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## **International Evaluation of Scientific Institutions Activity Panel Report: Medicine and Health Sciences**

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## Table of Contents

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List of abbreviations	4
1 Introduction	5
1 Institution reports	6
M_1 Riga Stradiņš University Latvian Academy of Sport Education	6
2.1.1. The unit	6
2.1.2. Expert Group evaluation	6
M_2 Riga Stradiņš University Health and Natural Sciences Platform	14
1.2.1 The unit	14
1.2.2 Expert Group evaluation	14
M_3 Faculty of Medicine and Life Sciences, University of Latvia	21
2.3.1. The unit	21
2.3.2. Expert Group evaluation	21
M_4 Riga East University Hospital	28
2.4.1. The unit	28
2.4.2. Expert Group evaluation	28
M_5 Pauls Stradins Clinical University Hospital	34
2.5.1. The unit	34
2.5.2. Expert Group evaluation	34
M_6 Latvian Institute of Organic Synthesis/Latvian Biomedical Research and Study Centre	41
2.6.1. The unit	41
2.6.2. Expert Group evaluation	41
2 Summary of findings across the set of unit evaluations	49
Appendix A Feedback on Expert Group assessment	53
Feedback from Riga East University Hospital	53



## Figures

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Figure 1 "Rīga Stradiņš University Latvian Academy of Sport Education"– Scores _____	6
Figure 2 "Rīga Stradiņš University Health and Natural Sciences Platform" – Scores _____	14
Figure 3 Faculty of Medicine and Life Sciences, University of Latvia – Scores _____	21
Figure 4 Rīga East University Hospital – Scores _____	28
Figure 5 Pauls Stradiņš Clinical University Hospital – Scores _____	34
Figure 6 Latvian Institute of Organic Synthesis/Latvian Biomedical Research and Study Centre – Scores _____	41

## List of abbreviations

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BBMRI - Biobanking and Biomolecular Resources Research Infrastructure  
BMC - Latvian Biomedical Research and Study Centre  
EATRIS - European Infrastructure for Translational Medicine  
EMBL - European Molecular Biology Laboratory  
EPO - European Patent Office  
ERIC - The European Research Infrastructure Consortium  
ESCAPE - European Syringe Collection and Analysis Project Enterprise  
ESIF - European Structural and Investment Funds  
FEGA - The Federated European Genome-phenome Archive  
FMLS-UL - The Faculty of Medicine and Life Sciences of the University of Latvia  
GC/MS - Gas Chromatography-Mass Spectrometry  
HPC - High-Performance Computing  
IMI - Innovative Health Initiative  
IT-TOF instruments - Ion trap (IT) and a time-of-flight (TOF) analyser  
KPI – Key performance indicator  
LC/MS/MS systems - liquid chromatography, tandem mass spectrometry  
LIOS - The Latvian Institute of Organic Synthesis  
MDR-TB - Multidrug-Resistant Tuberculosis  
MSCA - The Marie Skłodowska-Curie Actions  
OLEC - Organic light-emitting materials  
PSCUH - Pauls Stradiņš Clinical University Hospital  
REUH - Riga East University Hospital  
RIS3 - Smart Specialisation  
RISE - Research and Innovation Staff Exchange  
RSU - Riga Stradiņš University  
RSU-HNSP - Riga Stradiņš University Health and Natural Sciences Platform  
RSU-LASE - Riga Stradiņš University – Latvian Academy of Sport Education  
SAB - Scientific Advisory Board  
UL - University of Latvia  
WIPO - World Intellectual Property Organisation

# 1 Introduction

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International Evaluation of Scientific Institutions Activity analysed the research performance and international competitiveness, considering also the socio-economic impact and development potential of the units. Results of the evaluation can serve as input in policy making and will enable the units to improve their performance based on the recommendations.

The Medicine and Health Sciences panel evaluated six units:

- "Riga Stradiņš University Latvian Academy of Sport Education"
- "Riga Stradiņš University Health and Natural Sciences Platform"
- Faculty of Medicine and Life Sciences, University of Latvia
- Riga East University Hospital
- Pauls Stradins Clinical University Hospital
- Latvian Institute of Organic Synthesis/Latvian Biomedical Research and Study Centre

The Expert Group evaluated the units using the following criteria:

- Quality of the research
- Impact on the scientific discipline
- Economic impact
- Social impact
- Research environment and infrastructure
- Development potential

The evaluation of each unit involved a documentary review and the Expert Groups' visit to the units. The final evaluation of each unit is a collective view of the Expert Group.

The analysis of each unit by the Expert Group is presented in the following sections.

Feedback on the Expert Group assessment received from the units is published in Appendix A.

# 1 Institution reports

## M\_1 Riga Stradiņš University Latvian Academy of Sport Education

### 2.1.1. The unit

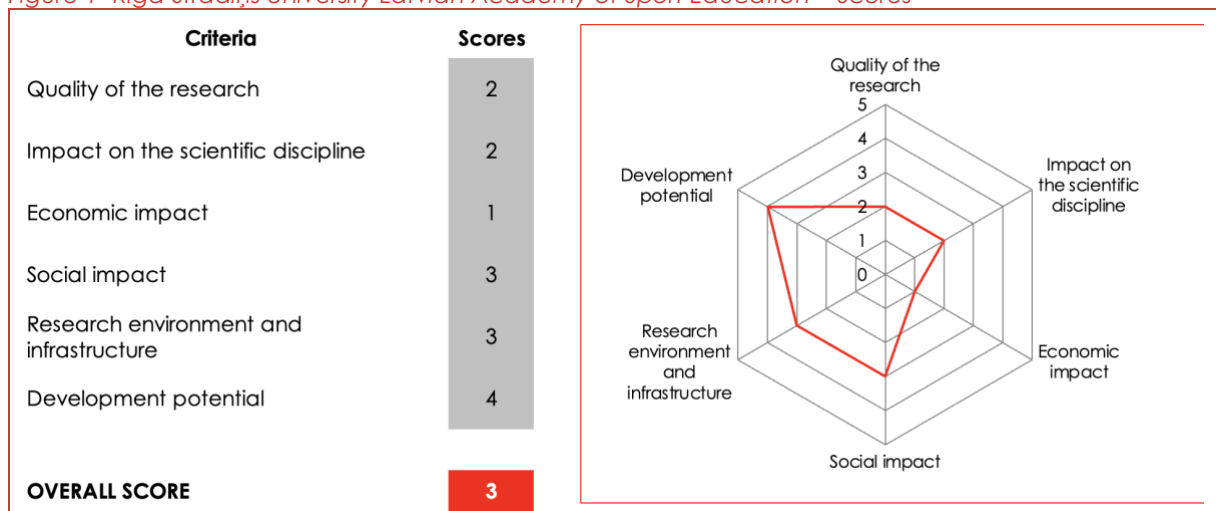
Riga Stradiņš University - Latvian Academy of Sport Education (RSU-LASE) is one of the three research platforms of Riga Stradiņš University. In July 2024, LASE merged with Riga Stradiņš University to enhance governance, improve sports studies, and strengthen research collaboration in health and social sciences. RSU-LASE is dedicated to sports science, physical education, and health research.

RSU-LASE balances basic research (advancing fundamental scientific knowledge in exercise physiology, biomechanics, and sports psychology) with applied research (developing practical solutions for training, rehabilitation, and education). By maintaining this dual focus, RSU-LASE contributes both to the theoretical foundation of sports science and to practical improvements in sports and health sectors.

### 2.1.2. Expert Group evaluation

The figure below presents the scores assigned by the Expert Group to the unit.

Figure 1 "Riga Stradiņš University Latvian Academy of Sport Education" – Scores



### Overall score

Score 3: good

RSU-LASE has made significant progress since the last evaluation, and the formation of RSU-LASE in 2024 offers great potential to improve the quality and impact of the unit's work further as one of the research platforms of RSU. The unit's overall research performance is assessed as good (score 3). The experts assessed the quality of research in RSU-LASE as adequate, but it was encouraging to see both the number and the quality of publications improving. The overall level of the unit's impact on the scientific discipline is adequate; the unit occupies a firmly stable position in the national and regional scientific community and is becoming a respected partner and collaborator in regional and other European networks.

The economic impact of the unit remains limited, but this is not unusual for sports science units internationally, and RSU-LASE has made continuous progress in developing links with relevant stakeholders in sports, such as, for example, the Latvian Olympic Committee and the Latvian Health and Fitness Association. The sports field is a very important contributor to the economy, and RSU-LASE's research has the potential to make important contributions, but the links with the private sector must be further developed for this potential to materialise in the future. The social impact of RSU-LASE is good overall and is one of the unit's main strengths, as it is conducting important research for society and its interactions with the non-academic sector and the public are satisfactory. Overall, the work conducted by RSU-LASE contributes to improving the work, lives and health and wellbeing of many athletes, sport, education and health professionals as well as the general population of Latvia.

The research environment and infrastructure are good, and the unit is a strong national player providing a research environment comparable to those of globally recognised academic institutions in sports sciences. The long-term research strategy, as outlined in the self-evaluation report and during the site visit, is ambitious and clearly articulated, and it includes an overall vision for the platform, associated goals, and main tasks, including conducting high-quality, innovative, and impactful research through multidisciplinary approaches that have the potential to advance the dynamic field of sport sciences in Latvia. As demonstrated in RSU-LASE's research profile, advances in areas such as movement analysis, exercise physiology, sports psychology, virtual reality, and data-driven performance monitoring require constant methodological renewal and interdisciplinary integration. Overall, the development potential of RSU-LASE following the merger with the university in 2024 is very good. The merger is a major milestone in LASE's history, and the unit has the potential to establish itself as a recognised and respected player in the international scientific community in sports sciences.

### **Quality of Research**

Score 2: adequate

The overall research quality of the unit is adequate, and RSU-LASE is an important national and regional player in this area of work, especially since LASE has historically been the only institution serving the sport science and physical education disciplines in Latvia. The unit reported 234 publications in total during the assessment period, but only about 40% are indexed in Scopus or WoS, which is low. It is encouraging to observe that RSU-LASE has had a steadily increasing number of publications annually. However, the FWCI of the unit is below the world average, and only 21.7 % of publications are in Q1 journals. In terms of content, research contains limited internationally novel discoveries/new knowledge in sports science.

The level of interdisciplinary research is improving through the systematic integration of sport sciences with health sciences, rehabilitation, psychology and digital technologies, supported by shared infrastructure and closer collaboration within Riga Stradiņš University following the 2024 merger. The potential for collaborations with cognate disciplines in the other research platforms within RSU and other universities in Latvia is a strength for the future following the merger of LASE with Riga Stradiņš University in 2024. In terms of research strategy, the research vision and strategy are appropriate, but there are no key performance indicators (KPIs) attached to the goals and main tasks or the specific activities. The range of research directions in the strategic plan is large for a small unit, and this is not sustainable and negatively impacts the international competitiveness of research.

### **Impact on scientific discipline**

Score 2: adequate

The unit contributes to the scientific discipline through its research on athletic performance, the impact of physical activity on public health, sports management and sports education and promoting the importance of sports science in modern society. Contributions include interdisciplinary research to improve athletic performance in various sports, including swimming

and alpine events, adapted physical activity for individuals with disability, such as wheelchair tennis players, physical activity for young and older adults and healthy ageing and exercise in clinical populations, such as cancer patients in the Cancer Beat project.

The unit also has a strong focus on sport and physical education, with research outcomes helping to shape policy in schools and modernising curricula, as well as sports management and policy. The unit has participated in over 30 research projects funded by national and university sources, including some EU Recovery and Resilience Facility funding. For example, researchers from RSU LASE, Riga Technical University and University of Latvia have launched a research project on innovations for the development and management of the sport sector in Latvia. Work in these project areas has been published in international and regional journals (for example, *European Journal of Physical Education and Sport Science*), and many of these projects are in collaboration with partners (e.g. Józef Piłsudski University of Physical Education in Warsaw, University of Tartu), mainly in the Baltic, Scandinavian and Eastern European areas. However, the unit has not yet secured funding from more high-end competitive international research funding programmes, which would signal international relevance. Also, LASE itself seldom leads large competitive international projects, but it does participate as a partner in internationally framed research activities and bilateral collaborations.

The overall level of the unit's impact on the scientific discipline is adequate; the unit occupies a firmly stable position in the national and regional scientific community and is becoming a respected partner and collaborator of Baltic and Scandinavian consortia for projects with some recent European and international consortia presence (such as EUPASMOS and EOSE). Still, the international impact of the research remains constrained, as reflected in the modest number of globally visible outputs and their relatively low citation rates. The unit is a strong national player; its position and contributions at the international level are below what would be expected at a good scientific impact level, but they are evolving and improving, showing a positive trajectory for the future.

### **Economic impact**

Score 1: poor

The economic impact of the unit remains limited. RSU-LASE has made some progress in developing links with relevant stakeholders in sports, such as national sports governing bodies, the Latvian Olympic Committee, the Latvian Health and Fitness Association, sports teams and clubs, and local sports and training equipment manufacturers. But the collaboration with industry is insufficient for achieving major contributions to commercialisation and economic growth at this stage.

There is no notable commercialisation of research outcomes, no spin-offs, and there is no evidence or examples of development to support new economic sectors. Industry representatives at the site visit confirmed collaborations and the relevance of the research, but there are no strong, specific examples of how LASE research is used. However, it is hoped that now that LASE operates within a university environment, there will be collaborations with other sectors and research platforms in RSU to start making meaningful contributions to economic impact in the future. The sports field is a very important contributor to the economy, and RSU-LASE's research has the potential to make important contributions, but the links with the private sector must be further developed for this potential to materialise in the future.

## **Social impact**

Score 3: good

The social impact of RSU-LASE is good, as the unit conducts important research for society, and its interactions with the non-academic sector and the public are satisfactory and in line with the expectations of recognised academic institutions. These interactions allow the transfer of scientific knowledge and expertise to actions and changes that benefit the Latvian society. LASE research addresses nationally important challenges related to physical inactivity, population health, and lifestyle-related diseases. Studies on physical fitness, exercise interventions, and movement behaviour can provide evidence to inform public health initiatives, physical education curricula, and preventive health strategies. However, the overall level of engagement and the strategic approaches to ensuring the unit's research is translated into tangible, significant social impact require improvement, with enhanced public involvement at all stages and elements of the unit's research work.

Science communication is becoming a strategic priority for the unit, and over the assessment period, examples have been highlighted of RSU-LASE researchers actively sharing scientific knowledge through public lectures, media appearances, and outreach events for schools and the public. These activities, along with a community-oriented approach, promote an active and healthy lifestyle and have the potential to benefit the wider Latvian society. The RSU Research Week is another example of sharing knowledge with a wider audience, including an International Student Conference.

The Sports Science Research Centre is central to supporting elite-level athletes in optimising their performance and preventing injuries as part of Latvia's Olympic training system, using state-of-the-art laboratory equipment, wearables, and digital technology.

The work of the unit in the area of sports education has an impact across different levels of the education system in Latvia by developing physical education curriculum programmes for schools, teacher training, innovative techniques for improving teaching quality in schools, and educational programmes in adapted physical activity that prepare teaching professionals when working with individuals with disabilities in schools or other social environments. The unit led the creation of the Sport and Health Education programme under the Skola2023 reform, advocating for a modern Physical Education curriculum that has an active lifestyle and health literacy at its core in Latvian schools.

Sports management is another key area where RSU-LASE research findings have influenced sports policy in Latvia by providing evidence-based insights to improve sports governance, infrastructure planning, funding models for sport, and workforce development, thereby enhancing job satisfaction in the sport sector. Overall, the work conducted by RSU-LASE has strong potential to improve the work, lives, health, and well-being of many athletes, sport, education, and health professionals, as well as the general population of Latvia.

## **Research environment and infrastructure**

Score 3: good

The research environment and infrastructure are good, and the unit is a strong national player, providing a research environment comparable to those of globally recognised academic institutions in sports sciences.

The long-term research strategy is ambitious and clearly articulated, and it includes an overall vision for the platform, associated goals, and main tasks, including conducting high-quality, innovative, and impactful research through multidisciplinary approaches that have the potential to advance the dynamic field of sport sciences. RSU LASE has identified several research directions to prioritise work that aligns with the evolving demands of various

stakeholders and industries in this field: Sports Science and performance optimisation, Physical Activity, Health and Well-being, Adapted Physical Activity, Sports and Physical Education, and Sports Management and Sociology. Although these research directions align with the unit's expertise and historical development, consideration should be given to critical mass, vitality, and sustainability in each research area, given the unit's small number of FTEs.

There is no clear organisational structure for managing research within the unit. The main organisational structure within RSU-LASE is the Sports and Healthcare Research Centre, but it is unclear how the centre is managed, its relationship with the research platform leadership, and its links to the wider RSU research management structure.

