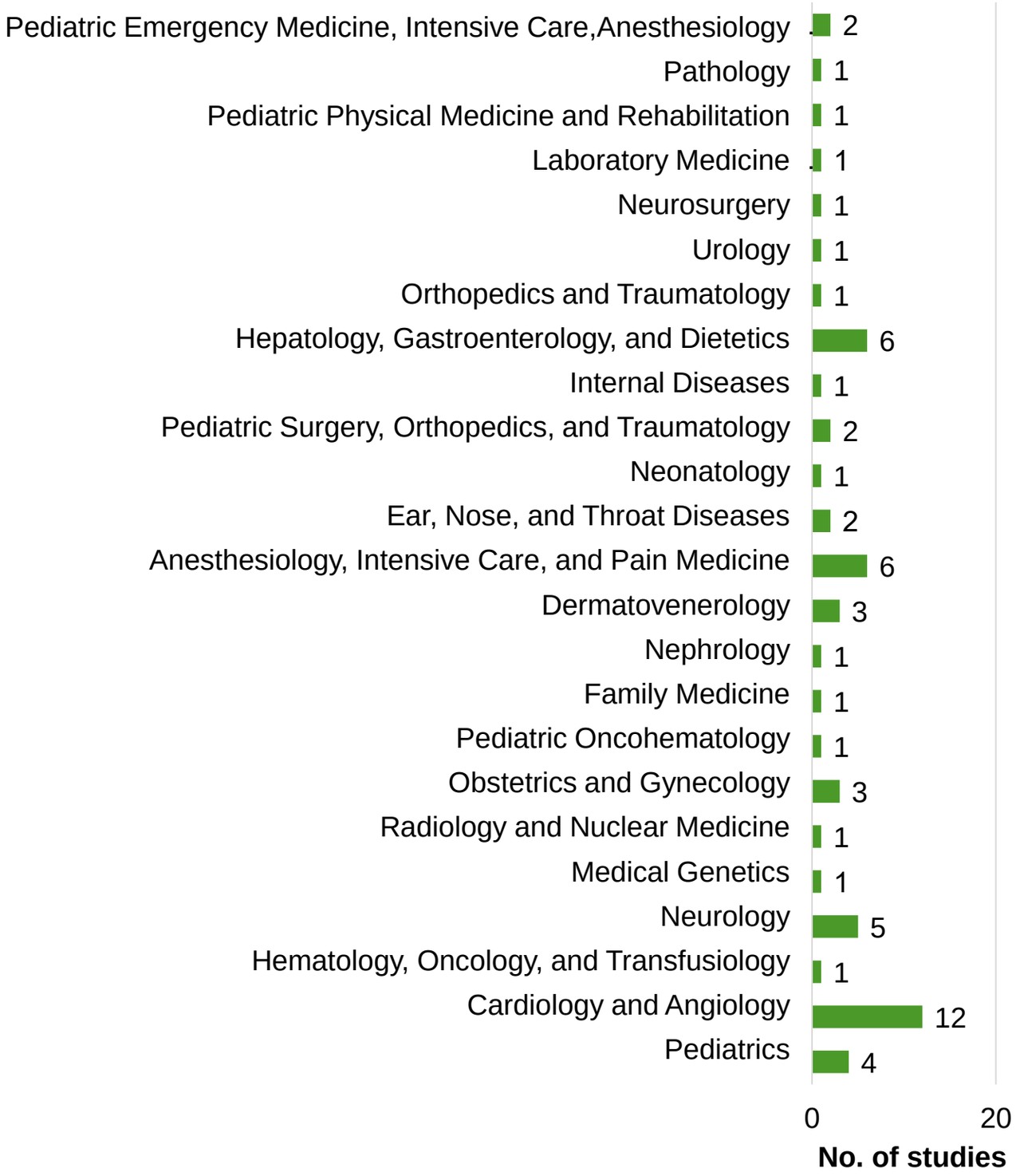


↑ Newly-initiated biomedical studies at Santaros Klinikos in 2024 by study type



Trend of the number of newly-initiated biomedical studies at Santaros Klinikos in the period 2018-2024

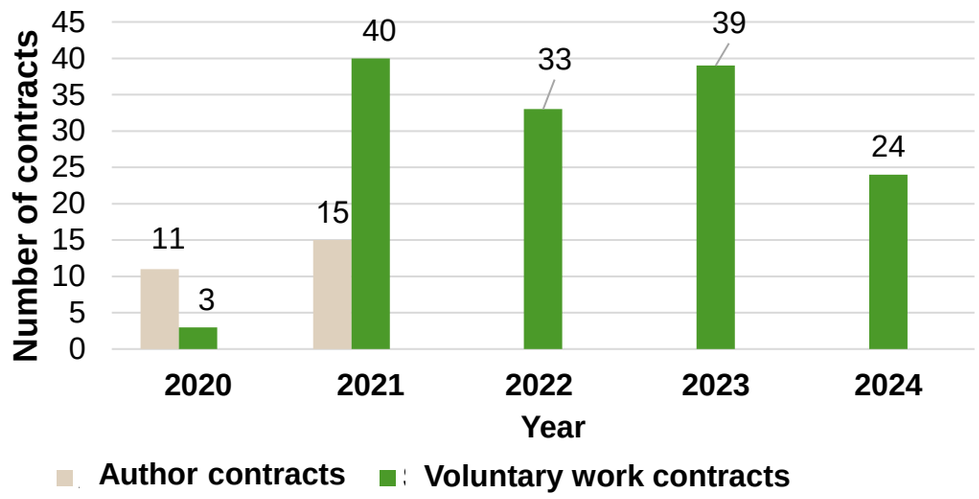
Biomedical studies



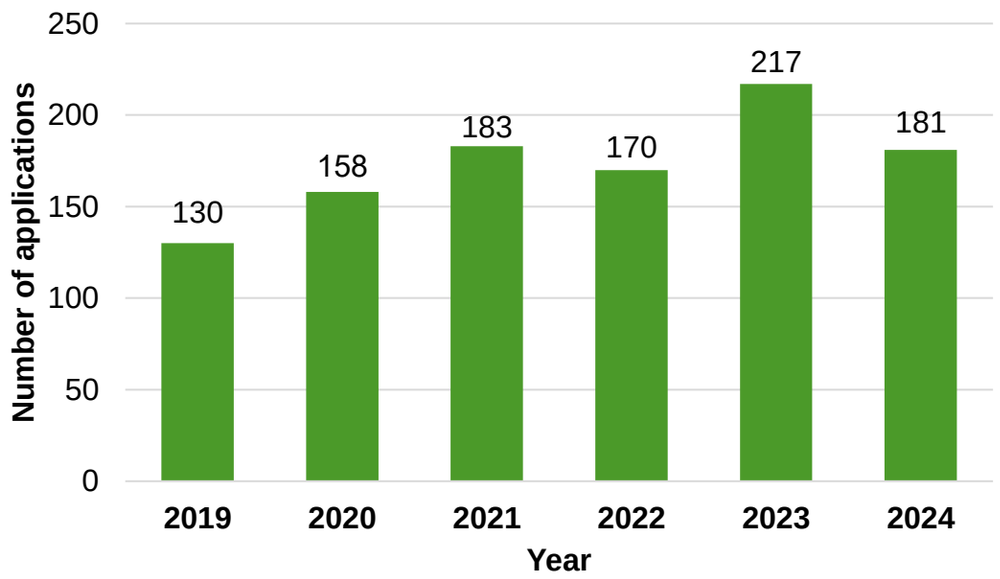
↑Biomedical studies at Santaros Klinikos in 2024 by field of research

Student research

In 2024, a total of 181 students applied for research activities at Santaros Klinikos. The students mainly engaged in clinical case report and survey analysis. There were 24 voluntary work contracts signed with students, and dozens of bachelor, master and student theses were carried out under the supervision of specialists at Santaros Klinikos.



↑ Research participation contracts with students at Santaros Klinikos



↑ Student applications to use Santaros Klinikos as a base for their thesis project

Partners for medical device, clinical trials and other academic partners of Santaros Klinikos

Partners for clinical drug trials at Santaros Klinikos

Abbvie, Amgen, Merck, Servier, Sanofi, Novartis, Bayer, Biotex, Boehringer-Ingelheim, Takeda, Hoffmann-La Roche, Shire, Celgene, Odonate Therapeutics, Gilead, Biogen, Pfizer, Dr. Falk Pharma, Astex Pharmaceuticals, NOVO NORDISK, PAREXEL, Astrazeneca, Takeda Development, InDex Pharmaceuticals AB, Syneos Health, Alnylam Pharmaceuticals, Onorach, F. Hoffmann-La Roche, Alvotech Swiss AG, Pharm-Olam International, Actelion Pharmaceuticals, GlaxoSmithKline Biologicals SA, Basilea Pharmaceutica International, Argenx, NEC OncoImmunity AS, Morphic Therapeutic, Ventyx Biosciences, Vedanta Biosciences, MicuRx Pharmaceuticals, Urovant Sciences GmbH, Galapagos NV, OMEROS CORPORATION, Berlin Chemie AG, Janssen-Cilag International NV, Astellas, Antev Ltd., Boehringer Ingelheim, Cosmo Technologies Ltd., Arrowhead Pharmaceuticals, Inc., Lundbeck A/S and other partners of innovative pharmaceuticals.

Partners for clinical medical device trials at Santaros Klinikos

Micro Interventional Devices Inc., St Jude Medical koordinacinis centras, Medtronic, Millipede, PiCardia, NuVera Medical, K2 Medical Ltd., CorFlow Therapeutics AG, Meril Life Sciences, Abbott, CoreMedic, Biotest AG, Biosense Webster, Bolt Medical, Orion Corporation, Cardiac Success Ltd, Novostia SA, Endomatic Ltd, Append Medical Ltd, CryoTherapeutics S.A., Stereotaxis, Inc., InnovHeart, HVR Cardio, ENTire Medical Ltd., Tioga Cardiovascular, Inc. and other representatives.

Research partners of Santaros Klinikos

Lithuanian University of Health Sciences, Lithuanian Research Council (Lithuania), National Cancer Institute (Lithuania), Center for Innovative Medicine (Lithuania), Vilnius Gediminas Technical University (Lithuania), Kaunas University of Technology (Lithuania), Institute of Biotechnology (Lithuania), New York University School of Medicine (USA), University of Cologne (Germany), University of Rostock (Germany), Stanford University (USA), Aalborg University (Denmark), University Hospital Erlangen (Germany), University Hospital Heidelberg (Germany), Menzies Research Institute (Tasmania), INSERM Research Institute (France), International Professional Societies, European Society of Cardiovascular and Interventional Radiology, Lithuanian Stroke Association, Lithuanian Association of Intensive Cardiology and Emergency Medicine, Dutch-Belgian Cooperative Hematology Oncology Research Group HOVON, Medical University of Vienna, Hamilton Health Sciences Corporation, EuroSurg Collaboration, PSI CRO, Angion Biomedica Corp, BIO1, Karolinska University Hospital, University of Leipzig, University of Heidelberg, University College Dublin, National University of Ireland in Dublin, University of Cologne, Hannover Medical School, UAB "Institute of Management and Psychology", Lithuanian Society of Oncologists and Chemotherapists, Universität des Saarlandes (Germany), Nordsjælland Hospital, European Society of Cardiology, Les Templiers (France), Nordic Society of Pediatric Hematology and Oncology, Royal Hospital for Sick Children in Edinburgh, Scientific Subcommittee on Pediatric and Neonatal Thrombosis and Hemostasis of the International Society on Thrombosis and Haemostasis, Princess Máxima Center for Pediatric Oncology (Netherlands), Giannina Gaslini Institute in Italy, Lariboisière Hospital in France, Society for Pediatric Oncology and Hematology in Berlin, and other scientific institutions.

Santaros Klinikos have received authorization from the State Medicines Control Agency to organize Good Clinical Practice (GCP) training. Basic and advanced Good Clinical Practice courses can be taken remotely: researchers are given the opportunity to attend the training and take the test at any time and from any convenient location. Those who successfully complete the course and pass the test are awarded a certificate of Basic Good Clinical Practice training (8 academic hours) or Advanced/Refresher Good Clinical Practice training (4 academic hours).

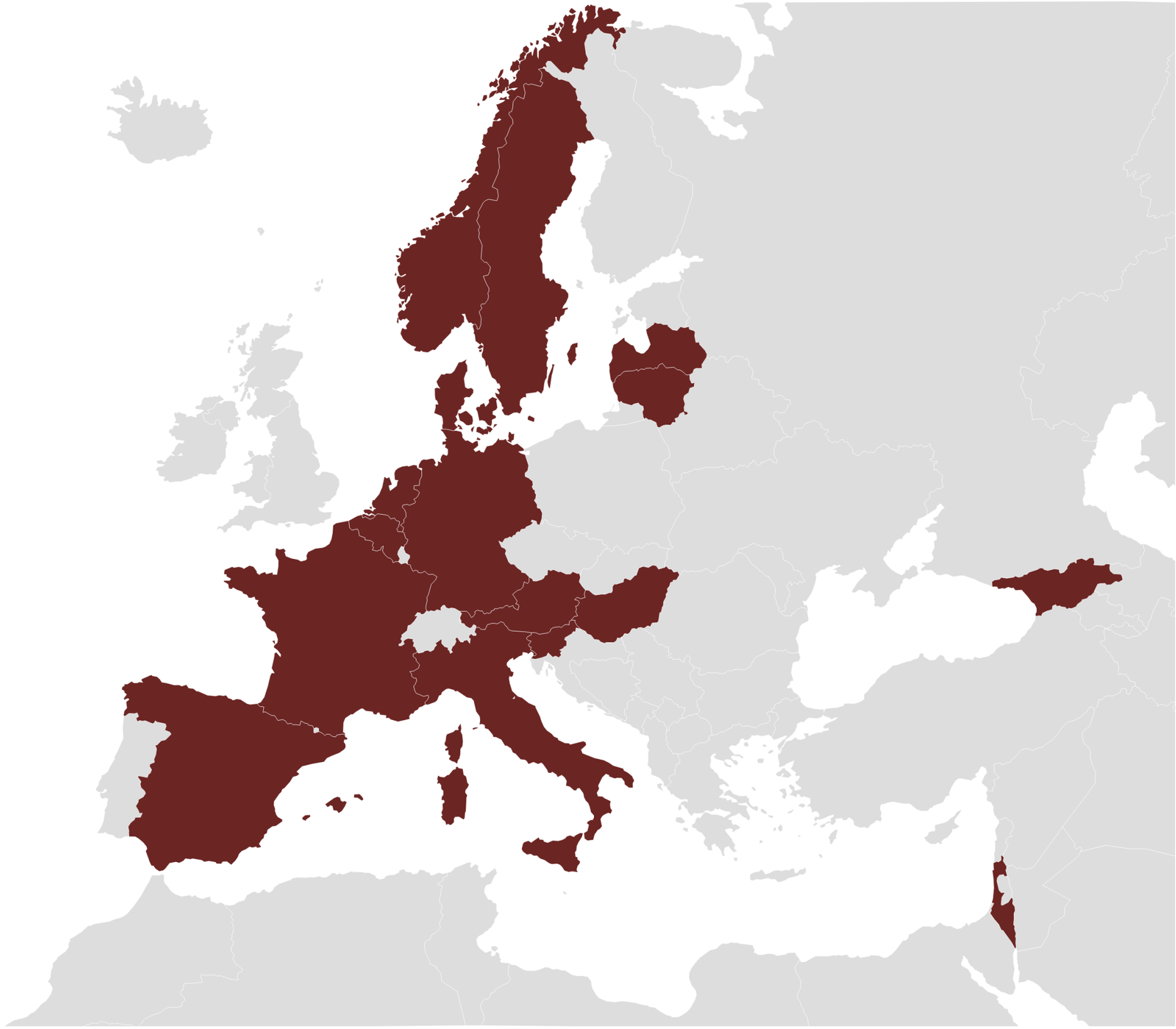
Medical device trials

At Santaros Klinikos, the only center in the Baltic States, the following medical device studies have been conducted or are ongoing

