



Lithuania: Research Assessment Exercise Panel B2: Biomedicine



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Panel B2: Biomedicine

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Table of Contents

Introduction	6
Assessment of the Unit	8
Faculty of Odontology, Lithuanian University of Health Sciences	9
Faculty of Medicine (Clinical medicine), Lithuanian University of Health Sciences	12
Faculty of Medicine, Vilnius University	15
Faculty of Pharmacy, Lithuanian University of Health Sciences	18
Faculty of Nursing, Lithuanian University of Health Sciences	21
Institute of Endocrinology, Lithuanian University of Health Sciences	24
State Research Institute Center for Innovative Medicine	28
Behavioural Medicine Institute, Lithuanian University of Health Sciences	32
Faculty of Public Health, Lithuanian University of Health Sciences	35
Faculty of Health Sciences, Klaipeda University	38
Institute of Cardiology, Lithuanian University of Health Sciences	41
National Cancer Institute, National Cancer Institute	44
Faculty of Medicine (Fundamental medicine), Lithuanian University of Health Sciences	47
Faculty of Sport biomedicine, Lithuanian sports university	51
Neuroscience Institute, Lithuanian University of Health Sciences	54
Institute of Sports Science and Innovations, Lithuanian Sports University	58
Summary of the Institutional Assessments	61
Overview of research performance across the Biomedicine Panel' coverage	64

Introduction

Background

The overall objective of the research assessment exercise of the Lithuanian Higher Education and Research Institutions was:

To provide the Lithuanian public, policy-makers and decision-makers and the academic community with the most objective picture possible of the excellence and competitiveness of Lithuanian science in comparison with global practice in the respective area of science.

The assessment produced evidence based analytical material that carefully and in details analyses the research excellence and competitiveness of Lithuanian research, whilst also considering its socioeconomic impact and the capacity of its research institutions. This material provides evidence for research policy making at different levels as well as enabling the research institutions involved in the process to gain a significant impetus for improving their operations. The research assessment was directed at institutions that were Higher Education institutions and their constituent faculties/departments/research groups or State research institutes.

Altogether nine panels were appointed to perform the evaluation. This document is the report of Panel B2: Biomedicine.

Scope of Panel B2: Biomedicine

The Panel was asked to evaluate research in 16 Units of Assessment (UoA) using the following criteria: research quality, economic and social impact, infrastructure, research management and development potential and to score each Unit on a five point scale, namely, ranging from outstanding [5] to poor [1]. The overall objective was to benchmark research in Lithuania against international research in the Biomedicine.

Material on which the assessment was made

Each Unit participating in the evaluation provided the Panel with a self-assessment report for the years 2009 - 2013. The self-assessment report contained the following categories:

1. General information about the unit of assessment (UoA)
2. Human resources
3. Research output
4. Doctoral training
5. National and international collaboration
6. Other scientific and social activities
7. SWOT analysis
8. Funding

The self-assessment also included a list of best publications which were sent to the panellists. The Panel also had access to a bibliometric analysis including information on citations and international co-authors.

Assessment procedure

Experts from the Panel B2 visited Lithuania on February 2 – 6, 2015 and during this period they made site-visits to all UoA. The final Panel B2 assessments were based on both, the self-assessment reports and evidence gathered during site visits. At least two Panel members were present at each visit. Each self-assessment report was read in details by at least two Panel members and then discussed by the whole Panel on at least two occasions, namely, before and after the Panel visits to the Units.

Institutions involved

Panel B2 was asked to evaluate 16 UoA within 6 institutions. The scientific disciplines of these institutions include Medicine, Biology, Public Health, Pharmacy, Odontology and Nursing. The institutions were as follows:

Universities

1. Lithuanian University of Health Sciences
2. Vilnius University
3. Klaipeda University
4. Lithuanian Sports University

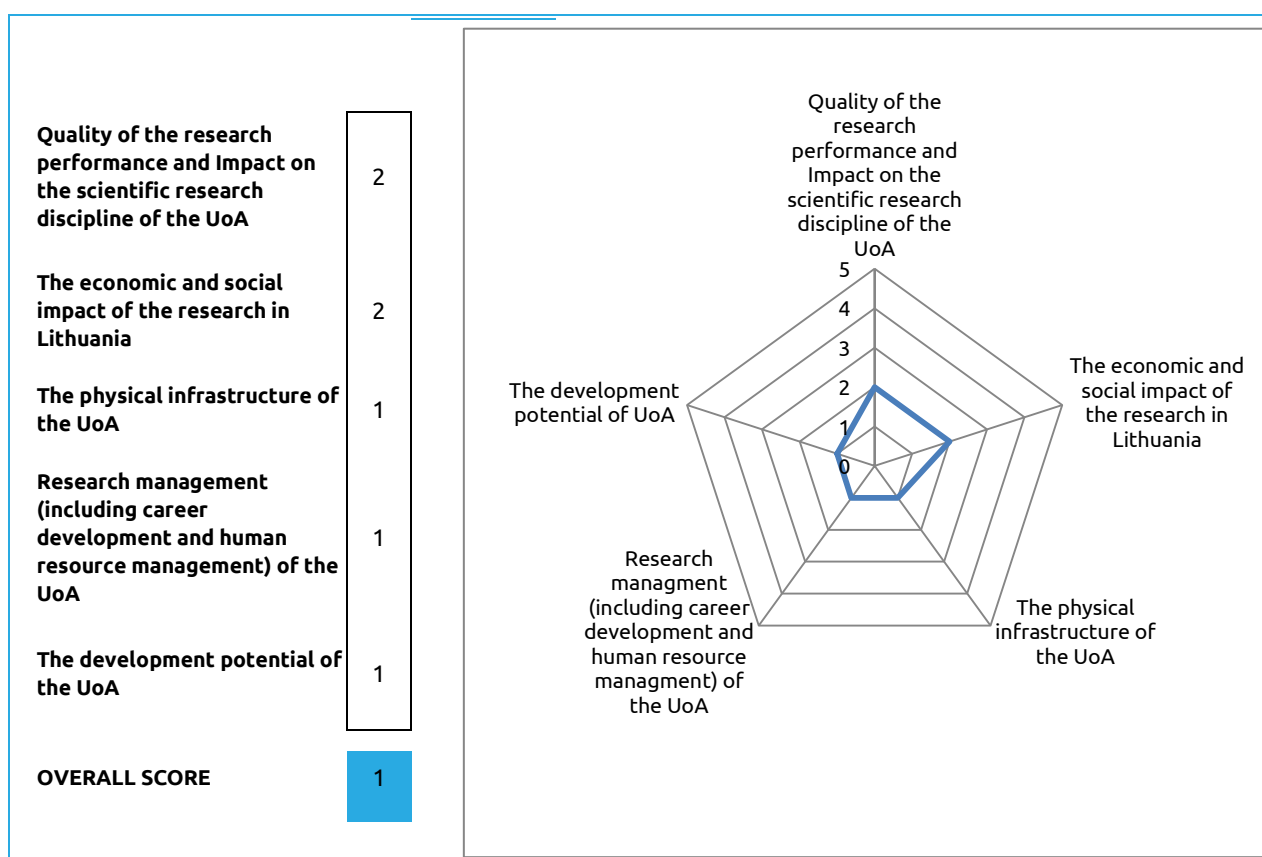
Research Institutes

1. State Research Institute Center for Innovative Medicine
2. National Cancer Institute

Assessment of the Unit

Faculty of Odontology, Lithuanian University of Health Sciences

Name of the UoA	Faculty of Odontology
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	26,43
Composition of the Unit of Assessment (UoA)	1.Clinical Department of Preventive and Pediatric Dentistry; 2.Clinical Department of Dental and Oral Pathology; 3.Clinical Department of Prosthodontics; 4.Clinical Department of Orthodontics; 5.Clinical Department of Maxillofacial Surgery



Overall score

Taking in account everything observed, this Faculty cannot be estimated as an adequate national player in the field, since its overall research activities are inadequate and poorly developed. The potential for improvement in the near future is low. Thus the final score for the Unit is **Poor (1)**. This means that there are some research activities, but they are not on adequate level.

Quality of the research performance and Impact on the scientific research discipline of the UoA

The Faculty of Odontology at The Lithuanian University of Health Sciences is composed of 5 departments and has 187 employees (FTE research 26,4). The primary activity of the Faculty is education of doctors of dental medicine.

Although the age structure of the Faculty is well balanced and the number of PhD students is significant (declared as to be 10), the final score of the level of research is estimated as **Adequate (2)**. This means that the significance of the research as compared to European average of similar units involved in Odontology is estimated as acceptable. It has to be noted that discussion among reviewers mentioned the possibility to estimate the level of research in this Unit as Poor (1), which brings the important message and warning to the Faculty research management. Among 20 selected publications, a great majority are published in journals with impact factor around 1 to 1.5. This is indeed confirmed in bibliometric data which reveal that one researcher in this Unit has been cited less than 2 times in one year. On the other hand, some positive elements which need to be recognized are several international collaborations (e.g. with University of Granada) which yielded a rather constant number of publications in the last 5 years. The reviewers are well aware that faculties of odontology are primarily focused on the patients and that the observed research outcome need to be put in this context, but what left negative impression is an observed lack of motivation to improve and move in a more progressive direction. During the meeting with 8-10 senior researchers, it was asked how many of them applied for the new research project in the last period of 3-4 years. It was significant to find out that only one person applied 2-3 years ago and after the failure she did not apply anymore. This left the reviewers with the feeling of scientific apathy and a huge lack of willingness to constantly apply and actively search for the budget needed for research on European level. This leads to the observation that level of competitiveness of this institution is rather low with not easily recognisable elements which will lead to improvement. During discussion with PhD students it was revealed that majority of their thesis do not have international elements and that the general level of scientific value should be increased. For example, a statistical approach to analyse angle in mandibular bone between twins is rather obsolete approach in the dentistry.

The economic and social impact of the research in Lithuania

Following what has been written above and what has been discovered in analyses; the economic and social impact of the Faculty of Odontology is estimated as **Adequate (2)**. The Faculty is the biggest center covering this field and it is involved in promotion of the health of oral cavity, including some public initiatives and public lectures (e.g. promoting fight against caries). Although the existence of this institution is highly needed and it is recognised as a national institution, there is no evidence of significant interactions with non-academics, for example companies with expressed interest to invest in the research at the Faculty. The reviewers did not find elements of significant interaction with society, opinion-makers or any other activity which would allow to recognise this institution as being a strong national player which influences the society.

The physical infrastructure of the UoA

Taking in account that the Faculty does not have one single full time researcher and that there is no space dedicated exclusively to research activities, the physical infrastructure has to be evaluated as **Poor (1)**. The Panel has to express a concern that without at least some basic research infrastructure which can be shown to the students, the level of teaching cannot be excellent. Odontology, like any other biomedical field, also needs a progress in science and it is needed to maintain some level of research within the facility and to use it as a core of research – oriented thinking in biomedicine. It is understandable that some equipment used for clinical work is used for some of research existing in the Unit and for PhD thesis, but the lack of will to declare elements of clinical units as being at least a part time research units leads to general feeling or inadequately developed research infrastructure.

Research management (including career development and human resource management) of the UoA

Although we are thankful to the research management for the useful written report and although the reviewers who visited Faculty thank for welcome in the Unit, the overall score for the management is estimated as **Poor (1)**. Taken altogether what has been observed and written in the previous sections, a current organization of the management does not seem to promote development of research activities and to promote attraction of financial support which would stand for the benefit of everyone: students, PhD students, researchers and the patients. The long term strategic and financial plans are very general and without any practical goals. The Faculty Board needs to be aware that this is one of the very rare institutions in the biomedical field in Lithuania with practically not existing bottom up received grants in the last several years. This is clearly recognised as the problem on the organisational and management level.

The development potential of the UoA

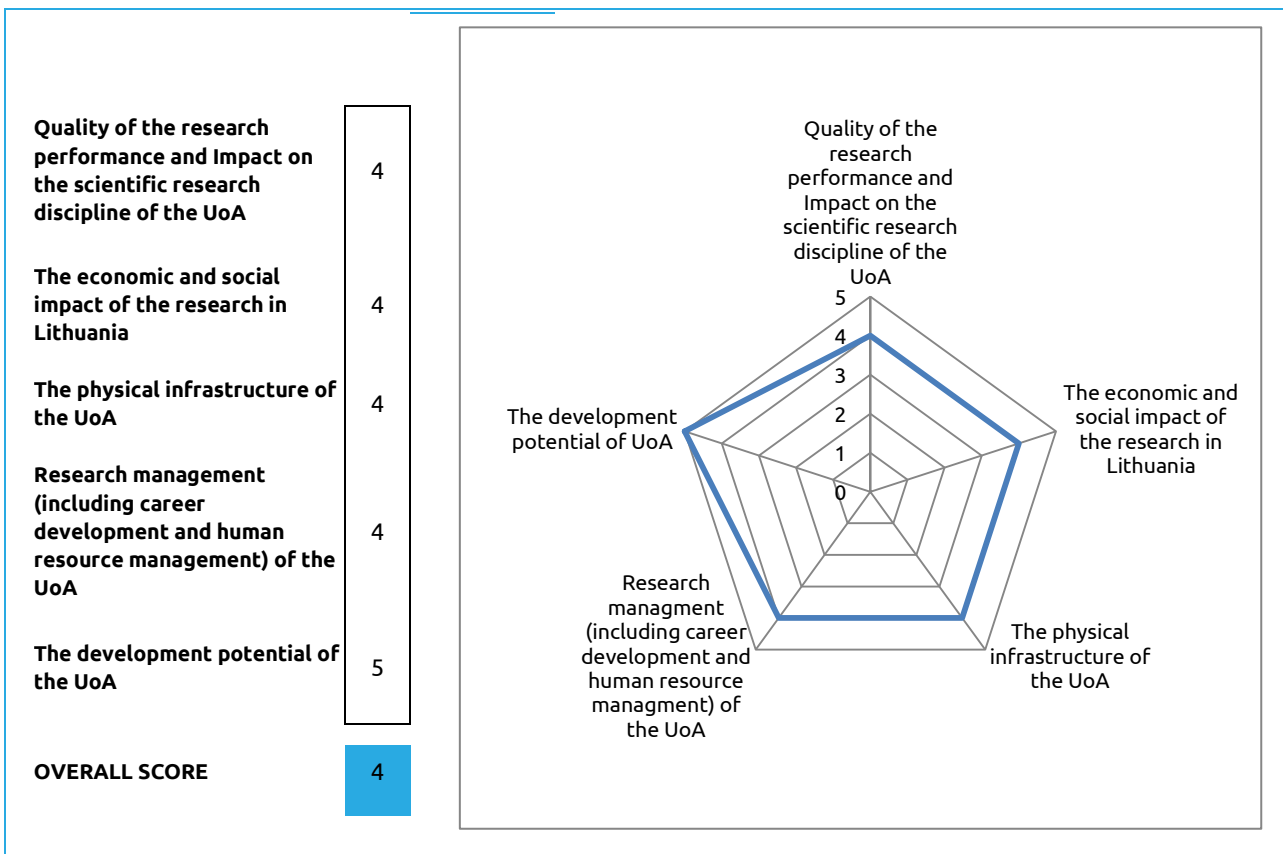
Taking in account the current level of management, an observed lack of investment in time and energy to attract new grants, a complete lack of research infrastructure, the score for the potential is **Poor (1)**. The current scientific environment is not supporting development of research, thus it is very hard to detect the potential for a significant development in the following period and possibility to influence the international scientific community. The Unit's vision is very general, not realistic and it is not clear what are the main directions in which the Unit wants to develop. The reviewers could not detect new and fresh driving force which would promise a significant improvement in the next years.