The merger with RSU provided access to the university's centralised technical and administrative support system, which is one of the major advantages of being part of a large university rather than an independent academic unit. The availability and quality of support centralised services from RSU is very good and includes a dedicated Research Department, a Development and Project Department, a Department of Doctoral studies, Data Curation and Data Protection units, and an Innovation Centre, including an RSU Business Incubator, in addition to standard university IT, Library and Research Ethics departments.

RSU-LASE also nurtures an open research culture, making research accessible and inclusive through institutional repositories and various other initiatives, including encouraging and supporting Open Access publishing whenever possible and supporting responsible, ethical, and FAIR Data Management through dedicated data curators and a Research Information Management system.

### **Development potential**

Score 4: very good

The development potential of RSU-LASE following the merger with the university in 2024 is very good. The merger is a major milestone in LASE's history, and the unit has the potential to establish itself as a recognised and respected player in the international scientific community in sports science. Bringing together the expertise and experience of LASE in sports science, physical activity and sport and physical education and RSU's research strengths, centralised support and collaboration opportunities with other research platforms, provides an unprecedented opportunity for RSU-LASE to achieve an excellent level of scientific quality and influence and become a highly regarded and valued partner and leader of international collaboration projects and networks over the next assessment period. The site visit confirmed the units' ambition and clear vision to achieve this.

Merger with RSU has improved LASE's performance in structural, strategic, and capacity-related ways, rather than through immediate step-changes in outputs. The improvements are therefore best understood as enablers of higher performance and sustainability, which is typical shortly after a merger.

RSU-LASE has the capacity to identify emerging trends in sports science research and recognises the importance of securing funding for research activities and investing in human capital as critical success factors. The unit has conducted a comprehensive, objective, and realistic assessment of its strengths and weaknesses, and has identified threats and opportunities in the new university environment across several areas, including enhanced internal and international collaborations, public engagement and policy influence, and interdisciplinary research and innovation. The establishment of a Scientific Advisory Board comprising recognised international research leaders and scientists from around the world, and Latvian authorities' representatives, will provide strategic direction and recommendations for institutional development to achieve their ambitious future research plans.

### **Potential to offer doctoral studies**

RSU-LASE has an established, accredited doctoral studies programme designed to cultivate high-level research competencies in sports science and health care through a comprehensive approach that combines theoretical knowledge with practical application. Over the previous assessment period, 14 students successfully defended their PhD theses. The unit is committed to developing the next generation of research leaders and has been supporting the development of young researchers for a number of years through research assistant university positions, structured mentorship within the active research groups, access to state-of-the-art laboratory facilities and infrastructure and support for internal grants for mobility and publishing. The unit's doctoral students also organise each spring the LASE Scientific Conference for Doctoral and Master's students, which provides opportunities to develop their organisational skills, interact with other researchers and academics, and foster long-term collaborations that enhance their career opportunities and contribute to knowledge exchange and innovation.

Early career researchers are supported through a number of initiatives identified as part of their strategic review and Strategic Advisory Board recommendations, including targeted investments and seed funding, career development training, and participation in national and EU projects. These strategic approaches have led to new research job opportunities for graduate PhD students and early-career researchers, supporting succession planning within research groups and ensuring the sustainability of the research environment. The PhD student representatives who met with the Expert Group were satisfied with their studies, university, and supervisor support, and recognised that the opportunities for funding and collaboration, now that LASE is part of RSU, will further improve the PhD student experience in the future.

The merger with RSU provides further opportunities to expand and improve doctoral studies, given the additional support and services offered by the RSU Doctoral School, which serves as a central one-stop agency for doctoral students and young researchers across the university. The Doctoral School offers structured, high-quality professional development in key areas, including research impact, integrity and public value, research output quality, and research data management. This allows doctoral researchers to develop and enhance essential research and personal skills crucial for a successful academic career. The sustainable development of RSU-LASE's doctoral programmes will help strengthen the unit's role in sports science and increase its international recognition.

### **Alignment with the Smart Specialisation Strategy**

RSU-LASE's self-assessment explains that the unit's work on its scientific initiatives aligns with the objectives of the Smart Specialisation Strategy (RIS3), by fostering innovation and addressing key societal challenges, particularly within the domains of health and well-being. By focusing on sports science, physical education, and human performance, RSU-LASE contributes to improving public health outcomes and enhancing quality of life, supporting a healthier, more resilient, and productive population. The unit conducts some work that targets and advances specific RIS3 priorities, such as biomedicine and medical technologies, through applied research in areas including sports diagnostics, rehabilitation, and physical activity monitoring. Specific examples include virtual reality technology applications in physiotherapy and sports materials research examining tensile, thermal, and flame-retardant properties of polymers, aligning with RIS3 specialisation areas in smart materials and technology development.

RSU-LASE has the potential to contribute more significantly to RIS3 priorities if collaborations with health- and science-based units in RSU and external industrial links continue to develop.

## **Conformity with state scientific and technology development**

RSU-LASE plays a significant role in advancing Latvia's national science, technology, and innovation policies within its sphere of competence by conducting research that fosters education, innovation, and public health. Although there is no specific reference to the objectives of the state scientific and technological development guidelines in the vision, goals, main tasks, and activities of the RSU-LASE research strategy, the unit does demonstrate adequate alignment with these objectives. More specifically, RSU-LASE contributes to the country's economic, social, and cultural development by enhancing sports science, physical education, and athlete performance. For example, promoting physical activity aligns with national healthcare goals, reducing costs and improving overall well-being. There are also other contributions to improving sports sector governance, refining training methods, and fostering innovation in sports education and management.

These efforts contribute to economic growth by increasing the competitiveness of Latvian athletes and reducing healthcare costs. International collaborations help to advance innovations and technological developments in sports sciences. Although industry links are limited, RSU-LASE does collaborate with sports federations, the Latvian Olympic Committee, the Latvian Olympic Unit, the Latvian Anti-Doping Agency, sports clubs, sports schools, and municipalities to conduct research, enhance athlete performance, and advance training methodologies and through these initiatives, the unit does make an important and recognisable contribution to science, education, and sports development in Latvia.

## **Recommendations**

The Expert Group recognised the progress achieved in LASE since the last assessment, and the formation of RSU-LASE in 2024 offers great potential to further improve the quality and impact of the unit's work as one of RSU's research platforms. RSU-LASE has the potential to establish itself as a recognised and respected player in the international scientific community in sports sciences. The unit has identified the main weaknesses and threats to achieving its strategic objectives. The Expert Group supports these plans, and the following recommendations are suggested as additional actions that will enhance the research quality and impact of the unit:

- The research vision and strategy are very appropriate, but there are no key performance indicators (KPIs) attached to the goals, main tasks, or specific activities. The establishment of SMART KPIs will enable the monitoring of progress and the celebration of achievements
- The range of research directions in the strategic plan is rather broad for a relatively small unit, raising critical mass and sustainability concerns. The unit needs to prioritise areas of excellence and concentrate support and focused effort on a limited number of areas with stronger potential for international visibility and competitiveness
- Although the quality of the outputs improved, further improvements are needed to realise the full development potential and become a recognised and respected player in the international scientific community. Specific actions and support are necessary for this objective, and the leadership of the unit must design, plan and implement them
- There are no specific references to the objectives of the state scientific and technological development guidelines in the vision, goals, main tasks and activities of the RSU-LASE research strategy. Although the unit demonstrates adequate alignment with some of the state's scientific and technology development objectives, which were explicitly included in the strategic plans, it would be easier to align work with state requirements for development, innovation, and growth if these objectives were referenced in the LASE strategy.
- The unit governance and research management structures are not clearly defined, and this needs to be addressed, especially as RSU-LASE is now a research platform of

the university and has a research centre and several research areas, without a clear leadership and communication structure will be an obstacle to developing effective collaborations internally and externally

- Develop an internationalisation mentoring programme to support researchers in developing mobility actions and strengthening international leadership skills, enabling them to lead developments in international networks, consortia, and research grants
- Encourage international mobility of doctoral students to broaden their experience and consider developing dual or joint PhDs with other regional universities, European, and international universities with embedded mobility requirements.
- The research infrastructure requires careful consideration to enable research collaborations between RSU-LASE academics and researchers in the other RSU platforms, to enable interdisciplinary approaches. The proposed new sports facility will be an excellent development in this direction. In particular, the design, governance and access arrangements of research facilities should be planned to actively facilitate collaboration between RSU-LASE researchers and other RSU platforms, including health sciences, rehabilitation and public health.
- RSU-LASE has made excellent progress in developing local and regional collaborations in recent years, but this effort needs to continue and be supported by the university with funding and administrative support where possible. Joint or dual PhD degrees are normally an excellent pathway to initiate collaborations, so these schemes, as well as staff and postdoctoral mobility programmes, should be explored for enhancing research collaborations.
- Develop a long-term strategic plan for improving financial support and grant submission and success through enhanced university administrative support for research grants
- Target industry collaborations and SMEs to explore commercialisation of research opportunities, technology transfer and innovations in sports.

## M\_2 Riga Stradiņš University Health and Natural Sciences Platform

### 1.2.1 The unit

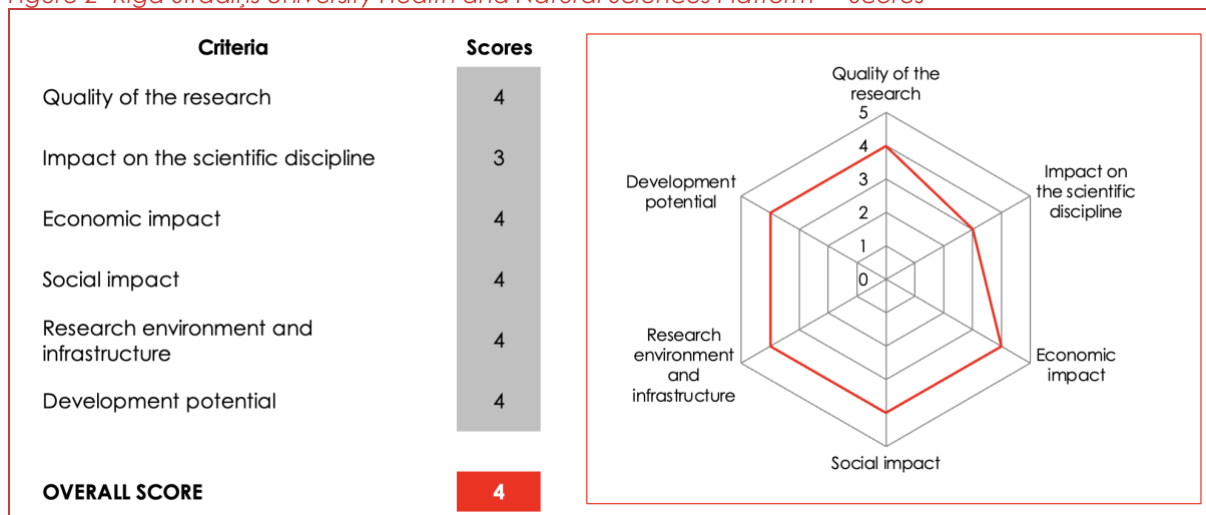
The Health and Natural Sciences Platform (RSU-HNSP) is one of three research platforms at Riga Stradiņš University (RSU). RSU-HNSP focuses on research in health and natural sciences and works on developing methods for evaluating, preventing, diagnosing, and treating the most common diseases in the EU.

The RSU-HNSP combines fundamental and applied research across clinical and basic medicine, health, and natural sciences. Its primary research areas include Clinical and basic medicine, Pharmacy, Natural Sciences, Public health, Psychology, and Occupational and Environmental health. The research at RSU-HNSP spans foundational and applied studies in medical, health, and natural sciences, promoting scientific advancements and practical healthcare solutions.

### 1.2.2 Expert Group evaluation

The figure below presents the scores assigned by the Expert Group to the unit.

Figure 2 "Riga Stradiņš University Health and Natural Sciences Platform" – Scores



### Overall score

Score 4: very good

RSU has made rapid progress over the evaluation period and is assessed overall as very good (score 4). Between 2019–2024, it produced more than 2,300 publications, 99 PhD theses, and joined 300 clinical trials. The growing share of publications in top (Q1) journals highlights the rising quality of its output. These achievements reflect a coherent institutional strategy combining incentives, competitive tenure-track professorships, and international partnerships, particularly with US and German universities. Active participation in EU infrastructures has further expanded RSU's visibility and networks.

RSU plays a central role in Latvian health sciences and contributes to European research through projects such as HBM4EU, PARC, and the Baltic Biomaterials Centre of Excellence. It also demonstrates leadership, for instance, by coordinating a COST Action on chronic fatigue syndrome. Tangible health impacts include neonatal and cancer screening, biomaterials innovation, and occupational health programmes, showing RSU's ability to generate both scientific knowledge and practical benefits.

The university's research also has a strong economic and social impact. Its pharmaceutical and biomaterials centres collaborate closely with industry, while its expertise supports national policy-making and healthcare workforce training. RSU is socially embedded, working with ministries, municipalities, hospitals, and NGOs to advance public health and social welfare.

The research environment is robust, with clear governance, strong doctoral training structures, and productive clinical-research interfaces through hospital partnerships.

Looking ahead, RSU's development potential is very good. It is well placed to lead EU-level projects, expand doctoral studies, and increase international visibility. With strategic prioritisation and continued investment in excellence, RSU can consolidate its position as a leading biomedical research institution in Europe. To strengthen competitiveness further, RSU should focus resources on a few priority areas of excellence and secure more predictable national research funding.

### **Quality of Research**

Score 4: very good

The quality of research at RSU is very good (score 4). Over the evaluation period (2019–2024), RSU reported 2,303 scientific publications, 99 successfully defended PhD theses, and participation in 300 clinical trials carried out through partner organisations. These figures highlight both the scale and the diversification of the university's research activity. An upward trend can be observed not only in the number of publications but also in their scientific quality, as demonstrated by the increasing share of articles published in high-impact (Q1) journals (44%) such as, for example, Nature Microbiology, PLoS ONE and others.

This progress reflects the effectiveness of the university's institutional strategy, which actively combines several reinforcing measures. Financial incentives targeted at both individual researchers and research units have stimulated productivity, while the introduction of competitive tenure-track positions has strengthened the faculty's internationalisation and helped attract qualified researchers. Partnering with US (e.g., Emory University) and German universities (e.g. Ulm University) is also an asset. RSU's participation in EU-funded research infrastructures and collaborative projects has expanded its access to resources, networks, and visibility at the European level. These strategic measures have not only increased research output but also enhanced its quality and international relevance, positioning RSU as a competitive research institution.

Progress remains constrained and international impact is not yet as strong as it could be because of the limited amount and predictability of long-term national research funding, which is essential for sustained engagement in priority areas of health and natural sciences. In addition, the evolving geopolitical context requires agility in adapting research agendas to emerging strategic needs. These challenges, if addressed through clearer funding commitments of national stakeholders and a strategic focus of the unit, could significantly enhance the international competitiveness of RSU's research.

To further strengthen its visibility at the international level, RSU will need to identify and support a more limited number of areas of excellence. Concentrating resources on these areas would allow the university to reinforce its research focus and provide stronger institutional backing (e.g., better grant-writing support), thereby increasing its capacity to secure international competitive grants. Such a strategic prioritisation could also inform and guide the recruitment of tenure-track professors, ensuring that new appointments align with and reinforce these priority areas.

## **Impact on scientific discipline**

Score 3: good

RSU's impact on the scientific discipline is considered good (score 3). RSU demonstrates a solid level of international engagement, complementing its strong national role in medical and health sciences. The university leads or participates in national research programmes in areas of high societal relevance, such as COVID-19 research, public health, biomedicine, medical technology, and pharmacy. These activities ensure that RSU remains a central player in Latvia's research and innovation system.

At the European level, RSU is a valued partner in several collaborative projects. Examples include participation in the HBM4EU initiative and its follow-up PARC, the Baltic Biomaterials Centre of Excellence, and Phototheraport. RSU's coordination of a COST Action on myalgic encephalomyelitis/chronic fatigue syndrome, demonstrating the unit's capacity to assume leadership roles in pan-European networks, represents a positive step towards strengthening the coordination of EU research projects, even if the unit has not yet fully reached this stage as examples of leadership roles are few.

RSU also contributes actively to European research infrastructures. It serves as the Latvian national node for EATRIS and ELIXIR, coordinates SHARE for Latvia, and is involved in other infrastructures through national partnerships. These engagements provide RSU researchers with easy access to state-of-the-art resources and facilities, strengthen scientific collaboration across Europe, and enhance the visibility of Latvian biomedical research within the international arena.

Importantly, RSU has clearly identified specific fields of research where the unit has made direct contributions to population and patient health. These programmes are well-defined and include neonatal screening programmes, genetic screening for predisposition to cancer, biomaterials research transforming stomatology, and occupational health research. The outcomes of these programmes have had a measurable impact (through adoption in guidelines and practice) at both the national and international levels, improving prevention, diagnosis, treatment, and quality of life. This capacity to deliver tangible health benefits illustrates RSU's dual role as a generator of scientific knowledge and as a driver of practical innovation in healthcare.