■ APAMA 1 – a balloon for pulmonary vein isolation (for the treatment of atrial fibrillation); ■ AFERA 2 – catheter and navigation system (for the treatment of atrial fibrillation); ■ Beat to Beat – pacemakers that also reduce arterial blood pressure; ■ CCM – pacemakers that improve myocardial contractility; ■ Double-Check AF – a non-commercial study conducted with Kaunas University of Technology – a wearable watch for detecting atrial fibrillation and extrasystoles; ■ HYDRA – transcatheter aortic valve implantation study (monitoring); ■ Accu-CINCH – a left ventricular ring designed to restore the geometry of the left ventricle and reduce mitral valve insufficiency; ■ FAME III – drug-eluting stents for percutaneous intervention; ■ TRISTAR – tricuspid valve ring for valve correction; ■ PLA – pulsed field ablation system study for the treatment of paroxysmal atrial fibrillation; ■ E-SAFE – a study to measure esophageal temperature and the temperature of a retraction probe during atrial fibrillation ablation; ■ KALPA™ – a study to evaluate the safety and effectiveness of a medical device and its capabilities for mapping, visualization, and control in patients undergoing left atrial appendage closure; ■ Leaflex Performer – clinical study to demonstrate the safety and efficacy of a medical device; ■ NuVera ICE – catheter introduction for percutaneous procedures using septal puncture to access the left atrium; ■ CCM-HFpEF – study on the safety and performance of an implantable device, the Sphere-9 catheter, and Affera marking and radiofrequency pulsed field ablation system for the treatment of atrial fibrillation; ■ CorFlow CoFI™ system – a medical device that combines microcirculation assessment (diagnosis) and therapeutic methods to treat microvascular obstruction after myocardial infarction; ■ Myval™ – transcatheter heart valve system; ■ Bolt Lithotripsy RESTORE FIH – lithotripsy system with angioplasty to help treat narrowing/obstruction of heart or leg arteries; ■ TRUPULSE™ generator – specialized device that delivers radiofrequency or pulsed field energy through an investigational catheter; ■ THERMOCOOL SMARTTOUCH™ SF (STSF) – a bidirectional navigation catheter with contact force sensing – a steerable, multi-electrode, irrigated catheter; ■ Apollo Intravascular Lithotripsy (Apollo IVL) system – designed to enhance percutaneous transluminal angioplasty using IVL to break down calcium before complete balloon dilation at low pressure; ■ Remo-Wax® Oil – used to treat isolated itching of the external auditory canal; ■ Vsling™ III device – designed to correct ventricular issues in patients with heart failure; ■ OMNYPULSE™ – a bidirectional catheter used for cardiac electrophysiological mapping, stimulation, and recording, and ablation when used with the Biosense Webster TRUPULSE™ generator; ■ Triflo – aortic valve; ■ ENDOMATIC SEPIOLA device – intended to reduce the risk of thrombus in the left atrial appendage and related systemic thromboembolism; ■ Append system – designed to reduce the risk of thromboembolism originating in the left atrial appendage (LAA) in patients with non-valvular atrial fibrillation by tying off the LAA with a surgical suture; ■ Cryotherapy System (CTS) – assessment of safety and feasibility for high-risk plaque stabilization in patients with acute coronary syndrome (ACS); ■ MAGiC – Magnetic Interventional Ablation Catheter using radiofrequency energy or heat to destroy parts of the heart that cause or contribute to abnormal heart rhythms; ■ SATURN TS system – a novel approach to TMVR (transcatheter mitral valve replacement) for patients with mitral regurgitation who are unsuitable for other treatments due to factors like annular dilation, complex anatomy, or varied pathophysiological features of MR; ■ CathHELIX® – a Mitral Valve Reducer System (MARS) for temporarily reducing the mitral annulus via the coronary sinus, accessed through the superior vena cava; ■ IRE system – locally applies short high-voltage (HV) pulses that increase cell membrane permeability, creating non-thermal irreversible electroporation; ■ Adona Heart Failure Management System – a minimally invasive, transvenous transcatheter system that implants and adjusts an interatrial shunt with a controllable opening to reduce left atrial pressure. The shunt also includes sensors to measure and transmit left and right atrial pressures. It is intended for use by interventional cardiologists in treating heart failure; ■ TactiFlex™ – ablation catheter for use in cardiac electrophysiological mapping and treatment of drug-resistant, recurrent symptomatic paroxysmal atrial fibrillation and atrial flutter, when used with a compatible generator and 3D mapping system.

Research Projects

Projects Carried Out at Santaros Klinikos: Map of Principal Investigator Countries



APOLLO 2028

Improving mental health, wellbeing, and resilience of healthcare workers in Changing Environments

apollo-2028.eu

Project period: 01/2024–12/2027

Link of the European Commission

Total cost: 5 626 338,75 €
Part of Vilnius University: 495 306,25 €

Coordinated by: UNIVERSITE DE MONTPELLIER (FRANCE)

Coordinators at Santaros Klinikos: Lina Šopienė, Rūta Bučytė, Mykolas Valainis, Martyna Atraškevičienė

APOLLO2028 Project is an initiative funded by the European Commission, aimed at addressing key issues related to mental health and resilience among healthcare professionals. Representatives from Santaros Klinikos, in collaboration with a team from Vilnius University – one of the project's implementers – will conduct a survey of healthcare workers to assess their mental health status and identify possible measures to enhance resilience.

The overall goal of the APOLLO2028 project is to provide healthcare and nursing professionals, organizations, healthcare system funders, and policymakers with research-based innovative solutions that improve mental health, well-being, and the capacity to adapt to a changing environment—especially daily pressures and extreme events—at the workplace.

The originality of the project lies in its holistic approach to resilience in healthcare, aiming to strengthen individual, team, and organizational capacities to better cope with both extreme events and routine stress. The project will analyze individual, group, and organizational factors influencing worker resilience and will develop a model that integrates all of these elements. Based on this model, guidelines will be created and disseminated to healthcare and nursing staff, their supervisors, policymakers, and health system funders.

Additionally, an artificial intelligence-based system will be developed to help identify stressors and recommend actions to reduce stress. The project will engage various stakeholders and assess the cost-effectiveness of the proposed solutions.

The main impact of the project will be reducing workplace stressors and increasing resilience among all healthcare and nursing staff. Project participants will ensure that the proposed solutions are disseminated across all EU member states and adapted to the specific features of each healthcare system.

PANCARESURPASS

PanCare studies of the scale-up and implementation of the digital Survivorship Passport to improve people-centred care for childhood cancer survivors

pancaresurpass.eu

Project period: 03/2021–08/2025

Link of the European Commission

Total cost: 4 000 000,00 €
Part of Santaros Klinikos: 242 606,25 €

Coordinated by: UNIVERSITAETSMEDIZIN DER JOHANNES GUTENBERG-UNIVERSITAET MAINZ (GERMANY)

Poject Lead at Santaros Klinikos: Prof. Jelena Rascon

Across Europe and in Lithuania, the number of individuals who have survived cancer during childhood or adolescence is increasing. As they grow up, these individuals face unique health issues related to their past illness and its treatment. Due to higher morbidity and mortality rates, their long-term healthcare is especially important. Unfortunately, both healthcare professionals and the survivors themselves often lack access to previous medical records. To address this knowledge gap, the "Survivorship Passport" (SurPass) solution was developed. The goal of the PanCareSurPass project is to implement the digital Survivorship Passport in six European countries, including Lithuania.

Santaros Klinikos is one of the six institutions participating in the project where the digital Survivorship Passport is being introduced. The project aims not only to implement the passport but also to evaluate its impact on patients and their families—how it influences awareness of late effects of cancer treatment and how it supports health monitoring.

Seventy childhood cancer survivors have received a digital treatment summary and health surveillance recommendations—the Survivorship Passport. It summarizes the cancer treatment, past complications, and the risk of long-term side effects in a concise and understandable manner. Additionally, follow-up care recommendations are included. The document is uploaded to the eHealth system and is accessible both to the patient and other healthcare providers.

The project involves the Center for Pediatric Oncohematology at Santaros Klinikos (Dr. Monika Kapitančukė) and the Centers for Informatics and Development (IT group leader Dr. Justas Trinkūnas, Audronė Ciesiūnienė). As part of the project, a new tool was integrated into the electronic hospital system: the Pediatric Oncohematology Treatment Passport, which enables the creation of the Survivorship Passport.

The impression of prof. Jelenos Rascon : "It was a joy to finally see the Survivorship Passport in the Lithuanian language. The project began in 2021, but the implementation of the Passport had been discussed for a decade before the project even started. Lithuania is one of the few European countries where the Passport has already been implemented".

OD4RD2

ORPHANET DATA FOR RARE DISEASES 2

od4rd.eu

Project period: 01/2023–12/2025

Link of the European Commission

Total cost: 5 724 325,59 €
Part of Santaros Klinikos: 85 185,05 €

Coordinated by: INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE (FRANCE)

Project Lead at Santaros Klinikos: Doc. Birutė Tumienė

The “Orphanet Data for Rare Diseases” Project (OD4RD2) – the second phase of this initiative – is funded by the European Union’s EU4Health programme and is dedicated to the implementation of ORPHA coding and the promotion of Orphanet data collection and usage across member states.

In currently widely used disease classification and coding systems (such as ICD-10, ICD-11, and SNOMED), rare diseases are poorly represented (for instance, only about 17% of rare diseases or their groups are assigned a specific code in ICD-10). As a result, these conditions often remain “invisible” in healthcare systems, making it difficult to collect and manage epidemiological and other types of data, as well as to monitor and plan healthcare services.

The ORPHA coding system is the only system in the world designed specifically for the classification and coding of rare diseases. The Orphanet database is a comprehensive source of information about rare diseases and related services and resources. Since 2006, the Faculty of Medicine of Vilnius University, and later Santaros Klinikos, have participated in Orphanet activities and serve as the national coordinator of these efforts.

Relevant Lithuanian institutions have decided to implement ORPHA coding in the Lithuanian e-Health system. The Centers of Expertise and Reference for Rare Diseases at Santaros Klinikos are mandated to code using ORPHA codes, in accordance with the Order No. V-1087 of the Ministry of Health, dated June 17, 2022, “On the Coding of Rare Diseases with ORPHA Codes.”

As part of the OD4RD2 project, ORPHA coding tools are being implemented and training on the use of ORPHA coding is being conducted.

JARDIN

Joint Action on integration of ERNs into national healthcare systems

jardin-ern.eu

Project period: 01/2024–01/2027

Link of the European Commission

Total cost: 18 811 740,04 €
Part of Santaros Klinikos: 409 326,36 €

Coordinated by: MEDIZINISCHE UNIVERSITAET WIEN (AUSTRIA)

Project Lead at Santaros Klinikos: Doc. Birutė Tumienė

JARDIN is one of the EU4Health Joint Action programs of the European Health Programme, aimed at integrating European Reference Networks (ERNs) into national healthcare systems. ERNs are 24 thematic networks of reference centers for rare diseases, comprising more than 1,600 centers across the European Union and Norway. Their main mission is to provide highly specialized healthcare services for patients with rare and complex diseases, as well as to engage in training, scientific and clinical research, and the dissemination of knowledge and information.

The goal of JARDIN is to promote the integration of ERNs into national healthcare systems by identifying and developing national models for governance, quality assurance, care pathways, undiagnosed rare disease programs, data management, and support for ERN activities. The program includes representatives from the health ministries or relevant institutions of all EU countries, Norway, and Ukraine (29 countries), ERN coordinators, and rare disease experts.

Santaros Klinikos have taken a leadership role in shaping the program, having led the ERN Integration Working Group of the Board of Member States, and are in charge of two program work packages (WP4 and WP6). Additionally, 14 rare disease reference center teams from Santaros Klinikos are participating in the implementation project, working on the development of care pathways for rare diseases adapted to the Lithuanian healthcare system.

ERDERA

EUROPEAN RARE DISEASES RESEARCH ALLIANCE

erdera.org

Project period: 09/2024–08/2031

Link of the European Commission

Total cost: 145 830 619,47 €
Part of Santaros Klinikos: 366 112,50 €

Coordinated by: INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE (FRANCE)

Poject Lead at Santaros Klinikos: Doc. Birutė Tumienė

The European Rare Disease Research Alliance (ERDERA) is one of the partnerships under the Horizon Europe program. It unites over 170 organizations from 37 European and other countries, with the main goal of ensuring European leadership in rare disease research and innovation, ultimately leading to improved prevention, diagnosis, treatment, and quality of life for people living with rare diseases.

The core ambitions of the ERDERA program align with the mission and goals of the International Rare Diseases Research Consortium, established in 2010 by the European Commission and the U.S. National Institutes of Health. ERDERA continues and expands upon the work of the European Joint Programme on Rare Diseases, in which research groups from Santaros Klinikos and the Faculty of Medicine of Vilnius University actively participated.

These activities include calls for projects by international research groups (with the Research Council of Lithuania committing funding for local researchers), support for networking initiatives, a broad range of clinical trials in which European Reference Networks (ERNs) play a central role (Center for Medical Genetics of Santaros Klinikos team leads specific work package projects and is actively involved in rare disease diagnostics research), training and capacity-building in rare disease science (with Santaros Klinikos leading the relevant work package), activities in data management, research methodology development and dissemination, and innovation implementation.

The program emphasizes the integration of European, international, and national rare disease research programs and initiatives (a National Coordination Group for these efforts has also been established in Lithuania) and aims to promote inclusiveness of less-represented countries—with Santaros Klinikos leading specific projects within this work package.

EPROBES

Preventing lifetime obesity by early risk-factor identification, prognosis and intervention

eprobes.eu

Project period: 01/2023–12/2028

Link of the European Commission

Total cost: 9 875 071,25 €
Part of Santaros Klinikos: 406 937,50 €

Coordinated by: CONSORCIO CENTRO DE INVESTIGACION BIOMEDICA EN RED M.P. (SPAIN)

Poject Lead at Santaros Klinikos: Prof. Augustina Jankauskienė

Obesity is one of the main global threats to public health, with its prevalence increasing steadily over recent decades. For this reason, there is a critical need to develop effective strategies to reduce the complications associated with being overweight. Adult obesity is most often the result of early puberty, as well as pathophysiological and psychological factors that arise during pregnancy, infancy, and/or adolescence. Identifying these early pathogenic mechanisms and biomarkers of metabolic disorders is essential for preventing excessive weight gain later in life.

EprObes is a multidisciplinary, patient-centered project focused on different stages of puberty. It involves clinical studies, investigation of mental health, lifestyle, and behavior, as well as preclinical models, with the aim of defining effective strategies for active obesity prevention. Multimodal research and integrated analysis of EprObes data will help outline preventive measures and lifestyle interventions to avoid excessive weight gain and lifelong metabolic complications in both sexes.

The project targets lifelong active obesity prevention, placing special emphasis on early development—from the prenatal period (including conception) to puberty—and on nutritional behavior factors.

In summary, the main goal of the EprObes project is to identify early causal factors of obesity, define the mechanisms involved (including psychological and behavioral aspects), pinpoint potential early biomarkers, and develop and support preventive strategies.

Representatives from Santaros Klinikos are involved in working groups with a primary focus on cardiometabolic risk factors, from preterm newborns to adolescents.

Currently, data collection is ongoing, an initial multicenter data analysis is being conducted, and scientific publications are in preparation.

Impression by Prof. A. Jankauskienė: “Stimulating multidisciplinary international collaboration that provides an opportunity for new ideas and directions of cooperation to emerge”.

CraNE

Network of Comprehensive Cancer Centres

crane4health.eu

Project period: 10/2022–09/2024

Link of the European Commission

Total cost: 3 749 998,00 €
Part of Santaros Klinikos: 10 828,40

Coordinated by: NATIONAL INSTITUTE OF PUBLIC HEALTH OF THE REPUBLIC OF SLOVENIA (SLOVENIA)

Poject Lead at Santaros Klinikos: Prof. Jelena Rascon

The general objective of the CraNE project is to establish a network of national Comprehensive Cancer Centres (CCCs) across the European Union (EU) to ensure high-quality early identification, diagnosis, and treatment of cancer patients.