Conclusions and recommendations

Faculty of Odontology is the unit with some level of research activities which yield some results in collaboration with several European institutions. Unfortunately, these publications are of low impact factor and in many of them a local researchers are parts of larger teams. There is an apathic atmosphere and lack of motivation for progressive research, visible as well in lack of equipment or space dedicated to research. What can be highly recommended is more active approach in application for bottom up projects. For example, patients can be used as an excellent source of various tissues or stem cells which can be analysed and used in many different ways. It is easy to imagine cooperation between odontology and some other biomedical faculties in Kaunas which would like to use this source of the tissue. It is highly needed to define at least one laboratory space and collect some research equipment and motivate PhD students to work in a real research environment. Numerous examples of different clinical units were seen in Kaunas which in the same corridors with patients possess some rooms with equipment for molecular biology, imaging, electrophysiology or cell cultures are examples which need to be followed by the Faculty of Odontology.

Faculty of Medicine (Clinical medicine), Lithuanian University of Health Sciences

Name of the UoA	Faculty of Medicine (Clinical medicine)
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	100,94
Composition of the Unit of Assessment (UoA)	1.Clinical Department of Ophthalmology; 2.Department of Obstetrics and Gynaecology; 3.Clinical Department of Anaesthesiology; 4.Clinical Department of Otorhinolaryngology; 5.Clinical Department of General Surgery; 6.Clinical Department of Surgery; 7.Department of Disaster Medicine; 8.Clinical Department of Endocrinology; 9.Clinical Department of Gastroenterology; 10. Clinical Department of Infectious Diseases; 11. Clinical Department of Intensive Care; 12. Clinical Department of Cardiology; 13. Clinical Department of Laboratory Medicine; 14. Clinical Department of Nephrology; 15. Clinical Department of Neonatology; 16. Clinical Department of Neurosurgery; 17. Clinical Department of Neurology; 18. Clinical Department of Skin and Venereal Diseases; 19. Clinical Department of Oncology and Haematology of Institute of Oncology; 20. Oncology Research Laboratory of Institute of Oncology; 21. Clinical Department of Orthopaedics and Traumatology; 22. Clinical Department of Pathological Anatomy; 23. Pulmonology laboratory of Clinical Department of Pulmonology and Immunology; 24. Clinical Department of Plastic and Reconstructive Surgery; 25.Clinical Department of Psychiatry; 26. Clinical Department of Pulmonology and Immunology; 27. Clinical Department of Radiology; 28. Clinical Department of Rheumatology; 29. Clinical Department of Family Medicine; 30. Clinical Department of Cardiac, Thoracic and Vascular Surgery; 31. Clinical Department of Urology; 32. Clinical Department of Pediatric Surgery; 33. Clinical Department of Pediatrics; 34. Clinical Department of Internal Medicine; 35. Laboratory of Surgery Gastroenterology of the Institute for Digestive Research; 36. Laboratory of Clinical and Molecular Gastroenterology of the Institute for Digestive Research



Overall score

Overall score of the Clinical Medicine unit of the Faculty of Medicine is estimated as **Very good (4)**, which corresponds to one of the best national and very strong international player. Although it is hard to estimate in how many parts of this large complex research activities are not so well developed, it is obvious that there is a significant number of departments which reached the level of research output which can be estimated as recognized and competitive on European level.

Quality of the research performance and Impact on the scientific research discipline of the UoA

Faculty of Medicine (Clinical Medicine unit) at The Lithuanian University of Health Sciences is one of the largest research units in Lithuania. The hospital declares to be divided into 35 departments and it is employing 1200 physicians. Although it is obvious that this extraordinary large research complex would need a more prolonged visit of experts in order to detect what is the average and what are the weaker parts of the Faculty, the list of very well developed units which are driving forces of the whole complex is rather impressive. When compared to similar size units across Europe, there are several units which are developed up to the level of a strong international player, which estimates the overall level of research of this Faculty as **Very good (4)**. The fields of interest which could have been detected as the most prominent ones include gastroenterology, cardiology, oncology, rheumatology, pulmonology, dermatology and some others. Examples of the best publications presented to the Panel were coming from above mentioned fields and they were all published in respectful journals and with a significant impact of Lithuanian scientists. Clinical laboratories within the hospital department dedicated to molecular and surgical gastroenterology can be taken as examples of a successful and competitive clinical research. Step by step growing of these laboratories using grants won in local or international competition and hiring the full time researchers are excellent examples of high level research in the field. This is indeed proven by bibliometric data: an average of 10 citations per researcher in one year is a very good number when taking into account that the primary focus of a great majority of declared researchers is work with patients and not full time research. The Faculty is involved in more than 100 clinical trials and all students are obligatorily involved in some kind of clinical research. What is missing to declare this Institution as being Excellent, or “the European leader in the field” is larger number of international projects which would boost to publish in highly cited publications with Lithuanian researchers as the main or exclusive authors. Up to know, in publications with the highest impact factors, Lithuanian researchers are parts of large international studies and their research funding is mostly based on national grants.

The economic and social impact of the research in Lithuania

The economic and social impact of the Faculty is estimated as **Very good (4)**. There are clear elements that this Unit has an important impact on society, it is recognised as the largest clinical centre with many experts. It is involved in business sector (prototypes, patents; e.g. SkinDetector, SkinMonitor, Electronic Nose) and it is a regular partner of many companies for testing of new diagnostic or therapeutic tools (e.g. Convatec from UK and Denmark; Inova, Portugal; Boynedun, Ireland; DotSoft, Greece). It is obvious that there is a constant income of funds based on collaboration with business sector (increasing over time) and from competitive projects (both bottom up and top down projects) which means that the Unit represents a very strong player in this field.

The physical infrastructure of the UoA

The physical infrastructure is estimated as **Very good (4)**. This means that the Faculty is a strong international player with equipment which is comparable to other similar size European institutions. Equipment is served by appropriate number of technical staff. Apart from many pieces of equipment used for clinical work, there is an impressive list of instruments used for molecular biology, cell culture, imaging and

many other purposes. Another positive element is that there was no evidence that some pieces of equipment have been bought without plan and that they are not used. As mentioned in the previous chapters, the best examples are laboratories linked to gastroenterology and cardiology where one can find a full set up of equipment which allows publishing original results in the excellent journals. Also, we noticed that there are some reconstructions going on in the campus and we hope that excellent scientists will get even more space to further develop their infrastructure. Access to databases is estimated as being sufficient and appropriate.

Research management (including career development and human resource management) of the UoA

The research management is estimated to be **Very good (4)** which corresponds to a strong international player. It is very positive to see that clinical research is included in all elements of every day work of the Faculty. It starts from the level of students, who are involved in research, which is really a positive sign. It is thus obvious that this is a “research oriented” institution having clear long term strategic plans. In discussion with PhD students it was very positive to see that apart from their clinical obligations, they are fully motivated to finish their thesis on time and then continue research within clinical environment. They are happy with their mentors and as such they represent a strong future of the Institution. Career development and staff training can be pinpointed as one of the strongest elements of the institution. In addition, selection of residency centralised and coordinated at the national level is fully supported by this largest hospital, which reveals a modern management supporting competitiveness.

The development potential of the UoA

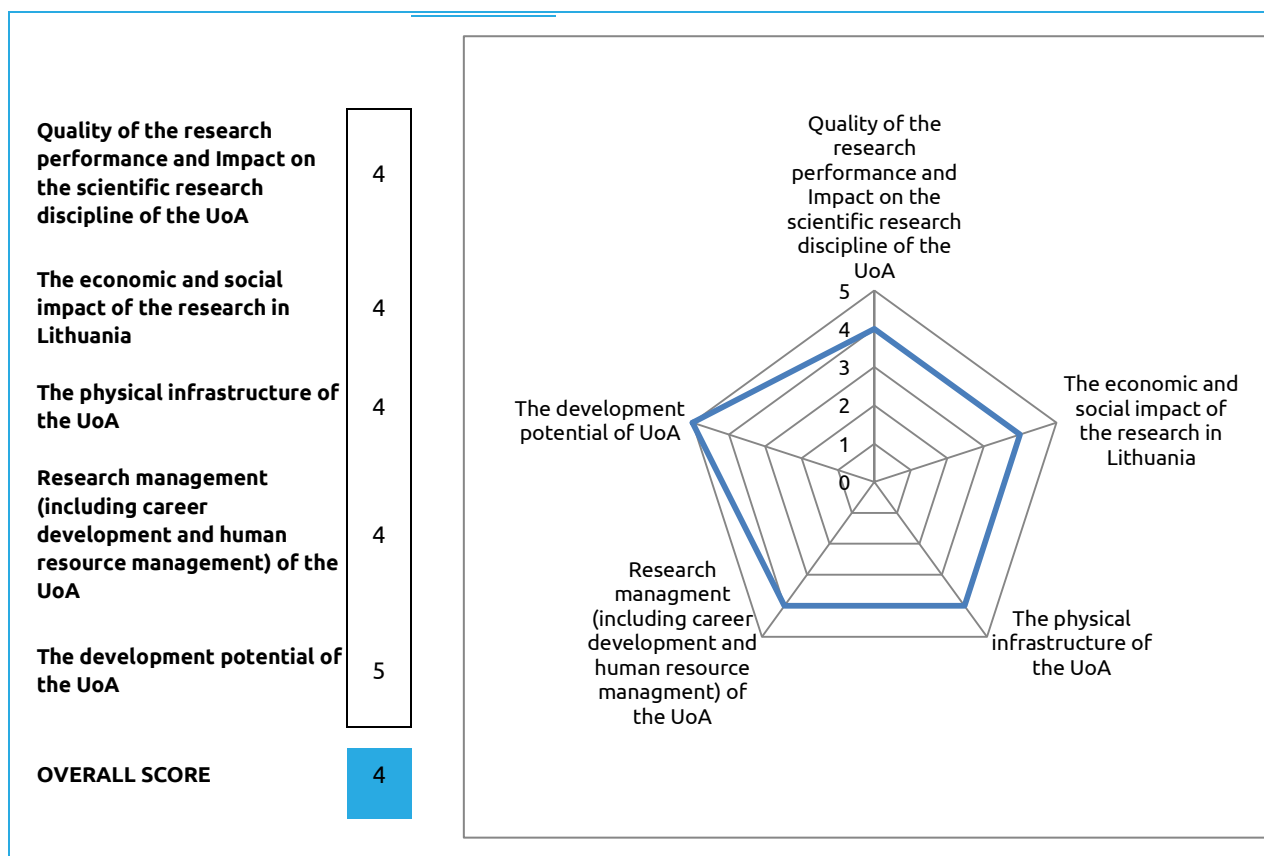
Clinical Medicine unit of the Faculty of Medicine is an example of the clinical research complex with all prerequisites fulfilled for continuous growth and further development. It represents an excellent environment to support selected research directions and even more, to launch some new research topics. In discussion with group leaders and PhD students it was visible that there is a clear vision and well planned investment in research activities. Based on the environment and already proven capabilities, all presented plans are realistic. The critical mass of clinical researchers has been reached in several different units and this will allow that the whole institution can reach the level of excellent European center. Thus this Unit deserves estimation of its development potential as **Excellent (5)**.

Conclusions and recommendations

This is one of the best research units in Lithuania with very good scientific output, infrastructure, research management and an excellent potential for further development. It is obvious that in some fields of interest (e.g. gastroenterology, oncology, cardiology, dermatology, etc.) the reached level of quality is fully competitive on European level. Without any need for low self confidence, these scientists are capable to win the best European grants (H2020, ERC, etc.) and even become better – to start to publish as Lithuanian scientists as main or exclusive authors of publications. This will open possibility to enter in the club of the best European research centres. It would be highly recommended to motivate PhD students to write their thesis in English, since it will in addition increase visibility of the Faculty. Based on experience from other countries, it is important to motivate clinicians who reached this level of research quality to continue their work: research management is responsible to maintain the concentration of quality and prevent abandoning of research because of every day routine work with the patients.