In terms of broader impact, RSU has become a key driver of national progress in science, technology, and education. Its research outputs contribute to excellence in academia, healthcare, pharmaceutical, and biomedical sectors. The integration of research outcomes into education helps students acquire advanced scientific skills, thereby fostering a highly qualified workforce. Moreover, RSU's personnel are not only active researchers and clinicians but also recognised policy advisors, amplifying the institution's role in shaping national research priorities and contributing to the visibility and competitiveness of Latvia in the European research landscape.

RSU demonstrates the profile of a strong national player with growing international recognition. Its consistent involvement in EU projects, infrastructures, and networks, combined with its direct contributions to public and patient health, positions it as a respected centre of competence with a stable integration into the international scientific community. These developments highlight that RSU is now well-prepared to take on leadership roles in international projects, building on its growing momentum.

## **Economic impact**

Score 4: very good

The economic impact of RSU's research activities is assessed as very good (score 4), with several centres and units demonstrating strong alignment with the needs of industrial partners and non-academic stakeholders. From the self-evaluation report and on-site visit, it was evident that RSU hosts facilities of direct relevance to industry, most notably the Pharmaceutical Research and Study Center, where the Laboratory of Finished Dosage forms maintains active collaborations with industrial partners and exemplifies applied research with clear economic value. Similarly, the Baltic Biomaterials Centre of Excellence, including its Horizon Europe EIC project, has established itself as a key regional player with high innovation potential. The Environmental Research Unit also functions as a core facility, providing prototype testing and further development services in workplace safety, indoor air quality, and ergonomic solutions, supported by advanced instrumentation. RSU's laboratories are already being used by national manufacturers, such as for testing new materials, which further illustrates the university's role as a sought-after and dynamic R&D partner.

In addition to these industrial collaborations, RSU makes a significant contribution to policy-making and supports decision makers, particularly in the field of public health. This contribution is an important lever for economic development, given the close relationship between population health, productivity, and national competitiveness. However, despite the clear societal and economic value of this activity, it is not currently supported by specific financial mechanisms. Dedicated governmental funding for expert consultations in public health would recognise and reinforce this crucial function, ensuring that RSU's expertise continues to generate both economic impact and societal benefit.

## **Social impact**

Score 4: very good

RSU demonstrates a very strong social impact (score 4), with its activities promoting higher education, social equality, public health, occupational health, inclusion and equity, and public understanding of the significance of science. The institution is a sought-after R&D partner for non-academic stakeholders and plays an important role in addressing societal needs.

A key contribution of RSU is its role in training the national healthcare workforce, notably through its PhD programmes for physicians, which develop highly qualified healthcare professionals to serve the country's long-term needs. This commitment to advanced training underpins national health security and reinforces the institution's relevance to both society and the economy.

RSU is a socially embedded institution, actively engaging with society through contract research, policy development, NGO collaboration, and public outreach. Its research for ministries, municipalities, and hospitals has directly advanced public health, occupational safety, social care, and healthcare service delivery. This is particularly evident in the Occupational Safety and Environmental Health Unit's targeted initiatives for SMEs and industry, as well as the Public Health Institute's broader initiatives (e.g., on road safety, cancer screening, and others) that reach the general population.

Through these activities, RSU supports policy development and public health systems while reinforcing its role as a reliable societal and economic partner. Its broad engagement with the public sector and civil society demonstrates the strong societal relevance and lasting impact of its research.

## **Research environment and infrastructure**

Score 4: very good

RSU provides a strong and internationally comparable research environment (score 4), well-suited to attract and support high-level scientists in its disciplines. Significant progress has been made in structuring and organising research coordination and governance, with clearly defined research platforms, effective leadership, and the establishment of centralised technical and administrative support. The information provided and the monitoring of the research outputs rely on a robust information system. These developments demonstrate a strategic commitment to creating a coherent and supportive research ecosystem.

The institution has introduced important efforts to structure research governance. The International Scientific Advisory Board is particularly effective and represents a major strength. The doctoral school provides a dedicated organisation and structured support for early-stage researchers. The implementation of competitive research tenure professorships strengthens human resource development and scientific excellence. RSU should also be commended for its active support of women in leadership positions.

Shared research infrastructures and access to centralised services for data management, statistics, and technical support are established and effective, as confirmed by PhD candidates during the visit. The connection with the three main hospitals, supported by medical and PhD students and medical staff with dual appointments, creates a productive clinical-research interface.

RSU is engaged in European Research Infrastructure and is the national coordinator for EATRIS (European Infrastructure for Translational Medicine) and participates in BBMRI (Biobanking and Biomolecular Resources Research Infrastructure), the European Molecular Biology Laboratory (EMBL) and its associated ELIXIR infrastructure. It also coordinates the national EIT Health Hub, and participates in multidisciplinary international consortia such as CIMBA & BCAC. These activities position RSU as a recognised international player with strong collaborative networks. While RSU has developed a strong research environment, further progress could be made in the systematic identification of excellence and the concentration of support in priority areas, to ensure resources are optimally aligned with the most competitive research fields. In addition, there is scope to strengthen national-level collaboration, in particular by reinforcing or formalising networks, notably in public health, occupational health, and sports science, together with other research institutions.

The current organisational structure, divided between RSU faculties and the RSU Science Hub, is somewhat complex. Greater integration and closer grouping of institutes could further strengthen synergies, increase critical mass, and enhance overall research capacity. Such measures would consolidate RSU's national leadership role and enhance the visibility and impact of its research at both national and international levels.

## **Development potential**

Score 4: very good

The developmental potential of RSU is very good (score 4). RSU has developed a strong ability to participate in international EU projects. As a further step, RSU will need to reinforce its ability to support researchers of a selected panel of topics of excellence to lead an EU project. The dynamic strategy put in place to increase research quality based on incentives and internationalisation, notably via tenured research professorship, will certainly enable RSU to achieve this goal within the next 5 years. This would be even reinforced if the RSU had the ability to select a few topics of excellence to support. In order to provide strong support to reach an internationally competitive level in a leadership position, RSU will have to identify and select its

few areas of excellence. This can be defined at the university level or as a part of the national strategy (for example, RSU could undoubtedly contribute to a national strategy targeting generic drug manufacturing, as a focus on generic drug manufacturing reflects an alignment between national capabilities and institutional strengths).

#### **Potential to offer doctoral studies**

The establishment of the Doctoral Studies Department as a centralised entry point for PhD candidates is a notable strength of RSU's research strategy. It provides clear structures for funding, guidance, and research support, which students highly value.

This system could be further strengthened by implementing formal mechanisms to support and monitor progress, such as follow-up committees, regular reviews, and an ombudsman procedure. Such measures would ensure consistency and timely assistance throughout doctoral studies.

As part of RSU's internationalisation strategy, PhD candidates should also be encouraged to pursue mobility and post-doctoral positions abroad, broadening their career prospects and reinforcing RSU's global visibility.

At the national level, more systematic support is needed for clinicians undertaking PhDs. Currently, the lack of structured programmes to protect research time forces clinicians to balance their duties individually, which limits their ability to contribute at an internationally competitive level. Establishing tailored schemes would greatly enhance the impact and productivity of clinician-scientists.

#### **Alignment with the Smart Specialisation Strategy**

RSU research is well aligned with the objectives of Latvia's Smart Specialisation Strategy, contributing to the knowledge-based economy and strengthening Latvia's position within the European Research Area. Its participation in EU programmes and research infrastructures, as well as the growth in publication output and quality, demonstrate alignment with RIS3 goals. RSU's research is directly relevant to the RIS3 priority domains of Biomedicine, Medical Technologies and Biopharmacy. Many programmes focus on applied research, supporting innovation and change in healthcare practice. Public health research further enhances societal impact through improved diagnostics, population health monitoring, and evidence-based policy support.

#### **Conformity with state scientific and technology development**

RSU's research and teaching activities are well aligned with Latvia's national science, technology, innovation, and education priorities. Its work in biomedicine, precision medicine, and health data directly supports priorities in medical technologies and biotechnology. By bringing research into the curriculum and training students in health and biomedical research skills, it helps strengthen Latvia's pool of skilled researchers and innovators. The institution also contributes to policy goals through its role in developing biobank legislation, improving health data systems, and joining national initiatives such as precision medicine. RSU is expanding its international role through European collaborations and strong interactions with a German university (Ulm University), showing readiness to take leadership in international projects. While collaboration with industry is less developed, the institution supports the biomedical and pharmaceutical sectors and has clear potential to deepen these links. Overall, RSU plays an important role in achieving Latvia's policy goals by promoting research excellence, preparing a skilled workforce, and raising the country's international profile in science.

## Recommendations

- **Prioritise excellence:** identify and concentrate RSU support on a limited number of priority areas of excellence to strengthen international visibility and competitiveness. Align tenure-track recruitment and research support (e.g., university grant-writing assistance) with these chosen areas.
- **Try to secure income,** particularly from competitive EU grants and industry collaborations, to reduce reliance on national fluctuations. Pursuing and strengthening current grant-writing efforts, supported by targeted assistance, may be key to empowering the team to continue delivering excellent research while building a more sustainable funding base
- **Strengthen International Leadership:** Move from participation to leadership roles in EU-funded projects and international consortia, especially in fields where RSU already demonstrates strong impact.
- **Simplify Structures:** Streamline governance between faculties and the Science Hub to increase synergies, efficiency, and critical mass. Continue strengthening centralised services (data management, statistics, technical support) and ensure equitable access across faculties.
- **Support Doctoral Training and Human Capital:** Enhance monitoring of PhD progress through structured follow-up committees and ombudsman mechanisms; create (or advocate for the creation of) a specific support mechanism that provides systematic support for clinician-scientists (e.g., protected research time) to fully harness their potential. Encourage international mobility of PhD candidates and postdocs to broaden experience and visibility.
- **Deepen Industry and Policy Engagement:** Build on existing strengths in pharma, biomaterials, and environmental health to expand industrial collaborations and commercialisation. Advocate for governmental recognition and funding of RSU's role in public health policy support, ensuring sustained impact on productivity and competitiveness.
- **Social and National engagement:** Continue reinforcing RSU's embeddedness in Latvian society through partnerships with ministries, municipalities, NGOs, and healthcare providers and outreach activities.
- **Development Potential:** Reinforce new research directions (e.g., bioinformatics) to stay aligned with emerging scientific priorities. Position RSU as a key contributor to national strategies (e.g., generic drug manufacturing) that align with EU and global research agendas. Generic drug manufacturing represents a particularly appropriate focus, as it aligns closely with RSU's expertise in clinical pharmacology and health systems research.

## M\_3 Faculty of Medicine and Life Sciences, University of Latvia

### 2.3.1. The unit

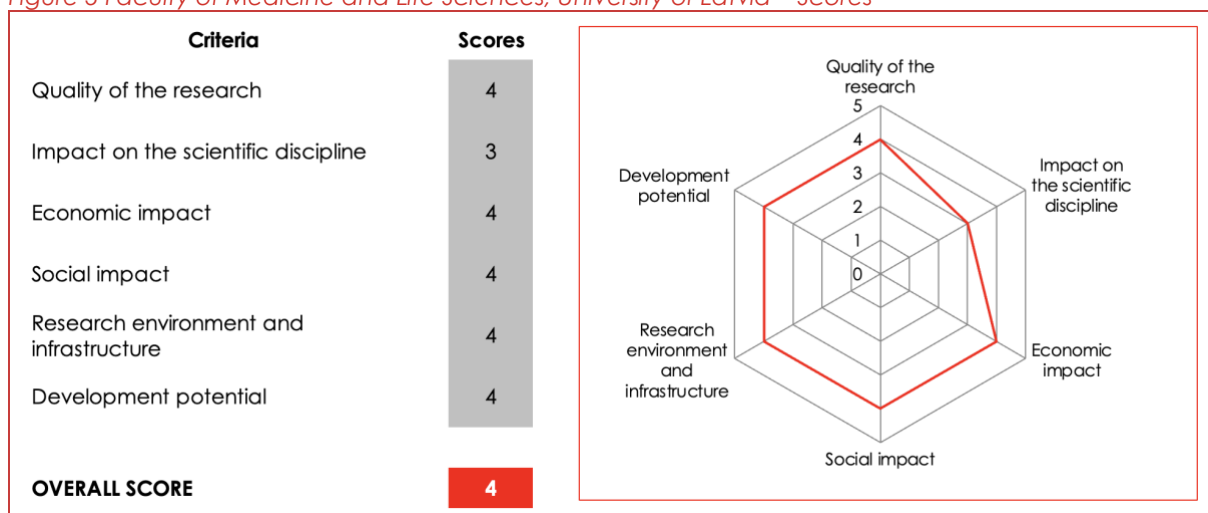
The Faculty of Medicine and Life Sciences (FMLS) of the University of Latvia (UL) was established in July 2024, by merging the Faculties of Medicine, Biology, and Chemistry, along with four research institutes. The FMLS vision is to become an internationally recognised partner in advancing science and innovation in medicine, chemistry, and biology at the Baltic and European levels.

The key research areas include biomarker research, personalised cancer and rare disease therapies, disease prevention, epidemiology, preclinical research, and studies on non-communicable, infectious, and neurodegenerative diseases. Other foci include new analytical methods in drug and biomaterial research, drug synthesis, human factor and workplace safety, applied research on biodiversity, and plant and microorganism biotechnology.

### 2.3.2. Expert Group evaluation

The figure below presents the scores assigned by the Expert Group to the unit.

Figure 3 Faculty of Medicine and Life Sciences, University of Latvia – Scores



#### Overall score

Score 4: very good

The FMLS was evaluated with an overall score of very good (4). This score stems from the very good quality and breadth of research at FMLS, including its strong performance in publishing in qualitatively high journals, a high ratio of external third-party funding to base funding and development of novel strategic directions in research. FMLS also has a good impact on scientific disciplines based on participation in international research consortia and an active role in national agencies and international scientific organisations. FMLS has a very good performance with respect to economic impact, including numerous industry partnerships and creating value via innovation and a focus on translational research. FMLS has a good level of social impact by virtue of its key role in the development and implementation of key policies in the medical and public health sectors in Latvia, and public outreach and educational activities. FMLS has a very good research environment, including excellent building infrastructure, a strong focus on core facilities and centralised platforms and very good concepts for investments in infrastructure programmes and new research fields. Finally, FMLS has a very good level of potential for further development based on incentivisation of

competitive research funding and publication in high quality journals, excellence-focused personnel policy, newly introduced training programmes for doctoral and postdoctoral trainees and a well-planned merger that has made FMLS greater than the sum of its individual parts. The merger has created shared research infrastructure, integrated doctoral and postdoctoral training programmes, coordinated research strategy, and increased critical mass for competitive funding and high-impact publications.

### **Quality of Research**

Score 4: very good

The quality of research at the FMLS is judged to be very good (score 4). The FMLS has built a rich research portfolio that spans multiple fields in clinical medicine, such as oncology, metabolic and cardiovascular disorders, neuromedicine and infectious disorders. Keeping with times, the research strategy on health includes early diagnostics and personalised medicine, and FMLS was able to successfully bridge medical research with pharmacy, chemistry and microbial/plant biotechnology to create innovative research foci on technology development, testing of drugs, cosmetics and other bioactive compounds, analytical and sustainable chemical solutions. The efforts to improve workplace safety, prevention research, biodiversity and developing sustainable solutions throw a very favourable light on the timeliness and progressive nature of the FMLS vision for the future. Research at FMLS reflects a good balance between bottom-up basic research (about a third) and applied research (about two-thirds) on clinical and industrial applications and public health and conservation strategies. It sustains high-quality fundamental research while enabling effective translation into applied outcomes aligned with clinical, industrial, and public health needs.

The publication output of 250 papers per year is very good, given the number of Professorships (94 in total), but it can be significantly improved. A very positive aspect is that more than 50% scientific papers are published in Q1 journals, and in some areas, more than 70% of the publications are in the top category. This represents nearly a doubling of publications in the Q1 category since the last evaluation (2018). Thus, the FMLS has acted positively on the criticisms and suggestions from the previous evaluation. Significant research achievements include several high-ranking publications (e.g., on treatment of Parkinson's disease, epidemiology of multidrug-resistant pathogens in hospitals and others), which are very good; nevertheless, there is room for further improvement, as many of these studies involve contributions from FMLS scientists to international collaborations rather than originating in the FMLS. Moreover, the proportion of publications with authorship positions in leading capacity (such as first and last authorships in biomedical journals) has increased from 35% of total publications at the last evaluation (2018) to 43% in 2025; however, it still represented a small proportion of the most important publications presented by FMLS at the review, such as those in leading journals such as *Lancet* and *Nature Communications*, and could be raised significantly. Providing incentives for high-quality publications for studies that are initiated or conducted at the FMLS in a leading capacity could boost this important performance indicator.