Main objective:

- To create a sustainable EU structure for a CCC network, improve access to comprehensive high-quality cancer care, and develop a common CCC model.

Specific objectives include:

- Ensuring the sustainability of CraNE project outcomes so they can be implemented across EU Member States;
- Establishing a network of national CCCs in the EU to enhance care quality and reduce disparities in cancer care across the EU;
- Further improving access to and availability of high-quality comprehensive oncology care within networks in all EU countries;
- Developing a harmonized model for CCCs;
- Identifying and analyzing current practices and organizational models in real-world settings to inform future care approaches.

EUNet CCC

The European Comprehensive Cancer Centre Network

ecc-cert.org/health-service-research/eunetccc

Project period: 10/2024–09/2028

Link of the European Commission

Total cost: 112 012 503,62 €
Part of Santaros Klinikos: 499 624,93 €

Coordinated by: INSTITUT NATIONAL DU CANCER GIP (FRANCE)

Poject Lead at Santaros Klinikos: Prof. Jelena Rascon

Comprehensive Cancer Centres (CCCs) are leaders in cancer research, treatment, and education. Their multidisciplinary approach ensures that patients benefit from the latest scientific advancements – from early diagnosis to innovative treatments and post-treatment care. The creation of a European Union Comprehensive Cancer Centre (EUCCC) network represents a coordinated and integrated approach to cancer care across the continent. This initiative is based on the principles of excellence and collaboration.

The main goal of the EUCCC network is to establish a cohesive and integrated consortium of CCCs throughout Europe to ensure that all patients, regardless of their location, have access to high-quality care. This network will also serve as a collaborative platform, enabling centres to share best practices, resources, and knowledge. Such collaboration is vital for promoting scientific research, translating the latest discoveries into clinical care, and ensuring that patients receive the most effective available treatments.

The network will support the development of high-quality diagnostic and treatment methods, training, research, and clinical trials across the European Union. It aims to reduce disparities in diagnosis, treatment, and care, increase access to clinical trials, enhance research quality, integrate clinical care with research, and evaluate the quality of cancer care globally.

eCAN

Joint Action on strengthening ehealth including telemedicine and remote monitoring for health care systems for cancer prevention and care

ecanja.eu

Project period: 09/2022–09/2024

Link of the European Commission

Total cost: 4 995 796,18 €
Part of Santaros Klinikos: 25 029,45 €

Coordinated by: SCIENSANO (BELGIUM)

Poject Lead at Santaros Klinikos: Dr. Marija Turlinskienė

During the international eCAN project, implemented across 16 European Union (EU) countries, the goal was to expand access to comprehensive care for patients with advanced cancer—particularly psychological support and rehabilitation services—by using telemedicine. The scientific and practical benefits for patients were evaluated by comparing intervention and control groups to determine the effectiveness of telemedicine in providing psychological and rehabilitation services.

At the Center for Hematology, Oncology and Transfusion Medicine of Santaros Klinikos, clinical psychologists conducted psychological assessments and provided remote psychological counseling for patients with advanced cancer who were receiving outpatient treatment, lived far from the hospital, and experienced high levels of disease-related distress. The project team, including the administrative, coordination, and clinical psychologist staff, also contributed to the development of evaluation questionnaires and the design of the study.

The eCAN project results showed that remote psychological counseling is effective: the distress levels of patients with advanced cancer significantly decreased after eight teleconsultation sessions.

A continuation of the project—eCAN+ (2025–2029)—is now being planned. As telemedicine-based psychological support services expand, the project will include additional patient groups: adolescents and young adults with cancer, as well as family members of cancer patients. Preventive and self-help programs will also be developed to support psychological health and will be made accessible remotely. These measures are expected to have a positive impact not only on the mental health of cancer patients and their families but also on the well-being of medical professionals and the broader public. A unified EU data protection system will also be developed as part of the project.

Impression by Dr. Marija Turlinskienė: "The international scope of the project enabled us to observe how remote psychological support is organized in other countries and to share our own experience. The application of telemedicine and modern technologies (apps, platforms) to expand access to psychological support for oncology patients proved not only interesting and innovative, but also effective and beneficial."

SCARLET

Scaling up early and late effects research in Lithuanian childhood cancer survivors through education and twinning

siope.eu/Scarlet-project

Project period: 10/2024–09/2027

Link of the European Commission

Total cost: 1 499 720,63 €
Part of Santaros Klinikos: 777 105,00 €

Coordinated by: VILNIUS UNIVERSITY HOSPITAL SANTAROS KLINIKOS (LITHUANIA)

Poject Coordinator: prof. Jelena Rascon

The SCARLET project aims to strengthen scientific expertise and the capacity for innovation at Santaros Klinikos and the National Cancer Center. The primary objective of the project is to expand existing and initiate new research initiatives focused on long-term complications of childhood cancer and its treatment, with the overarching goal of improving the quality of life for childhood cancer survivors in Lithuania.

Key Challenges addressed by the SCARLET Project:

- Lack of data on the prevalence of childhood cancer survivors in Lithuania.
- Insufficient transition from pediatric to adult care, which interrupts research initiated before adulthood.
- Limited innovation aimed at preventing early and late toxic effects of cancer treatment.
- Suboptimal competencies in managing and administrating large-scale research projects that would enable the most effective scientific development.

By implementing the SCARLET project, Santaros Klinikos and the National Cancer Center aim to:

- Increase the number of scientific studies.
- Enhance institutional reputation, international visibility, and appeal.
- Expand networking channels to facilitate the involvement of Lithuanian specialists in international research groups focused on childhood cancer survivorship, ultimately aiming to improve their quality of life in Lithuania.

EU CAN SCREEN

EU CanScreen
European Joint Action on Cancer Screening

EU4health
Civil Society Alliance

Implementation of cancer screening programmes

ecc-cert.org/health-service-research/eucanscreen

Link of the European Commission

Project period: 06/2024–05/2028

Total cost: 38 749 935,32 €
Part of Santaros Klinikos: 171 012,53 €

Coordinated by: LATVIJAS UNIVERSITATE (LATVIA)

Poject Lead at Santaros Klinikos: Dr. Robertas Adomaitis

EUCanScreen aims to ensure the sustainable implementation of high-quality screening programs for breast, cervical, and colorectal cancer, as well as the development of recently recommended screening programs for lung, prostate, and gastric cancers.

Seven specific goals of EUCanScreen have been identified:

1. Ensure full implementation of evidence-based, cost-effective, and quality-assured screening programs for breast, cervical, and colorectal cancers;
2. Prepare to implement evidence-based, cost-effective, and quality-assured screening programs for lung, prostate, and gastric cancers;
3. Ensure appropriate program governance and sustainability;
4. Ensure the collection and monitoring of high-quality, timely, and comparable data on screening programs;
5. Ensure equal access to screening programs for all EU citizens eligible to participate;
6. Strengthen cancer screening capacity;
7. Ensure collaboration and consistency with related projects funded under EU programs.

The EUCanScreen consortium links well-functioning screening programs with those that require substantial improvement. In total, 29 countries are participating in the consortium (25 EU Member States, plus Ukraine, Moldova, Norway, and Iceland).

JA PreventNCD

JA PreventNCD
Joint Action Prevent Non-Communicable Diseases

EU4health
Civil Society Alliance

Joint Action Prevent Non-Communicable Diseases and Cancer

preventncd.eu

Link of the European Commission

Project period: 01/2024–12/2027

Total cost: 95 523 718,92 €
Part of Santaros Klinikos: 81 367,93 €

Coordinated by: HELSEDIREKTORATET (NORWAY)

Poject Lead at Santaros Klinikos: Dr. Ramūnas Janavičius

The JA Prevent NCD project aims to support strategies and policies designed to reduce the burden of cancer and other non-communicable diseases (NCDs), addressing their shared risk factors both at the individual and societal levels, and to identify methods for evaluating the effectiveness of these strategies across Europe.

Cancer and other non-communicable diseases account for more than two-thirds of the disease burden experienced in Europe. A significant portion of this burden is preventable. The project seeks to enhance the overall capacity of EU member states to plan prevention policies and activities at the national, regional, and local levels, improve surveillance systems for cancer and other NCDs, and tackle the common risk factors associated with these diseases. The project collaborates with key prevention experts, policymakers, civil society organizations, healthcare professionals, the general public, and patient groups to effectively achieve its goals.

Key expected outcomes include:

- The establishment of an EU consortium on cancer prevention;
- Annual project events;
- Intervention measures and policy recommendations that will support improved care for cancer and other non-communicable diseases;
- Reduction of health inequalities.

SANGUINE

SANGUINE

HORIZON EUROPE

Early detection and screening of hematological malignancies

sanguine-project.eu

Project period: 01/2023–12/2025

Link of the European Commission

Total cost: 8 478 000,00 €
Part of Santaros Klinikos: 487 125,00 €

Coordinated by: TEL AVIV UNIVERSITY (ISRAEL)

Poject Lead at Santaros Klinikos: Karolis Šablauskas

The SANGUINE project focuses on improving diagnostic methods for hematologic malignancies. The project aims to develop a new minimally invasive blood testing method that would enable specialists to detect and classify hematologic cancers. This blood testing is based on identifying peripheral blood cells with or without DNA.

With the creation of the “HemaChip” microchip, direct analysis of epigenetic fluorescence markers using patient DNA will be performed. The SANGUINE team comprises a comprehensive and highly skilled group of experts who will address the medical, technological, and social aspects related to the developed diagnostic test.

The medical component of the project includes clinical studies and technological development. In cooperation with partners, representatives from Santaros Klinikos are responsible for implementing the medical part of the project, including the collection and analysis of necessary medical samples. The project also involves the acquisition of reagents, HemaChip microchips, and data analysis software.

CHIP-AML22

EU4health Civil Society Alliance

Improved diagnostics and survival for all children with Acute Myeloid Leukemia treated within the NOPHO-DB-SHIP consortium; a cross-European collaboration

Link of the European Commission

Project period: 11/2022–10/2025

Total cost: 2 993 152,73 €
Part of Santaros Klinikos: 55 840,30 €

Coordinated by: REGION SKANE (SWEDEN)

Poject Lead at Santaros Klinikos: Ramunė Pasaulienė

The CHIP-AML22 consortium aims to implement genetic diagnostics and targeted treatment for children with acute myeloid leukemia (AML). AML is a severe form of blood cancer, and despite intensive chemotherapy, treatment outcomes are generally unsatisfactory. Recently, using risk-adapted treatment based on the cytogenetic foundation of the disease and response to treatment measured by minimal residual disease (MRD), survival rates typically reach around 70%.

Pediatric AML is rare, and to improve outcomes, international collaboration is essential. The countries of NOPHO (Nordic Society of Pediatric Hematology/Oncology), which includes Sweden, Denmark, Finland, Norway, Iceland, Estonia, Lithuania, and Latvia, along with the Netherlands, Belgium, and Hong Kong, began implementing the AML12 treatment protocol for this disease in 2012. Spain, Israel, and Portugal joined in 2012, and the consortium is now known as NOPHO-DB-SHIP. The main achievement of AML12 was the cytogenetic risk group stratification and advanced MRD-based treatment adaptation, resulting in unprecedented survival rates of around 80% for thoroughly studied patients.

The project implements the continuation of AML12 – the International Pediatric Protocol for Acute Myeloid Leukemia 2022 (CHIP-AML22). The goal of CHIP-AML22 is to consolidate cytogenetic and MRD risk assessment and make it available in all participating countries. Additionally, based on the experience gained from AML12, more advanced cytogenetic disease profiling will be introduced to improve risk group stratification. The project also aims to utilize next-generation sequencing to apply new and targeted treatment for a subset of patients, further optimizing MRD analysis. The project’s goal is to ensure that the most advanced diagnostic and treatment methods are applied across consortium countries, providing children with AML equal opportunities for optimal care.

DIGI ONE I3

DigiONE I3

ERDF I3-FUNDED DIGITAL INFRASTRUCTURE FOR ONCOLOGY IN EUROPE

DIGItal Infrastructure for ONcology in Europe

digicore-cancer.eu/projects/7

Project period: 11/2023–04/2026

Link of the European Commission

Total cost: 12 367 638,63 €
Part of Santaros Klinikos: 96 228,69 €

Coordinated by: DIGITAL INSTITUTE FOR CANCER OUTCOMES RESEARCH (BELGIUM)

Poject Lead at Santaros Klinikos: Karolis Šablauskas

The DigiONE I3 (DIGItal Infrastructure for ONcology in Europe) project aims to create a federated European network of digital real-world scientific evidence and research, which will link daily clinical care records with everyday molecular diagnostic results. The objective is to ensure that this interface complies with privacy protection, the General Data Protection Regulation (GDPR), and data automation principles. It is expected that the project outcomes will improve healthcare quality and create conditions for providing digital oncology research services, such as facilitating the initiation of pragmatic precision medicine clinical trials and collecting advanced real-world data-driven evidence.

Key objectives of the project:

- Create a European-scale digital interaction for cancer clinical records.
- Promote the use of the Minimal Essential Description of Cancer (MEDOC) as a minimal research record that can be expanded.
- Develop interaction tools for hospitals to create a competitive data market.
- Create interoperability solutions for molecular data from various suppliers and functionalities, while complying with GDPR.
- Invest in hospital IT team capabilities and enhance their skills through collaboration with research professionals.
- Invest in the development of hospitals' digital research capabilities.
- Encourage hospitals at different levels of technological maturity to create a capable European digital research network.
- Develop business models and contract principles that promote fair sharing of benefits from digital research services.

EuCARE

EUCARE

EUROPEAN COHORTS OF PATIENTS AND SCHOOLS TO ADVANCE RESPONSE TO EPIDEMICS

HORIZON EUROPE

European Cohorts of Patients and Schools to Advance Response to Epidemics

eucareresearch.eu

Project period: 10/2021–10/2026

Link of the European Commission

Total cost: 9 995 920,00 €
Part of Santaros Klinikos: 324 375,00 €

Coordinated by: EURESIST NETWORK GEIE (ITALY)

Poject Lead at Santaros Klinikos: Daniel Naumovas

The EUCARE project aims to provide reliable, science-based evidence in the fight against SARS-CoV-2 variants and the COVID-19 epidemic. It is grounded in immunological and virological research, as well as artificial intelligence components, with a primary focus on patients hospitalized in healthcare facilities, vaccinated healthcare workers, and school groups.

The Santaros Klinikos Biobank contributes biological samples and health data to support the research goals of the project. The biobank collects samples in a prospective manner, and Santaros Klinikos' researchers actively participate in summarizing and analyzing the collected data, and preparing publications based on the results.

Key developments in the project so far: data analysis is already underway, and some results have been published in scientific journals. A partner meeting was organized in Vilnius to discuss the progress and set goals for the next phase of the project. During the remainder of the project, significant data analyses are expected to be completed, which will help prepare for future pandemics.

References: ■ Hedberg P, Parczewski M, Serwin K, et al. In-hospital mortality during the wild-type, alpha, delta, and omicron SARS-CoV-2 waves: a multinational cohort study in the EuCARE project. Lancet Reg Health Eur. 2024; ■ 38:100855. Published 2024 Feb 2. doi:10.1016/j.lanepe.2024.100855 ■ Bai F, Santoro A, Hedberg P, et al. The Omicron Variant Is Associated with a Reduced Risk of the Post COVID-19 Condition and Its Main Phenotypes Compared to the Wild-Type Virus: Results from the EuCARE-POSTCOVID-19 Study. Viruses. 2024; ■ 16(9):1500. Published 2024 Sep 23. doi:10.3390/v16091500

The impression of Daniel Naumov: "This year, during the project, not only was it possible to publish an article in a high-impact journal, but also to showcase to our international partners how wonderful Lithuania is during the conference in Vilnius."