Faculty of Medicine, Vilnius University

Name of the UoA	Faculty of Medicine
Name of institution being assessed	Vilnius University
Total no. FTE researchers	152,61
Composition of the Unit of Assessment (UoA)	Clinic of Obstetrics and Gynaecology; Department of Anatomy Histology and Anthropology; Clinic of Anaesthesiology and Reanimatology; Clinic of Ear Nose, Throat and Eyes diseases; Department of Physiology Biochemistry Microbiology and Laboratory Medicine; Gastroenterology Nephrourology and Surgery Clinic; Clinic of Infectious Chest diseases Dermatovenereology and Allergology; Neurology and Neurosurgery Clinic; Institute of Odontology; Department of Pathology Forensic Medicine and Pharmacology; Clinic of Psychiatry; Department of Radiology Nuclear Medicine and Medical Physics; Department of Rehabilitation, Physical and Sports Medicine; Department of Nursing and Fundamentals of Internal Medicine; Clinic of Rheumatology Orthopaedic and Traumatology and Reconstructive Surgery; Clinic of Cardiovascular diseases; Clinic of Children Diseases; Clinic of Internal Medicine Family Practice and Oncology; Institute of Public Health; Department of Human and Medical Genetics



Overall Score

The overall score of 4 (**Very good**) means that the Panel appreciated several aspects within this large UoA. The positive aspects included: high level of research, especially within international collaborative projects leading to super-quality articles, (ii) enthusiasm and apparent appreciation of medical research at all levels (deans and other high management, professors, students), and (iii) positive attitude to the use of English language and to collaboration with foreign institutions. The Panel expects a bright future and a rich development potential for this UoA if it continues to value biomedical research as one of its main duties. The UoA is already an internationally recognised research institution.

Quality of the research performance and Impact on the scientific research discipline of the UoA

Vilnius University is an internationally respected academic unit in Lithuania. This UoA is large (a full-scale Faculty of Medicine) and has a large number of employees with lot of activity. Six of the ten articles provided represent valuable international collaboration (on evolution of human genomes, schizophrenia-associated genes, chemotherapy of non-small-cell lung cancer, chemotherapy of chronic lymphocytic leukaemia, treatment of acute stroke, and mitochondrial DNA in ancient humans in Central Europe). While VU is here just one of the many international collaborators, it has had a definitive contribution in all six articles. Notably these six papers have all appeared in top journals (Science, Blood, and two both in Lancet and Nature). Thus it is an honour for VU to be there. The other four articles provided are nearly or totally Lithuania-only papers and have all appeared in high-quality journals. What was also evident to the Panel site visitors was that the Faculty had prepared well for the site visit and the members of each group (deans and vice deans, professors etc., and students) expressed enthusiasm. Naturally, the size of the Unit allows weak research to remain unnoticed. Yet, according to Scopus (2009-2013), The Faculty of Medicine had 5.4 articles per researcher (quite good) and as many as 48.7 citations (excluding self citations) per researcher (quite good; within the range expected from internationally recognized clinical centres). These figures raise this UoA to the international level, at least within the Nordic-Baltic area.

The economic and social impact of the research in Lithuania

Vilnius University is clearly a leading biomedical institution in Lithuania, internationally recognised by its reputation, a source for pride, and is contributing and likely to contribute further economically and socially in this small country. Moreover, there are some important projects with industry (one such example is the start-up company Bioseka that has the aim to develop novel antimicrobials for treatment of bacterial and viral infections, naturally increasing the impact. There have been a substantial number of conferences organised by this UoA, considerable number of public activities, which, all in all, add to the economic and social impact of the Faculty.

The physical infrastructure of the UoA

As indicated above this UoA is a full-scale medical faculty, with a total of 772 individuals engaged in research activities in both basic and clinical units, covering all clinical disciplines and also laboratory-oriented units. This UoA seems to be well equipped but of course the unit is large and many instruments and facilities are needed. The instruments are used both in research and in educational activities. This enables internationally recognised research, especially in the field of genetics, genomics, proteomics and cell culture analyses. It is very nicely visible that some of the instruments are well used and that there is a relation between the best publications and the equipment, indicating good investments in the infrastructure.

Research management (including career development and human resource management) of the UoA

The faculty has a clear vision and a strategic, long-term research plan, with a policy of fostering interdisciplinary and transdisciplinary research. They are creating a system to develop human resources to match their long-term plans, plan to support staff development, entrepreneurship, to enhance staff mobility and to improve the research environment, make it more attractive to young and senior researchers.

There were many more than hundred doctoral dissertations in five years and the titles give the impression that many of them were at an international level. Unfortunately only a few were in English. VU would benefit from using more English. A number of postdoctoral researchers were reported in the self-assessment but for that size of the UoA more would be necessary. Several of VU researchers have been elected to the editorial board of international journals, which is a good sign of quality. All in all, the research management

deserves a very good mark because this UoA is a recognised partner in several international collaborations resulting in joint publications and has been a partner in several EU research initiatives that have included research units from Finland, Germany and Sweden. The number of publications and their citation indices is one of the highest in the biomedical field compared to other Lithuanian institutions. What is lacking is coordination of the international funding schemes. This UoA could well facilitate the career development by providing “sabbatical leave” for its senior researchers, permitting them to visit foreign research institutions and establish close international collaboration.

The development potential of the UoA

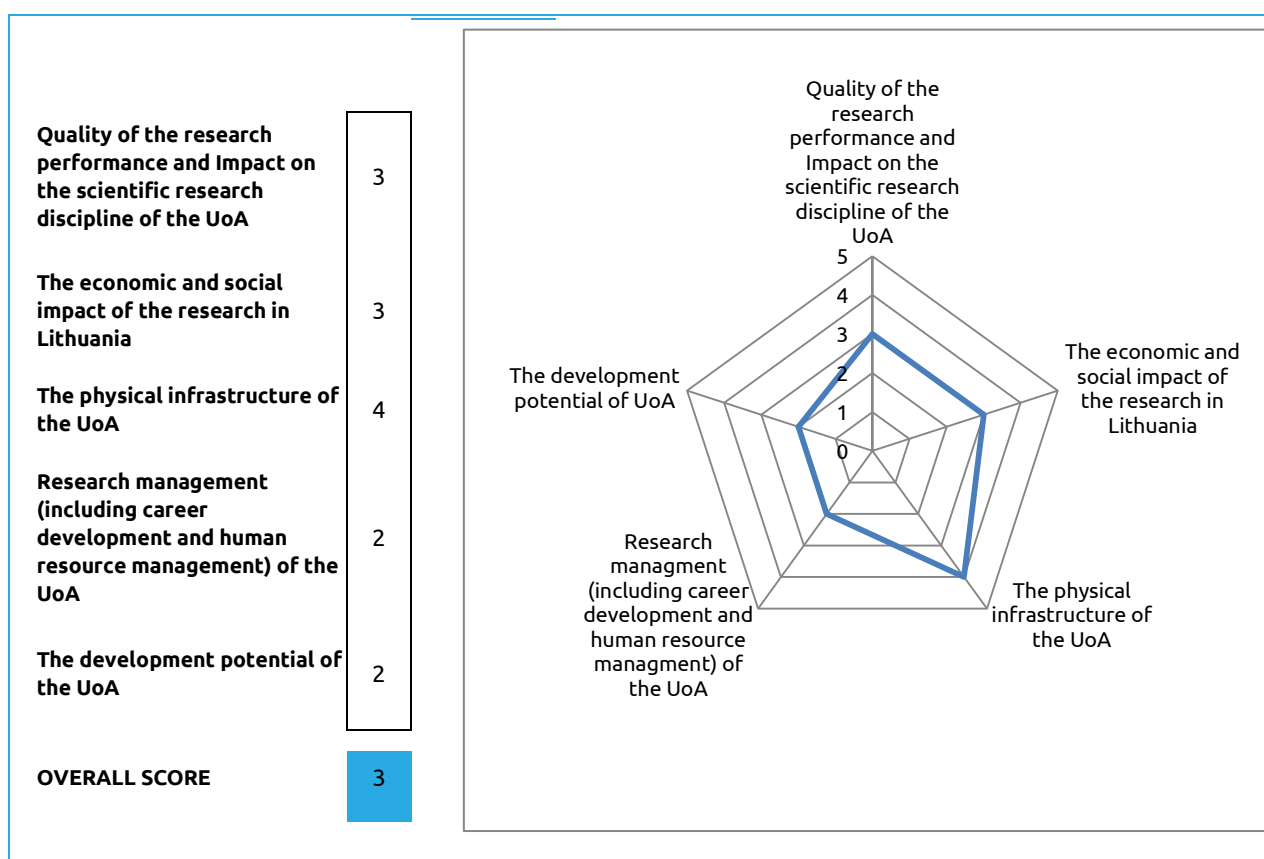
This is a promising full-scale medical academic Faculty where the research environment is supportive of creative work, the management is striving for excellence, has a clear vision for the future of the institution and has a long-range plan to achieve its vision. The plans have a solid foundation in the high quality research already published in the past five years and in the careful nurturing of the next generation of researchers. The SWOT analysis is careful and realistic, the weaknesses and threats seem to be addressed by the plans for the future. The unit already has a lot of international contacts (visits abroad) and collaborations but this UoA would be able to establish more international collaboration. The Vilnius University Faculty of Medicine has excellent possibilities to become a leading academic research unit in the Nordic-Baltic area. Looking at the 20 publications listed from this large UoA it would seem that there could and should be more work in which the clinical units collaborate with the basic biomedical units. This could lead to personalised diagnostics, personalised medical care and high-quality translational medicine. Each patient is an individual with his/her own genes. Yet there is a critical mass of researchers and equipment and there is a rather constant flow of budgetary income from basic grants. Moreover, since the age structure is balanced, the Faculty has development potential.

Conclusions and recommendations

The panel feels that this Faculty is scientifically productive and internationally recognized, and has a good potential but is currently still somewhat “introvert” and operates in too many unrelated directions. The panel was pleased to learn that teaching in English has been initiated a few years ago both in the Medicine and Dentistry branch. Yet the panel feels that the UoA should (i) start using predominantly English (dissertations, local meetings, thesis books should be primarily in English with a short summary in Lithuanian language and not the other way around), and (ii) try to generate further international contacts and collaborations. There are currently a number of students from abroad but getting more would not hurt. Thus e.g. foreign post-doctoral students and more senior researchers should be attracted.

Faculty of Pharmacy, Lithuanian University of Health Sciences

Name of the UoA	Faculty of Pharmacy
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	21,23
Composition of the Unit of Assessment (UoA)	1. Department of Analytical and Toxicological Chemistry; 2. Department of Pharmacognosy; 3. Department of Clinical Pharmacy; 4. Department of Drug Chemistry; 5. Department of Pharmaceutical Technology and Social Pharmacy



Overall Score

The overall score of 3 (**Good**) means that the Panel sees a fairly good level of research, but publications are published only in medium-quality journals. Thus, the present level of research does not reach high enough level to deserve a higher score. The UoA should focus its research activity, try to achieve critical mass and not follow superficially too many avenues (e.g. extracts from so many plants). Additional reasons for the score of 3 include: (i) lack of use of sophisticated technology in identification of the ingredients in the extracts, (ii) lack of extensive collaboration with foreign institutions or with pharmaceutical industry, (iii) in contrast to a quite fruitful collaboration in applied research with cosmetic industry and (iv) division of this relatively small UoA in many departments. Theoretically this UoA, if reorganized, could have a significant positive economic impact for Lithuania.

Quality of the research performance and Impact on the scientific research discipline of the UoA

What the panel liked about this UoA is that it is a compact autonomous unit with a special interest to discover “lead” pharmaceutical compounds from plant extracts. This would be a modern version of the good-old traditional herbal medicine. However, none of the 20 original publications listed and of the 8 original publications provided have appeared in high-prestige journals. Some articles have appeared in medium-impact journals such as PLoS ONE, Journal of Chromatography, International Journal of Biochemistry and Cell Biology. According to Scopus (2009-2013) the number of publications per researcher is 4.7 (a fair value) and the number of citations (excluding self-citations) is 12.9 (a quite low number for a 5 years period). This UoA cannot list any real break-through findings and cannot be considered to belong to the leading pharmacy research units in the Nordic-Baltic area. Several of the papers provided deal with effects of antioxidants/anthocyanins on mitochondrial functions. This is an example of an avenue that could be the Faculty’s future focus in which the Faculty could go deeper.

The economic and social impact of the research in Lithuania

The panel feels that thus far this UoA has not reached any real economic impact, and e.g. has not yet yielded or is not approaching towards novel pharmaceuticals. It may be noted, however, that the application has been written clearly and well. Thus these researchers “seem to know what they are doing” or at least they “seem to know what they would like to achieve”. Time will tell whether there will be also real social impact. The Panel felt that the Faculty has had relatively good doctoral training. Some prototypes and collaborations with practical outcomes (applied research) have been mentioned, the UoA developed some formulations which reached the market in cosmetic products as well as in the local LUHS pharmacy. In this respect it is notable, that the UoA has not reported contract research income from such activity. These include collaboration with the company in Vilnius, JSK Biok Laboratorija (which produces plant extract-derived gels, creams and ointments), one of the largest producers of cosmetics in Baltic countries. Also research collaboration is mentioned (but not specified) with several JSC enterprises in Kaunas. Notably, however, this UoA has not reached significant collaboration with pharmaceutical industry either in Lithuania or abroad. Moreover this Faculty could collaborate with the Department of Pharmacology of Vilnius University, Faculty of Medicine. No such collaboration is listed or evident.