A positive development that supports the potential of FMLS is the recent establishment of novel and strategic research directions, such as cell therapy research, organ-on-chip models and fostering of specialised interest centres and incentivisation of research in Q1/Q2 journals.

The FMLS reported acquisition of 35 Million Euro (M€) funding in 2024, of which 25 M€ constitute research funding, with 21.4 M€ being acquired via competitive grant funding. While annual base funding has increased progressively since the last evaluation in 2018, the competitive funding volume has increased to a much larger extent. Thus, the ratio of competitive funding to base funding indicates excellent performance by FMLS. Nevertheless, there is room for improvement in competitive international funding programmes of the EU framework programme, which currently make up a rather small proportion; currently, the largest proportion of competitive funding falls under the category 'other international sources'.

Overall, research at FMLS is recognised internationally as original and significant, with some room for improvement.

### **Impact on scientific discipline**

Score 3: good

The overall impact of FMLS is considered good due to its research collaborations at both national and international levels, contributions to policies of government and international agencies in the health research sector, partnerships with industry, social impact and public outreach.

The impact of FMLS on the scientific discipline has been considered good, though there is significant potential for improvement. Strong international partnerships with research institutions and industry have been built in several areas, including biodiversity monitoring, microbial technology, and diagnostics, amongst others. High-ranking academic collaborations have been established with leading international universities, such as UCL (UK), Charité (Germany), amongst others, in areas of cancer research, communicable diseases and cell therapy. FMLS scientists make key contributions to international collaborative networks, such as PARC, EuroNanoMed, CoreEuStem, to name a few. Moreover, as described above, the largest publication output of FMLS comes from international collaborations. However, whilst FMLS researchers contribute to international collaborative consortia and have also started leading consortia, enhancing the role of FMLS in a leading capacity in the consortia is necessary for increasing its international impact and visibility.

The FMLS has reported an increased commitment to boosting administrative support for international grants and establishing KPIs for funding and publications with international sources. While this is a very positive development, an important recommendation is to place special emphasis on competitive funding in EU framework research programmes, which will, in turn, have a positive impact on FMLS's international ranking.

### **Economic impact**

Score 4: very good

The economic impact of FMLS was judged to be very good (score 4). FMLS has developed a strong profile of partnerships with the industry. Research and development activities spanned more than 35 companies (e.g., Grindex, Tenachem, Longenesis, Biolat and others), largely on a national scale, involving microplastics, agrobiolgy, cosmetics and health. Discussions with industry representatives during the onsite visit revealed that scientists at FMLS foster innovation at partner companies; thus, FMLS is not just a recipient of industry research outsourcing contracts but is also seen as a valuable asset for finding solutions, fostering application-based research, and promoting its successful implementation in industry. For example, partners of FMLS at the company Madara, which develops sustainable and natural solutions for skin care, made a strong case for the scientific input provided by FMLS that made innovation possible. Industry partnerships not only span local companies in Riga, but also international giants such as Roche. An important insight gained during discussions with industry partners is that FMLS puts major emphasis on accelerating industry partnerships by providing strong administrative support to overcome process-related and regulatory hurdles that delay progress.

The excellent new research infrastructure of FMLS is highly conducive to developing projects that generate a strong economic impact. Ongoing activities include partnerships on microbial and biotechnology resources, agrobiotech and food industries and finding data-driven healthcare solutions with IT companies represents a new area of development. These have enormous potential to generate further economic impact.

While the FMLS has made a convincing case for performance in industry partnerships, economic impact can be further developed by fostering the establishment of spin-offs and

startups. Here, although start-up support was mentioned during the onsite evaluation, no specific cases were demonstrated. Regulatory hurdles were cited, which other research centres (research institutes) in Latvia appear to have successfully overcome. In the self-assessment report, intellectual property (IPR) development spanned only one product. Therefore, there is a strong recommendation to improve on this front by (i) providing incentives for promoting IPR and establishing spin-offs, (ii) addressing regulatory hindrances at the institutional level and providing administrative support, (iii) training young scientists in entrepreneurship and innovation via courses, industry-on-campus activities and workshops and (iv) develop incubators in partnership with industry where early transition of research insights into industrial applications can receive funding, space and practical support.

### **Social impact**

Score 4: very good

FMLS is judged to have a very good level of social impact (score 4) by virtue of its important contributions to health, education and nature conservation. FMLS plays an important national role in developing and implementing key policies in the medical and public health sectors. For example, FMLS contributed in an important capacity to research programmes at the national level that impact national policies and guidelines in areas such as COVID, public health and biomedicine over the last years, acquiring more than 4 million € funding for the implementation of six state research programmes. Current collaborations with government agencies also include the National Health Service, the Disease Prevention and Control Centre, the Ministry of Health, and the Latvian Environmental Protection Fund. In addition to public health, the FMLS also contributes to the nature conservation guidelines of Latvia.

Moreover, as the University of Latvia is one of the leading teaching universities in Latvia, the FMLS is an important vehicle for education in Medicine, Life Sciences, Pharmacy, and other STEM areas. The FMLS has shown a very good level of public outreach in the form of participating in radio and television shows and social media platforms that are frequented by students and young professionals.

Efforts have been made in terms of engaging in public discourse on science, informing the public on key scientific discoveries and the importance of funding research, engaging school children and college students in STEM projects, supporting public health and citizen science initiatives, and, importantly, informing and supporting patient groups and initiatives with regards to medical research and development of therapeutics. These can be intensified to reach more impact, and FMLS should develop more comprehensive impact tracking mechanisms to improve the ability to demonstrate how the research has led to change in society.

### **Research environment and infrastructure**

Score 4: very good

The research environment and infrastructure of the FMLS were judged to be very good (score 4). FMLS has established a remarkable research infrastructure that appears to be on par with that of leading international research institutes. The diverse faculty infrastructural units are comparable in quality to very good research institutions worldwide.

In addition, FMLS has followed up on recommendations from previous evaluations and the Strategic Advisory Board to develop central infrastructural units that can be used and shared by all researchers in the form of core facilities. These span the animal facility lab, chemistry laboratories, microorganism and cell culture units, microscopy facilities, microbial and plant laboratories and the central biobank for human samples, which provide timely resources and state-of-the-art technologies. While the biobank represents a step forward, further efforts are needed to meet international benchmarks.

The equipment infrastructure is excellent, with all types of equipment required for niche areas and core facilities being available. The building infrastructure is outstanding, with new, visionary buildings being established ('House of Science', 'House of Nature').

New developments also strongly support the significant potential of infrastructure development. For example, FMLS has invested 4 M€ in 2024-2025 for a new clean room complex for cell therapy development, a secure medical research data cluster and automation in biology and chemistry laboratories. Moreover, infrastructure development is anchored in the FMLS Strategy 2027, and major international partnerships in research infrastructure are planned.

While infrastructure development at FMLS is very strong, FMLS should develop a clear and sustainable strategy for providing long-term tenure or tenure-equivalent institutional support to technology-driven scientists who are responsible for establishing, operating, and continuously advancing key technological platforms and core facilities. In this context, tenured support refers to stable employment arrangements, clearly defined career pathways, and protected roles that recognise technological leadership and service provision as a core academic function.

### **Development potential**

Score 4: very good

The development potential of FMLS is judged to be very good (score 4).

Factors that support confidence in a positive prognosis for future growth of the FMLS include excellent concepts in research in several areas of medicine and health, biopharmaceuticals and chemistry. An excellent indicator of the potential of FMLS is that overall research performance increased considerably in 2024. Also, the ability to raise competitive funding, which is many-fold higher than basal funding, and participation in key international consortia, indicate a very good development potential.

Excellent infrastructure established for biomedical research, which is on par with high-quality international research institutions in the corresponding fields; cross-disciplinary access, open service model, data cluster with remote digital access, and plans for further significant investments in the future strategy provide further confidence in the growth potential of FMLS.

The recent establishment of an excellence-focused personnel policy, which not only includes recruitment initiatives of top researchers at the International and national scales, but also career development concepts for all levels, ranging from early career scientists to senior researchers, in the form of tenure-track positions shows a very good development potential.

Incentivisation of competitive research funding as well as publication in high-quality journals (Q1) is a good direction of travel. So are also the internationally competitive researchers at FMLS, whose performance will further increase with the help of the new measures adopted by FMLS. The age and progression of the research staff is judged to be very good and conducive to growth of FMLS.

FMLS leadership made an excellent impression, showing awareness for strengths and weaknesses, vision to catalyse innovation and strong commitment towards development of policies that are progressive and targeted towards positioning FMLS as an internationally attractive institution for research and training. The merger process showed a very good balance achieved between bottom-up development of concepts and top-down measures that were implemented. The FMLS has shown excellent ability in generating economic impact via industry partnerships.

### **Potential to offer doctoral studies**

The FMLS already offers several doctoral programs across the fields of medicine, biology, chemistry and pharmacy. The FMLS shows a relatively high output of defended PhD thesis projects, demonstrating a significant commitment to and productivity in doctoral training. The number of postdocs remains low but stable compared to national levels. Importantly, the FMLS has acted in a decisive capacity on the recommendations from the previous review in 2018, as well as the advice of its international Scientific Advisory Board (SAB) to establish measures to foster the training of young scientists.

The recent introduction of new doctoral and postdoctoral career development programmes by the FMLS is expected to overcome and counter several deficiencies that were pointed out by young scientists during the site visit, such as unequal pay, low pay, insecurity about extension of contracts, and lack of networking activities, among others. Moreover, structured mentoring programmes are included in the FMLS's new strategy, which is a promising step forward. In the next evaluation, close attention should be paid to ensure that the newly proposed measures were indeed implemented and that the current problems faced by doctoral and postdoctoral trainees are addressed and overcome.

FMLS is also on a very good path to enhancing its attractiveness to international researchers, including international graduate students. The excellent building and research infrastructure at FMLS are major enablers for attracting young scientists and trainees. With the improvement of postdoctoral programmes and structured efforts, a major increase in research output is expected. Furthermore, these newly introduced policies will serve to enhance the attractiveness of FMLS to prospective students and postdoctoral scientists.

### **Alignment with the Smart Specialisation Strategy**

FMLS research is well aligned with the objectives of Latvia's Smart Specialisation Strategy. Two smart specialisation strategy areas (RIS) were supported at a reasonably high level, namely "Biomedicine, Medical Technologies, and Pharmacy" and "Knowledge-Intensive Bioeconomy". The FMLS shows strong alignment through its substantial contributions combining fundamental and applied research with clear pathways to clinical, industrial, and societal impact. Its activities in biomedicine, pharmacy, biodiversity, biotechnology, and sustainable chemical solutions are closely integrated with national programmes, ERDF funding, and industry collaboration, demonstrating coherent and effective support of RIS3 objectives.

### **Conformity with state scientific and technology development**

The University of Latvia is a major pillar of science, technology development and education in Latvia, with major contributions from the FMLS. The FMLS is a strong player in the development and implementation of national policies in medical health, food technology, public health, and nature conservation. Via its strong culture of fostering innovation, excellent infrastructure, and major commitment towards industry partnerships, the FMLS is an important driver of economic development in the corresponding sectors. The FMLS is internationally recognised for its relatively strong publication output and participation in research consortia, which can be further built upon by increasing leadership roles to enhance international impact. The FMLS is also well-aligned with the National Education Policy (2021–2027), in relation to FMLS's role in developing modern academic programmes, strengthening STEM education, and addressing workforce needs in medicine and life sciences.

### **Recommendations**

For reaching its potential, it will be important for the FMLS to continue to implement excellence-based measures and put in major efforts to consider and implement, as appropriate, the specific measures outlined above for improving performance with respect to research quality,

internationality and output, funding, training and economic impact. The Expert Group recommends the following:

- Provide incentives for high-quality publications by supporting studies that are initiated or conducted at the FMLS in a leading capacity, with a more prominent position in terms of authorship, and establish this as a KPI
- Foster innovation by providing incentives for cross-cutting research themes that bridge the different areas that came together to form the FMLS, such as cross-disciplinary seed grants
- Place more emphasis on acquiring competitive funding in EU framework research programmes as compared to industry or other organisations that have lower visibility.
- Provide more incentives for initiating international consortia and grants with FMLS researchers in a leading capacity.
- Ensure the successful implementation of recently introduced doctoral and postdoctoral career development programmes, placing emphasis on quality control and achievement of goals towards improving salaries, consistency and sustainability of positions as well as networking and mentoring of young scientists.
- Promote successful implementation of tenure-track programmes or similar options and promote early research independence in young scientists by providing seed grants for new ideas as well as for research topics that bridge different disciplines
- Foster establishment of spin-offs by providing incentives for promoting IPR and establishing spin-offs, and by addressing regulatory hindrances at the institutional level and providing administrative support for spin-offs
- Provide training to young scientists in entrepreneurship and innovation via courses, industry-on-campus activities and workshops
- Develop incubators in partnership with industry where early transition of research insights into industrial applications can receive funding, space and practical support (hands-on assistance beyond funding and space, including access to technical expertise and shared infrastructure, mentoring in product development and regulatory pathways)
- Conduct regular user surveys and periodic external evaluations of core research infrastructure to ensure that service quality, performance, and capabilities meet internationally recognised standards in the relevant fields
- Develop a tenured career track for staff developing and providing technological services (personnel who provide essential scientific and technical assistance that enables research to be carried out effectively but who are not classified as independent researchers) to ensure long-term sustainability of technological advances at FMLS.
- Enhance engagement in public discourse, training of school teachers, involvement of school children and undergraduate students in STEM projects and initiatives supporting patient groups.

## M\_4 Riga East University Hospital

### 2.4.1. The unit

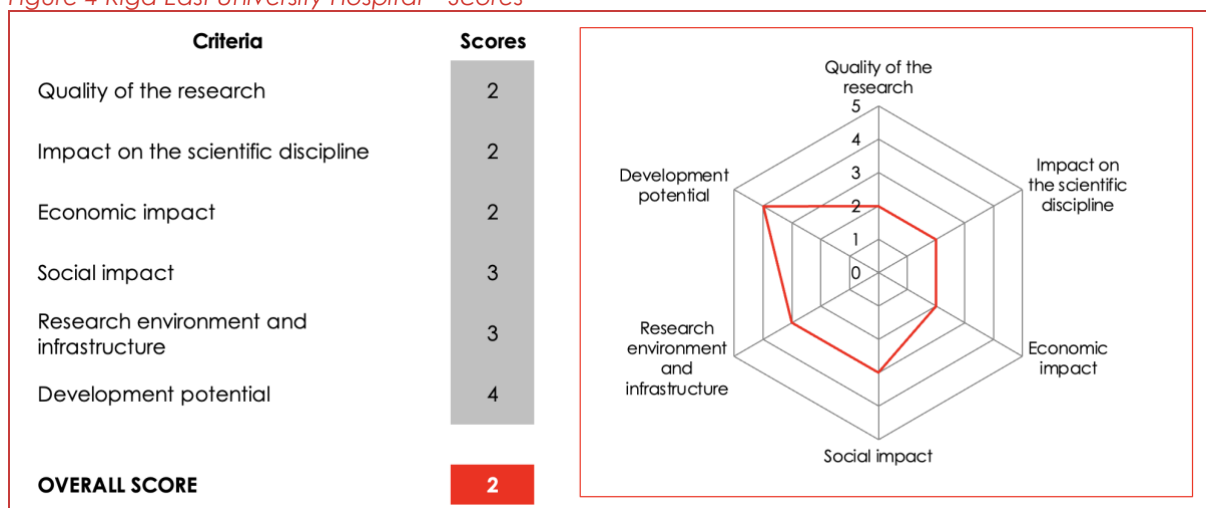
Riga East University Hospital (REUH) is the largest hospital in Latvia with over 5000 employees and about 10 FTE elected academic research personnel. REUH's research goals focus on advancing medical knowledge and improving patient care through high-level scientific research in healthcare, fostering innovation, and ensuring the transfer of knowledge through training, publications, and public awareness.

REUH's main research directions include cancer research, infectious diseases, neurological disorders, metabolic and autoimmune diseases, surgery, and ophthalmology. REUH collaborates with universities, research institutions, and international bodies to foster collaboration and share knowledge. At REUH, applied research focuses on advancing patient care and public health through innovative methods.

### 2.4.2. Expert Group evaluation

The figure below presents the scores assigned by the Expert Group to the unit.