GDI

Genomic Data Infrastructure

gdi.onemilliongenomes.eu

Project period: 11/2022–10/2023

Link of the European Commission

Total cost: 40 000 000,09 €
Part of Santaros Klinikos: 93 357,50 €

Coordinated by: EUROPEAN MOLECULAR BIOLOGY LABORATORY (GERMANY)

Poject Lead at Santaros Klinikos: Prof. Laima Ambrozaitytė

The goal of the GDI project is to address the complex issue of how to safely and efficiently use cross-border access to highly sensitive genomic data for scientific research and clinical practice. Such access would allow specialists to improve diagnostic, treatment, and prevention decisions, provide patients with personalized medicine opportunities, and offer the public better healthcare services. This project is particularly important as it promotes the integration of genomics into healthcare systems and fosters trust in cross-border data access.

In 2024, significant results were achieved during the GDI project. First and foremost, international infrastructures were developed and tested, enabling federated access to genomic data from six countries, and pilot programs based on usage cases were launched. The project also actively contributed to the development of global standards for genomic data sharing in collaboration with the "Global Alliance for Genomics and Health, GA4GH." Additionally, seminars and training sessions were held to strengthen the development and implementation of national genomics plans.

The project's continuation is planned through joining initiatives related to GDI, such as "1+ Million Genomes, 1+MG," which aim to further develop and integrate genomic data into healthcare and scientific research in Europe. The infrastructure created by GDI will be expanded to include more countries and users. The project's results will provide value to patients (aiming to improve personalized diagnostics and treatment options), specialists (ensuring faster access to high-quality data for scientific research), the public (strengthening public health measures), and innovation developers (creating opportunities to develop new treatment methods).

References: ■ zenodo.org/records/13987107 ■ zenodo.org/records/14001481
■ https://gdi.onemilliongenomes.eu/news/1+MG-framework-and-roadmap-launch

The impression of Prof. Laima Ambrozaitytė: "The most significant highlights of 2024 were international collaboration enabling innovative solutions to integrate genomic data into healthcare, and the successful testing of the infrastructure across the six countries participating in the project. An inspiring aspect is the clear impact of the project: from faster access to research data to enhanced diagnostics and treatments, which have the potential to transform patient care and public health."

GOE

Genome of Europe

b1mg-project.eu/1mg/genome-europe

Project period: 10/2024–03/2028

Link of the European Commission

Total cost: 44 465 986,08 €
Part of Santaros Klinikos: 105 286,31 €

Coordinated by: ERASMUS UNIVERSITAIR MEDISCH CENTRUM ROTTERDAM (THE NETHERLANDS)

Poject Lead at Santaros Klinikos: Prof. Laima Ambrozaitytė

The "Genome of Europe" (GoE) project involves 48 partners from 27 European countries (26 EU countries and 1 non-EU country), aiming to create a unique pan-European reference database consisting of at least 100,000 genomes of European citizens. This project aligns with the goals of the "1+ Million Genomes" initiative. The main objectives of the project are:

To create a pan-European community of specialists who will integrate existing genomic data sets and de novo sequencing data from various national populations to develop a reference genome.

To define the ethical, legal, and societal conditions for the creation of a reference genome.

To ensure data security and integrate GoE data into the genomics data infrastructure funded by the Digital Europe Programme.

The value and applicability of the GoE project will be assessed based on cases of genetic diversity, kinship assignments, service development, and recalibration of genetic risk profiles. After the project’s completion, GoE will become crucial for genetic-phenotypic discoveries, supporting national genome programs and integrating genomics into the European Health Data Space (EHDS).

The GoE project places particular emphasis on public participation, transparency, and the continuity of research, ensuring responsible and sustainable progress in genomics. Integration with other European initiatives enhances the potential impact of this project on personalized medicine and aligns with broader scientific and healthcare goals, including European competitiveness in genomic research and innovation. Examples of synthetic genomic and/or clinical data already demonstrate how the 1+MG infrastructure will help drive progress in rare diseases, cancer, and public health, while complementing the capabilities of the European Health Data Space (EHDS).

In line with the goals of the 1+MG initiative, the "Genome of Europe" aims to create the European reference genome – a unique data source that will enable the integration of genetic information fragmentation across member states. It is important that conditions will be created for innovative medical research aimed at disease prediction, prevention, diagnostics, and treatment purposes, thus promoting progress in individualized medicine and contributing to the implementation of public health policies, such as those related to rare diseases and cancer.

JANE- EU

Joint Action on Networks of Expertise

jane-project.eu

Project period: 10/2022–09/2024

Link of the European Commission

Total cost: 4 536 432,99 €
Part of Santaros Klinikos: 15 981,52 €

Coordinated by: FONDAZIONE IRCCS ISTITUTO NAZIONALE DEI TUMORI (ITALY)

Poject Lead at Santaros Klinikos: Prof. Tomas Poškus

JANE is a general initiative aimed at creating seven new competence networks in the field of cancer in the following areas: personalized primary prevention, survivor care, palliative care, omics technologies, high-tech medical resources, one or more complex and poor prognosis cancer cases, and young adults with cancer.

The general actions have two objectives: 1) to prepare the necessary groundwork for the new competence networks to begin operations and 2) to critically evaluate the current and future European Union (EU) network development models to optimize the functioning of the new competence networks.

The project management goal is to create the conditions for establishing 7 expert networks (Networks of Expertise, NoEs) within two years, with the final outcome of each being an invitation to express interest. It is planned to establish 5 cross-sectoral working groups that will operate across all thematic project work packages: EU networks and member state integration, integration of information technology infrastructures (including the use of artificial intelligence tools), integration of healthcare and research, the European reference network model, patient participation, and sustainability.

These general actions aim to prepare for new expert networks that could operate effectively, building on past and current EU network development experiences and addressing healthcare network issues observed in Europe. The healthcare networks created could become a unique feature of the EU health model, leading to highly coordinated assistance for EU citizens.

JANE- EU 2

Joint Action on Networks of Expertise on Cancer

jane-project.eu

Project period: 11/2024–10/2028

Link of the European Commission

Total cost: 50 717 563,17 €
Part of Santaros Klinikos: 247 624,53 €

Coordinated by: FONDAZIONE IRCCS ISTITUTO NAZIONALE DEI TUMORI (ITALY)

Poject Lead at Santaros Klinikos: Prof. Tomas Poškus

The JANE-EU 2 project consortium consists of 121 partners (competent institutions and their associated entities), who, building on the results of the JANE project, will continue the development of seven Networks of Expertise (NoEs) in the following areas: individualized primary prevention, care of survivors, palliative care, omics technologies, high-tech medical resources, one or more complex and poor prognosis cancer cases, and young adults with cancer.

JANE-2 will provide the necessary tools for the competence networks already envisioned in JANE, ensuring their continuous development and the involvement of different stakeholders in the activities of these networks.

CARAMEL

CArdiovascular Risk Assessment in MEnopausaL women via multimodal data analysis enabling personalized prevention strategies

Link of the European Commission

Project period: 12/2024–11/2029

Total cost: 11 998 512,63 €
Part of Santaros Klinikos: 596 500,00 €

Coordinated by: FUNDACION CENTRO DE TECNOLOGIAS DE INTERACCION VISUAL Y COMUNICACIONES VICOMTECH (SPAIN)

Poject Lead at Santaros Klinikos: Prof. Žaneta Petrulionienė

According to the European Society of Cardiology, there is still insufficient attention given to women's cardiovascular health – it is believed that both doctors and women themselves still underestimate the risk of cardiovascular diseases (CVD) in women. CVDs are underdiagnosed, inadequately treated, and poorly understood, especially among women aged 40-60, a group where individual risk assessment and prevention can have a positive impact on their health.

In light of this, the CARAMEL project aims to develop a new personalized prevention model for women aged 40-60, based on a risk stratification model that considers gender-related risk factors, using self-assessment and self-monitoring methods, innovative digital technologies, thereby giving women the opportunity to optimize their cardiovascular health.

The proposed cardiovascular disease risk assessment and stratification scheme will only be developed after conducting a cumulative risk factor analysis, using artificial intelligence tools and incorporating a wide range of different data sources, including clinical electronic records, medical images, biomarkers, metabolomic data, lifestyle information (sleep, physical activity, nutrition) from large cohorts and biobanks.

The consortium will also create, test, and validate a personalized prevention program in monitoring and interventional studies at clinical institutions in Colombia, Croatia, Greece, Lithuania, and Spain. To achieve this goal, women aged 40-60 will be involved from the outset in the development of a joint research and self-monitoring program ecosystem.

The CARAMEL project participants will also jointly develop health policy recommendations and clinical guidelines that will encourage healthcare institutions and service providers to design and update CVD care plans, taking into account new AI-based risk models applied to women aged 40-60.

JARED

Joint Action on REspiratory Diseases

Link of the European Commission

Project period: 12/2024–11/2027

Total cost: : 5 999 999,93 €
Part of Santaros Klinikos: 100 045,86 €

Coordinated by: ORSZAGOS KORANYI PULMONOLOGIAI INTEZET (HUNGARY)

Poject Lead at Santaros Klinikos: Prof. Edvardas Danila

The JARED project aims to significantly reduce the impact of chronic respiratory diseases in Europe. It will uniquely combine innovative digital health technologies, improved access to diagnostic tools, and greater health literacy efforts to effectively address and manage chronic respiratory diseases. This initiative is based on collaboration, involving various healthcare stakeholders to promote preventive strategies and reduce the overall burden and mortality associated with these diseases. Focusing primarily on environmental and lifestyle factors, the project aims to offer a holistic solution to reduce the burden of chronic respiratory diseases. The JARED project also prioritizes inclusivity, ensuring that vulnerable populations receive significant attention throughout the implementation of the project. The strategic use of digital healthcare solutions is expected to significantly improve the health of individuals suffering from chronic respiratory diseases.

The JARED project is expected to have a significant short-term, medium-term, and long-term impact. In the near future, reliable evaluation systems will be developed, chronic respiratory disease management knowledge will be expanded through educational materials, and the involvement of key stakeholders will be initiated. In the medium term, the project aims to strengthen healthcare capacities related to chronic respiratory diseases, influence public health policy by providing evidence-based recommendations, and expand public health interventions. In the long term, JARED aims for a continual reduction in the prevalence of chronic respiratory diseases, significant improvement in patients' quality of life, and for the project outcomes to become part of long-term health policy and practice. This long-term strategy seeks not only to immediately reduce the burden of chronic respiratory diseases but also to systematically transform healthcare methods and health policy systems.

NARRATIVE

NARRATIVE: Natural history, quality of life and patient-reported outcomes in vascular abnormalities

https://www.ejprarediseases.org/narrative/

Project period: 06/2024–06/2027

Total cost: 1 801 512,00 €
Part of Santaros Klinikos: 99 960,00 €

Coordinated by: HOSPITAL SANT JOAN DE DEU/FUNDACIÓN SANT JOAN DE DEU, DERMATOLOGY DEPARTMENT (SPAIN)

Poject Lead at Santaros Klinikos: Dr. Birutė Vaišnytė

The goal of the NARRATIVE project is to collect and record clinical and genetic information in order to better understand the natural progression and risk factors of vascular anomalies, thereby expanding the possibilities for targeted treatment of patients.

Vascular anomalies are a genetically defined, rare, and highly heterogeneous group of disorders. The identification of a common molecular basis for these anomalies has enabled the development of individualized and targeted pharmacological therapies for affected individuals. However, there is a lack of studies monitoring disease progression and translating those findings into clinically applicable outcomes.

The results of the NARRATIVE project will provide the basis for informing patients about disease prognosis and for making shared decisions regarding new experimental treatment methods, potentially in combination with existing targeted therapies.

Representatives from Santaros Klinikos are full participants in the project and will be involved in all stages. Currently, patient self-assessment questionnaires and sets of clinical parameters are being developed at Santaros Klinikos, which will be important for collecting patient data for the project's registry.

Since the project has only recently begun, the main current objective is to create a patient registry that will systematize patient data, facilitate analysis, and enable further research into vascular anomalies.

The project's continuity is expected to be ensured through the creation of a European registry for patients with vascular anomalies. The results are anticipated to help identify more precise pathways of vascular malformation development and to implement personalized medicine approaches by applying new drugs targeting specific therapeutic mechanisms.

Impression by Dr. Birutė Vaišnytė: "Participation in the NARRATIVE project left a particularly positive impression, especially due to the opportunity to establish new connections with vascular anomaly specialists from European countries. Interacting with experts from various fields broadened my perspective, allowed for knowledge sharing, and provided valuable new experiences. The connection established with the international community opened up opportunities for further collaboration and future projects."

TELEGRAFT

Telemonitoring of home dialysis utilizing a smart biomimetic arteriovenous graft

sdu.dk/en/forskning/telegraft

Project period: 09/2022–02/2027

Link of the European Commission

Total cost: 5 298 235,75 €
Part of Santaros Klinikos: 40 118,00 €

Coordinated by: SYDDANSK UNIVERSITET (DENMARK)

Poject Lead at Santaros Klinikos: Dr. Tomas Baltrūnas

Hemodialysis is a treatment for kidney failure in which blood is purified using an external machine known as an artificial kidney. To perform dialysis, it may be necessary to surgically insert arteriovenous grafts that allow access to the bloodstream. However, many of these grafts eventually fail due to thrombosis or infection.

The goal of TeleGraft is to create a next-generation smart diagnostic device for patients undergoing dialysis at home. The device will consist of two diagnostic tools designed to prevent complications related to hemodialysis: pressure transmitters will be used to monitor blood flow, and optical sensors will detect potential inflammation and infections. The data will be processed using artificial intelligence and machine learning models and presented to healthcare professionals in an easy-to-understand information system. This will enable physicians to remotely monitor and consult patients.

It is expected that, with the use of the TeleGraft equipment, home dialysis will become safer even in areas with less developed infrastructure or where patients live far from hemodialysis clinics.

The TeleGraft system will be tested in a two-phase randomized clinical trial involving 60 patients across 5 hospitals in Europe (Denmark, Sweden, Lithuania, Spain, and Germany).

LYMPHOAI

LMT
Lietuvos mokslo taryba

Development of a minimally invasive and artificial intelligence-based lymphoma monitoring method

Project period: 11/2024–08/2027

Total cost: 199 996,79 €
Part of Santaros Klinikos: 79 656,05 €

Coordinated by: NATIONAL CANCER INSTITUTE (LITHUANIA)

Poject Lead at Santaros Klinikos: Raminta Batiuškaitė

The goal of the LYMPHOAI project is to develop a minimally invasive, AI-based molecular testing method that will enable sensitive and specific detection of gene alterations in lymphoma cell-free DNA (cfDNA) samples. This aims to improve lymphoma diagnostics, enhance the sensitivity of minimal residual disease detection, and enable early relapse identification.

The project consists of two main activities: the development of a cfDNA mutation detection method specifically for lymphomas, and the creation of an artificial intelligence (AI)-based bioinformatics algorithm designed to more accurately detect somatic variants.

The project aims to develop and integrate a cost-effective methodology into clinical practice that will help improve the quality of life for patients with lymphoma.

TBmikrobiomas

LMT
Lietuvos mokslo taryba

Study of the lung microbiome in Lithuanian patients with tuberculosis

Project period: 11/2024–09/2027

Total cost: 170 789,81 €
Part of Santaros Klinikos: 28 770,45 €

Coordinated by: FACULTY OF MEDICINE, VILNIUS UNIVERSITY (LITHUANIA)

Poject Lead at Santaros Klinikos: Dr. Edita Davidavičienė

Tuberculosis (TB) is a disease that has afflicted humanity for centuries and has yet to be eradicated globally. In many European Union (EU) and European Economic Area (EEA) countries, it is almost exclusively found among immigrants from non-EU countries. Only a few EU and EEA countries still report low levels of TB incidence. Despite the improving situation across the EU and EEA, TB incidence remains high in Lithuania and Romania, exceeding the EU/EEA average by more than three times.

Lithuania stands out further due to the high proportion of TB cases that are drug-resistant (18%), which is over five times the EU/EEA average. This high incidence of TB and drug-resistant TB does not align with Lithuania’s relatively advanced economic development and the availability of quality medical care for TB patients. The cause of this phenomenon remains entirely unclear.