The physical infrastructure of the UoA

This UoA has recently moved to a new building and received some new instruments as well. There are excellent new laboratories, some equipped mainly for students’ use but also some spacious laboratories with new equipment for research. The Self-Assessment Report lists only the necessary chromatographic and electrophoretic instruments but on the site visit the Panel observed that all the necessary smaller instrumentation is also present. The staff explained that some of the instrumentation did not reach the administrative limit for inclusion in the self-assessment.

The characterization of ingredients in the plant extracts and the isolation of the active compounds from the extracts may require collaboration with chemists having high-end instrumentation for structural identification, such as easy access to mass spectrometry and/or nuclear magnetic resonance spectroscopy. Whether such facilities exist in other units nearby is not mentioned.

The infrastructure – with some future investment – could easily support vigorous research activity. However, during the site visit, the Panel did not encounter plans or wishes to expand the research to a level possible with the infrastructure.

Research management (including career development and human resource management) of the UoA

The UoA is a typical teaching Faculty of Pharmacy where 76 members of staff, with 21.2 FTE are working in 5 departments: (i) Department of Analytical and Toxicological Chemistry, (ii) of Pharmacognosy, (iii) of Clinical Pharmacology, (iv) of Drug Chemistry and (v) of Pharmaceutical Technology and Social Pharmacy. Each department has its own Professor, but it seems that there are seven additional professors, all together 12 leaders. The age distribution of the staff is fair, with about 60% under 44 years of age. There was no reported postdoctoral researcher. During the site visit the Panel was presented with 7 different lines of research ranging from technology of purification of proteins to tissue engineering, a clear indication of research fragmentation. In the discussions with the management and the researchers the Panel detected no intention to concentrate and achieve a critical mass in any of the fields, no plans for human research management. There is not enough focusing even with the herbal extracts: within the eight original publications provided, there are approaches on extracts of as many as five distinct plants: *Fragaria* (strawberries), *Perilla*, *Achillea*, *Vaccinium myrtillus* (blueberries) and of the widely studied *Ginkgo biloba* (maidenhair tree). Eleven PhDs in five years is quite good. Unfortunately only one of the dissertations was in English. Yet it may be noted from the titles that the dissertations (thesis books) have been based on solid research work. Taken together in the Panel's opinion this is a teaching faculty with no firm research management.

The development potential of UoA

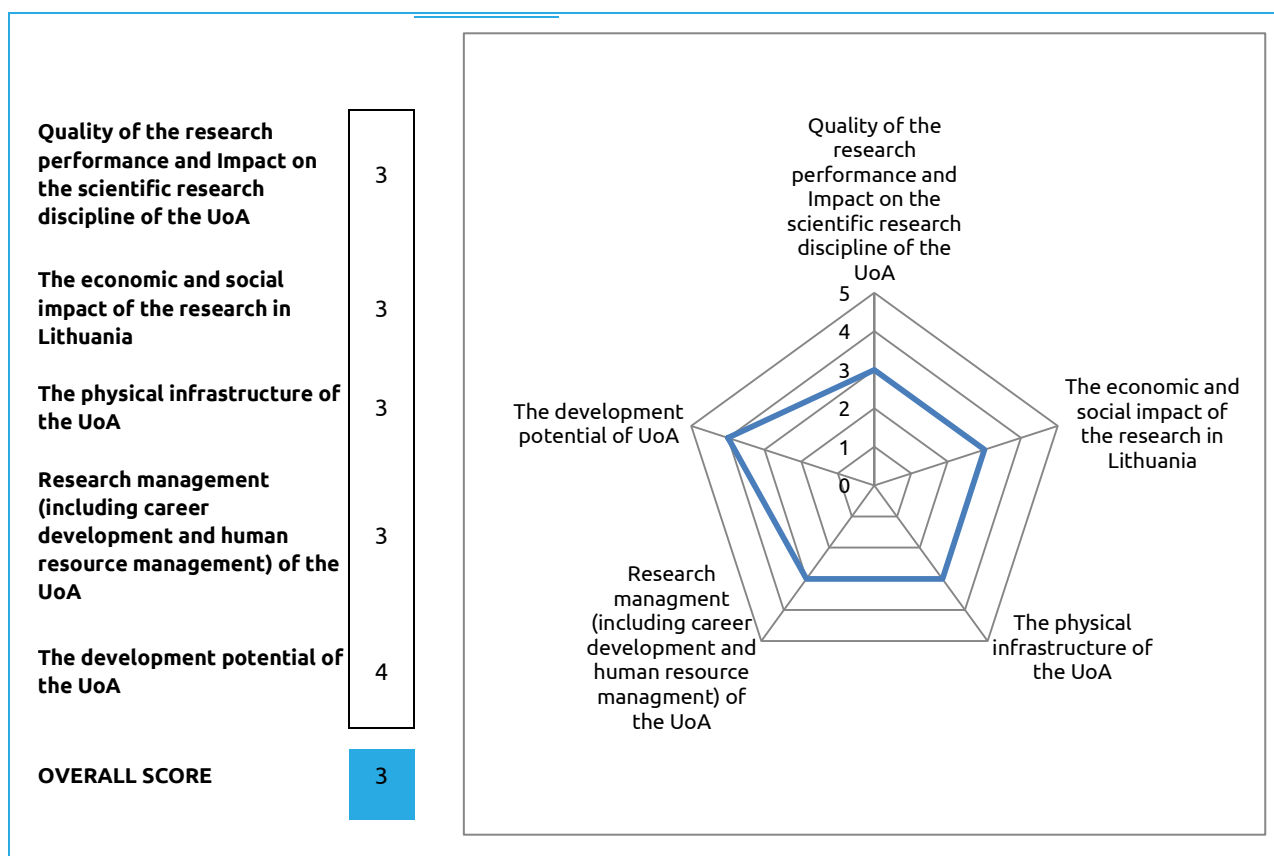
Because of lack of concentration and critical mass as well as a weak research management the Panel sees only a potential to become a strong national player in the near future. The description of the main research fields demonstrate the fragmentation, the description of the strategic, long-term research plans contain general statements, but no credible plan to change the present situation. The UoA may stay as a visible local player with the Lithuanian small and medium businesses involved with drugs and cosmetics but without a marked change in direction it is unlikely to achieve the potential which is offered by the infrastructure and its being embedded in a university with a number of good research units. The assets are a relatively young staff and an excellent infrastructure which should be supplemented with goal-directed and concentrated research. The ability to attract research funding to the UoA is not clear. The section 9.1 does not list significant competitive funding from international R&D programs and only modest funding from competitive State Budget funding. Contract research brought in 14 thousand euros only in 4-5 years. Unless the UoA becomes more attractive to funders, the development potential may stay weak.

Conclusions and recommendations

The panel feels that this UoA is currently too "introvert" and operates in too many unrelated directions. The UoA may have critical mass for a couple of research topics but suffers from the division to five small units (departments) that seem to operate largely on their own without appreciable coordination even within the departments. The panel also feels that the UoA should consider either fusing some of the departments or reorganize its research into two areas, entitled e.g. General or Basic Pharmacy and Clinical Pharmacy, and focus on a few topics in each.

Faculty of Nursing, Lithuanian University of Health Sciences

Name of the UoA	Faculty of Nursing
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	17,72
Composition of the Unit of Assessment (UoA)	1.Clinical Department of Geriatrics; 2.Clinical Department of Rehabilitation; 3.Department of Nursing and Care; 4.Institute of Sport; 5.Clinical Department of Pediatric Rehabilitation



Overall score

The overall score of three for the Faculty of Nursing is based on a good level of research, which is increasingly visible in the international arena. This will be potentially enhanced with their forthcoming move to new premises, which will provide closer links with clinical facilities. They have the potential to be a strong European player in relation to nursing science, particularly in the care of older people. The area of research clearly has a strong contribution to make to Lithuanian society. Faculty of Nursing has good research leadership and with appropriate funding has a potentially bright future.

Quality of the research performance and Impact on the scientific research discipline of the UoA

The Faculty of Nursing present a multidisciplinary research profile. Sitting within the Lithuanian University of Health Science it covers research in nursing, medicine, rehabilitation and public health. This UoA spans applied and laboratory based research. It is the only Faculty in Lithuania to offer PhD in Nursing science. As such, it would appear to be the leading institution in this academic discipline. It has strong links to the European Academy of Nursing Science. This is also exemplified by good citations of research outcomes and

the international significance of their research (evidenced by American Journal of Sports Medicine). However, it was clear that in some papers they were not lead authors and merely contributed data to a multicentre study. There are very few high-impact factor journals in the field of nursing and this should be taken into consideration when evaluating the research performance of this UoA. In summary, this self-assessment report highlights a good level of research, which was confirmed on the site visit.

The economic and social impact of the research in Lithuania

Research produced by Faculty of Nursing would appear to be very important to Lithuanian society. Its main contribution relates to the care of the older people in Lithuanian society. They have provided guidance on the issue of drugs in older people. As such, research within this UoA has clear social contribution to make, including work on cerebral palsy. Faculty of Nursing holds close relationship with hospitals and other health care facilities. However, there was only limited evidence of high levels of interaction with non-academics within this UoA.

The physical infrastructure of the UoA

Faculty of Nursing is able to provide a research environment that is comparable with other established nursing academic institutions in Europe. On the site visit, there good evidence of adequate facilities for the type of research conducted within this UoA (i.e. gymnasiums) However, it was not fully clear the exact role that sports science/medicine plays within this UoA, giving the impression of a rather heterogeneous group of disciplines in terms of one unit of research activity. Movement to new facilities, which are closer to university teaching hospital, should enhance opportunities for research linkage between the academic and clinical nursing communities.

Research management (including career development and human resource management) of the UoA

Faculty of Nursing would appear to have a solid approach towards research management, evidenced by their strategic approach towards care of an ageing population. They have produced 24 completed doctoral thesis in the last five years., Although the number of published doctoral theses and articles in scientific edited journals appears to have dropped since 2009 (88 articles published in 2009 against 43 in 2013) the Faculty occupies a very important position within Lithuania as the faculty at the forefront of nursing science, in particular the science of caring for older people. The management appear capable and enthusiastic to develop an international standard nursing research unit, it is important that nursing science does not get lost within their current multidisciplinary approach to research.

The development potential of the UoA

Faculty of Nursing has the potential for very good development. Nursing science is a relatively young academic discipline and there are many opportunities for international collaboration. Discussion with senior researchers and PhD students demonstrated a clear vision and commitment towards future research development. The vision and plans of this UoA are focused on research related to the care of older people. It is a relatively small UoA, however it does appear to have the critical mass to attract high level nursing doctoral students and engage in international collaborative activities. All staff that were interviewed at the site visit indicated that they had given input to the development of the self-assessment report and it was clear that there was transparency in this process.

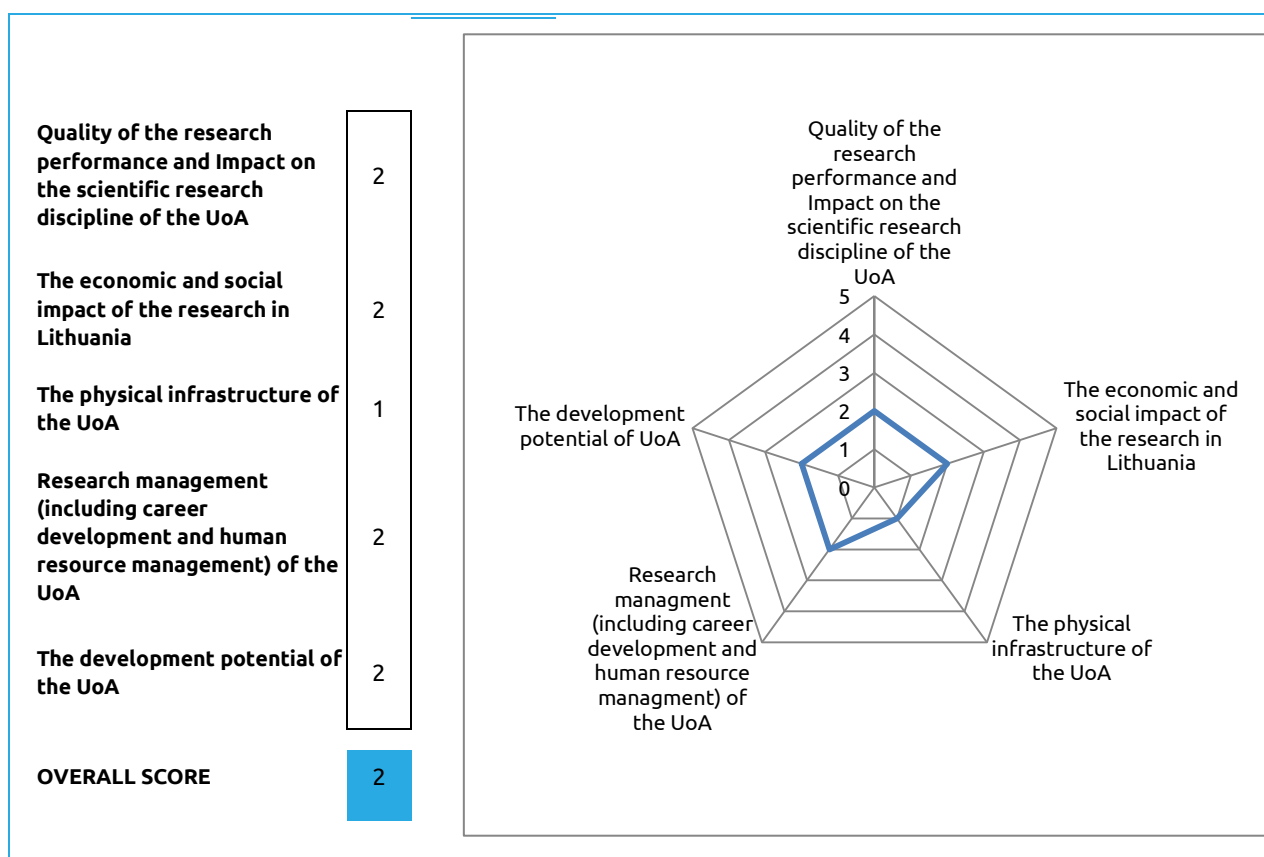
Conclusions and recommendations

It is recommended that the Faculty of Nursing sharpens its focus and specifically develops nursing research. This should be done in a strategic manner and concentrate on areas of international relevance, such as care of older people. The Faculty is also encouraged to develop greater links with international academic networks,

such as the European Academy of Nursing Science. With the attraction of international grants this UoA could have a bright future. One general recommendation from the evaluation would be to encourage all PhD students to write and defend their dissertation in English. This will enhance their ability to disseminate the findings of their research more readily in English language international journals. This would not only raise the individual profile of the student but would also raise the institutional profile.