Figure 4 Riga East University Hospital – Scores



#### Overall score

Score 2: adequate

Riga East University Hospital (REUH) is one of the largest healthcare institutions in the Baltic region and plays a central role in the Latvian health system. Despite this strong positioning and clear clinical excellence, the hospital's research profile remains constrained by limited access to stable and predictable funding, limited competitive funding, as well as internal weaknesses such as the absence of long-term strategic and financial resource planning, including a comprehensive human resource development strategy, limiting the scope and quality of research. This lack of structural financial support limits its ability to plan strategically, build sustainable infrastructure, and secure visibility for the research produced within its facilities. The establishment of methodological centres and the planned Comprehensive Cancer Centre offer important opportunities to strengthen research capacity, particularly in oncology and clinical studies. However, to realise this potential, a clearer and more formalised collaboration framework with the universities will be essential, ideally through the definition of a university hospital model that integrates research, clinical care, and education.

## **Quality of Research**

Score 2: adequate

REUH research quality was rated as adequate. REUH has established a set of priority research areas that reflect both pressing public health challenges and the hospital's clinical strengths. These include cancer research, infectious diseases, neurological disorders, metabolic and autoimmune diseases, surgery, and ophthalmology. This thematic orientation is well aligned with national and international research agendas and contributes to shaping a scientific profile for the hospital. In particular, the emphasis on cancer research is highly relevant in light of the planned development of a future comprehensive cancer centre.

Notably, REUH includes several national reference centres, such as the National Office for Methodological Guidance in Oncology and the National Office for Methodological Guidance in Radiology, the latter scheduled to open in 2025. Since 2004, the hospital has also hosted the WHO Collaborating Centre for Multidrug-Resistant Tuberculosis (MDR-TB) Research. Together, these two National Offices and the WHO Collaborating Centre provide strong institutional leverage and underscore the scientific credibility of the hospital.

During the evaluation period (2019–2024), the hospital reported 749 papers. An important increase was observed over the last two years. About 40% were published in Q1 journals, indicating good quality.

However, attribution of research output remains very unclear: much of the research is conducted by healthcare professionals with dual affiliations with universities or research centres and significant clinical workload, and the role and contribution of REUH to this output is unclear. The hospital does not systematically gain recognition for the use of its staff, infrastructure, or data.

The quality of the research is limited by restricted access to competitive research funding, which constrains the scale and sustainability of research activity and limits the development of more strategic research management and institutional recognition.

The outcomes in terms of clinical trials remain modest, both in the number of studies conducted and the level of associated funding. Investigator-initiated trials are particularly limited. Existing fields of clinical excellence provide a valuable basis for the expansion of clinical research. To foster its development, it is essential to establish dedicated clinical research facilities staffed with trained professionals. Such infrastructure is critical to enable broader participation in externally sponsored studies. In addition, structured support for data management and statistical analysis must be organised to strengthen internal research initiatives. While some of these resources could be shared with partner institutions, they need to be clearly structured and accessible. Sustainable implementation and operation of such facilities will require a clear long-term funding model.

## **Impact on scientific discipline**

Score 2: adequate

As one of Latvia's largest healthcare providers, REUH plays a central role in advancing national health sciences and clinical medicine, particularly through the training of healthcare professionals and the provision of high-quality care. Its impact at the national level is further reinforced by the establishment of methodological centres in oncology and radiology, which contribute to standard-setting and quality assurance in clinical practice.

At the international level, REUH demonstrates active engagement through participation in European research and policy networks. The hospital is involved in cancer-related initiatives such as ECHO<sub>S</sub>, in EU Joint Actions including CrANE and JANE2, and in collaborative research projects funded under Horizon Europe (e.g., ARDERA). These activities illustrate REUH's

integration into European research frameworks, although its role remains primarily that of a participant rather than a coordinator. Compared to international academic hospitals, REUH continues to lag in research output and grant acquisition. While these activities demonstrate connectivity and willingness to engage internationally, REUH's role is largely limited to that of a contributing partner rather than a leader or coordinator. In comparison with internationally competitive academic hospitals, the hospital's research output, success in competitive grant acquisition, and visibility as a coordinating institution remain limited, constraining its overall international impact.

Nationally, the hospital's contribution to clinical research is recognised as significant in terms of expertise and infrastructure. However, the overall scale of activity remains modest, with relatively few studies and limited funding. Strengthening its research capacity and visibility would enable REUH to move from a contributing partner to a more prominent actor within both national and international research landscapes.

### **Economic impact**

Score 2: adequate

REUH generates economic impact through its role as one of the largest healthcare institutions in Latvia, both as a major employer and as a provider of essential services that directly contribute to population health and, by extension, national productivity. Its position within the healthcare system exerts structural influence on the broader economic landscape, particularly in workforce development, healthcare quality, and the sustainability of the health sector.

Regarding research-driven economic impact, REUH's performance appears more limited. The hospital has attracted only modest levels of industry-related funding for clinical trials, with revenues reported at below €400k over the evaluation period. This suggests that while REUH participates in clinical studies, it has yet to establish itself as a significant partner for industrial R&D or as a driver of large-scale clinical trial activity. The relatively low number of investigator-initiated trials further constrains its potential to generate innovation with direct commercial applications. Limited volume of investigator-initiated trials reduces opportunities for clinician-led innovation, early proof-of-concept studies, and hypothesis-driven clinical research that can, in some cases, later inform translational or commercial development.

Looking ahead, the planned establishment of a comprehensive cancer centre offers an important opportunity to strengthen REUH's role in clinical research and to position the institution as a more attractive partner for industry. Such an initiative could expand collaboration with pharmaceutical companies and medical technology firms. This would imply provision of dedicated infrastructure and professional expertise; the cancer centre has the potential to substantially enhance the hospital's economic impact and its contribution to Latvia's economy.

### **Social impact**

Score 3: good

REUH exerts social impact as the largest hospital in Latvia, serving a significant share of the population and providing advanced healthcare services that directly contribute to national welfare and security. Beyond clinical care, the hospital plays a vital role in the training of healthcare professionals, thereby strengthening the overall capacity and resilience of the Latvian health system. Its research and expertise are closely aligned with public health priorities, including cancer, infectious diseases, and chronic conditions, which have a profound bearing on social equality and population well-being.

Collaboration with the public sector further reinforces REUH's social role. The hospital works in partnership with ministries, national health agencies, and other public service providers, ensuring that evidence-based practices inform healthcare delivery and policy development

(as illustrated by the National methodology centres). Public understanding of scientific activity is also fostered through REUH's engagement in awareness-raising and health promotion initiatives.

Looking to the future, the planned comprehensive cancer centre has the potential to further expand REUH's societal impact. If designed to integrate not only cancer treatment but also prevention, risk reduction, health education, and screening programs, the centre could significantly enhance access to care, reduce health inequalities, and strengthen public awareness of disease prevention.

At the same time, REUH's ability to systematically amplify its social impact is constrained by the limited protected research time available to clinicians, which restricts sustained engagement in research and outreach activities. In addition, while public engagement and policy collaboration are evident, mechanisms for evaluating the long-term societal impact of research outcomes and translating them into scalable health system innovations remain underdeveloped.

### **Research environment and infrastructure**

Score 3: good

The research environment at the institution is assessed as good (score 3). The establishment of a Department of Research marks a positive step forward in strengthening the organisation and coordination of research activities, even if this structure is still at a preliminary stage. However, the absence of long-term strategic and financial resource planning, including a comprehensive human resource development strategy, limits the institution's capacity to build a sustainable research framework.

In addition, the current absence of structured support services for grant writing, data management, and statistics constrains research efficiency and competitiveness. The planned Comprehensive Cancer Center is expected to become a strong lever for strengthening clinical research capacity and positioning the institution more firmly in this area. At the same time, the National Methodology Center constitutes a notable strength and represents a strong platform for advancing research in specific fields. Overall, while the institution demonstrates promising foundations and clear potential, significant progress is needed in strategic planning, resource allocation, and support services to ensure a stronger and more competitive research environment.

### **Development potential**

Score 4: very good

The development potential of REUH is assessed as very good. Over the next 5–10 years, the institution has the capacity to strengthen its participation in international projects by building on existing collaborations and expanding involvement in EU-funded projects and networks. A key driver will be the planned Comprehensive Cancer Center, which represents a major opportunity to reinforce clinical research capacity, attract international partners, and establish REUH as a leader in an area of high scientific and societal relevance. Prolonging the National Methodology Center, this initiative provides solid foundations for developing visible platforms of excellence.

REUH demonstrates a realistic understanding of its strengths and weaknesses, acknowledging constraints linked to limited funding opportunities and the absence of comprehensive support services for the development of clinical research.

Further development potential lies in the elaboration of a clearer and more established framework with the university, particularly through the formal definition of a university hospital

model. Such a model would strengthen the integration of clinical care, research, and education, enhance institutional identity, and provide a solid basis for long-term strategic planning and international competitiveness.

### **Potential to offer doctoral studies**

Riga East University Hospital (REUH) contributes to doctoral studies primarily through partnerships with the University of Latvia and Rīga Stradiņš University, providing a clinical base and access to patient data and diagnostics. While this creates opportunities for doctoral research in medicine, nursing, psychology, and related health sciences, the main academic and supervisory support remains anchored within universities rather than at the hospital. On the hospital side, structured support for PhD students is limited, and the high clinical workload of medical staff significantly restricts the time and capacity available for research. During the evaluation period, this posed a challenge for doctoral candidates who are also clinicians, as their clinical responsibilities compete with their research commitments. The Expert Group acknowledges that the new doctoral training model, whereby doctoral students admitted to state-funded places are to be employed and remunerated through a formal employment contract with their host institution, is intended to ensure stable and predictable remuneration and stronger involvement in research from the start of the programme. However, the exact mechanisms and conditions for employment, supervision, and the relationship between clinical duties and doctoral research at the institutions are in development, and REUH has not yet demonstrated a clearly structured institutional framework to ensure protected research time within the hospital setting. The Expert Group does not suggest that REUH should implement or award doctoral study programmes; rather, it emphasises the importance of the hospital establishing structured internal mechanisms to support doctoral researchers conducting their studies in partnership with universities, including protected research time, access to infrastructure, and research mentorship.

REUH plays an enabling role in doctoral training provision. Its potential for expansion is dependent on strengthening research infrastructure and reducing the imbalance between clinical and research duties. At the national level, more systematic support is needed for clinicians undertaking PhDs. Currently, the lack of structured mechanisms to support doctoral researchers and to protect research time forces clinicians to balance their duties individually, which limits their ability to contribute at an internationally competitive level. Establishing tailored schemes would greatly enhance the impact and productivity of clinician-scientists. While universities retain full responsibility for doctoral programmes, hospitals are expected to provide protected research time, access to data and infrastructure, local research mentorship and administrative support. International best practice treats hospitals as co-responsible training environments, not passive clinical sites.

### **Alignment with the Smart Specialisation Strategy**

REUH contributes to Latvia's RIS3 in the areas of biomedicine, medical technologies, and biotechnology, as well as public health, healthcare services, and national security. Its research priorities in oncology, infectious diseases, and neurological disorders are well aligned with RIS3 objectives, and recent initiatives—such as the planned Comprehensive Cancer Centre and methodological centres in oncology and radiology—further reinforce this positioning. REUH's innovative diagnostic approaches and participation in projects such as EUonQoL and ECHoS demonstrate its engagement with personalised medicine and patient-centred care. The hospital also played a key role during the COVID-19 pandemic, contributing to Latvia's health emergency preparedness and thereby supporting RIS3's national security dimension.

Research output remains closely tied to partner universities, which diminishes institutional ownership. Overall, REUH's alignment with Latvia's RIS3 can be judged as good, though its full contribution is constrained by structural barriers and limited institutional recognition.

### **Conformity with state scientific and technology development**

REUH's research is broadly consistent with Latvia's policy objectives for science, technology, education, and innovation, particularly in the fields of biomedicine and health sciences, and in strengthening public health and national security. REUH's role during the COVID-19 pandemic also demonstrated conformity with national policy objectives on health preparedness and security.

Again, significant barriers constrain its contribution. Human resource development could be reinforced if protected time for research were available for clinicians, thereby strengthening the hospital's contribution to training and retaining research-active clinical staff. Industry collaboration remains modest, with low levels of external funding and limited engagement with pharmaceutical and medical technology firms. Internationalisation is present but limited, with REUH often participating rather than leading in European projects. Overall, conformity with Latvia's science and technology development objectives may be judged as adequate, with clear potential for improvement in human resource development, industry collaboration, and international competitiveness.

### **Recommendations**

- University hospital model: Develop a formalised university hospital framework in collaboration with partner universities, clearly integrating clinical care, research, and education. This would make it easier to share research goals, support doctoral students, and strengthen REUH's academic profile.
- Strengthening clinical research structures: develop a long-term financial and strategic plan to secure stable resources for research infrastructure – notably for clinical research. Research infrastructure for clinical research includes not only physical facilities and equipment, but also the organisational and human support structures required to conduct high-quality clinical studies. This encompasses clinical trial units, data management and bioinformatics platforms, secure access to electronic health records for research purposes, regulatory and ethics support, research nurses and coordinators, statistical and methodological expertise, and dedicated time and space for research activities. Stable funding is critical to develop research support structures: identify solutions to provide access to support for data management and statistical analysis; establish a structured clinical research office to support investigator-initiated and industry-sponsored clinical trials; strengthen support for young researchers and clinicians to expand human resource capacity and promote career development.
- Improved attribution and research visibility: Introduce systematic mechanisms to ensure that research conducted by hospital staff with dual affiliations (hospital and university) is adequately and properly attributed to REUH. This would improve institutional visibility and better reflect the hospital's actual contribution to research.
- Protected time for research: Create structured programmes to protect research time for clinicians undertaking doctoral or postdoctoral research. This would enhance the research capacity of clinician-scientists and improve international competitiveness.
- Industry collaboration: Explore funding opportunities and expand joint projects (including clinical trials) with pharmaceutical and medical technology companies, particularly in relation to the planned Comprehensive Cancer Centre.
- Strategic use of new centres: Leverage the planned Comprehensive Cancer Centre and the national methodological centres in oncology and radiology as platforms of excellence, ensuring they are equipped with research capacity, protected staff time, and integrated training opportunities for doctoral students.
- Doctoral training environment: Enhance structured support for PhD students. Develop joint supervision agreements with universities, mentoring systems within the hospital, and access to research infrastructure. Reduce the conflict between clinical work and research by protecting academic time for doctoral students.

## M\_5 Pauls Stradiņš Clinical University Hospital

### 2.5.1. The unit

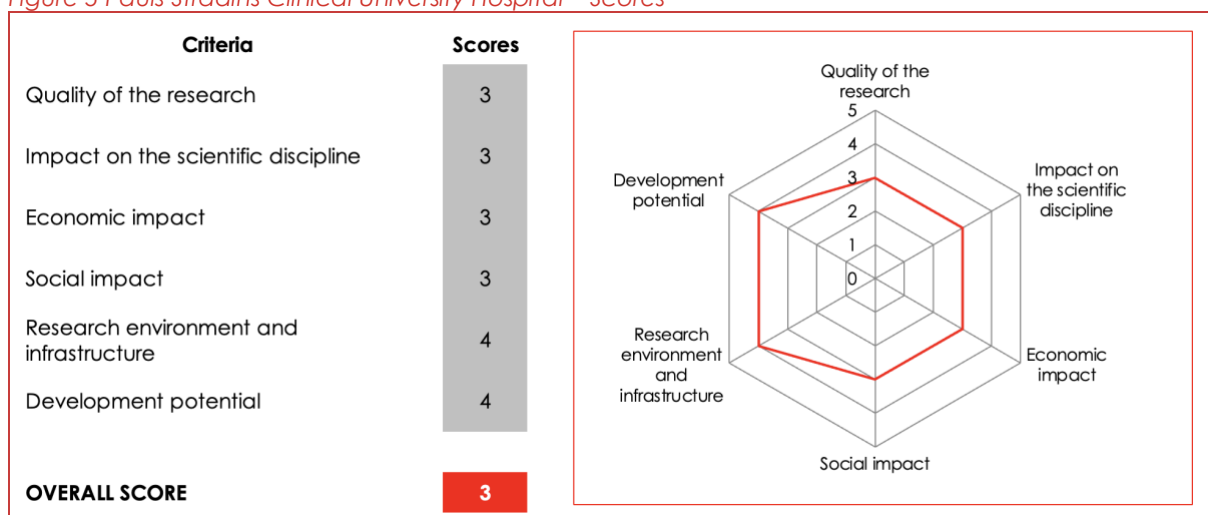
Pauls Stradiņš Clinical University Hospital (PSCUH) takes a priority role at the national level in the context of tertiary-level medical treatment services and is built on three strategic pillars: the delivery of high-quality healthcare, the education/training of future medical professionals, and the advancement of scientific research.

The research foci are related to the PSCUH's clinical fields, core medical and research areas, and aligned with the smart specialisation strategy RIS3 priority area "Biomedicine, Medical Technologies, and Pharmacy". Its primary research areas include the development and validation of novel diagnostic and therapeutic methods, as well as studies on disease pathogenesis. Research is integrated into clinical practice and education, providing early-career professionals with direct exposure to applied research from the beginning of their careers.