The aim of the project is to examine the lung microbiome (the composition of bacteria and microscopic fungi) of individuals newly diagnosed with pulmonary TB. This will be compared with the lung microbiome of a control group and with data from studies conducted in other countries. Additionally, the project will explore links between the microbiome composition and TB type (drug-sensitive or drug-resistant), treatment duration, and other variables.

For the first time, the lung microbiome composition will be studied in a sufficiently large group of individuals in Lithuania. The findings will provide scientifically grounded insights into the high TB prevalence in the country and will foster further research in this important area.

Impression by Dr. Edita Davidavičienė: "The most inspiring aspect is my colleagues' enthusiasm and willingness to carry out the project."

TWINNING

Strengthening Georgia's national disease surveillance system by improving epidemiological and molecular (genomic) surveillance

Page of the Central Project Management Agency

Project period: 06/2024–06/2026

Total cost: 1 200 000 €

Poject Coordinators at Santaros Klinikos: Dr. Živilė Gudlevičienė, Prof. Algirdas Utkus, Prof. Laima Ambrozaitytė

During the Twinning project funded by the European Commission, Lithuanian experts are providing assistance to Georgia in implementing genomic surveillance of infectious diseases in the country.

Specialists from Santaros Klinikos, together with partners, coordinate the project's progress, appoint the project leader and a permanent Twinning advisor in Georgia, and conduct expert missions to Georgia in collaboration with their partners.

In 2024, an introductory visit took place to meet with the project beneficiaries in Georgia – the National Centre for Disease Control (NCDC) and its scientific “Lugar” Laboratory. In September 2024, a Kick-off event and two Steering Committee meetings were organized. During the first six months of the project, 12 short-term expert (STE) missions to Georgia were carried out, during which the legal framework for genomic surveillance of infectious diseases, the technical capacity of laboratories, available human resources and their qualifications, and management documentation were assessed.

The planned duration of the project is two years. In 2025, training in bioinformatics for NCDC laboratory specialists and public education lectures in Georgia will be delivered by Santaros Klinikos experts. As demonstrated by the COVID-19 pandemic, it is essential to monitor not only known infectious diseases but also to predict and track the emergence and spread of new infections – special attention will be given to this aspect.

During the project, experts from Santaros Klinikos will develop a new list of potential infectious pathogens for surveillance, a surveillance strategy, and new legal acts. Once these are implemented by the Georgian NCDC, the public will become safer, and a portion of infectious diseases and related deaths will be prevented.

The project plays a key role in bringing Georgia's legal framework and personnel qualifications in line with European Union standards.

Impression by implementors of the project: "The National Centre for Disease Control of Georgia has a substantial amount of high-quality and modern equipment; however, they lack both human and financial resources, as well as staff qualifications in certain areas—particularly in applying bioinformatics and information technology solutions to ensure the effective expansion of infectious disease control across the country."

NAUJOS KARTOS LIETUVA

Finansuoja Europos Sąjunga NextGenerationEU

CPVA Centrinė projektų valdymo agentūra

Inovacijų agentūra

Implementation of mission-driven science and innovation programs

Gene Technology Competence Center – HEMATO
(Poject Lead at Santaros Klinikos: – Daniel Naumovas)

Gene Technology Competence Center– ONCOINTEGRA
(Poject Lead at Santaros Klinikos: – Prof. Arvydas Laurinavičius)

Gene Technology Competence Center– IMUNOTERAPIJA
(Poject Lead at Santaros Klinikos: – Daniel Naumovas)

Total cost: 94,728 mln. € | **Project funding** 88,530 mln. € (Funded by the Economic Recovery and Resilience Plan "Next Generation Lithuania" and the Republic of Lithuania State Budget funds)

Project implementer: Innovation Agency Lithuania
Project period: 02/2024–04/2026

Planned activities in the project: establish 3 competence centers (one in each theme), implement 23 R&D projects, create 41 prototypes and 32 unique products, submit 19 international patent applications, publish 55 scientific articles, and establish 21 startups or spin-off companies.

The project “Implementation of Mission-Driven Science and Innovation Programs” is being carried out across three priority mission themes aligned with smart specialization priorities: “A Safe and Inclusive e-Society”, “Smart and Climate-Neutral Lithuania”, and “Health Innovations”.

Each mission promotes collaborative projects between science and business in different thematic areas, supports the development and commercialization of scientific and business ideas through the establishment of start-ups and spin-offs, enables fundamental or early-stage research, and addresses existing service and infrastructure gaps in research and experimental development (R&D) at high technology readiness levels. During the project, efforts will be made to address the lack of incubators for start-ups/spin-offs, prototyping spaces, and pilot production lines.

Under the “Health Innovations” theme, a Vilnius University consortium aims to establish a Gene Technology Competence Center, which will bring together clusters of cutting-edge scientific equipment (including next-generation sequencing and bioinformatics, cytometry and cell sorting, microscopy and imaging, cell culture, microbiology, bioengineering, and mass spectrometry) and a multidisciplinary base of expert researchers. This will ensure the efficient execution of new biomedical programs and the improvement of existing treatment strategies, with a particular focus on age-related diseases and cancer.

With state-of-the-art infrastructure and a business-oriented management model, the consortium aims to make a positive impact on national R&D advancement, healthcare, and the economy.

EUROHEART

NAUJOS KARTOS LIETUVA

Finansuoja Europos Sąjunga NextGenerationEU

CPVA Centrinė projektų valdymo agentūra

Pilot project for the digitalization of the myocardial infarction cluster using the EUROHEART solution

Total cost:
940 146,59 €

Project period:
02/2024–03/2025

Cardiovascular diseases (CVD) have remained one of the leading causes of death in Lithuania for many years, claiming the lives of over 22,000 people annually—a rate nearly three times higher than the European Union average. In Scandinavian and Western European countries, specialized registries have long been in place, collecting comprehensive datasets on CVD. These registries support timely clinical and health policy decisions and enable the secondary use of data for scientific research and the development of new technologies.

It is clear that effective CVD management requires a comprehensive, data- and evidence-based strategy, encompassing infrastructure, human resources, patient pathways, outcome evaluation, and continuous improvement of processes. However, timely advancements in CVD prevention, diagnosis, treatment, and monitoring—as well as the integration of scientific achievements—are not possible without high-quality, detailed, and correctly interpreted real-time CVD data.

In the pilot project, participating institutions will upgrade their information systems and forms to enable the homogeneous collection of data necessary for calculating and analyzing all CVD monitoring indicators, and the transmission of this data for national-level monitoring and analysis.

During the pilot, a standardized and comprehensive set of indicators will be developed based on the EuroHeart platform created by the European Society of Cardiology, along with tools for detailed real-time data analysis. This will contribute to improving CVD management in Lithuania. Standardized data collection will also enable Lithuanian healthcare institutions to join European clinical quality and pragmatic research networks and to facilitate secondary use of this health data.

Accurate and high-quality CVD datasets—including those for myocardial infarction (MI), heart failure (HF), atrial fibrillation (AF), and aortic valve stenosis (TAVI)—with the capability to monitor and analyze indicators in real time, would enable the creation and implementation of a science-based, comprehensive CVD management strategy in Lithuania.

Investments in hospital information systems that ensure automated, high-quality data collection and comprehensive real-time analysis, along with the implementation of innovative solutions, would reduce the costs of CVD management in healthcare institutions, enable more efficient use of infrastructure and human resources, increase the number of patients served, and contribute to improving working conditions for medical personnel. Comprehensive nationwide CVD datasets would also create opportunities to participate in European clinical quality networks and future pragmatic clinical trials.

CLUSTERS

NAUJOS KARTOS LIETUVA

Finansuoja Europos Sąjunga NextGenerationEU

CPVA Centrinė projektų valdymo agentūra

Medical clusters data exchange and monitoring platform

Total cost:
12 717 690,02 €

Project period:
04/2024–12/2025

The goal of the Medical Clusters Data Exchange and Monitoring Platform project is to increase the efficiency of cluster operations by managing cluster activity quality indicators, enabling evidence-based decision-making, and facilitating the reuse of data to improve the quality of healthcare services. The key issues addressed during the project are:

- The current cluster activity quality indicator management system does not create the conditions for improving the quality of active treatment.
- The functionalities for calculating, validating, analyzing, comparing, informing, and reusing cluster activity quality indicators have not been implemented in the e-Health system, cluster HIS, or any other information system.
- Healthcare institutions involved in clusters, such as outpatient clinics, ambulance services and other participating healthcare system entities, experience significant time expenditures when calculating cluster activity indicators and reporting them.

Currently, 8 specialized medical clusters operate in Lithuania: ST-elevation myocardial infarction, non-ST-elevation myocardial infarction, acute stroke, intensive therapy and care, oncological diseases, severe trauma, pregnant women, parturients, and neonates, and organ donation services. Each cluster's activity is evaluated by the cluster management committee, whose composition and working regulations are approved by the Minister of Health. The findings of the cluster management committees are submitted to the Ministry of Health, which subsequently shapes state policy in the field of healthcare, organizes, coordinates, and supervises its implementation, and establishes healthcare needs, resources, and quality requirements.

The target group of the project includes beneficiaries who will benefit from the improved public services, the management of cluster healthcare institutions, medical and administrative personnel, cluster committees, Ministry of Health staff, and researchers. Planned project outcomes:

- Optimal sets of 8 cluster activity quality indicators will be created.
- Variables necessary for determining the values of the updated cluster activity quality indicators will be identified.
- The activity stages of the cluster healthcare institutions (ASPĮ) will be unified, and data will be created within these stages to contribute to determining the values of cluster indicators.
- The variables necessary for determining cluster activity quality indicator values will be processed in the e-Health IT system.
- Criteria for determining cluster activity quality indicator values will be created digitally in all cluster institutional information systems according to unified requirements.
- Cluster activity indicator values will be automatically calculated.
- Reports on cluster activity indicator values will be generated and stored in the information system.

Clinical Innovations

Center for Obstetrics and Gynecology

The use of lung ultrasound in newborns in daily clinical practice

Innovation

Neonatologists in the department, who treat critically ill full-term and deeply premature newborns, perform bedside ultrasound assessments of the newborns' lung condition. This significantly reduces the frequency of radiological examinations and the associated radiation exposure during early development and helps make faster decisions for critically ill patients.

Problem being solved

By using the aforementioned examinations, the harmful effects of ionizing radiation from radiological tests in extremely premature newborns have been reduced by 50%. The examination has also helped reduce the prescription of antibacterial medications for newborns treated in the intensive care unit, as it provides additional real-time information about the patient's lung condition.

Major results

In the unit, the number of radiological examinations and the use of antibacterial medications decreased by 50%. Throughout 2024, the department's staff shared their experience with colleagues from other maternity hospitals in Lithuania and abroad (the United Kingdom, France, Egypt), organizing remote meetings, which are also planned for 2025.

← Bedside ultrasound assessment of a newborn

Further directions

In order to improve diagnostic and treatment outcomes and enhance the quality of neonatal care, efforts are being made to expand knowledge by performing ultrasound assessments not only of the lungs but also of the circulatory system in newborns. To support this, specialist physician training is planned at the hospital itself, inviting expert doctors from the United States and the United Kingdom. Following international guidelines, ultrasound diagnostics would enable more individualized and comprehensive assessments of critically ill or unstable newborns, allowing for the selection of the most effective treatment for each infant—and in some cases, even saving lives.

Center for Obstetrics and Gynecology

Identification of ovarian follicular fluid cells and molecular factors, and the study of their potential applications in reproductive medicine

Innovation

Identification of ovarian follicular fluid cells and molecular factors and the study of their potential applications in reproductive medicine.

Problem being solved

According to the latest data, the prevalence of infertility is increasing and currently affects 1 in 6 couples of reproductive age. Each year, more studies are conducted, not only searching for the causes of infertility but also for factors that could improve the chances of conception for these couples. One of the main research areas is ovarian tissue and follicular fluid.

Major results

Molecular analysis of follicular fluid and endometrial stromal cells in infertile women revealed that the expression of genes involved in DNA demethylation processes, apoptosis, and immune response modulation is higher in the endometrium of women who have not conceived, compared to follicular fluid. This may be associated with implantation disorders in cases of infertility. Preclinical in vivo studies showed that both primary and cultured stromal cells from follicular fluid could partially restore infertility caused by chemotherapy, suggesting that they could be applied in clinical practice for oncological patients of reproductive age. In 2024, Brigita Vaigauskaitė-Mažeikienė defended her doctoral dissertation at Vilnius University, based on this research. The aim of her dissertation was to investigate the regenerative and therapeutic properties of ovarian follicular fluid stromal cells and assess their clinical applicability in treating unexplained infertility.

Further directions

A more detailed evaluation of unexplained infertility and follicular fluid, and the application of this knowledge in clinical practice.

Center for Obstetrics and Gynecology

Application of endometrium-derived mesenchymal stem/stromal cells in the treatment of infertility

Innovation

In vitro studies of endometrium-derived mesenchymal stem/stromal cells and therapy *in vivo* models that simulate infertility cases caused by endometrial pathology.

Problem being solved

Infertility treatment is one of the fastest-growing fields in medicine. However, it is estimated that even now, 30-40% of couples remain childless within five years of diagnosis, despite having tried all the support measures implemented in clinical practice. One of the main reasons for this, and one of the most challenging areas in reproductive medicine, is the disruption of blastocyst implantation in the endometrium, associated with its pathology.

Major results

Endometrium-derived mesenchymal stem/stromal cells are characterized by differentiation in the decidual direction. Changes in gene expression, epigenetic modification, and protein concentration occurring during decidualization are associated with endometrial pathology and, ultimately, the development of fertility disorders. Therapy with endometrium-derived mesenchymal stem/stromal cells can reduce pathological changes in the endometrium, create a more favorable microenvironment for blastocyst implantation, and is associated with a higher pregnancy rate.

Further directions

Further studies involving women facing infertility.

Center for Obstetrics and Gynecology

Non-invasive fetal amniotic fluid test

Innovation

Non-invasive fetal amniotic fluid testing can be performed in the case of preterm premature rupture of membranes to predict fetal inflammatory response syndrome and outcomes for preterm neonates. An immunological analysis of amniotic fluid samples is conducted. The innovation has not yet been implemented in daily practice, but preparatory studies have been completed.

Problem being solved

Non-invasive fetal amniotic fluid testing is a potential early intervention in determining further pregnancy management strategies following preterm premature rupture of membranes and assessing the risk for preterm neonates even before birth.

Major results

Based on the results of studies conducted at Santaros Klinikos, non-invasive fetal amniotic fluid testing has the potential to significantly assist specialists in their daily practice, enabling better decision-making regarding further treatment strategies, actively initiating therapeutic actions, or, conversely, safely adhering to a watchful waiting approach when no inflammation is detected.

Further directions

The implementation of the most sensitive and specific immunological marker, TNFalpha, into the range of tests performed by the laboratory is planned. This would allow for the validation of critical marker values and the application of this diagnostic method in daily practice.

Center for Obstetrics and Gynecology

Risk factors and prevention of anorectal diseases in pregnant women

Innovation

In 2024, a study titled "Risk Factors and Prevention of Anal Diseases in Pregnant Women", conducted by Vilnius University, was completed at the Center for Obstetrics and Gynecology of Santaros Klinikos. The study was funded by the European Union Structural Funds project “Development of Doctoral Studies” (project code No. 09.3.3-ESFA-V-711-01-0001). The aim of the project was to investigate the effectiveness and safety of preventive measures that reduce constipation—one of the main risk factors for anal diseases in pregnant women—and to propose scientifically based preventive strategies for women during pregnancy.

Problem being solved

According to various authors, hemorrhoids affect one-third of pregnant and postpartum women. Although constipation, associated with hemorrhoids, is one of the best-known modifiable risk factors during pregnancy, there is limited literature on the topic. The study conducted is the first prospective randomized trial involving pregnant women aimed at assessing the safety and effectiveness of dietary and behavioral interventions for the prevention of hemorrhoids during and after pregnancy.