Institute of Endocrinology, Lithuanian University of Health Sciences

Name of the UoA	Institute of Endocrinology
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	9,6
Composition of the Unit of Assessment (UoA)	1. Laboratory of General Endocrinology; 2. Laboratory of Diabetes Mellitus



Overall score

The overall score of 2 (two) for this UoA is based on the average level of research without a credible strategic plan for the future, on the need to improve its weak infrastructure and organization, on the large number of weaknesses in the SWOT analysis without a plan to correct them. The lack of concentration of resources on a few selected topics resulted in a scatter of relatively low impact publications. There are major publications which resulted from international collaborations using the diabetes registry but unfortunately the institute's contribution is that of a data provider without clear intellectual contribution. In case the institute's position in the international scientific community should reach that of a convincing actor, credible plans for improvement would be needed.

Quality of the research performance and Impact on the scientific research discipline of the UoA

The significance of the research by the UoA seems to be acceptable on an international scale. An imbalance between basic and clinical publications exist, with the preponderance of clinical and public health studies

related to diabetes. The international publication output of the unit is less than expected for 5 years in a unit of about 10 FTE/year, together with an average of 5 PhD students. In clinical or basic endocrinology at least one international publication for 2 FTE capacity is expected in an efficient research environment. The self-evaluation summary shows 12 international publications, some of which are of high quality, such as the paper in JCEM (2011).

In terms of research impact, the UoA occupies a stable position in the national scientific community. The position of the UoA within the international scientific community is fair with a significant number of international collaborations, though in most collaborations the UoA appears to contribute by providing only patient data. The UoA still has to vie for its status as a recognised member of the discipline; its impact on the international scientific community is undetermined. More specifically, the Scopus indicators gives an h index of 7 which is rather modest for an independent research institute and suggests little international interest in the recent research output of the Institute.

The three “areas” of the research are defined with general lists of endocrinology topics and only a few of those items can be connected with published articles, in that respect the area “endocrine causes of family infertility” seems to be the exception with good correspondence of plans and publications.

Emphasis is placed on the collaborations in international programmes related to diabetes. However, the impressive list of collaborations is not paralleled by a similarly impressive list of *original* Lithuanian publications. It should be mentioned that those *important* publications on diabetes that were provided in full text seem to be based on contributing patient data from the diabetes registry without significant Lithuanian intellectual input to the research articles and the site visit failed to turn up information to the opposite. There are also publications with smaller impact which uses the diabetes registry data in the Lithuanian setting which is commendable. Establishing the register was an important scientific achievement in the past, maintaining it is an important professional and administrative, but not scientific accomplishment; the diabetes registry should be kept functioning in the future as a service, which should also be used for the UoA research as well.

The research is mainly clinical and epidemiological in nature. The basic research mentioned in the self-assessment report was not seen during the site visit even though the visiting Panel members were asking for details. This discrepancy between the self-assessment and the observations is a matter of concern for the Panel experts.

The economic and social impact of the research in Lithuania

The research activities of the unit are characterised by a low level of interaction with non-academics (i.e. business, policy-makers, and the public), therefore economic impact is little if any. The EUREKA project ANTIOKSDIABET does not seem to have resulted in any consequences.

However, the UoA together with the University Department of Endocrinology is an important centre in the health care system of the country, where it appears to be the largest centre and is also involved in training the clinical specialists in endocrinology. As most of the researchers in the UoA are working part time in the Department of Endocrinology and also are involved in an outpatient clinic within the UoA (not the Department) , it is almost impossible to separate the social relevance of the Department of Endocrinology and the Institute of Endocrinology. The two seem to form a single functional unit as two organisational entities under two separate administrations.

For the Lithuanian health care system of the Department + Institute is highly relevant as a site training specialists in endocrinology as well as a centre for endocrine diseases.

The physical infrastructure of the UoA

The Unit has not yet created an internationally acceptable research environment.

From the self-assessment, it was not possible to evaluate the quality of the infrastructure as the pieces of equipment listed (including an electromyograph and an eye fundus camera) are basic equipment for clinical diagnosis. During the site visit it became clear that the infrastructure is similar to that in a reasonably equipped non-research hospital caring centre for endocrine diseases. The UoA is able to do all the endocrine assays for which radioimmunoassay kits may be purchased. This technology is not in the cutting edge of endocrine research. Instrumentation needed for basic research is not present. Apart from the national diabetes database (an infrastructure item itself), the infrastructure is not up to date for a research centre in clinical endocrinology. Sizable investment would be needed to upgrade the institute to be able to do basic and clinical research at international level.

The diabetes registry is a major resource and was a scientific achievement when it was established. Its technical condition does not appear in the self-assessment and it is not clear whether its long-term functioning requires extra attention and funding.

The infrastructure and the research orientation in clinical medicine appear to be connected. To be a small research arm of a specialised hospital department, the infrastructure of the institute might be sufficient but it is not sufficient to perform high level research in clinical or in basic endocrinology.

Research management (including career development and human resource management) of the UoA

Considering the partnership of the UoA with the various European research groups and the number of publications made in collaboration, the research management is good, making good use of what can be done under the circumstances. Providing diabetes data for collaborations driven by European scientists is good service use of the diabetes registry. There is a good number of international collaborations also in fields other than diabetes, for example the fruitful collaboration with the Tartu University on the male reproductive health in the Baltic States. Visits abroad are almost non-existent (none was longer than one month), which makes it difficult to import fresh knowledge and methods.

The research in the unit is fragmented in the sense that there are 3 areas and altogether more than 20 items of research focus in their description of activities. Strategic planning is only slightly better but the site visit failed to find any sign of efforts of concentration to find a niche or two to achieve a critical mass there. It is understandable that being connected with the major clinical endocrinology centre of the country offers opportunities of numerous research topics, but it is the management's task to use the resources available efficiently and in a concentrated way.

The management seem to realise that the situation in the Institute of Endocrinology is not promising. The SWOT analysis exposes marked weaknesses and threats, however the management failed to address in its strategic planning the issues exposed by the good SWOT analysis, listing no credible strategic plans. No evidence is given for an effort to reduce the number of projects (which are too many considering the small FTE) or to find a unique scientific direction (niche) for the unit.

A strange characteristic of the human resource management is that the staff of the UoA is around 24 people with only 10.5 FTE for research, the remaining capacity being probably used for clinical work. This is also an indicator for the Panel that by merging the Institute and the Department, and requiring most of the physicians to participate in research (as it is in most clinical research centres in the world) the UoA may be started on a path leading to healthier clinical research centre.

Doctoral training is good considering the small staff FTE (10) and the research output. In 3 years 5 PhD degrees awarded and 11 new enrolments is promising. That rate of doctoral training might be optimal in providing the country with scientifically trained clinical endocrinologists.

An important negative aspect of the human resource management is the lack of postdoctoral researchers. This is not a specific weakness of this UoA but a widely although not universally observed characteristic of

the biomedical research in this country. However even if it may not be easy to find and employ postdocs, a healthy research institute should have plans to provide a better age distribution of the staff, which shows 5 under the age of 45 from a total of 22 peoples.

Although LSMU is an active participant of the ERASMUS exchange programme, no foreign PhD students were active in the UoA. Also, the mean number of months to get a PhD is 61,5 months with a standard deviation of 4,8 (calculated with 5 PhD periods). To be in accordance with other European countries this time should be reduced to reach 4 years maximum. This might be difficult to achieve if the research intensity stays at its present level and with the PhD “students” being trained and licensed endocrinologists also working part time in the clinical wards of the Department of Endocrinology.

The development potential of UoA

The UoA is capable of being (or remaining) a visible local player in its area of research, which from time to time can be expected to contribute to the activities of the international scientific community. In particular the site visit with oral presentation of the current research, methods and results did not give a promising view for the development potential. The researchers and the management are good in collaborating with European researcher exploiting the unique genetic characteristics of the Lithuanian population, however the Panel did not find signs of substantial original research effort originating from within the UoA. Without concentrating resources to a few focus area and achieving a critical mass, the UoA will remain a national endocrinology centre maintaining the research activity necessary for good teaching and clinical care but with little potential to achieve international impact.

Too many research topics, lack of concentration of research effort characterise the past performance and the strategic plans. Without reorganisation and dynamic management, the research potential for original research in clinical or basic endocrinology is not good. In case a change in course is decided, for good development a HR plan for hiring younger clinical researchers is needed for shaping a younger and more dynamic Institute.

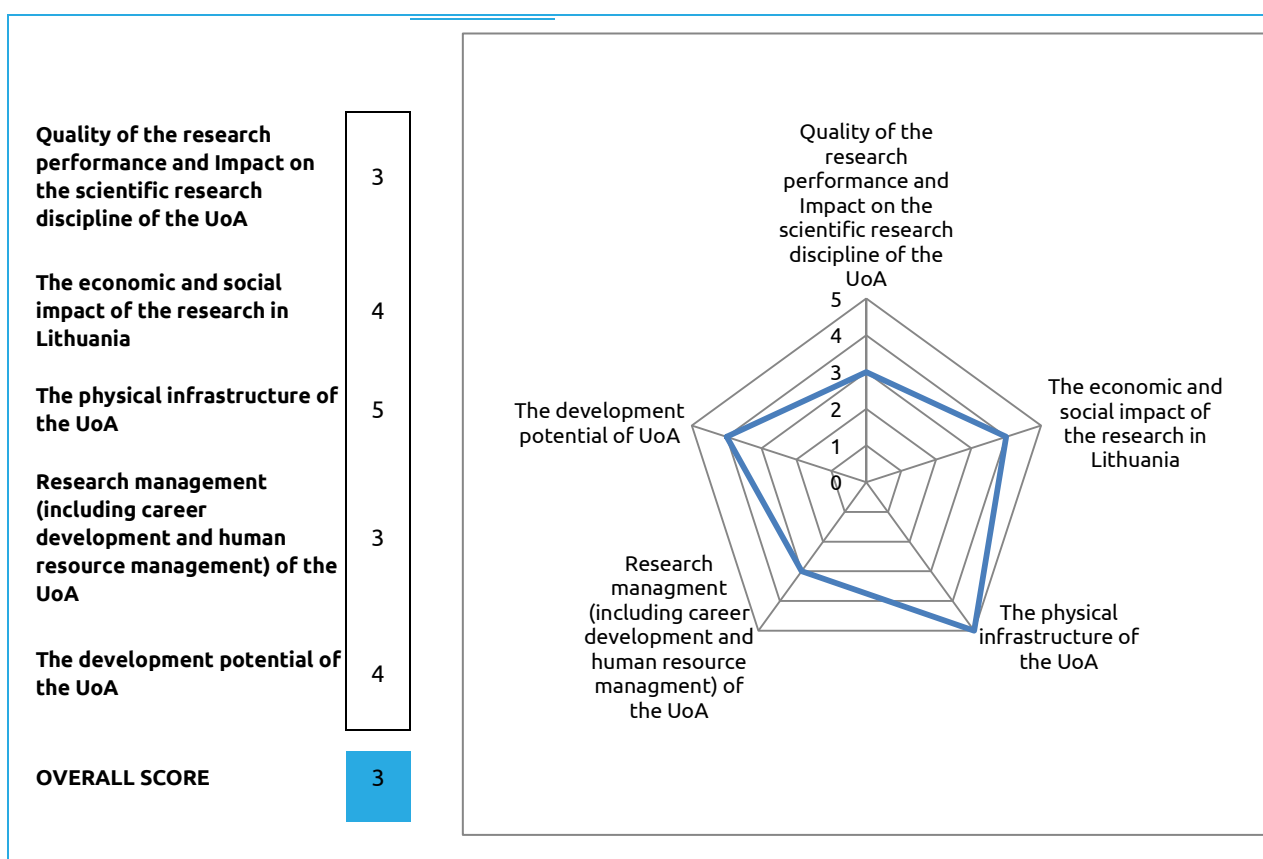
The Institute does not attract appreciable outside funding. There is a single important funding from the Swiss-Lithuanian „Genetic diabetes in Lithuania“ program but probably this is not a steady source. Credible and competitive projects based on human resources within the UoA would provide best chances for a stream of funding.

Conclusions and recommendations

Without planned change, the Institute may stay as a national player and centre in clinical endocrinology and may serve the Department of Endocrinology and the country with training young endocrinology experts. Considering all characteristics of the Institute of Endocrinology, the Panel suggest that some action should be taken. One possibility might be to strengthen basic research in endocrinology involving investment in new staff and equipment, another might be merging the Department of Endocrinology with the Institute of Endocrinology, combining administrations and involving all the physician endocrinologists in clinical research, which is a requirement in international university hospitals. Clinical research as conducted in the last 5 years does not require a separate institute and might easily be incorporated in the clinical work of the Department of Endocrinology.