### 2.5.2. Expert Group evaluation

The figure below presents the scores assigned by the Expert Group to the unit.

Figure 5 Pauls Stradiņš Clinical University Hospital – Scores



### Overall score

Score 3: good

Pauls Stradiņš Clinical University Hospital (PSCUH) has made good progress since the previous evaluation and has been given an overall score of 3. This scoring reflects the progress made and the national leadership role of the institution. It is also strengthening its international profile. Whilst the overall score is the same as the previous evaluation, there has been a strong improvement in scores for Impact on the Scientific Discipline, Research Environment and Infrastructure and Development Potential. These higher scores reflect the significant progress that has been made and the journey the hospital is on. The Expert Group are strongly supportive of the research strategy and leadership plans that put PSCUH on a very clear pathway to becoming a regional centre for excellence with significant international impact.

The quality of research is solid, underpinned by good bibliometric performance and a clear focus on clinical priorities. There is increasing focus on aligning clinical research with innovation

opportunities to produce outputs that will impact Latvia's health and care system, clinical priorities and scientific inquiry. While PSCUH's research intensity and grant capture remain below top-tier European academic hospitals, progress over the past evaluation cycle demonstrates clear upward momentum. PSCUH's impact on its scientific disciplines is strong at the national and regional levels and increasing in the European context. The institution now faces the strategic opportunity to transition from participant to leader within international consortia, further enhancing its scientific reach and influence.

Infrastructure and organisational development have advanced significantly. The establishment of the Institute of Science and a dedicated Clinical Trials Unit has strengthened the research environment, complemented by improved governance structures and ethical oversight. Continued investment in informatics, data management, and external advisory capacity will be essential to align PSCUH with internationally competitive standards. The hospital's inclusion of research and innovation among its four strategic goals signals a strong institutional commitment.

Development potential is high. With targeted actions—such as the establishment of an international advisory board, the development of a focused doctoral training pathway in clinical and translational research in partnership with degree-awarding universities, and enhanced collaboration with partner universities—PSCUH can realistically evolve into a Baltic and European centre of excellence in clinical and translational research. Continued attention to technology transfer, data-driven innovation, and researcher career pathways will be key to realising this ambition.

Overall, the institution's score of 3 accurately reflects a high-performing national leader that is making progress toward international competitiveness. Strengths in research quality, environment, and potential justify optimism for continued advancement. With sustained strategic investment and partnership development, PSCUH is on a clear trajectory to become a regional leader with increasing global impact.

### **Quality of Research**

Score 3: good

Pauls Stradiņš Clinical University Hospital (PSCUH) demonstrates a cohesive, strategically aligned, and evolving research ecosystem that bridges clinical excellence with biomedical innovation. Between 2019–2024, PSCUH produced 610 publications with international visibility (Scopus indexed). Approximately 40–50% of PSCUH publications list its researchers as first or last author, illustrating intellectual contributions. The hospital holds lead or co-lead roles in EU initiatives (e.g., EU JAMRAI, EUnetCCC), and its staff serve on editorial boards, EU advisory committees, and WHO expert panels. PSCUH participates in EU4HEALTH, Horizon Europe, ERASMUS and in international societies (e.g., ESC, WHO) and reference networks, increasing staff mobility and multicentre trials.

PSCUH has the largest clinical research programme in Latvia, as judged by clinical trial activity in terms of funding. This activity is enabling publications, whilst providing access to treatment for patients. Importantly, the clinical trial portfolio spans multiple disciplines, providing a balanced mix of activities and multiple opportunities for engagement. The Expert Group noted the growing grant capture by PSCUH investigators, which has increased over the last five years, averaging approximately 400K per annum from national funds and 1M per annum from international sources.

The Expert Group also noted PSCUH's efforts in medical technologies—an important area of innovation and economic opportunity for Latvia. Extending these technologies into health data and AI provides rich opportunities to further grow PSCUH's international research leadership.

Despite this, the institution has lower visibility than similar EU clinical centres and relatively limited success in high-end competitive grants. Although its research outputs, collaborations, and translational achievements firmly establish it as a regional leader and an emerging European centre in clinical and biomedical research, there remains scope for improving the visibility and impact of research by enhancing grant acquisition competitiveness and expanding capacity to secure sustained academic growth.

### **Impact on scientific discipline**

Score 3: good

PSCUH continues to develop its clinical research activities and is an important clinical research institution in Latvia, demonstrating decent performance across a broad portfolio, including cardiology, oncology, regenerative medicine, transplant, infectious diseases, and rare diseases. Its integration of basic and applied research into clinical practice is fully aligned with international best practice for university hospitals. PSCUH participates in European Union funded programmes such as Horizon Europe, EU4Health, Erasmus+ and collaborates with partners such as Aarhus University Hospital (Denmark), University of Helsinki (Finland), and EURECAT (Spain).

Over 57% of PSCUH's publications are co-authored with international partners, illustrating integration within European and global research networks. PSCUH's contributions to European guidelines in cardiology, stroke, and oncology, as well as its strong role in postgraduate and doctoral training, place it within the norms of academic hospitals, where care, education, and research are tightly interlinked. Its researchers publish in peer-reviewed journals (e.g., Journal of Endovascular Therapy, Frontiers in Microbiology, Journal of Vascular Surgery) and engage in international collaborations, providing visibility and impact at a regional and European level.

It is clear that PSCUH has made a reasonable impact on clinical medicine and health sciences nationally. However, its global visibility, research intensity, and innovation translation remain more modest than those of comparable international institutions. Limited competitive grant acquisition, doctoral training capacity, and commercialisation reduce its overall academic reach. Overall, PSCUH is a national leader but must look to growing its wider influence by producing research that meaningfully advances clinical practice, while aspiring to broaden its regional and European impact. A major ambition of PSCUH must be to act not just as a participant but to develop its activity as a leader of international research programmes.

### **Economic impact**

Score 3: good

PSCUH research collaborations with industry and its participation in clinical trials bring external funding into Latvia, while also fostering the growth of the life sciences sector. The clinical trial activity has generated income of over €3.5M per annum over the last three years. This is very positive and provides a foundation for significant growth. It was reassuring to hear of the ongoing projects with industry representatives, which are geared towards translating research activity into a collaborative commercial venture. This is a vital initiative that should be replicated and sustained. Compared with leading international academic centres, PSCUH's economic impact is strongest at the national and regional levels. Whilst PSCUH has active commercial studies, partnerships with med-tech/pharma (e.g., Roche, Biotronik), co-development with startups via Open Health Labs, etc., there is an underdeveloped technology-transfer/commercialisation pathway; spin-off formation is hampered by legal form and nascent policy; limited track record in patents/start-ups. Nonetheless, its role as a driver of biomedical innovation in Latvia ensures value creation, both in healthcare cost savings and in knowledge-based economic development. Development of the device for sleep disorders monitoring is one example of PSCUH's work in this area and illustrates a need for developing a system to support technology transfer.

To enable growth and sustainability of the research programme, it is vital that PSCUH introduce an overhead model for industry-funded research, including clinical trials. Even a modest 20% overhead would generate €700K per annum, which could be reinvested to grow and sustain the programme. Moreover, introducing more structured mechanisms for technology transfer and commercialisation alongside overhead funding models would significantly strengthen the hospital's long-term economic sustainability.

### **Social impact**

Score 3: good

PSCUH is a 900 bed hospital in Riga, with 26 specialities, delivering care on a national basis. The institution's social impact is clear through its substantial clinical activity. The Institute of Science augments this. By contributing to the development of national clinical guidelines and European standards, the hospital ensures equitable access to evidence-based, high-quality healthcare across major diseases. The hospital is part of the ERASMUS programme (e.g., project Transeuropean Educational initiative in Organ DONation and tRansplantation (TEODOR)), providing excellent opportunities for scholar exchange, which are vital to the continued emergence and development of a socially impacted research ecosystem. Notably, its substantial cardiology research programme is vital to efforts to address Latvia's lower life expectancy compared to other EU states. There is a significant opportunity for collaboration with Public Health to impact this.

PSCUH plays a central role in developing human capital. Through its integration of research into postgraduate education, residency programmes, and continuing medical education, it strengthens the skills and knowledge of healthcare professionals while embedding scientific evidence into everyday clinical practice. It is important to note the investment the hospital has made in these facilities. This ensures the sustainability and quality of the national healthcare workforce. PSCUH's engagement with society further amplifies its social impact. Public health campaigns, patient education initiatives, and partnerships with NGOs have advanced health literacy, empowered patients in self-care, and promoted healthier lifestyles. In addition, its expertise in disaster medicine and radiation safety enhances national security and resilience. Whilst the social impact of PSCUH is clear, there is also an opportunity to further extend this. With further investments in the dissemination of research findings, it is expected that PSCUH's activities will be even more recognised in Latvian life sciences.

### **Research environment and infrastructure**

Score 4: very good

PSCUH continues to enhance its research environment, complementing its excellent resources for clinical care and education. It is clear that hospital leadership has made efforts to improve their research organisation, oversight, and support systems. This intention has been signaled by the inclusion of knowledge generation and transfer as one of the institution's four major strategic goals. The academic activities at the hospital are organised around two departments- Education and Science. Within the Science department, there are three major elements - Clinical Trial Unit, Academic Research programme and Ethics Committee. The department of science is overseen by a chair, who reports to a Scientific Board. Of note, the members of the scientific committee are all internal to the institution- the inclusion of external members would be an advantage, providing advice and support on continued development and grounding the development plans in the context of international development and comparison.

The establishment of the Institute of Science as a structure has allowed the hospital to gather all its research activity under a single framework, which over time will enhance reporting, enable strategic planning and provide a clear mechanism for engagement with the partner universities. Progress has been made in enhancing the research environment with dedicated

facilities for clinical trials and doctoral students now in place. The clinical trial unit infrastructure, located adjacent to the main clinical buildings, has facilities for patient visits, IMP management and sample storage. The hospital has established support structures for grant applications, ethical compliance, and early-career mentoring. These are welcome and will enhance the offering in the years ahead. Nonetheless, challenges remain when benchmarked against leading centres. Some infrastructure and information systems are outdated or fragmented, limiting efficiency and scalability, including the research database and statistical support capacity. It is also clear that significant work remains to be done regarding the relationship with the university partners. Closer coordination with university partners on research infrastructure planning and resourcing is important to ensure growth in a joined-up way. Thus, for example, continuing investments in data management, informatics, and external strategic advisory inputs would better align it with internationally competitive programs.

### **Development potential**

Score 4: very good

Over the next 5–10 years, PSCUH is well-positioned to become a regional leader in Baltics and perhaps beyond translational biomedical research and healthcare innovation. The institution's combination of clinical excellence, healthcare expertise and developing infrastructure provides a strong foundation for growth. By prioritising international collaboration, digital transformation, and the creation of a vibrant university partnership, PSCUH can significantly enhance its scientific competitiveness, social impact, and contribution to Latvia's and Europe's innovation-driven economy.

With established strengths in translational and clinical research, particularly in cardiology, infectious disease (antibiotic resistance, fungal pathogens) and transplant medicine, PSCUH occupies a competitive niche among Baltic and European university hospitals. The hospital is well-positioned to expand its role in European health research networks. With strategic investment in capacity, commercialisation mechanisms, and talent attraction, the hospital could evolve into a regional leader in biomedical innovation and a preferred partner for international clinical and translational research collaborations over the next 5–10 years. Given its national leadership and active European collaborations, PSCUH has a strong foundation for expanding its international scientific and societal influence. Continued investment in digital transformation, data-driven healthcare, and open innovation partnerships will further elevate its global profile and economic impact.

PSCUH possesses strong potential to pioneer new research directions and attract interdisciplinary collaborations. Strengthening ties with data science, bioengineering, and health economics would allow the institution to remain at the forefront of the evolving global healthcare research agenda. This would require strengthening the links with the universities as a vital step.

### **Potential to offer doctoral studies**

PSCUH provides an ideal training environment for students in clinical and translational research. Access to patient populations and large datasets, combined with dedicated facilities, provides an important opportunity for students. Doctoral students are registered for the degrees at both the University of Latvia and Riga Stradiņš University, though they conduct a substantial part of their clinical research at the hospital. Furthermore, PSCUH's participation in Horizon Europe, EU4Health, and European Reference Networks opens pathways for international co-supervision, mobility, and exposure to global research standards. Internal mentoring schemes and development funds further support the engagement of early-career researchers. However, significant challenges remain.

Support for doctoral studies remains fragmented, lacking the institutional integration seen in leading academic centres. In addition, the pool of qualified doctoral supervisors is relatively narrow, particularly in translational sciences. PSCUH is not itself accredited to award doctoral

degrees, and the arrangements for doctoral supervision and training are largely ad hoc. There is a great opportunity to create a thematic PhD training in Medical Sciences, clearly defining the complementary roles of universities and hospitals, and ensuring that doctoral candidates receive coordinated academic, clinical and research support throughout their programme. This would also overcome the differential experiences of students and provide standard structured training, a feature of programmes at many large, high-profile universities.

### **Alignment with the Smart Specialisation Strategy**

Latvia's RIS3 seeks to help transform the economy toward higher value-added activities, higher productivity, and more efficient use of resources and aligns with national planning (e.g. Latvia's National Development Plan 2021-2027) and with EU funding cycles (cohesion / structural funds).

PSCUH demonstrates strong alignment, particularly in the priority areas of biomedicine, medical technologies, and biotechnology. Its research areas in cardiovascular medicine and infectious diseases fit well with the biomedical focus. Through its Research Institute, national competence centres, and partnerships with industry leaders such as Roche Latvia and Medtronic Baltic, the hospital effectively bridges clinical research and innovation, supporting the strategy's emphasis on public-private collaboration and knowledge transfer. In particular, the panel noted the move towards active entrepreneurial development through industry partnership, a core RIS3 principle, active engagement in digital health, infection control, and personalised medicine also reinforces cross-cutting priorities in ICT and data-driven healthcare. As a leading national hub for translational research, education, and innovation, PSCUH plays a pivotal role in advancing Latvia's high value-added, knowledge-based economy in line with RIS3 objectives.

To deepen alignment with RIS3 objectives, PSCUH could develop impact measurement frameworks to quantify health and economic outcomes of research, supporting RIS3 monitoring and evaluation goals.

### **Conformity with state scientific and technology development**

PSCUH demonstrates strong alignment with state scientific and technology development objectives, though it is unclear if this alignment is a specific strategic pursuit or a coincidence. Regardless, good alignment is seen in terms of alignment with STI & RIS3 priorities - research focus in biomedicine, medical technologies, and biotechnology directly mirrors national STI Guidelines 2021-2027 and RIS3 priorities; work spans cancer, CVD, rare diseases, AMR, regenerative medicine, digital/AI-enabled care, and clinical trials.

The hospital trains ~1,600 students and ~250 residents annually and provides CME to >3,000 professionals per year, supporting national education and digital-skills objectives. With partner universities, it is providing doctoral training to 73 PhD students, contributing significantly to skills development. The unit is active in AI-assisted diagnostics, telemedicine, and "Open Health Labs" with startups—advancing policy aims for a knowledge-based, innovation-driven economy and digital health.

Contributions to EU and national clinical guidelines (e.g., CVD, neurology, infectious diseases), national strategies (AMR, immunisation, hepatitis), and reference-centre functions strengthen evidence-based healthcare governance.

### **Recommendations**

The Expert Group recognised the progress that PSCUH have made over recent years and is supportive of the actions in place. The hospital can become a regional and internationally recognised centre for excellence in clinical and translational research, acting as a focal point for collaboration between Industry, academia and the healthcare sectors. Central to

achieving this goal is expanding the vision for the institution and implementing concrete measures which will enhance the research profile. Specifically, the Expert Group recommends:

- To continuously benchmark achievements and objectives internationally, PSCUH would benefit from convening an international advisory board, which will be able to support the institution's plans and provide guidance on opportunities
- It is vital that PSCUH invest in the informatics, data management and biostatistics support that are the hallmarks of an internationally competitive clinical research programme. These resources enable leadership of consortia, as opposed to membership, and provide additional opportunities to lead international clinical studies across multiple therapeutic domains
- It is vital that PSCUH develop a coherent strategy and implementation plan around the dissemination of its research activity, including its scholarly outputs. Support for open-access publishing, together with a clear strategy for selecting and prioritizing target journals, is critical. A coherent approach here will ensure the hospital's reputation grows externally—a vital conduit for international collaboration. Such a dissemination and communication strategy is also vital to growing the hospital's influence nationally and regionally, clearly identifying PSCUH as the Baltic centre for excellence in biomedical research
- Doctoral students are in many ways the engine of research productivity. They are a vital component of the research ecosystem. Notwithstanding the challenges of PSCUH not being a degree-awarding institution, the Expert Group recommends that it organise, in partnership with both the University of Latvia and Riga Stradins University, a thematic doctoral training framework in clinical and translational research. It would standardise the doctoral studies process, create clear pathways and clarify expectations and roles. Importantly, it would place PSCUH as not just a provider of facilities and access to patients, but as a real partner in the doctoral training
- The Expert Group recognises the complexity of relationships between universities and hospitals in Riga. This complexity creates challenges for the organisation and delivery of collaborative research and training activities. The Expert Group strongly urges PSCUH to engage formally with its partner universities to develop a joint research strategy and to develop a vision for clinical research that benefits patients, institutions and the country
- Working closely with the university partners, PSCUH should introduce tenure-like research clinician pathways with transparent criteria, bridging resident → fellow → clinician-scientist. This would establish PSCUH as a beacon of scientific career development and would leverage the excellent early career investigators, who are clearly committed to the hospital. Building on this, PSCUH should establish competitive starter grants/bridge funding and protected time for early career researchers, which would also be a route to expand international mobility
- The unit has significant opportunities for further interaction with industry, including co-development and commercialisation of intellectual property. Whilst the partnering capacity of PSCUH is applauded, it is recognised that further efforts in technology transfer are vital to growing the hospital's economic impact. PSCUH should implement a dedicated technology transfer office function (IP scouting, patent budgets, licensing templates), plus clinical innovation sprints to move validated ideas to TRL 5–7. In addition, the hospital should pilot industry-embedded research posts (1–2 FTE/year) and collaborative industry PhD positions.