According to the study’s findings, the recommended dietary, physical activity, and bowel hygiene guidelines are effective—showing a 2.5-fold reduction in the likelihood of postpartum hemorrhoids—and safe for pregnant women (no statistically significant differences were found between study groups in terms of miscarriage, preterm birth rates, or neonatal pathologies). The identified risk factors can be used by family physicians or obstetrician-gynecologists to better tailor preventive care as part of routine pregnancy management.

Major results

The main findings of the study in 2024 were as follows:

- 34.59% of postpartum women experience hemorrhoids.
- Independent risk factors for postpartum hemorrhoids include a newborn’s average birth weight of ≥ 3.380 g and daily or more frequent consumption of eggs.
- Protective (preventive) factors include daily or more frequent consumption of fruits and vegetables as well as the preventive measures applied during the study.
- The dietary, physical activity, and bowel hygiene recommendations developed proved to be effective (with a 2.5 times lower risk of postpartum hemorrhoids) and safe for pregnant women.

Further directions

The recommendations developed could complement the current antenatal care guidelines provided to pregnant women. Future studies could explore in greater detail the relationship between dietary habits and anal pathologies in pregnant women, as nearly half of all pregnant women experience such conditions. Certain dietary interventions may have the potential to reverse this trend.

Center for Dermatovenerology

Innovations in Dermatovenerology Diagnostics and Treatment

Innovative therapy trials

In 2024, clinical trials of a biologic therapy and a Janus kinase (JAK) inhibitor were conducted at the Center for Dermatovenereology, targeting patients with hidradenitis suppurativa. These innovative treatments significantly improve disease progression and quality of life for patients, while also providing researchers and sponsors with valuable scientific insights into the efficacy, safety, tolerability, pharmacokinetics, and immunogenicity of the therapeutic agents.

Innovation: skind and subcutaneous ultrasound

The Center for Dermatovenereology is introducing an additional diagnostic method widely used in Europe and globally—ultrasound examination of the skin and subcutaneous tissue. The main applications of this method in dermatology include the diagnosis and differentiation of benign and malignant tumors, nail disorders, and inflammatory dermatoses; assessment of lesion extent, depth, and vascularization; and reduction of complications in aesthetic procedures.

Innovation: new photodynamic therapy equipment

In 2024, the Center for Dermatovenereology acquired the most powerful and effective "TriWings" photodynamic therapy equipment currently available on the market. Photodynamic therapy is a method used to treat various skin conditions by utilizing visible light. One of the advantages of this treatment is that the equipment does not emit harmful UVA or UVB rays, and it provides quick results without side effects. At the Center for Dermatovenereology, photodynamic therapy is used not only for treating precancerous and cancerous skin conditions but also for rare hair disorders such as folliculitis decalvans and alopecia areata.

Innovation: Expanding the Range of Surgical Services

Experience is being accumulated in the application of minimally invasive surgical treatment for hidradenitis suppurativa. Hidradenitis suppurativa is a chronic, autoinflammatory disease of the sweat glands. In severe cases, painful nodules and fistulas that discharge purulent secretions form, most commonly in the armpit and groin areas. In such cases, medication alone often proves insufficient to control the disease. Surgical procedures targeting the nodules and fistulas of hidradenitis suppurativa enable the opening or removal of inflammatory lesions, thereby improving patients’ quality of life and treatment outcomes.

Center for Infectious diseases

Project "Development of Antimicrobial Resistance Management" – "Pilot Implementation of the Model for Antimicrobial Drug Use Management in Inpatient Healthcare Facilities"

Innovation

The implementation of the pilot model for Antimicrobial Drug Use Management (ADUM) in the hospital began in November 2024. During this month, the ADUM committee was updated, and its composition now includes various specialists: infectious disease doctors, clinical pharmacologists, microbiologists, infection control experts, information technology (IT) specialists, and others. The ADUM action plan for 2025 has been approved. A list of the hospital's reserve antibiotics has been compiled. The activities for promoting the rational use of antimicrobial drugs in the hospital are being expanded.

Problem being solved

In collaboration with the Institute of Hygiene, the project has been launched to ensure the continuous improvement of antimicrobial resistance management at Santaros Klinikos. Antibiotic resistance is an increasing global healthcare issue associated with improper antibiotic use, which is why ADUM programs are being implemented more widely in various countries. The goals of the program are to achieve the best clinical outcomes for patients, reduce drug toxicity and other adverse effects, limit the selection of antimicrobial resistance in bacteria that promote the spread of resistant strains, and reduce excessive costs associated with suboptimal use of antimicrobial agents.

Major results

The project is still in its early stages of implementation, but it is encouraging to see the enthusiasm of the multidisciplinary team members and the opportunity to share knowledge.

Further directions

The implementation of the ADUM program includes various activities: antimicrobial treatment guidelines will be updated at the hospital, the consumption of antimicrobial drugs will be monitored and analyzed, and the spread of resistant microorganisms within the hospital will be tracked, with feedback provided to staff. Training on the rational use of antimicrobial drugs will be organized for doctors, and participation in visitations, consultations, and multidisciplinary meetings will be held to advise physicians on rational antibiotic therapy. Plans are in place to introduce rapid sepsis diagnostic tests and expand the ability to measure the concentration of certain antibiotics. IT module functionalities related to antimicrobial drug use, bacterial resistance to antimicrobial drugs, and epidemiological surveillance will be further developed.

Center for Cardiology and Angiology

Transcatheter Mitral Valve Repair (TMVR) with the MitraClip G4 Device

Innovation

↑ MitraClip G4 sytem

The MitraClip G4 system, used to treat mitral valve regurgitation, is introduced into the left atrium above the mitral valve through the femoral vein and interatrial septum, with the help of specialized wires and catheters. Under the control of fluoroscopy and transesophageal echocardiography, the MitraClip G4 device is implanted by clipping the mitral valve leaflets together. More than one device can be implanted to achieve an optimal result. The procedure is performed under general anesthesia. The MitraClip G4 system is a fourth-generation device with four sizes of clips, which are individually selected for each patient based on the patient's mitral valve anatomy. The variety of clip sizes offers more flexibility for physicians during the procedure.

Problem being solved

Mitral valve regurgitation (MVR) is the second most common valvular heart disease in Europe. Clinically significant moderate to severe MVR affects about 10% of individuals over the age of 75, and up to 80% of patients hospitalized due to heart failure are found to have MVR. If left untreated, MVR can lead to atrial fibrillation, pulmonary hypertension, further deterioration of heart failure, or even its onset and death. Due to high surgical risk, extensive comorbidities, and limited pharmacological treatment options in Lithuania, these patients often had no alternative treatment options. Transcatheter mitral valve repair (TMVR) is designed for patients with ≥2+ degree primary or secondary mitral valve regurgitation, where surgical treatment is not possible due to high surgical risk.

Major results

The introduction of MitraClip in Lithuania is the result of a multi-year process that required significant effort. As part of routine clinical practice in Lithuania, the first six TMVR procedures with the MitraClip G4 device were performed at Santaros Klinikos in November 2024, with the participation of interventional cardiologists, echocardiographers, anesthesiologists, and foreign colleagues.

Further directions

Since 2024, with the inclusion of the MitraClip G4 TMVR procedure in the list of centrally reimbursed pharmaceutical preparations and medical devices, Santaros Klinikos plans to perform 30–50 TMVR procedures annually, with expectations for this number to gradually increase.

Center for Cardiology and Angiology

Development of a User-Friendly Diagnostic Watch with Pulse Wave Algorithm for Detecting Arrhythmias and a 6-Lead Wireless ECG

Innovation

Santaros Klinikos telemedicine specialists, in collaboration with researchers from Vilnius University and Kaunas University of Technology, developed the world's first watch featuring a pulse wave algorithm for detecting arrhythmias and a combination of 6-lead electrocardiography (ECG). Scientists in the DoubleCheck-AF study have confirmed the high diagnostic accuracy of this innovative technology.

Problem being solved

The invention enables the detection of atrial fibrillation episodes that contribute to the risk of thromboembolism, including asymptomatic cases. The six-lead ECG allows for precise differentiation of arrhythmias, even in the presence of frequent premature contractions (ectopic beats), which often interfere with the accuracy of other devices on the market.

Major results

The developed watch has already saved a life, with the patient agreeing to share their story. This patient experienced sudden, rapid tachycardia episodes (>220 bpm), and lost consciousness twice while driving. The results of their tests in the emergency department were normal. Accurate diagnostics using the developed watch allowed for the identification of the condition and the performance of the appropriate life-saving procedure. This case perfectly illustrates the potential applicability of the device.

Further directions

The developed device is a success story of Vilnius University and Kaunas University of Technology. The innovation was systematically developed through all stages, from the idea and prototype creation and testing to the commercialization of the product as the "TeltoHeart" device. It is now sold by the company "Teltonika" to various telemedicine centers not only in Europe but also in Asia, North and South America, and Africa. Santaros Klinikos are also implementing this service so that Lithuanian patients can experience its practical benefits.

Center for Cardiology and Angiology

CT/MRI Imaging with the InHeart DI Program in Preoperative Preparation of Patients with Ventricular Arrhythmias to Identify Critical Tachycardia Areas

Innovation

"InHeart" is a medically validated artificial intelligence program that assesses scarring changes in the heart chambers and predicts the most likely critical arrhythmia-triggering circuits. After examination, during surgery, the cardiologist-electrophysiologist correlates these anatomical findings with electrical intracardiac signal changes and other electrophysiological maneuvers—this allows for precise arrhythmia ablation (cauterization).

Problem being solved

According to scientific research, the "InHeart" artificial intelligence program significantly improves ablation outcomes and reduces procedure time in patients with structural heart disease. Additionally, "InHeart" conveniently visualizes other nearby structures, such as coronary vessels, the phrenic nerve, and others.

Major results

Cardiologist Justinas Bacevičius, together with his department colleagues, performed the first "InHeart"-guided ventricular arrhythmia ablation in the Baltic States. Using the system on three critically ill patients with ventricular storm and defibrillator shocks up to 30 times per day, they successfully managed the condition. The patients are now feeling well, and the previously occurring episodes no longer recur.

Further directions

A clinical study is planned in collaboration with colleagues from the United Kingdom and Germany to evaluate the correlation between the localization of critical channels identified by “InHeart” and the electrical findings during intracardiac electrophysiological examination.

Clinical Radiation Safety Department

Optimization of radiation doses in pelvic radiography

Innovation

Optimization of exposure parameters in digital pelvic radiography to reduce patient radiation doses without compromising diagnostic image quality.

An anthropomorphic pelvic phantom, which simulates the radiation attenuation characteristics of human tissues, was used to optimize the protocols. The phantom was used to model clinical scenarios, enabling a comprehensive assessment of radiation doses and image quality across different digital radiography systems. This method ensures that patients receive an optimal amount of radiation during diagnostic procedures, tailored to the technical characteristics of the X-ray equipment used.

Problem being solved

Research on X-ray radiation and dose optimization is crucial for reducing the harmful effects of ionizing radiation exposure to patients and lowering the risk of carcinogenesis during radiological examinations.

Optimizing radiological examination protocols for digital X-ray systems is an important part of clinical practice. Stationary X-ray diagnostic machines process clinical images differently, resulting in variations in patient exposure and image quality. Therefore, it is especially important to understand the parameters of images generated by each diagnostic device to ensure patient examinations are performed safely, using the optimal amount of radiation.

Major results

The study found that, even with identical exposure parameters, different radiology equipment produces diagnostic images of varying quality, resulting in significant differences in radiation doses.

This highlights the necessity of optimizing radiation dose levels for each type of radiological equipment. The use of anthropomorphic phantoms made it possible to test and refine clinical examination protocols without involving patients. Additionally, interdisciplinary collaboration between radiologists and medical physicists was crucial for successful implementation.

Further directions

The research will continue with the optimization of clinical examination protocols, taking into account feedback from radiologists regarding the deployment of new X-ray diagnostic equipment at Santaros Klinikos.

Future research directions include innovative methods for patient dose optimization in other anatomical regions, such as the abdomen, hips, and lungs.

Clinical Radiation Safety Department

Implementation of a clinical specialized inspection system to ensure the quality of personal radiation protection equipment

Innovation

In 2024, Santaros Klinikos became the first hospital in the Baltic States to test and validate the specialized radiation protection equipment inspection system "FLOWD 8020" in a real clinical setting.

This system uses advanced imaging and analysis technology to efficiently inspect the integrity of lead-based protective equipment and determine its lead equivalence, thereby ensuring the radiation safety of healthcare professionals.

Problem being solved

Medical personnel are exposed to ionizing radiation while performing procedures with radiological equipment and other sources of ionizing radiation.

Various protective measures are used to reduce the radiation doses received. The implementation of a new inspection system for ionizing radiation protection equipment aimed to improve the quality control of such protective gear—an especially important step in ensuring radiation safety for healthcare workers. Traditional methods for evaluating the quality of protective equipment, such as visual inspections and checks using diagnostic X-ray equipment, are time-consuming, require high levels of expertise, and rely on expensive resources like operating rooms. The new inspection method, using the "FLOWD 8020" system, enables fast and high-quality evaluations outside of operating rooms, facilitates the use of safer protective gear, and allows medical physicists to allocate their time more efficiently to other clinical tasks.

Major results

During the testing of the new system, areas for improvement and corrective actions were identified. Based on the experience of the Clinical Radiation Safety Department at Santaros Klinikos in scanning protective equipment, the manufacturer improved the system's software, which now enables easier defect detection and more accurate calculation of lead equivalence values.

Further directions

The specialized protective equipment inspection system is expected to become a model tool for quality assurance. This innovation will also enable future scientific research on the wear and degradation of protective equipment, the study of composite material deterioration, and the improvement of protective material and model development.

Department for Vascular Surgery

The use of innovative copper dressings in the treatment of acute and chronic wounds

Innovation

Copper is one of the essential trace elements for the human body. A deficiency in copper is thought to weaken the immune system and reduce collagen production, which is particularly necessary for wound healing. Copper dressings have antimicrobial properties and promote granulation, which is associated with the hypoxia-inducible factor-1 alpha. It has been observed that copper dressings allow wounds to heal more quickly and can be used for both acute and chronic wounds.

Problem being solved

Copper dressings were introduced at Santaros Klinikos for wound treatment in 2024 and are used following cardiac, gynecological, orthopedic, urological, and vascular surgeries. When used for chronic wound treatment, they shorten hospitalization time, reduce treatment costs, and allow patients to become mobile more quickly. Copper dressings, as an innovative wound healing tool, are also valuable for pediatric surgeons (used for children after burns, abdominal, and orthopedic surgeries), gynecologists, plastic and reconstructive surgeons, traumatologists, urologists, and abdominal and vascular surgeons. Copper dressings are also notable for being changed only once a week, providing an additional economic benefit.

Major results

At Santaros Klinikos, the use of copper dressings in patients has been observed to significantly accelerate the wound healing process – for some patients, this has allowed them to save damaged limbs and return to work.

Further directions

It is expected that copper dressings will be applied in daily practice, thereby shortening patients' hospitalization times, easing the workload of nurses, and improving patient outcomes (for example, limbs without major blood circulation may be preserved).

Center for Laboratory Medicine

Rapid detection tests for infection pathogens and their antibiotic resistance genes.

Innovation

Several rapid tests for detecting infection pathogens and their antibiotic resistance genes have been implemented at Santaros Klinikos. These tests use the polymerase chain reaction (PCR) method and can simultaneously detect many of the most common pathogens responsible for sepsis, pneumonia, meningitis, encephalitis, and intestinal infections in a short amount of time. In cases of sepsis and pneumonia, there is also the possibility of detecting bacterial antibiotic resistance genes.

Problem being solved

The implementation of these tests at Santaros Klinikos aimed to accelerate the detection of pathogens and their resistance genes in critically ill patients with sepsis, pneumonia, meningitis, encephalitis, or intestinal infections.

Major results

The implementation of the innovation was significantly supported by the collaborative work of the departments within the Center for Laboratory Medicine – individual laboratories – bringing together staff for a common goal. The challenges of test verification were overcome.