State Research Institute Center for Innovative Medicine

Name of the UoA	State Research Institute Center for Innovative Medicine
Name of institution being assessed	State Research Institute Center for Innovative Medicine
Total no. FTE researchers	63,4
Composition of the Unit of Assessment (UoA)	1. Department of Stem Cell Biology; 2. Department of Regenerative Medicine; 3. Department of Immunology; 4. Department of Innovative Diagnostic, Treatment and Health Monitoring Technologies; 5. Department of Biopharmaceuticals; 6. Department of Biomodels



Overall score

The overall score of 3 (three) means that the Panel sees already a good level of research, with mixed components: a very good developmental potential, which has to materialise before the UoA may reach a very good level and the promise of an excellent infrastructure already near completion. However, the present level of research and the concern about the management precluded a higher overall score.

The reasons for the score of 3 are: 1) A good level of research, partly based on results obtained by the predecessor institutions, 2) a relatively good economic impact shown by the list of market oriented and contract research projects, 3) a good management with some cause of concern (risks) for the future and 4) with development potential both in their fields of science and in benefit to the Lithuanian economy, also shown by their potential for generating income for research.

Quality of the research performance and Impact on the scientific research discipline of the UoA

State Research Institute Center for Innovative Medicine is organised as a modern institution covering fast developing fields of biomedicine - regenerative medicine, stem cells, biomodels and others. The focus on four main research topics is important for a professional research institute and the main directions carry the approval by the Government.

The Panel realised that this is an institute being in the middle of a planned transition, being amalgamated from other research units in 2010 and given a novel mission and ongoing investment. At this stage of the transition the past may not predict well the future.

Its research activities are well recognised on a national level. Looking up their selected publications in international indexing databases, the UoA has a constant, although still not very significant impact on international level. Some of the recent publications received high numbers of citations (Analytical Chemistry, 2010, 82: 6401: 80 citations, Human Molecular Genetics, 2011, 20:3304: 33 citations), Compared to other similar institutions in the biomedical field, topics are up-to-date and dynamic, but still, results are sometimes not published in the leading journals and number of articles and number of citations per researcher (3.2 article/researcher; 25.2 citations/ researchers) are lower than would be expected in case the institute would have been fully functional already for 5 years. However, after finishing with the transition period publications may improve as a result of better conditions, decreasing administrative and logistic loads on staff.

Most of the collaborative publications seem to involve important contribution by the staff of the UoA, which is a positive sign when comparing to some other Lithuanian UoAs.

The economic and social impact of the research in Lithuania

The Institute already has numerous contracts for research and has the potential to attract more when the investment and transition phase is concluded. This shows that this UoA is very important for society and – taking into account the sizes of the units – this is the best in economic impact amongst the UoAs in the biomedical field. A significant portion (more than 40%) of the budget comes from competitive funding/grants/contracts. The economic and social impact is probably going to be even better after 2015 when the Institute will be transferred to its final place in the middle of a campus. It is expected that it will establish more concrete connections with industry with measurable outcomes and final products. It is not enough to have just a set of good ideas, but it would need to present measurable outcomes in concrete investments from the independent investors.

Economic impact is also shown by the fact that two department heads are leading experts in companies (Biotechpharma and Kardivita, respectively)

The topic of human health monitoring and development of novel diagnostic and treatment methods promises social impact through improved health care.

The physical infrastructure of the UoA

At the time of the site visit some of the laboratories and the management was still in its old building, which is not suitable for laboratory work, with small rooms, wooden floors, 19th century style building, overloaded with boxes with supplies stored for the new facilities. The visitors got a glimpse of the past and present but due to time constraints could not visit all the past and future facilities.

Up to date facilities (8500 square meters) will house cutting edge instrumentation and a large portion of that will be usable by researchers from other institutions in an Open Access configuration, which is part of the Vilnius Santara Valley. It will be a challenging task to provide the services and at the same time maintain the focused strategic research programs. The management seems to focus on this task. The UoA has a large

number of technical staff (36 persons) which is probably necessary for providing services and maintaining the instrumentation in good operating conditions.

The Institute will possess a very good infrastructure with potential to attract researchers from both national and international niches. Equipment covers a wide range of instruments for the need of imaging, genetics and proteomics, as it is needed by the 3 research areas. One would expect that this infrastructure should attract significant numbers of researchers and bring in additional projects, which should be kept within the scope of the institute.

The information needs of the researchers are not served in an optimal way, which may be improved after transfer to their new location in a campus with other institutions.

Research management (including career development and human resource management) of the UoA

The self-assessment report portrays a solid management using up to date management concepts and organisational methods. Research is properly concentrated in 4 main topics and 3 long-term strategic programmes as expected from a professional research institute. The topics and strategic programmes are promising.

The research staff is mostly full time (as it should be but not observed in all other Lithuanian research institutes) and seems to be dedicated to its research duties. PhD students are also working but in the Panel's opinion concerted actions to attract more PhD students and some postdoctoral fellows will be required. On meeting the PhD students the visitors had good impressions, however their numbers (4-5 annual average for 63 FTE researchers) is much less than expected. Difficulties in recruiting students is a risk and a problem facing all research institutes working independently of the universities and requires careful HR planning. At the moment there is a preponderance of staff over 45 years of age, which is not a good sign in "innovative medicine". An infusion of young talent is needed to exploit the opportunities lying ahead.

Research management has a clear vision of the institution strategy and one can recognise their priorities: investment in higher number of international collaborations, especially for early stage researchers. Although the number of articles per researcher should be higher to reach international competitiveness, the number of citations to recent publications is suggesting that the level of research has a good background in the quality of the mentorship system.

The research is structured around three major topics that have a clear strategy. However, some of the departments (less visible ones) do not fit into these three thematic areas, thus the inner architecture of the institute already shows some of the risks of fragmentation that has to be addressed by the management.

The number of visits abroad is clearly very small, with only a single researcher being abroad for 12 months during the reporting period of 5 years. Considerable effort will be needed to have more mobility with promising young researchers spending at least one year working in a recognised international research centre. Also, the Panel sees not enough emphasis on attracting young researchers, which should be a priority in a state research institute where exposure to students is much less than in a university setting.

A general management problem manifested also at this institute: only one PhD thesis has been written in English in the past. During the site visit - on direct questioning - several PhD students expressed plans to submit the thesis in English, but clearly most if not all PhD theses in this field of research need to be submitted in English. In a small country it is important to have not only home-grown examiners of the theses which is possible only if the thesis work is reported in English.

This institute has a Scientific Board, the composition of which is not given in the self-assessment. An external advisory boards with national and international members is important to oversee the direction of the research and give strategic advice to the management.

The site visit resulted in mixed feelings about the top management. Such a new institute was expected to have young and dynamic management which does not seem to be the case. Evidence for losing research focus was detected during the site visit, which is reinforced by the self-assessment text. The Panel considers it important that the management maintain its focus during and after the present transition period and should resist opportunities for proliferating projects. An external (!) advisory body may help in keeping the UoA on track.

The development potential of the UoA

The Panel sees good prospect for all the planned activities, even the possibility of breakthrough in the next 10 years. New facilities, instrumentations together with timely and up-to-date research subjects promises exploitation of the opportunities in research. The threats and risks are seen in the management side. The SWOT analysis point to weakness in the managerial capabilities of the staff, also mentioned during the interviews. The partial service orientation of the institute will be a real challenge for the staff involved especially since in their previous research none of them seem to have experience with providing research services or received previous training in management skills.

The development of the institute may be critically dependent on good management. The real risk of losing focus and the resulting fragmentation of research should be handled by the management; constant focus on the mission of the new institute will be crucial. The focus also should be on acquiring talented, innovative young researchers so that the age distribution be considerably improved.

There is a good potential for development of the institute, but for the next level, it should attract more significant international grants as well as a good number of promising young researchers. In the past the predecessors had sizable international grants of which less (50 k EUR) is available in 2013. This is partly understandable as the EU Horizon 2020 has not yet reached working speed and grants opportunities may be better in 2015-2016. When compared to other fields, truly innovative medical research has a large potential to attract such grants. Also, more focused approach to some topic is needed to further develop in a specialised direction to find the research niches for the Center of Innovative Medicine.

Using the Open Access instrumentation as service to other researchers will require application of novel concepts of management which will be only tested in the coming years, but the site visit did not turn up reasons for serious concern.

Conclusions and recommendations

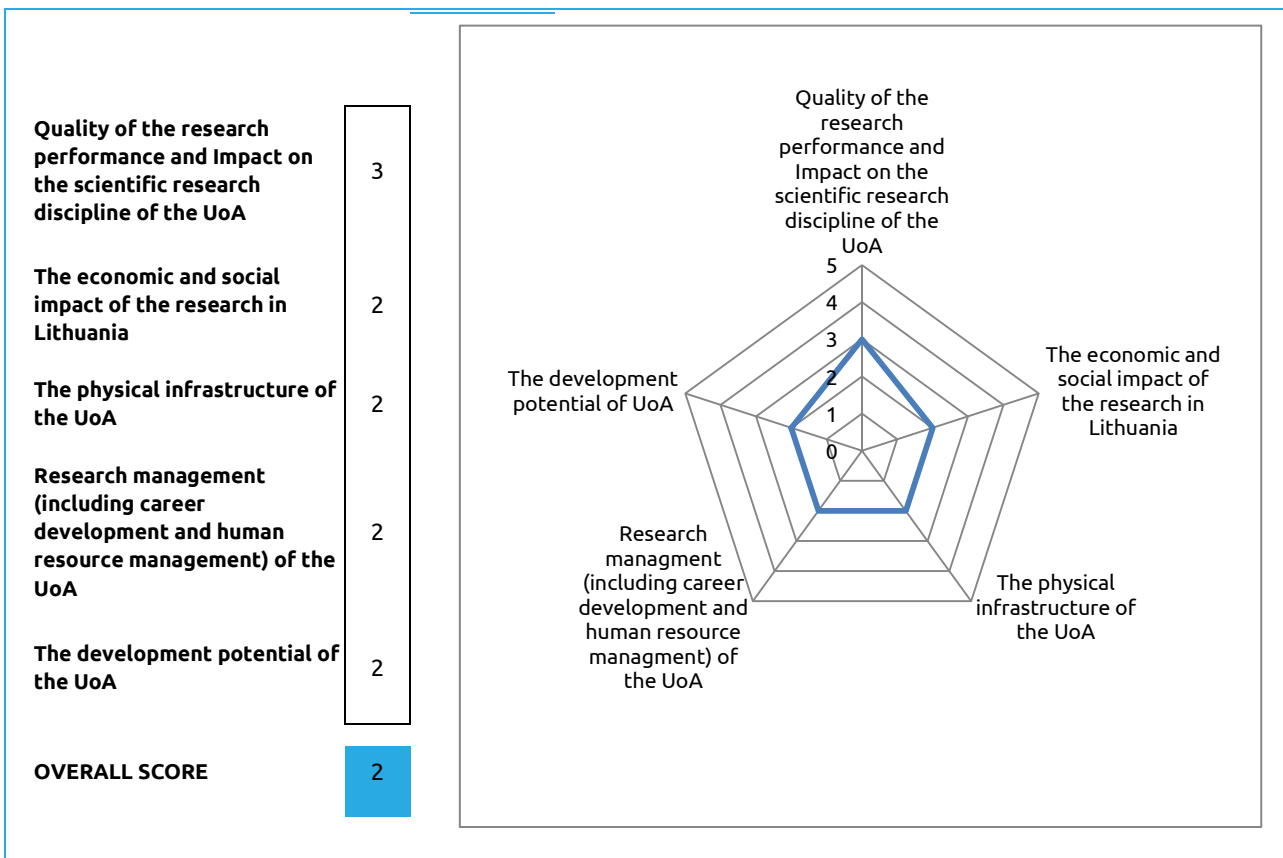
The Panel emphasises the need for maintaining activity along the vision of the Institute, and especially resisting challenges to involve further projects which might result in research fragmentation. The staff offering the Open Access services (also all other staff) might be constantly challenged to explore new avenues where the institute does not have the critical mass and/or the particular expertise to carry basic science results through applied research to innovations. The Panel suggests that an external advisory board with national and international members should oversee the general direction of the research and give strategic advice to the management.

The Panel identified the need to involve more PhD students and postdoctoral researchers and also helping young promising researchers to much more mobility towards the international centres in the institute's fields.

The name "Center for Innovative Medicine" sounds somewhat strange to the Panel. It suggests that medicine as such is not innovative. In the view of the Panel a better name might be an asset and should convey the notion that innovation and translational activity in medicine are the corner stones of the institute's mission.

Behavioural Medicine Institute, Lithuanian University of Health Sciences

Name of the UoA	Behavioural Medicine Institute
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	14,1
Composition of the Unit of Assessment (UoA)	1.Laboratory of Clinical Physiology and Rehabilitation; 2.Laboratory of Psychosomatic Research; 3.Hospital of Behavioural Medicine Institute



Overall Score

The overall score of two (2) is based on a satisfactory level of research. The quality of research would appear to have declined over last few years and currently they do not have a fully established international presence. They have limited engagement with non-academics, however their research does have potential benefits for Lithuanian society. Their current infrastructure would appear dated and has real scope for modernisation. Research management would appear to be going through a transitional phase and BMI would benefit for greater focus and innovation to develop their future research activities.

Quality of the research performance and Impact on the scientific research discipline of the UoA

The Behavioural Medicine Institute (BMI) is a part of the Lithuanian University of Health Sciences. This UoA covers research which is fundamental, applied and experimental. The quality of research within BMI was assessed as satisfactory from a national perspective. This is a multidisciplinary unit comprising

medicine, nursing, public health and informatics. It is clear that this UoA has suffered from the recent death of two of the most senior academic researchers. From the papers submitted in the self-assessment report there is clear evidence research which is of international significance, however many of these are journals with relatively low impact factors. Those that do appear in higher ranking journals (i.e. BMC Medicine) the Lithuanian academics do not appear to be taking lead roles in these collaborative studies (EU commissioned projects). Additionally, the number of articles in referenced scientific journals appears to have dropped since 2009 and levels of citation are also relatively low. They report 46 articles in refereed scientific edited journals in 2009 and this drops to 27 in 2013. Nursing is listed as one of the key fields of research in this UoA, however there was little evidence of nursing research in the self-assessment report or on the site visit. There were no nursing publications listed in section 4.3 of the self-assessment report.