Through these recommendations, the Expert Group are of the view that PSCUH can further develop as the regional centre of excellence and a major international leader in clinical and translational research.

## M\_6 Latvian Institute of Organic Synthesis/Latvian Biomedical Research and Study Centre

### 2.6.1. The unit

The Latvian Institute of Organic Synthesis (LIOS) and Latvian Biomedical Research and Study Centre (BMC) are two separate research organisations, two legal entities. LIOS is the leading centre in medicinal chemistry and preclinical pharmaceutical development in the Baltic States, focused on drug discovery and development for treating cancer, cardiovascular, infectious, and CNS diseases. BMC performs fundamental and applied research in human genetics and disease mechanisms, including cancer research, biotechnology, and structural biology and has long-term experience in vaccine development.

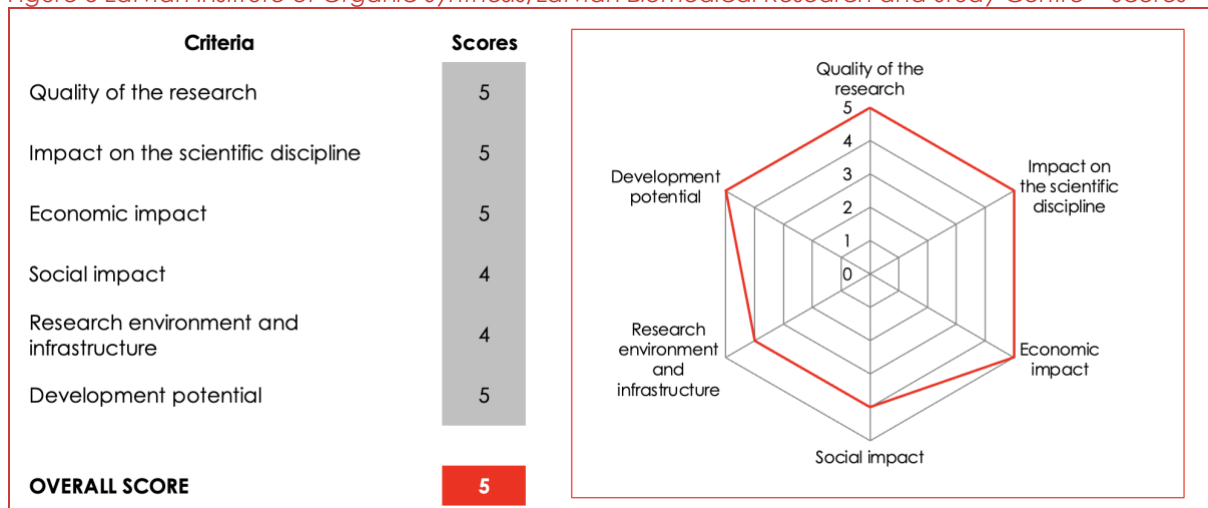
The main research focus of the Latvian Institute of Organic Synthesis (LIOS) is drug discovery and preclinical development. LIOS possesses a broad spectrum of expertise, including medicinal chemistry, organic synthesis methodology, in vitro and in vivo pharmacology, bioanalytical studies, biophysical chemistry, structural biology, computational chemistry, and process chemistry. Latvian Biomedical Research and Study Centre (BMC) is engaged in fundamental and translational research in various biomedicine and molecular biology areas broadly grouped into three main directions: (1) molecular medicine; (2) biotechnology and structural biology; (3) molecular ecology and biosystems.

On May 31, 2026, LIOS and BMC will unite to form the National Research and Innovation Institute (NIRI).

### 2.6.2. Expert Group evaluation

The figure below presents the scores assigned by the Expert Group to the unit.

Figure 6 Latvian Institute of Organic Synthesis/Latvian Biomedical Research and Study Centre – Scores



#### Overall score

Score 5: outstanding

The Expert Group concludes that LIOS and BMC — soon to become NIRI (National Institute of Research and Innovation) — represent a national strategic asset of international excellence. The institutes' interdisciplinary approach, combining natural sciences with medical and health

sciences, positions them as global leaders. Their focus on sustainable chemistry and biotechnology further enhances long-term viability.

The overall quality of research at LIOS and BMC is outstanding, demonstrated by high-impact publications, strong competitive funding success, and a proven ability to translate discoveries into patents, licensing deals, and clinical-stage drug candidates. Their record of €77.4M in competitive grants, €31.8M in industrial collaboration, and a substantial increase in top-tier publications validates this top score.

Their international visibility and scientific influence are exceptional, with leadership roles in Horizon Europe consortia, national node status in major ERICs, and contributions to vaccine development, infectious disease research, and precision medicine. Industry engagement, spin-offs, and licensing activities highlight a strong innovation pipeline and significant economic impact, confirming maximum scores in these areas.

Social impact and infrastructure are rated as very good. While the institutes contribute substantially to public health, COVID-19 response, and outreach, further systematic evaluation of infrastructural priorities and greater European visibility are needed. Infrastructure is modern and well-supported, but stronger inter-campus integration and investment in data science remain priorities. With youthful staff, structured career development, and extensive international networks, the development potential is outstanding, positioning the institute for even greater impact in the next decade.

### **Quality of Research**

Score 5: outstanding

The Expert Group finds that the combined research output of LIOS and BMC demonstrates high originality, innovation, and international significance. This excellence is well reflected in publication output and the ability to secure competitive funding and produce impactful results. Specifically, during the reporting period (2019-2024), LIOS and BMC collectively secured €77.4 million in competitive research funding from diverse sources, including EU Framework Programmes (€13.7M), EU Structural Funds (€30M), state budget funding (€29.7M), and other sources. Beyond public funding, they attracted €31.8 million in private collaborative research funding, working with over 150 companies globally. This funding enabled the production of 955 peer-reviewed publications, indexed in Web of Science or Scopus, representing a 42% increase over the previous evaluation period (672 publications in 2013-2018). Notably, 60.7% of these publications appeared in Q1 journals, and publications in the top 10% percentile journals increased substantially.

The impactful results of this research are demonstrated by several concrete achievements: three drug candidates advanced to clinical trials (including EBL1003 for bacterial infections, passing Phase 1 trials, SBT-272 for neurodegeneration, and a candidate for hyperglycemia treatment), 61 patents registered during the reporting period, and 12 licensing deals completed.

Examples of excellence in medicinal chemistry include the development of peptidic boronic acids as potent antimalarial drug leads in collaboration with the Francis Crick Institute, published in PNAS (2021, IF 9.4), and the discovery of metallo-beta-lactamase inhibitors published in Nature Chemistry (2023, IF 19.2) as part of the IMI ENABLE consortium. In molecular biology, BMC contributed to breakthrough discoveries in the genetics of COVID-19 susceptibility through the COVID-19 Host Genetics Initiative, published in Nature (2021, IF 50.5), and pioneered research on gut microbiome biomarkers predicting metformin therapy efficacy in Type 2 diabetes patients, published in Gut Microbes (2024, IF 12.2).

Interdisciplinary collaboration between medicinal and organic chemistry (LIOS) and molecular biology, genomics, and infectious disease research (BMC) are emerging as a key strength. The

interdisciplinary collaboration is exemplified by joint projects such as the development of SARS-CoV-2 mRNA Cap Methyltransferase inhibitors as potent antiviral drug leads, combining LIOS's medicinal chemistry expertise with BMC's virology knowledge. Another example is a very potent integration of BMC's biobank resources (with over 40,000 participants, representing 2% of Latvia's population) with LIOS's drug discovery capabilities to enable precision medicine approaches.

While both institutes have made investments in bioinformatics and data infrastructure (including NAS storage with 1 PB capacity at BMC and access to HPC clusters), the exponentially growing volume of genomic and other omics data requires continued strengthening of computational capabilities. The institutes recognise this gap and have included data science investment as a priority in their strategic planning. The recently launched ERA Chair project, EchoHEALTH, specifically aims to establish a One Health Informatics Centre to address this need.

### **Impact on scientific discipline**

Score 5: outstanding

The institutes maintain exceptional international visibility, coordinating six Horizon Europe consortia and participating in 43 others with over 580 partners. Their roles in European Research Infrastructures (EU-OPENSOURCE, BBMRI, INSTRUCT, EMBL contact point) ensures strong integration into the European Research Area.

Concrete examples of their international leadership include LIOS serving as the national node of EU-OPENSOURCE ERIC and coordinating the MR-Latvia project to establish a regional NMR excellence centre in collaboration with very strong French and Italian institutions. Moreover, BMC represents Latvia in the European 1+ Million Genomes Initiative and serves as the national node for BBMRI-ERIC and EMBL. Through LIOS's participation in the ISIDORE transnational access project (the largest infectious disease research infrastructure in Europe), their medicinal chemistry services are available to researchers across Europe.

Another notable example of the impact on the scientific discipline is their contribution to vaccine development, which has influenced policy and practice across Europe. Specifically, BMC's development of a universal vaccine platform using chimeric virus-like particles has resulted in a vaccine against peanut allergy entering Phase I/II clinical trials with Swiss partners, and vaccines targeting nerve growth factor for chronic pain treatment and insect-bite hypersensitivity in horses being transferred to leading animal health companies.

### **Economic impact**

Score 5: outstanding

LIOS and BMC exhibit outstanding engagement with industry, with 150 corporate partners, €31.8M in collaborative research income, six spin-offs, and 12 licensing deals. They are national leaders in EPO and WIPO patent filings.

The depth of industry collaboration is illustrated by several long-term partnerships. The GMP-compliant stability testing facility at LIOS, developed in collaboration with international industry partners, generated significant income during the reporting period while providing regulatory compliance services essential for maintaining marketed medicines. Collaborations with several biopharmaceutical and drug discovery companies support the development of innovative therapies.

The institutes translate research into innovation through active technology transfer and business development. The six spin-off companies established during this period represent diverse applications - PrintyMed (biomimetic spider silk for medical devices), Spidero and Spinneret (spider silk-based materials), OLEC (organic light-emitting materials), CellBox Labs (organ-on-

chip platforms), and Bio-Advice. Two of these spin-offs, PrintyMed and CellBox Labs, have been recognised as national success stories, collectively raising €1.73M in public and private funding and winning prestigious awards including the Entrepreneurship World Cup, Latvian Startup Award, EIT JumpStarter, and WOMEN TechEU.

Ongoing development of drug candidates and diagnostics demonstrates a robust innovation pipeline.

Beyond the clinical-stage candidates mentioned above, the institutes have several preclinical candidates, including microtubule targeting agents as anticancer drugs (developed through LIOS's work on diazonamide), AHR antagonists as anticancer leads (joint project with universities in Oslo, Lithuania, Estonia, and Toronto), and selenoorganics as anticancer lead compounds. In diagnostics, BMC's work on extracellular vesicles as sources of RNA biomarkers for cancer detection and the development of the Polygenic Risk Score Calculator for precision medicine represent emerging commercial opportunities. Furthermore, from 2021-2023, LIOS and BMC together conducted 32% of Latvia's total research organisation collaborative research with industry in monetary terms, with €5.4M delivered to local companies to support regional economic development. Their contribution extends beyond direct project revenues: inventions developed at LIOS, such as meldonium, continue to generate significant sales for local pharmaceutical company JSC Grindex (€166M annually), while exclusive rights to Belinostat (invented by LIOS) were granted by Onxeo to Acrotech BioPharma for €6.6M.

### **Social impact**

Score 4: very good

The institutes make a strong contribution to public health and societal development. Their role in COVID-19 diagnostics (sequencing over 7,000 viral isolates) was nationally significant. This rapid response capability was enabled by BMC's pre-existing infrastructure and expertise, allowing immediate establishment of nationwide sequencing capability at the pandemic's onset. BMC served as an advisory body to health authorities for the identification and quantitative estimation of different virus variants' spread, and continues conducting wastewater-based NGS to track viral strain presence and levels in major cities, providing weekly reports to the Latvian Disease Prevention and Control Centre.

Beyond COVID-19, their public health contributions include development of improved genetic diagnostics for rare diseases, particularly inherited neuromuscular and metabolic diseases and familial hypercholesterolemia; participation in the European Syringe Collection and Analysis Project Enterprise (ESCAPE) network since 2020, contributing to five campaigns identifying substance use patterns among people who inject drugs across EU sentinel cities (43 reports submitted to law enforcement during the reporting period on illicit substance identification); and establishment of the Latvian Biobank with over 40,000 participants, making Latvia one of the few countries worldwide where approximately 2% of the population is enrolled in biobank research.

Science communication and outreach are very good, with hundreds of media engagements and youth initiatives. Quantitatively, during 2019-2024, the institutes achieved: 185 appearances on TV and video content, 46 radio broadcasts, 28 magazine and newspaper articles, 1,053 posts on social networks (Facebook, Twitter/X, LinkedIn), 175 events targeted toward the general public, 62 educational activities for youth including 226 students participating in Shadowing Day, European Researchers' Nights attracting approximately 4,500 participants, and 55 student excursions.

Future efforts should include systematic evaluation of social impact metrics and more work on stronger visibility at the European level, which is currently not well developed. While domestic outreach is exemplary, the institutes could benefit from more structured tracking of societal

impact indicators and enhanced international visibility of their science communication activities.

### **Research environment and infrastructure**

Score 4: very good

Both institutes maintain modern infrastructure, with clear governance and efficient management systems. Technical staff, maintenance planning, and grant support are exemplary.

Major infrastructure investments totalling €13.38M during 2019-2024 included construction of fully equipped structural biology facilities at LIOS with protein expression capabilities and state-of-the-art equipment; construction of biobank and biological material processing laboratories at BMC with an overground passage connecting the main building to the Biomedical Technology Complex; upgrade of existing LIOS facilities; establishment of a BSL3 laboratory at BMC; and comprehensive equipment upgrades across five core facilities at BMC. Specific infrastructure highlights include: LIOS possessing the largest NMR facility in the Baltic region with instruments at 300MHz (12,391 unique samples processed in 2024), 400MHz (13,534 samples), 600MHz with cryoprobe for biomolecular work (440 experiments), and 800MHz with solid-state probe for protein aggregation studies; comprehensive mass spectrometry capabilities with LC/MS/MS systems, GC/MS, high-resolution q-TOF and IT-TOF instruments, and MALDI-TOF; X-ray diffractometry with 196 single crystals and 219 powder samples processed in 2024; BMC's Genome Centre including biobank facilities, sequencing platforms (MiSeq, DNBSEQ-400, DNBSEQ-T7, PromethION) processing approximately 6,460 NGS sequences annually including >1,500 whole human genomes.

Challenges include the coordination of infrastructural priorities and scientific activities between the two campuses. The merger into NIRI provides an opportunity to address this through unified infrastructure planning and management. Continued integration of IT systems, various databases, and digital management tools is needed. The institutes have committed €1.9M from the Recovery and Resilience Facility funding toward digital transformation to address these challenges. A position for Infrastructure Director responsible for maintaining and developing an integrated research infrastructure across both campuses is planned post-merger.

Further attention should be given to data science investment and inter-campus coordination. The planned establishment of the One Health Informatics Centre through the EchoHEALTH ERA Chair project addresses the former, while the merger governance structure must prioritise the latter. Specific areas requiring continued focus include expanding computational biology capacity beyond current bioinformatics core facility capabilities, implementing unified data management systems across both campuses, strengthening applications for European Research Council grants (six applications submitted in the past two years, with continued support needed) and increasing consortium leadership beyond WIDENING pillar projects to mainstream Horizon Europe calls.