Further directions

It is planned to expand the spectrum of rapid PCR tests that simultaneously detect multiple pathogens and their resistance genes, including additional diseases (such as purulent joint infections).

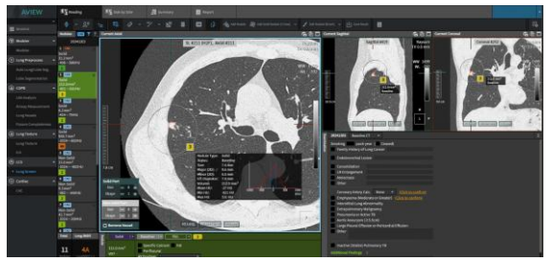
Center for Radiology and Nuclear Medicine

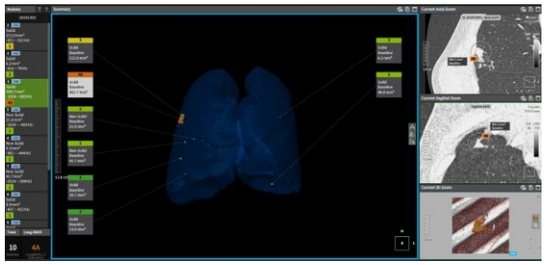
Application of low-dose computed tomography in a pilot program for the early diagnosis of lung cancer

Innovation

In September 2024, an innovative diagnostic program was launched at the II Radiology Department of the Center for Radiology and Nuclear Medicine (CRNM) at Vilnius University Hospital Santaros Klinikos, led by Assoc. Prof. Dr. Dileta Valančienė. The program uses low-dose computed tomography (LDCT) to aim for the early detection of bronchial and pulmonary malignant tumors.

Problem being solved





↑ Low-dose computed tomography software using artificial intelligence solutions and 3D rendering.

The LDCT examination is highly sensitive – it allows the detection of even the smallest changes in lung tissue at early stages of cancer, when treatment is most effective and can lead to full recovery. The diagnostic process has been optimized using the latest artificial intelligence solutions, which significantly enhance and accelerate the analysis of radiological images. The AI software automatically identifies lesions, measures their size and volume, and assesses the risk of malignancy. In collaboration with medical physicists from the Clinical Radiation Safety Department of Santaros Klinikos, led by Assoc. Prof. Dr. Birutė Gricienė, and radiology technologists, the LDCT examination protocol was optimized according to the latest international guidelines. The minimal ionizing radiation dose to the patient has been achieved while maintaining high diagnostic image quality.

Major results

This new pilot program is a significant step in the field of cancer prevention and early diagnosis in Lithuania.

Further directions

It is expected that the experience gained at Santaros Klinikos will be applied in the planned national early lung cancer diagnostic program.

Center for Radiology and Nuclear Medicine

Studies at Santaros Klinikos using positron emission tomography and computed tomography (PET/CT) with a next-generation digital device that also includes artificial intelligence functionality

Innovation

Positron emission tomography and computed tomography (PET/CT) is a radionuclide examination in which a radioactive substance is injected into the body. The positrons emitted by this substance, interacting with tissues, create gamma particles that travel through the scanned human body, and the equipment's sensors detect the distribution and concentration of these particles in the tissues – allowing for the identification of changes within them. This method is mostly used for examining patients with oncological diseases.

Problem being solved

↑ The PET/CT device

Given the long-term experience of other countries and Santaros Klinikos, the morbidity of the Lithuanian population, and the aging trends of society, it can be stated that the demand for PET/CT examinations will continue to grow. Globally, there is a general increase in the number of PET examinations being performed, with new radiopharmaceuticals being used. In the future, new systems will enable examinations with short-lived radionuclides that decay quickly and lose their radioactivity within a short period of time—within a few days. This reduces the risk of ionizing radiation for the subjects, and dynamic scanning protocols will be used (a series of sequential scans of body parts will be performed to monitor tissue changes in real-time). These new technologies will also open opportunities to develop theranostic procedures, combining diagnostics and treatment into a single process, helping doctors gather more clinical information on various oncological, cardiovascular, neurological pathologies, and other diseases.

Major results

According to the Head of the Nuclear Medicine Department, Renata Komiagienė, the new system, which was introduced at the beginning of this year, not only significantly reduced the waiting time for patients awaiting examinations but also improved the quality of the performed scan as it allows for the visualization of finer structures and tumor lesions, and the patient scan time has also been shortened.

Further directions

According to Assoc. Prof. Dr. Artūras Samuilis, the head of the Radiology and Nuclear Medicine Center, the PET/CT system can be upgraded to expand its diagnostic capabilities without major structural or facility modifications. It is expected that this will be achieved in the near future, allowing the device to be used not only for routine diagnostics but also for research.

Center for Pain Medicine

Spinal cord stimulation

Innovation

During the spinal cord stimulation procedure, a stimulation lead is inserted into the spinal canal and connected to an implanted stimulator. The electrical impulses emitted by the stimulator act on the spinal cord, alleviating pain.

Problem being solved

Spinal cord stimulation is an effective and important method for relieving neuropathic pain, intended for patients experiencing intense pain due to spinal pathology, where the pain persists even after spinal surgery, or neuropathic pain due to nerve damage. This treatment is used when other measures, such as medication, rehabilitation, or interventional pain relief procedures, fail to alleviate the pain.

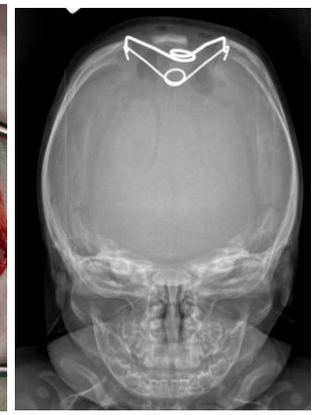
Major results

For this treatment method to be successful, close involvement and collaboration between the medical team and the patient were essential. A whole team of specialists works with the patient – neurosurgeons, doctors from the Center for Pain Medicine, as well as nurses and a medical psychologist.

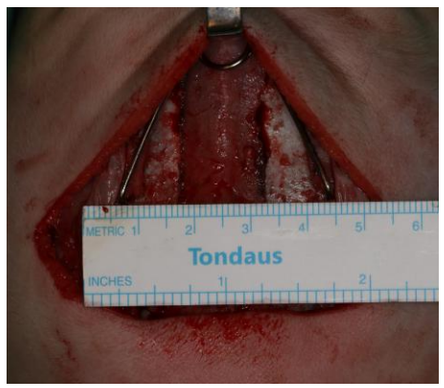
Žalgiris Clinic Center for Oral, Facial, and Maxillofacial Surgery
Pediatric Neurosurgery Department of the Center for Neurosurgery

Application of springs in skull corrective surgeries for scaphocephaly

↑ Incisions in the skull bones before inserting the springs



↑ Skull X-ray after cranioplasty using springs



↑ Expanded skull bones immediately after the springs are inserted

Innovation

For the first time in Lithuania, two cranioplasty surgeries were performed on 3.5-4-month-old infants diagnosed with skull deformity – scaphocephaly. Using special springs, the prematurely fused skull bones are expanded. This not only corrects the shape of the skull but also creates additional space for the brain to expand and grow normally (which directly impacts the patients' psychomotor development).

Problem being solved

Using this procedure, the surgery time is shortened by 2-3 times compared to previously used methods, there is no need for blood transfusions, and the hospitalization time as well as the patient's care time in the intensive care unit are significantly reduced.

Major results

The spring technology changes the course of cranioplasty, making the surgery shorter and less invasive. The first results are visible during the surgery, and the shape of the skull rapidly changes and normalizes within the first few months after the operation.

Further directions

It is expected to promote the expansion of such surgeries by improving early pathology diagnosis, as this surgical method can only be applied during the first few months of life.

Center for Family Medicine

Raising awareness about prostate cancer and the screening initiative (PRAISE-U): pilot study

Innovation

The Center for Family Medicine of Santaros Klinikos, participating in the PRAISE-U study, plans to invite 1,500 patients aged 50–69 who have not previously been diagnosed with prostate cancer. The progress of the study at the Center for Family Medicine of Santaros Klinikos is overseen by family doctor, Assoc. Prof. Dr. Lina Vencevičienė.

Problem being solved

The PRAISE-U study addresses issues related to the current prostate cancer prevention model. The goals of the biomedical research are:

- to create a nationally adapted, economically efficient early prostate cancer detection screening algorithm in the European Union, aiming to reduce prostate cancer morbidity and mortality while avoiding overdiagnosis and overtreatment;
- to reduce prostate cancer morbidity and mortality in EU member states through smart early diagnostics;
- to promote early detection and diagnosis of prostate cancer through risk-based screening programs;
- to harmonize protocols and guidelines across EU member states and create conditions for collecting and disseminating relevant data to reduce prostate cancer morbidity and mortality in Europe;
- to investigate healthcare providers' perspectives on the European Urological Association and PRAISE-U Consortium's recommended individualized risk-based prostate cancer screening model.

During the study, the aim is to evaluate the implementation process and outcome indicators of the European Urological Association and PRAISE-U Consortium's recommended individualized risk-based prostate cancer screening model in Lithuania, explore healthcare providers' perspectives on this model, assess the psychosocial impact of the program, evaluate implementation costs, and compare these aspects with the current standard practice.

Study plan

“ Patients who agree to participate in the study will be asked to complete questionnaires about their health, stress, anxiety, risk perception, knowledge, and attitudes towards prostate cancer screening and awareness before undergoing the PSA test. If the participant's prostate-specific antigen (PSA) concentration exceeds 3 ng/ml, they will be referred to the National Cancer Institute, where prostate volume will be measured, and the risk of prostate cancer diagnosis will be assessed. If the risk is moderate or high, magnetic resonance imaging (MRI) of the prostate will be performed. Regardless of the PSA concentration in the blood, all participants will receive standard healthcare. In addition to clinical examination, participants will be asked to fill out and validate psychosocial questionnaires.

Center for Family Medicine

Pilot program for early diagnosis of bronchial and lung malignancies and low-dose computed tomography screening

Innovation

The goal of the program at the Center for Family Medicine of Santaros Klinikos is to examine the effectiveness and feasibility of a lung cancer screening protocol (model) using low-dose chest computed tomography (LDCT) in Lithuania. The research objectives are: 1) to investigate the frequency of newly detected lung cancer, 2) to determine the distribution of newly diagnosed lung cancer cases by stages, 3) to investigate the frequency of newly diagnosed other diseases (lung, mediastinal organs, heart, gastrointestinal tract, etc.), 4) to find out what proportion of those invited for screening attend the chest CT, 5) to understand patients' perspectives on lung cancer screening (questionnaire data), 6) to determine the most appropriate way to inform patients about lung cancer screening, 7) to identify potential weaknesses and challenges of the developed lung cancer screening protocol in Lithuania.

The study participants are individuals aged 50–70 registered at the Center for Family Medicine of Santaros Klinikos.

Problem being solved

Lung cancer is one of the most common types of cancer in Lithuania. More than 1,500 new cases are diagnosed annually, and this number continues to rise. Although smoking remains the most significant modifiable risk factor for lung cancer, an increasing number of non-smokers are being diagnosed with this oncological disease. When early-stage (I–II) lung cancer is diagnosed, treatment is usually highly effective. Unfortunately, by the time symptoms appear, lung cancer is most often detected in the late stages (III–IV), which is nearly impossible to cure.

Major results

The goal of the program is to detect lung cancer as early as possible, before it becomes clinically apparent. This would allow for effective treatment of the disease and even the possibility of a complete recovery. It is very important that the chest LDCT scan can detect not only lung cancer but also other lung diseases (such as pulmonary fibrosis, tuberculosis, emphysema, bronchiectasis), as well as significant changes in other organs of the chest and abdominal area. In many cases, these diseases are detected even before symptoms appear. This allows for treatment or reduces the likelihood of progression or spread. The radiation dose from the chest LDCT scan is several times lower than that of a standard CT scan, it does not require special preparation, and the procedure is painless.

Further directions

It is expected that during the ongoing project, not only early-stage lung cancer and other lung diseases will be successfully diagnosed. Innovative and advanced is the possibility of detecting significant changes in other tissues and organs of the chest and abdominal area.

Center for Urology

Implementation of the robotic surgical system "VERSIUS"

Innovation

The meticulous and standardized learning process allowed for the rapid and smooth implementation of robotic surgery into clinical practice without endangering patients. Using the "Versius" surgical system, urologists have already performed a significant number of prostate surgeries, avoiding major complications.

Creation of artificial urethra for urethroplasty purposes

Innovation

The goal of the study conducted at the Center for Urology of Santaros Klinikos is to create and test a functional artificial urethral tissue in an animal model, using 3D bioprinting technology. The main task is to develop a functional, antifibrotic artificial tissue fragment and assess its potential to treat urethral strictures in an *in vivo* model. In 2024, cell cultures were created from human and rabbit adipose tissue, buccal mucosa, healthy and fibrotic urethra. Markers for these cells were identified, and their proliferation and differentiation potential were assessed. To evaluate the mechanism of action of an antifibrotic drug and its potential use in creating artificial tissue, toxicity and effective dose determination tests were conducted with primary myofibroblast cells and the WPMY human myofibroblast cell line. Using 3D bioprinting, polymers and biological inks were selected and tested to create an artificial scaffold model for urethral reconstruction. Surgical procedures were carried out to create a stricture model in rabbits. This work forms the basis for a doctoral dissertation.

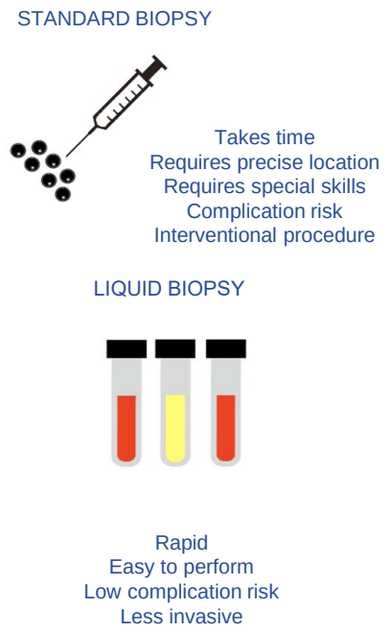
Center for Urology

Aggressive prostate cancer detection using liquid biopsy

Innovation

For some patients with metastatic castration-resistant prostate cancer (mCRPC), mutations in DNA damage repair pathway genes are identified. Molecular changes can be detected using bodily fluids – a minimally invasive method required to collect samples (e.g., blood, urine collection, etc.), thus avoiding the standard tumor or metastasis biopsy.

Major results



↑ Key differences between standard and liquid biopsy

The aim of the study conducted at the Center for Urology of Santaros Klinikos was to investigate the frequency of mutations in DNA damage repair pathway (DPA) genes (BRCA1, BRCA2, ATM, CHEK2, and NBN) in blood and/or urine samples and evaluate their impact on the clinical course of advanced and localized prostate cancer (PCa). The research served as the basis for a medical doctorate dissertation defended in 2024.The study found a high frequency of DPA pathway gene mutations (ATM, BRCA1, BRCA2, CHEK2) in leukocytes of patients with advanced and localized PCa, at 14.8% (22/149) and 16.8% (18/107), respectively. Additionally, the frequency of mutations in urine samples from patients with advanced PCa was 16.6% (23/139) for ATM, BRCA1, BRCA2, CHEK2, and NBN. Patients with DPA pathway gene mutations exhibited a worse response to treatment and poorer survival rates compared to tumors without these gene mutations. The relative risk of developing localized prostate cancer was three times higher (p = 0.16) in patients with ATM, BRCA1, BRCA2, CHEK2 gene mutations, and the disease was more aggressive, as evaluated through clinical, histopathological, and radiological data.

Further directions

When predicting the aggressive clinical course of advanced prostate cancer (PCa), it is recommended to test for mutations in the ATM, BRCA1, BRCA2, CHEK2, and NBN genes in patients' leukocytes or DNA from urine sediment. In patients with advanced PCa, mutations identified in the ATM, BRCA1, BRCA2, CHEK2 (c.1100delC), and NBN genes should be considered independent prognostic markers of aggressive disease progression. In cases of high-risk localized PCa, genetic testing for DNA damage response (DDR) pathway gene mutations should be considered.