The economic and social impact of the research in Lithuania

Research produced by BMI should be important to Lithuanian society, making a strong contribution to the field of cardiovascular rehabilitation and prevention. However, there was only limited evidence of high levels of interaction with non-academics within this UoA. The self-assessment report highlighting that 'outreach' is currently a weakness in this UoA. There is much stronger evidence of the historical impact of research within this UoA. They have organised international conferences that have been attended by non-scientists, however there is little other evidence of engagement with non-academic professional.

The physical infrastructure of the UoA

From reading the self-assessment report it was difficult to evaluate the quality of research infrastructure at BMI. However, on the basis of the site visit much of their equipment seems dated (e.g. sleep lab equipment).

They have good levels of technical staff (17.75 FTE), with very good working conditions, however they are inadequately qualified. There was not too much evidence of up to date equipment and this UoA is certainly not equipped with the infrastructure to be a top international player. Additionally, there appeared to be a limited number of PhD students conducting research studies based on the institutional infrastructure.

Research management (including career development and human resource management) of the UoA

There is some evidence of international collaboration, however little demonstration of national collaboration.

On the international front, they are working with University of Miami (USA) and University of Tilburg (The Netherlands) The public health research does not appear to be linked in any way to other institutions conduct interestingly, the PhD students at BMI appeared reluctant to write and defend their doctoral thesis in English language. The standing of BMI as an international research institute appears to be lapsing and they have only had six PhD completions in last five years. In the self-assessment report they highlight 'lack of sufficient research staff' and 'lack of diversity management' as weaknesses and these were clearly noted on the site visit. Internationally, they appear to have a limited presence. This is perhaps best highlighted by the effort that is given to a Lithuanian language journal, which has no international visibility or currency. In relation to international research development it was also rather surprising to see that the current leader did not display a good level of English language proficiency. The management also considered their location in Palanga as detrimental to their research development, as it difficult to attract researchers to this rural small town

The development potential of the UoA

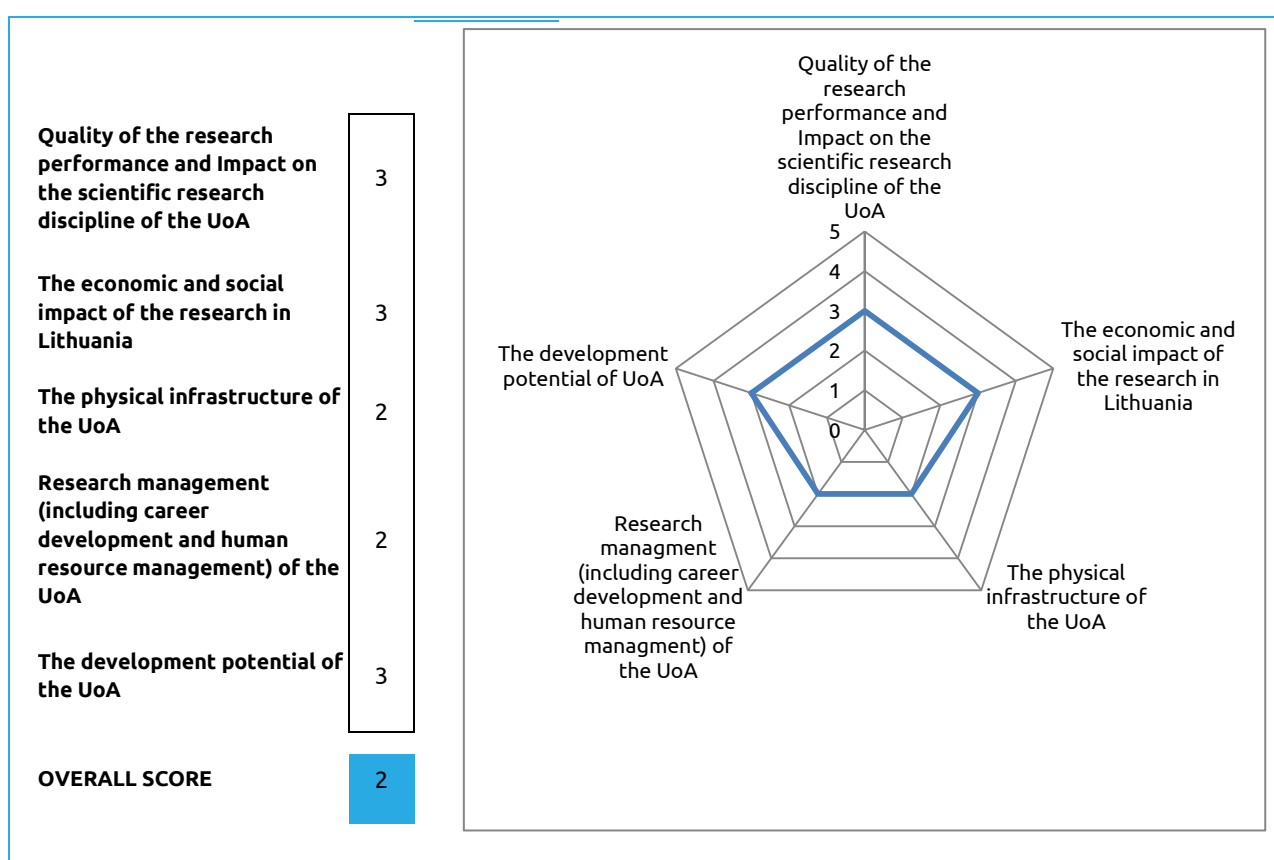
Development of this UoA would appear to be dependent on strategic research leadership. The BMI appears to have insufficient research funding at present and this is also a serious issue for long term development of this UoA. In their self-assessment report they acknowledge the need to develop a research infrastructure to ensure that they can compete at the highest level, at present there is little evidence of such developments

Conclusions and recommendations

The current size and location of this UoA may be a serious threat to its future potential development. The decreasing number of senior academics during this period of time is very worrying. BMI requires quick and appropriate replacement of former research leaders. Some of their current research would appear to be a little bit dated, there is a need for more diversity and a more innovative and strategic approach to future research aims. Unfortunately, there was little evidence of strategic research leadership on the site visit and this would appear crucial for future development. Replacement of senior researchers to initiate and develop strategic research plans is urgently required. As it is a relatively small institution, the potential of BMI may be greater if it became part of a larger institution or research unit within LUHS.

Faculty of Public Health, Lithuanian University of Health Sciences

Name of the UoA	Faculty of Public Health
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	32,3
Composition of the Unit of Assessment (UoA)	1. Department of Social Sciences and Humanities; 2. Department of Environmental and Occupational Medicine; 3. Department of Preventive Medicine; 4. Department of Health Psychology; 5. Department of Health Management; 6. Laboratory of the Prevention of Chronic Disease of Health Research Institute; 7. Laboratory of the Child and Youth Health of Health Research Institute; 8. Laboratory of Health System Research of Health Research Institute



Overall score

The overall score of two (2) was mainly linked to current low level of research infrastructure and limited engagement with non-academic professionals. FPH does have a good international level of research, however they do not appear to be leading on many of the projects they work on. Evidence of academic leadership and international engagement could enhance their current position. They should strive to be seen as the leading Public Health institution in Lithuania, a discipline which has several departments nationally. The panel foresees a more positive future for FPH if they address issues raised in this report, which may also be enhanced by their imminent move to new purpose-built facilities.

Quality of the research performance and Impact on the scientific research discipline of the UoA

In general, research presented by the Faculty of Public Health (FPH) is of a good international standard. This UoA takes a multidisciplinary approach to research, reflected by eighteen fields of research being listed in their self-assessment report. Over a third of presented publications are at international level. Public health research is clearly the largest field, accounting for over half of all research activity in this UoA (53.5%). There is evidence of several publications in good international journals (i.e. PloS ONE, Social Science in Medicine & BMC Public Health) from public health researchers, however these are mostly as part of collaborative projects and there is no evidence of FPH faculty leading these studies. The papers that were sent out for review almost completely lack Lithuanian academic leadership. However, there was evidence of academic Lithuanian led academic impact factor publications in the self-assessment report (i.e. Public Health). Additionally, it is not clear whether the FPH collaborates with other public health units in Lithuania.

The economic and social impact of the research in Lithuania

The social and economic impact of research conducted at FPH was rated as good. The nature of the research has a clear impact on Lithuanian society. In particular, the research on smoking, alcohol and drugs which would appear to be important to Lithuanian society. This was reflected by the international collaborative research conducted by academics within this UoA. Again it should be stated that there was no evidence of academic leadership from within this UoA in relation to these international projects. There was only limited evidence of high levels of interaction with non-academics within this UoA.

The physical infrastructure of the UoA

It was very difficult to make an objective assessment of the current research infrastructure in their current location on the site visit. They are currently in a very dated temporary building, which appeared totally inadequate from a research perspective. This UoA lists 21 FTE technical staff, although there was little evidence of the work that they engaged with during the site visit, which was confined to one office. Despite this there was convincing evidence to suggest that infrastructure and research orientation will be connected in future developments. The process will be facilitated by the pending move to new purpose built facilities, providing a better research infrastructure and also closer physical links with the clinical/hospital facilities.

Research management (including career development and human resource management) of the UoA

Discussion with management, senior researchers and PhD students demonstrated a clear vision and commitment towards future research development. This was also reflected in the self-assessment report, outlining a strategic research plan for this UoA. This strategic direction corresponds to the overall strategic plans of their university. They have produced 29 doctoral theses in last five years. All staff interviewed at the site visit indicated that they had given input to the development of the self-assessment report and it was clear that there was transparency in this process. There were some concerns raised about time allocation for research, many research active staff indicated high teaching loads. In addition, there could be more strategic focus within FPH, further enhancing funding opportunities.

To become a notable international research player the FPB needs to make a concerted effort to develop a more strategic and focused approach towards public health research. Presently, their very diverse approach towards research lacks focus, reflected by eighteen fields of research in their self-assessment report.

The development potential of the UoA

The development potential of FPH is good and it has capability to strengthen its position as a national leader of public health research and to develop a greater international presence. A more strategic approach would

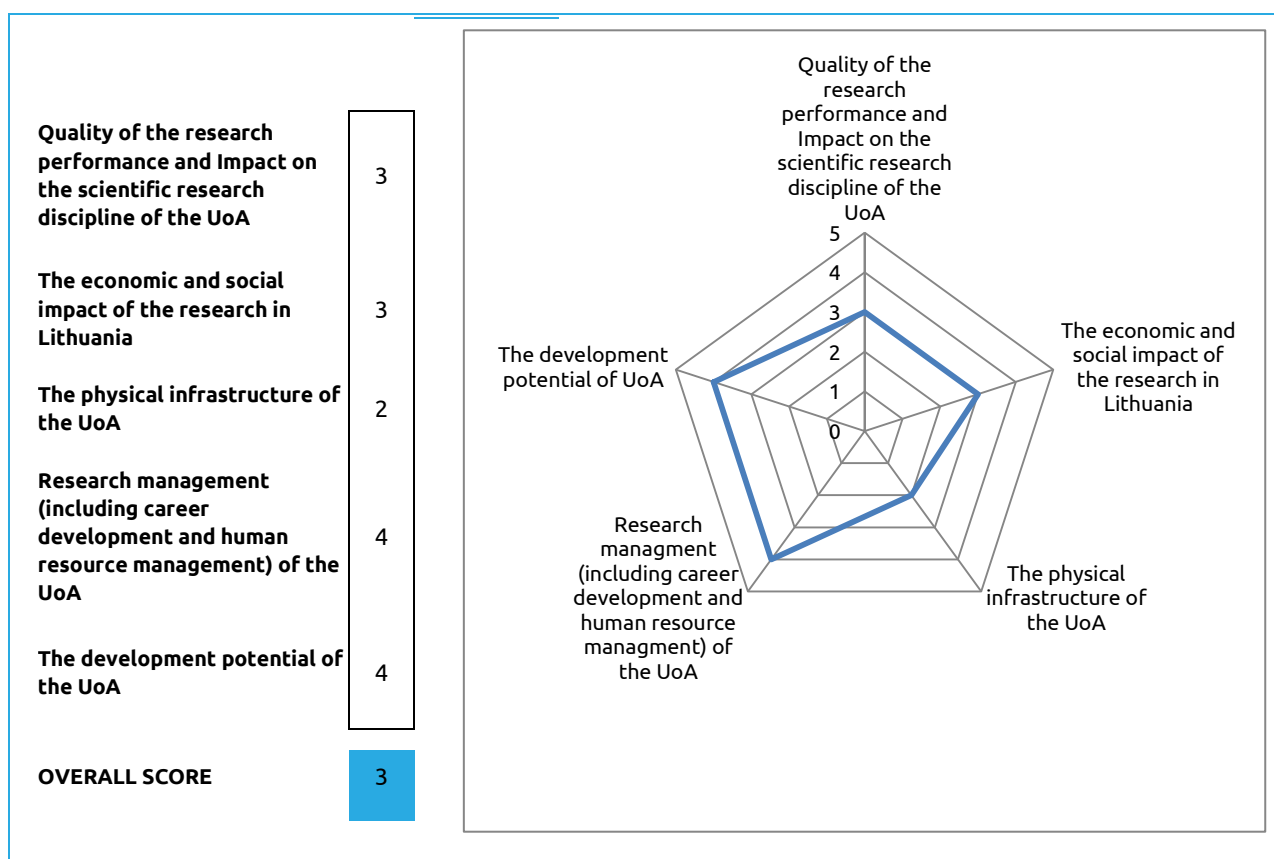
potentially improve funding opportunities, increase international collaborations, quality of research output and the impact of the FPH research. PhD students at FPH were ambivalent about whether they should write their doctoral work in English. This would not only raise their individual profile of the student but would also raise the institutional profile.