### **Development potential**

Score 5: outstanding

The institutes display very strong potential for 2026–2032. The merger will create critical mass for leading even more large European projects, have a significant impact on the discipline and economic impact.

Strong international networks support sustained growth. Participation in 43 Horizon consortia with 580+ partners, coordination of 6 multi-beneficiary Horizon projects, national node status for four ERIC infrastructures (EU-OPENSOURCE, BBMRI, INSTRUCT, EMBL) and representation in 17 COST actions are an excellent base for future growth. These networks provide access to cutting-edge methodologies, collaborative opportunities, and visibility essential for attracting talent and funding.

Youthful staff demographics favour future development. During the reporting period, 54 PhD theses were defended, 83 postdoctoral researchers were hosted through ESIF funding, and approximately 180 students annually worked on graduation theses supervised by institute researchers. The structured career development model introduced at BMC in 2018 and strengthened in 2022, which will be expanded institute-wide post-merger, provides clear progression pathways.

### **Potential to offer doctoral studies**

Both institutes have excellent capacity to support doctoral education. During 2019-2024, they collectively ensured 54 PhD defences and maintained approximately 60 PhD theses in progress annually, supporting over 50% of total national PhD output in biology, chemistry, and pharmacology. This positions LIOS and BMC as undisputed national leaders in doctoral training within these fields. This setup fosters interdisciplinary training in biomedicine, while international collaborations provide global opportunities for students. For example, PhD students have participated in three MSCA Innovative Training Networks (CARTNET, IT-DED<sup>3</sup>, CLEAR) and two MSCA RISE programmes (ALISE, InterTAU), enabling extended research stays at leading European institutions. The establishment of the "Welcome service" in 2021 has facilitated recruitment of foreign PhD students as part of incoming researchers (50 foreign researchers by the end of 2024, many at doctoral or postdoctoral level).

Infrastructure, supervision quality, and international exposure meet high standards. Partnership agreements on joint doctoral schools established in 2023 with the University of Latvia, Riga Technical University, and Riga Stradiņš University formalise collaborative frameworks and are expected to further increase PhD student recruitment. The new Biomedicine study programme at the University of Latvia, developed by BMC researchers and launching in 2025, will create an additional pipeline of well-prepared doctoral candidates.

Establishing a NIRI Doctoral School, which we recommend, would enhance coherence and visibility. A unified doctoral school would provide clearer branding and recognition of the doctoral training programme, enable systematic curriculum development and quality assurance across both institutes, facilitate allocation of internal resources (such as student grants) through transparent competitive processes, enhance recruitment of top domestic and international students through coordinated marketing and strengthen links with partner universities through formalised governance structures. The doctoral school should build on BMC's group leader support model and LIOS's internal grant system while incorporating best practices from both institutes.

### **Alignment with the Smart Specialisation Strategy**

Research activities align strongly with RIS3 priorities in biomedicine, biotechnology, and smart technologies. The institutes' work contributes directly to innovation-driven growth and knowledge-intensive industry.

Specifically, both institutes are active contributors to the Biomedicine RIS3 area "Biomedicine, medical technologies, and pharmacy" with the mission "To make Latvia a leading innovation and research environment in Europe in the field of biomedicine." Their contributions include discovery and development of new treatments (five chemical entities discovered/developed

by LIOS investigated in different clinical trial phases; BMC's chimeric VLP-based vaccine candidates targeting infectious diseases and therapeutic self-antigens); fostering academia-industry collaborations, partnership in EATRIS ERIC facilitating translational medicine knowledge transfer to Latvia, environmental epidemiological surveillance (central role in SARS-CoV-2 surveillance, ongoing wastewater-based monitoring); and health-related engineering solutions (BMC's Lab-on-a-Chip and Organs-on-Chip platforms through CellBox Labs spinoff, LIOS's biomimetic spider silk technology through PrintyMed).

Further development of digital health and data analytics will strengthen alignment with emerging European trends.

### **Conformity with state scientific and technology development**

The institutes' activities fully support Latvia's Science, Technology, and Innovation Development Guidelines (2021–2027). Their performance addresses key national challenges in human resources, industrial collaboration, and internationalisation. Under objective 1: Develop research excellence and international cooperation, they have major contribution, 54 PhD theses defended; €65.89M delivered in R&D staff salaries through competitive fundraising; 24 researchers engaged in teaching at three major universities.

Regarding objective 2: Increase innovation capacity and social/economic value of knowledge, it is well noted that they attracted 1.9M RRF funding to digital transformation, 47% of publications in Open Access mode (67% when including all open access types), dynamic consent framework for citizen science; data deposition in international repositories (ENA), establishment of FEGA node in Latvia.

Efforts in knowledge transfer align with policy goals, while their role in health biotechnology advances national priorities. Examples include technology transfer of vaccine candidates to leading animal health companies, COVID-19 rapid response demonstrating integration of research with public health needs, and development of diagnostic tools, including the Polygenic Risk Score Calculator, contributing to national precision medicine capabilities.

### **Recommendations**

The Expert Groups recommend the following:

- Implement NIRI's strategic plan with clear key performance indicators (KPIs) and staff participation. KPIs and monitoring of KPIs will enable monitoring and demonstration of progress for internal strategic planning and external engagement
- Unify governance and ensure balanced leadership across the two campuses. Make detailed analyses of how much certain infrastructure in both campuses is used, with the goal of making a clear selection of which facilities will be present in which unit
- Strengthen data-driven management and transparent decision-making. Rely on systematically collected and analysed evidence (bibliometric, funding data, analysis of scientific trends) to make strategic decisions.
- Consider appointing international experts to key leadership positions. This strategy could introduce fresh perspectives and neutrality, thereby minimising potential internal conflicts and perceptions of one unit overtaking the other during the transition to NIRI
- Formalise a tenure-track system and structured mentoring programme for the researchers of the institute to support career development and make the institute an even more attractive employer
- Support mid-career progression and leadership development by providing leadership training and mentoring
- Continue attracting international researchers and promoting gender equality. Consider offering seed funding or starting packages for international researchers joining the institution, so that they can establish their research at the institute
- Prioritise investment in computational biology and personnel trained to apply AI

- Ensure interoperability of IT systems and shared access to resources between the institutes
- Expand technical support staff to support the merger of the institutes and sustain open science practices
- Diversify funding sources and develop business-driven impact metrics. Implement an impact measurement framework for outreach and policy influence.
- Establish a NIRI Doctoral School and joint programmes with Latvian and EU universities

With coherent implementation of the above measures, NIRI can maintain international recognition as a leading European centre in biomedical and pharmaceutical innovation, delivering sustained scientific, economic, and societal impact for Latvia.

## 2 Summary of findings across the set of unit evaluations

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### General level of quality of research

The Expert Group finds that the overall quality of research across the Medicine and Health Sciences units ranges from adequate to outstanding, with clear differentiation between institutions in terms of scale, maturity, funding structures, and international competitiveness.

A very good level of research quality is demonstrated by RSU-HNSP and FMLS. Both units show strong and improving publication performance, with an increasing share of outputs in highly ranked international journals, well-established doctoral training, and growing engagement in European research infrastructures and collaborative projects. Together, these two units constitute the strongest academic pillars within the national medicine and health sciences research landscape.

The LIOS/BMC is outstanding in terms of research quality, particularly with respect to the originality, innovation, and international significance of its research in chemistry, pharmaceutical sciences, and biomedical research. Its work is internationally visible and benefits from long-standing expertise, stable research teams, and strong links with industry and international partners.

RSU-LASE has been evaluated as good, with clear progress since the previous evaluation. While both output volume and quality are improving, international visibility and citation impact remain limited. The recent merger with RSU represents a significant structural improvement expected to further enhance research quality over the next evaluation period.

In contrast, the university hospitals REUH and PSCUH show overall performance ranging from adequate to good, with research quality assessed as adequate at REUH and good at PSCUH, despite the high level of clinical expertise and the relevance of their research themes. In both cases, research performance is constrained primarily by structural factors, including the absence of stable research funding, limited protected research time for clinicians, and incomplete institutional frameworks for managing and recognising research activities.

Across the panel, a positive trajectory is evident over time: publication quality is improving, interdisciplinary research is expanding, and institutional strategies increasingly emphasise excellence, internationalisation, and societal impact. However, achieving consistently high international visibility and leadership remains an ongoing challenge for several units.

### Key strengths

A number of common strengths emerge across the evaluated units:

- **Strong national relevance and societal embeddedness.** Many units contribute directly to public health, clinical practice, policy development, and innovation in areas aligned with national priorities. The close interaction between research, healthcare delivery, and public policy enhances societal impact and supports the translation of scientific results into practical applications.
- **High-quality research environments,** supported by improving governance structures, modern infrastructure, and increasing use of shared platforms and centralised support services. These conditions provide a solid basis for conducting high-quality research and further strengthening international competitiveness.

- **Successful institutional reforms**, including mergers and platform-based organisational models, have strengthened interdisciplinarity and collaboration. These developments have reduced fragmentation and enabled more effective collaboration across disciplines.
- **Growing levels of international engagement** are reflected in participation in European research infrastructures, collaborative projects, and international networks. While leadership roles remain uneven across units, international collaboration is increasingly embedded in institutional strategies and research practices.
- **Contribution to education and capacity building.** The units collectively make a significant contribution to education and human capital development through their involvement in undergraduate, doctoral, and postdoctoral training. Research-led education, structured doctoral programmes, and supervision of early-career researchers support the development of scientific skills and research capacity, contributing to the sustainability and renewal of the national medicine and health sciences research workforce.
- **Clear development potential**, supported by ambitious research strategies, improving human capital policies (such as tenure-track systems), and continued investments in infrastructure and early-career researcher support.

### Main weaknesses

Despite the positive developments observed across the evaluated units, the Expert Group identifies several **structural and systemic weaknesses** that continue to limit overall research performance, coherence, and international competitiveness.

- **Uneven research performance and structural funding constraints** remain a central challenge. Smaller units and hospital-based institutions are particularly affected by the lack of stable funding. These conditions restrict long-term strategic planning, sustainable team development, and investment in research infrastructure.
- **Limited international leadership and strategic focus** reduce the system's global visibility and influence. While participation in international collaborations is widespread, relatively few units coordinate or lead large competitive consortia. This is compounded by insufficient prioritisation in some institutions, where research portfolios remain too broad relative to available resources, diluting critical mass and international competitiveness.
- **Weak integration and incentives for inter-institutional collaboration** constitute a significant barrier, particularly between universities and hospitals. A coherent and formalised collaborative model for university–hospital research is lacking, and existing incentives to promote sustained collaboration across institutions remain limited. This reduces synergies between academic research, clinical practice, and training, and constrains the development of strong clinical research programmes.
- **Underdeveloped economic impact and knowledge transfer mechanisms** exist in parts of the system. In several units, industry collaboration, technology transfer, intellectual property management, and spin-off creation remain limited, restricting the translation of research outcomes into economic and innovation benefits.

- **Governance, management, and human resource challenges** persist across several institutions. These include unclear research leadership structures, limited strategic use of KPIs, and insufficient protected research time and structured support for clinician-researchers. Together, these factors constrain the effectiveness of research management and the capacity to develop investigator-initiated clinical research.

## Conclusion

In conclusion, the Medicine and Health Sciences Expert Group identifies a solid and improving research ecosystem, with several units already operating at a very good international level and others demonstrating strong potential for further advancement. Structural reforms, institutional consolidation, and targeted investments have begun to yield tangible benefits, particularly in terms of research quality, infrastructure, and international visibility.

However, the Expert Group also finds that systemic constraints continue to restrict the full realisation of this potential. These include insufficient strategic prioritisation, uneven and in some cases inadequate funding mechanisms, limited international leadership capacity, and the absence of a clear and coherent collaborative framework between universities and hospitals. This lack of formalised and incentivised collaboration limits synergies between academic research, clinical practice, and training and constrains the development of strong translational and clinical research programmes.

## Recommendations

To strengthen research performance, coherence, and long-term impact across the Medicine and Health Sciences units, the Expert Group recommends the following strategic actions:

1. Prioritise excellence and focus resources by concentrating funding and institutional support on a limited number of strategically selected research areas with strong international potential and clear societal relevance.
2. Clarify and strengthen collaborative frameworks between universities and hospitals, supported by sustainable and predictable funding mechanisms. This includes establishing formal, incentivised models for joint research, education, and innovation, alongside stable funding for research-performing institutions, particularly clinical and hospital-based units, to enable long-term planning, infrastructure development, and integrated research capacity building.
3. Strengthen international leadership, enabling units to move from participation to coordination of EU-funded projects, European partnerships, and international research networks.
4. Support clinician-scientists, notably by ensuring protected research time, strengthening structured research support services, and developing dedicated pathways for investigator-initiated and translational clinical research.
5. Enhance economic and innovation impact by expanding industry collaboration, strengthening technology transfer and intellectual property management, and providing targeted support for spin-offs and start-ups.
6. Invest in human capital, with continued emphasis on high-quality doctoral and postdoctoral training, international mobility, interdisciplinary skills development, and transparent career development pathways.

7. Develop large-scale, mission-oriented collaborative programmes grounded in major population health needs, such as a national cancer plan or a national cardiovascular programme. By targeting priority disease areas with high societal burden, these programmes can provide a strong and shared rationale for sustained collaboration. They should integrate fundamental research units, healthcare systems, clinical and translational research, and public health research within coherent, long-term frameworks, with the dual objective of improving population health outcomes and strengthening structured collaboration between research institutions, universities, and hospitals.

## Appendix A Feedback on Expert Group assessment

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### Feedback from Riga East University Hospital



Rīga

Datums skatāms laika zīmogā  
Nr.8-10/26/1

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We hereby confirm that on 8<sup>th</sup> January 2026 Riga East University Hospital has received the revised evaluation report from the international experts regarding the evaluation of Riga East University Hospital as scientific organisation.

However, we would like to add our comment regarding the evaluation results and methods used. There have been improvements in virtually every area, nevertheless the overall score assigned to us remains at only 2. We are confident that the demonstrated progress since the previous evaluation, together with the total number of points earned, should correspond to an overall rating of 3.

According to the methodology of the international evaluation process we understand that the overall score is not a weighted or mathematical average of the individual criteria scores, but rather a final assessment determined by the Expert Group's overall judgement. Nevertheless, we find it difficult to reconcile the current evaluation outcome with the methodological principles described. In the present evaluation, the overall score of 2 was derived and assigned based on the criteria scores 2-2-2-3-3-4. In the previous evaluation in 2020, the overall score was also 2, although it was based on considerably lower criteria scores of 2-2-2-2-1-1. While we acknowledge that the overall score is not derived by a mathematical calculation as a mean, it is notable that the mean of the criteria score in 2020 was 1,66, whereas this year it is 2,66.

Both scores were converted to the overall score 2. We have reached a rather significant increase in several criteria. Despite this clear improvement across those criteria, the overall score remains unchanged and we can't see the improvement we have carried out reflected in the overall score.

The current methodology applied for score calculation does not, in our view, adequately represent or sufficiently reflect the clearly observable progress demonstrated in the evaluation results when individual components are assessed separately.

We would also like to emphasize that a substantial proportion of the objections and shortcomings identified in the evaluation could be effectively addressed if Riga East University Hospital (REUH) were to receive dedicated state funding for scientific activities.

We respectfully disagree with the assertion that REUH lacks a long-term strategy for the development of science. Such a strategy has been developed and is publicly available on the REUH website. At the same time, we wish to underline the significant challenges associated with defining long-term strategic objectives for human resource development in the absence of clarity regarding state funding for scientific work at the hospital, including whether such funding will be allocated, as well as its timing and scope.

With regard to the identified lack of support for doctoral students and the reported shortage of mentors, we would like to note that meaningful support mechanisms could be established should state funding for science be made available. Mentorship of doctoral students requires dedicated funding, which is currently not allocated to REUH.

Concerning doctoral studies, we do not concur with the statement that doctoral students lack access to the hospital's infrastructure, as such access is ensured. Likewise, we disagree with the indication that administrative support for doctoral students is not provided; appropriate administrative support mechanisms are in place.

Although the evaluation report indicates that REUH's international competitiveness is low, it places limited if not to say no emphasis on the hospital's national competitiveness and contribution. Consequently, the assessment does not fully reflect the substantial impact of REUH at the national level. Furthermore, we cannot agree with the conclusion that REUH's social impact is low. During both the self-assessment process and the evaluation visit, experts were introduced to the breadth and diversity of REUH's social networking activities and social impact at the national level, including active engagement with the public regarding clinical and scientific achievements.

Finally, we wish to reiterate our concerns regarding the equity of the overall score calculation methodology. International assessments should take into account the previous evaluation results and the baseline conditions from which progress has been achieved. We also consider it essential to acknowledge external factors beyond the control of REUH—such as legislation and the availability of state funding—which have a significant influence on the hospital's scientific performance and achievements.

Head of the Department of Science

Madara Tirzīte