Center for Urology

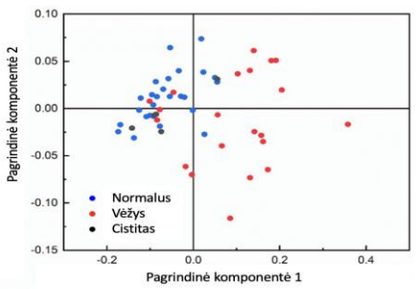
Comparison of bladder cancer diagnostic results using tissue vibrational spectroscopy, cytology, and histology methods

Innovation

Modern scientific literature places significant emphasis on indirect methods for detecting oncological diseases—so-called "liquid biopsies." The principle behind these methods is to non-invasively determine whether there are cancerous changes in a selected organ. At the Center for Urology, two vibrational spectroscopy methods were used: surface-enhanced Raman scattering spectroscopy (SERS) and fiber-optic attenuated total reflectance infrared spectroscopy. The first method was used to analyze bladder cancer and healthy bladder tissue samples, their intercellular fluid samples, and bladder washings from patients with and without bladder cancer. The second method was applied to samples of cancerous and healthy tissues.

Major results

It was found that SERS spectroscopy under ex vivo conditions can differentiate between extracellular fluid samples of bladder cancer and healthy bladder tissue. Spectral bands at 1052 cm^{-1}, associated with lactic acid and cysteine, show higher intensity in the SERS spectra of cancerous tissue extracellular fluid compared to that of healthy mucosa. Fiber-optic-based IR spectroscopy under ex vivo conditions can also distinguish between cancerous and healthy bladder tissues. Spectral bands at 1033, 1206, 1240, 1282, 1317, and 1339 cm^{-1} are associated with collagen; 972 and 1082 cm^{-1} with nucleic acids; and 1028 and 1154 cm^{-1} with glycogen. These bands differ in intensity between cancerous and healthy bladder tissues.



↑ Principal component analysis (PCA) plot in the 1020–1080 cm^{-1} wavenumber region, showing the SERS spectra of interstitial fluid samples from normal, cancerous, and cystitis-affected bladder tissue.

The SERS spectroscopy method can differentiate bladder wash samples between bladder cancer patients and healthy individuals with an accuracy comparable to the most widely used clinical cytology test. Under *ex vivo* conditions, SERS spectroscopy can distinguish between extracellular fluid samples from bladder cancer and healthy bladder tissues with 85% sensitivity and 97% specificity. IR spectroscopy, also under *ex vivo* conditions, can differentiate cancerous and healthy bladder tissues with 91% sensitivity and 98% specificity. While spectral differences were observed when differentiating between high- and low-grade urothelial carcinoma samples, the sensitivity and specificity were significantly lower compared to histological examination. When analyzing tissues using the SERS method, no significant differences were found between high- and low-grade urothelial carcinoma samples. This study formed the basis for a defended doctoral dissertation in medicine in 2024.

Center for Urology

Optimization of kidney stone disease treatment based on urinary sediment spectroscopic analysis method, laboratory blood and urine tests, and radiological data

Innovation

The method (FTIR ATR) allows for precise determination of kidney stone composition from very fine particles or dust, which can be obtained during surgery. The study was conducted to assess the accuracy of spectroscopy in determining the final composition of stones from urine containing only dust, collected during stone removal surgeries.

Problem being solved

Appropriate patient selection for extracorporeal shock wave lithotripsy (ESWL) is crucial for achieving the best treatment outcomes. Recent studies have revealed many factors and parameters that influence the effectiveness of ESWL: stone size and location, stone density on computed tomography images, the distance from the skin to the stone, and others. Based on these factors, various nomograms have been developed to predict the outcomes of ESWL treatment, but many of them are complex and difficult to apply in clinical practice. The current gold standard for stone composition analysis is considered to be infrared spectroscopy or X-ray diffraction.

Major results

I t was found that the FTIR ATR method is suitable for determining the final stone composition by analyzing urine samples obtained during the procedure of grinding stones into dust. The average sensitivity of this method for determining the composition of various types of urinary tract stones is 81.8%, specificity is 95.6%, positive predictive value is 90.2%, and negative predictive value is 93.1%. The highest accuracy was achieved when analyzing the residues formed during the treatment of uric acid stones (sensitivity 100%, specificity 98.3%). The FTIR ATR method, when using random single urine samples to determine the final stone composition, is not sufficiently accurate. Instead, other types of samples should be used: dust collected during the fragmentation process or stone fragments taken during the procedure. Proper patient selection is crucial for predicting the outcome of extracorporeal shock wave lithotripsy (ESWL). This is facilitated by the appropriate use of accurate predictive systems. In the study, the distance from the skin to the stone was less significant for treatment outcomes than the SMLI/AT ratio. By replacing the conventional skin-to-stone distance used in the triple-D system with the newly calculated threshold value of 0.681 for the SMLI/AT ratio, we found that this updated triple-D system (AUC 0.775; p = 0.001) predicts the ESWL outcome more accurately than the conventional triple-D or quadruple-D systems. This research forms the basis of a medical doctorate dissertation, defended in 2024.

National Center of Pathology

Unified micropreparation labeling format

Innovation

A unified micropreparation labeling system has been developed at the Santaros Klinikos National Center for Pathology, applied across all stages of pathology testing. The slide label provides detailed information, including a QR code, the test identifier in the information system, block and section numbers, staining abbreviations, immunohistochemical protocol details, used tissue control, additional test markings, and the NCP logo.

Problem being solved

Histological, immunohistochemical, and other micropreparations for pathology tests are labeled with unique identifiers, which are used to integrate pathology research information systems and various micropreparation manufacturing and digitization technologies. Equipment from different manufacturers required specific integration conditions and labeling standards, which complicated laboratory workflows and increased the likelihood of errors. Importance of the innovation:

- Pathologists receive clear and detailed information about staining procedures, protocols used, and test blocks.
- The section numbering allows precise assessment of the section depth, which is crucial for diagnosis.
- Direct labeling of glass slides is resistant to chemical effects and ensures labeling durability, reducing the need for manual labor and minimizing the risk of errors.
- Unified micropreparation labeling throughout the entire pathology testing process will increase work efficiency and speed up the pathological examination process.

Major results

Professor Arvydas Laurinavičius' impression: "The journey from idea to implementation required courage, persistence, and creative collaboration between the laboratory and information technology teams."

Further directions

Seamless and reliable sample labeling creates the foundation for automating various pathology research processes and further digital transformation of operations.

Doctoral Theses Defended at Vilnius University in 2024 by Staff of VUH Santaros Klinikos

DOCTORAL THESES DEFENDED AT VILNIUS UNIVERSITY IN 2024 BY STAFF OF VUH SANTAROS KLINIKOS

Surname, Name	Title of dissertation	Supervisor	Date of defense
Bieliauskienė Gintarė	Usefulness of tree-dimensional echocardiography to predict the tratment results in patients with functional tricuspid valve regurgitation	Prof. Diana Zakarkaitė	2024-02-02
Čiburienė Eglė	Study on implementing a cardio-oncology service, early diagnosis of cardiotoxicity, comorbidities and cardioprotective treatment	Prof. Sigita Aidietienė	2024-02-14
Snicorius Marius	Treatment optimization of urolithiasis patients based on spectroscopic analysis of urinary sediments, laboratory, and visual radiological findings	Doc. Arūnas Želvys	2024-05-30
Januškevičius Tomas	Detection of aggressive prostate cancer using liquid biopsy	Prof. Feliksas Jankevičius	2024-06-19
Sabonytė-Balšaitienė Živilė	Risk factors and prevention of perianal diseases during pregnancy	Prof. Gražina Stanislava Drąsutienė	2024-07-01
Kisielienė Inga	Assessment of endogenous and exogenous factors in children's atopic dermatitis and the impact of the disease on quality of life and behavioral difficulties	Prof. Matilda Bylaitė-Bučinskienė	2024-08-28
Viršilas Ernestas	Real time evaluation of dynamic changes of the lungs during respiratory support of very low birthweight neonates using electrical impedance tomography	Prof. Arūnas Valiulis	2024-09-12
Radauskaitė Greta	Results and their comparison of invasive atrial fibrillation treatment methods: surgical Mini Maze and percatheter cryoablation	Prof. Audrius Aidietis	2024-09-12
Platkevičius Gediminas	Comparison of bladder cancer diagnostic results by tissue vibrational spectroscopy, cytology, and histology methods	Doc. Arūnas Želvys	2024-09-18
Gražulytė Daiva	Impact of perioperative and psychosocial risk factors on quality of life and stress reactions after cardiac surgery	Prof. Jūratė Šipylaitė	2024-09-18
Račkauskas Rokas	Impact of chemotherapy on postoperative liver regeneration	Prof. Kęstutis Strupas	2024-10-30
Gulbinienė Violeta	Analysis of immunological biomarkers in amniotic fluid predicting fetal inflammatory response syndrome and outcomes in preterm neonates	Prof. Diana Ramašauskaitė	2024-11-14
Lengvenis Givi	Radiological evaluation of cerebral artery clots and development of a prognostic thrombectomy algorithm	Prof. Algirdas Edvardas Tamošiūnas	2024-11-22
Poluziorovienė Edita	Causative relationship between Alpha-1 antitrypsin variants and bronchial obstruction syndrome in preschool children	Prof. Arūnas Valiulis	2024-12-11
Žučenka Andrius	Biomarker-based research of new treatment approaches for relapsed and refractory acute myeloid leukemia	Prof. Laimonas Griškevičius	2024-12-13
Čėsna Sigitas	Renal perfusion changes in patients with coarctation of the aorta	Prof. Virgilijus Tarutis	2024-12-16
Stankevičienė Indrė	Dry mouth conditions: epidemiological and clinical characteristics and associations with genetic, behavioral and stress factors : summary of doctoral dissertation	Prof. Alina Pūrienė	2024-02-02
Tušas Paulius	Analysis of physicochemical and biological characteristics of flowable hydraulic tricalcium silicate-based root canal filling materials	Prof. Vytautė Pečiulienė	2024-06 20

2024 Publications in High-impact Research Journals

Publications of Santaros Klinikos employees in journals with a citation index greater than 20

No.	Citation	Impact factor
1	Kelly P, Lemmens R, Weimar C, Walsh C, Purroy F, Barber M, Collins R, Cronin S, Czlonkowska A, Desfontaines P, De Pauw A, Evans NR, Fischer U, Fonseca C, Forbes J, Hill MD, **Jatuzis D**, Kõrv J, Kraft P, Kruuse C, Lynch C, McCabe D, Mikulik R, Murphy S, Nederkoorn P, O'Donnell M, Sandercock P, Schroeder B, Shim G, Tobin K, Williams DJ, Price C. **Long-term colchicine for the prevention of vascular recurrent events in non-cardioembolic stroke (CONVINCE): a randomised controlled trial. Lancet.** 2024 Jul 13; ■ 404(10448):125-133. doi: 10.1016/S0140-6736(24)00968-1. Epub 2024 Jun 7. PMID: 38857611.	98.4
2	Beyrer C, Kamarulzaman A, Isbell M, Amon J, Baral S, Bassett MT, Cepeda J, Deacon H, Dean L, Fan L, Giacaman R, Gomes C, Gruskin S, Goyal R, Mon SHH, Jabbour S, Kazatchkine M, Kasoka K, Lyons C, Maleche A, Martin N, McKee M, Paiva V, Platt L, **Puras D**, Schooley R, Smoger G, Stackpool-Moore L, Vickerman P, Walker JG, Rubenstein L. **Under threat: the International AIDS Society-Lancet Commission on Health and Human Rights. Lancet.** 2024 Apr 6; ■ 403(10434):1374-1418. doi: 10.1016/S0140-6736(24)00302-7. Epub 2024 Mar 21. PMID: 38522449.	98.4
3	European Atherosclerosis Society Familial Hypercholesterolaemia Studies Collaboration. **Familial hypercholesterolaemia in children and adolescents from 48 countries: a cross-sectional study. Lancet.** 2024 Jan 6; ■ 403(10421):55-66. doi: 10.1016/S0140-6736(23)01842-1. Epub 2023 Dec 12. Erratum in: Lancet. 2024 Jul 13; ■ 404(10448):124. doi: 10.1016/S0140-6736(24)01409-0. PMID: 38101429.	98.4
4	Wilson MP, Kentache T, Althoff CR, Schulz C, de Bettignies G, Mateu Cabrera G, Cimbalistiene L, **Burnyte B**, Yoon G, Costain G, Vuillaumier-Barrot S, Cheillan D, Rymen D, Rychtarova L, Hansikova H, Bury M, Dewulf JP, Caligiore F, Jaeken J, Cantagrel V, Van Schaftingen E, Matthijs G, Foulquier F, Bommer GT. **A pseudoautosomal glycosylation disorder prompts the revision of dolichol biosynthesis. Cell.** 2024 Jul 11; ■ 187(14):3585-3601.e22. doi: 10.1016/j.cell.2024.04.041. Epub 2024 May 30. Erratum in: Cell. 2024 Jul 11; ■ 187(14):3784. doi: 10.1016/j.cell.2024.06.004. PMID: 38821050; ■ PMCID: PMC11250103.	45.6
5	Tierens A, Arad-Cohen N, Cheuk D, De Moerloose B, Fernandez Navarro JM, Hasle H, Jahnukainen K, Juul-Dam KL, Kaspers G, Kovalova Z, Lausen B, Norén-Nyström U, Palle J, **Pasauliene R**, Jan Pronk C, Saks K, Zeller B, Abrahamsson J. **Mitoxantrone Versus Liposomal Daunorubicin in Induction of Pediatric AML With Risk Stratification Based on Flow Cytometry Measurement of Residual Disease. J Clin Oncol.** 2024 Jun 20; ■ 42(18):2174-2185. doi: 10.1200/JCO.23.01841. Epub 2024 Apr 11. PMID: 38603646.	42.1
6	Banovic M, Putnik S, Da Costa BR, Penicka M, Deja MA, Kotrc M, Kockova R, **Glaveckaite S**, Gasparovic H, Pavlovic N, Velicki L, Salizzoni S, Wojakowski W, Van Camp G, Gradinac S, Laufer M, Tomovic S, Busic I, Bojanic M, Ristic A, Klasnja A, Matkovic M, Boskovic N, Zivic K, Jovanovic M, Nikolic SD, Iung B, Bartunek J. **Aortic valve replacement vs. conservative treatment in asymptomatic severe aortic stenosis: long-term follow-up of the AVATAR trial. Eur Heart J.** 2024 Nov 8; ■ 45(42):4526-4535. doi: 10.1093/eurheartj/ehae585. PMID: 39217448.	38.1
7	Mahdanian AA, Rosen A, Jureidini J, **Puras D. A call to avoid psychiatric labelling in a historic election year. Lancet Psychiatry.** 2024 Mar; ■ 11(3):168-169. doi: 10.1016/S2215-0366(24)00009-9. Epub 2024 Jan 23. PMID: 38278161.	30.8
8	**Ivanauskiene T, Zuoziene G, Zakarkaite D, Tarutis V, Glaveckaite S. The Anterior Mitral Valve Leaflet Prolapse as a Key to Diagnosis of ALCAPA Syndrome. J Am Coll Cardiol.** 2024 Aug 27; ■ 84(9):868-873. doi: 10.1016/j.jacc.2024.06.021. PMID: 39168574.	21.7
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Information: The source of publication selection and analysis is the Clarivate Web of Science (WoS)™ platform. Due to possible discrepancies in the indexing of first names or surnames between Clarivate WoS™ and the automated selection search algorithm, the number of exported publications may be lower than the actual number of publications authored by the employee. Early access publications are not always indexed by Clarivate WoS™ in the year of their publication. The names of participants from large consortia are not always indexed by Clarivate WoS™. For these reasons, the provided data should not be considered absolutely accurate.

Publications of Santaros Klinikos employees in journals with a citation index between 10 and 20

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