Conclusions and recommendations

The FPH is not the only HEI in Lithuania to conduct public health research, it does appear to make a good international contribution. However, improvements are required to allow it to fully realise its international potential. They should be encouraged to continue to develop international collaborations with existing world-class institutions and to lead on collaborative projects. To address the current paucity of international grants, successful application for international grants and other funding will be required to ensure a positive future for FPH. One general recommendation from this evaluation would be to encourage these PhD students to write and defend their dissertation in English. This will enhance their ability to disseminate the findings of their research more readily in English language international journals.

Faculty of Health Sciences, Klaipeda University

Name of the UoA	Faculty of Health Sciences
Name of institution being assessed	Klaipeda University
Total no. FTE researchers	23,68
Composition of the Unit of Assessment (UoA)	Medical Technology; Nursing; Public Health; Recreation and Tourism; Rehabilitation; Social Work



Overall score

The overall score of three (3) for KU is based on a good current level of international standard research, although they are not always leading projects. They have very good and innovative research management team in place, providing good vision and strategic direction for the institution. Site visit did not demonstrate appropriate research infrastructure and this is one area that would currently appear to require attention. KU makes valuable contribution to social and economic impact in Lithuania, especially in public health matters. The panel expects a bright future for this UoA, especially with planned activities around research in health tourism.

Quality of the research performance and Impact on the scientific research discipline of the UoA

A positive assessment was made of this UoA based initially on the very well written self-assessment report, this assessment was enhanced by the site visit. This is a UoA which is under relatively new and young leadership who appear very enthusiastic about research development in interdisciplinary and

multidisciplinary research. Within the self-assessment report, This UoA presented several fields of research including; sociology, nursing, biophysics and public health. From the self-assessment report, it is clear that maintenance and development of high quality international research is a priority for this UoA. This level of international research development is reflected by several of the papers submitted for review (i.e. Acta Paediatrica). However, it is clear from the submission that the faculty from the UoA do not always lead on collaborative international studies (I.e. Istomia et al 2011).

There are only a small amount of PhD students currently studying at KU, to date no PhD student has graduated. However, they have a number of PhD students who have graduated from a joint PhD collaboration they have with a Finnish institutions (University of Turku/University of Lapland). PhD students appeared motivated to study abroad to increase academic networks for collaboration, however this was little evidence of this type of activity to date. On the basis of the site visit it was difficult to ascertain why social work appears as one of the key academic departments within this institution, however there was little or no evidence of research being conducted within this discipline. It was slightly surprising that this did not appear as a field of research in the unit's self-assessment report and this could be seen as a missed opportunity at KU. Additionally, within the KU UoA self-assessment report nursing was listed in second place, yet very limited evidence of nursing research could be seen within list of presented publications. On collaborative research projects academics from KU do not appear to be taking lead roles. The geographical location of this UoA provides an opportunity to be one of the leading international research institutions in the Baltic region, in particular in relation to development of scientific research of health science and maritime facilities.

The economic and social impact of the research in Lithuania

The social and economic impact of research conducted at this UoA was rated as good. The nature of their multidisciplinary research has a clear impact on Lithuanian society. In particular, research related to public health status and health care as well as exploitation of the natural resources of this region. This is reflected in publications related to health tourism (i.e. Annals of Tourism Research), this would appear to be a developing and innovative area of research within this UoA.

In this UoA there limited evidence of high levels of interaction with non-academics within this UoA, this is one area that could be improved.

The physical infrastructure of the UoA

There would appear to be some issues with the current physical infrastructure at KU. As stated in their self-assessment report they have 'outgrown their current physical facilities' and this was highlighted as a potential weakness in this UoA. However, the nature of the majority of research conducted at KU does not appear to require laboratory facilities. Levels of international publications may improve as a result of better physical infrastructure, decreasing administrative and teaching loads on staff would also improve this situation.

Research management (including career development and human resource management) of the UoA

Research management would appear one of the strengths of this UoA. The description of management concept is very clear in the self-assessment report and is comparable with good international practice. There is a clear strategy from PhD students through to senior academics. Interview with the members of this faculty displayed a high level of motivation and staff indicated that they had protected time to develop research projects and apply for grants. However, it was not clear whether this protected time had any impact on publication rate or success in grant applications. Discussions with senior researchers and PhD students demonstrated a clear vision and commitment towards future research development. All staff that were

interviewed at the site visit indicated that they had given input to the development of the self-assessment report and it was clear that there was transparency in this process.

The development potential of the UoA

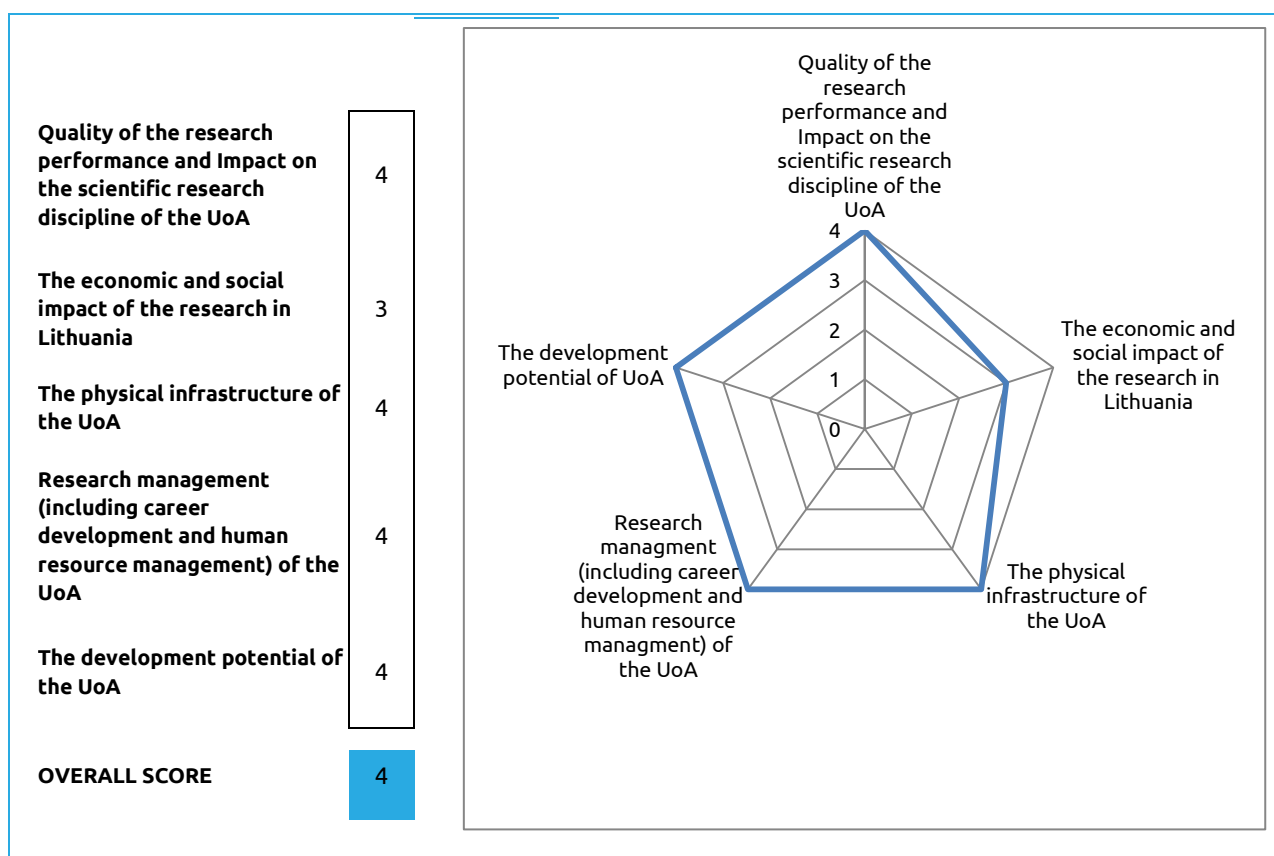
Internationally, this UoA would appear to have good potential to develop to become an international player. There was evidence of good research management and infrastructure, although the laboratory visit during the site visit was not relevant to work presented within the self-assessment report. Researchers were actively applying for international funds (e.g. one Horizon 2020 bid) and research management were examining innovative ways to develop research within their department. Innovation was demonstrated with the development of research in the field of health tourism. There was good evidence of international collaboration, including a joint EU BSR project with Turku University of Applied Sciences. This UoA appears to be using its geographical location to good advantage, evidenced by development of health tourism.

Conclusions and recommendations

Taken as a whole, this UoA gives the impression of a top-level national research player with good potential to develop into an international level research institution in the future. This development would appear to depend on the development of research links between health science and tourism. With the attraction of international grants this UoA has a very promising future with potential to contribute internationally in a range of health related disciplines. The research management team appeared very capable of addressing some of the issues raised around current infrastructure problems

Institute of Cardiology, Lithuanian University of Health Sciences

Name of the UoA	Institute of Cardiology
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	35,8
Composition of the Unit of Assessment (UoA)	1.Laboratory of Cell Culture; 2.Laboratory of Cardiac Pathology; 3.Laboratory of Molecular Cardiology; 4.Laboratory of Membrane Biophysics; 5.Laboratory of Population Studies; 6.Laboratory of Clinical Cardiology; 7.Laboratory of Automation of Cardiovascular Investigation; 8.Open Access Laboratory of Preclinical Drug Examination; 9.Open Access Laboratory of Medical Target Histopathological Research



Overall score

Based on assessment of this Unit in all analysed categories, the Institute of Cardiology at The Lithuanian University of Health Sciences deserves overall score of **Very good (4)**. This stands for one of the best biomedical units in the Lithuania and the unit which is recognised as the strong international player. The most positive elements include a very well balanced combination of experienced researchers and well established laboratories with the most modern ones, based on new generation bringing fresh ideas.

Quality of the research performance and Impact on the scientific research discipline of the UoA

Institute of Cardiology at The Lithuanian University of Health Sciences is the unit specialised in basic, clinical and translational research in cardiology and it is closely related to the University Hospital in Kaunas. It declares 105 employees with FTE of 67, revealing that apart from clinicians working only part time in the

Institute there is a significant number of full time researchers. The unit is composed of 7 laboratories situated within the campus, of which some do exhibit an impressive working atmosphere, innovativeness and measurable scientific outputs. Laboratory of Cell Culture is a modern unit with several PhD students/full time researchers, very well equipped and active in international collaborations. Different from what has been seen as an average in biomedical research in Lithuania, majority of PhD students and researchers are involved in very logical and fruitful collaborations with laboratories abroad (e.g. USA). For sure this adds to easily recognisable high standards of the Laboratory. The same can be said for Laboratory for Membrane Biophysics which can be compared to any very good unit working in the same topic across the EU. Laboratories for Cardiac Pathology and Molecular Cardiology are not less active, which is visible in the list of publications. What the experts see as an added value is a presence of the subunit involved in population studies which adds to the general scientific value of the Institute. The prominent research fields of interest include cell biology (e.g. several very good publications dealing with gap junctions), electrophysiology (e.g. very good publications of which some include an innovative patch clamp and visualisation set ups) and analyses of various gene polymorphism linked to risk factors or therapeutic response in various cardiovascular diseases. All in total, the Institute in the last 5 years produced more than 40 current content publications, of which majority are published in respectful journals and PhD students who worked in the Institute defended more than 15 PhD thesis. Following what has been investigated by a team of independent reviewers and what has been seen during visits, the research level of the Institute is estimated as **Very good (4)**. This corresponds to one of the best national institutions in the field of biomedicine and the strong international player with a recognized and significant international impact.

The economic and social impact of the research in Lithuania

The economic and social impact of the Institute is estimated as **Good (3)**. This means that the research of the Unit is important to the society and that the connections with non-academic sector are recognizable (e.g. project with the companies “Kardiosignals” and “Valentis Pharma”. In SWOT analyses the research unit declares insufficient collaboration with business and it is positive that they are aware of this fact. Indeed, contacts with business sector can be improved. The reviewers acknowledge results obtained in epidemiologic studies which influence the national strategy in cardiovascular diseases. Also there are some contacts with other institutions with potential for more significant commercialisation (e.g. the tool for sportsmen training).

The physical infrastructure of the UoA

The physical infrastructure is estimated as **Very good (4)**. The cell culture, histology and electrophysiology units can be seen as the national leaders in the fields. They possess equipment in the range of bit older, but still useful set ups to some very modern ones (e.g. patch clamp setup, cell culture unit, histology). Number of technical staff seems to be sufficient and access to databases is present. What is positive that all the equipment is being in a regular use and some of the set ups, like those ones for procedures on large animals, are used in education of medical doctors as well. Overall, this is a very good example of carefully selected and built pieces of equipment which are used in the very efficient way.

Research management (including career development and human resource management) of the UoA

The research management of the Institute is estimated as being Very good (4). There is a clear short and a long term strategy of research activities ranging from PhD students to the group leaders. The overall atmosphere and motivation are excellent. On the other hand, the received self-assessment report has been less informative than majority of other reports received from other units in Lithuania. This left the feeling that there was no precise coordination between laboratories and that the opportunity to present this Institute was a bit underachieved. From the written text it was very hard to recognise a real extent of scientific

activities and a real extent of scientific output. If the presentation of the Institute as a homogenous unit will be reached in the future, the research management will deserve even the superlative estimation.

The development potential of the UoA

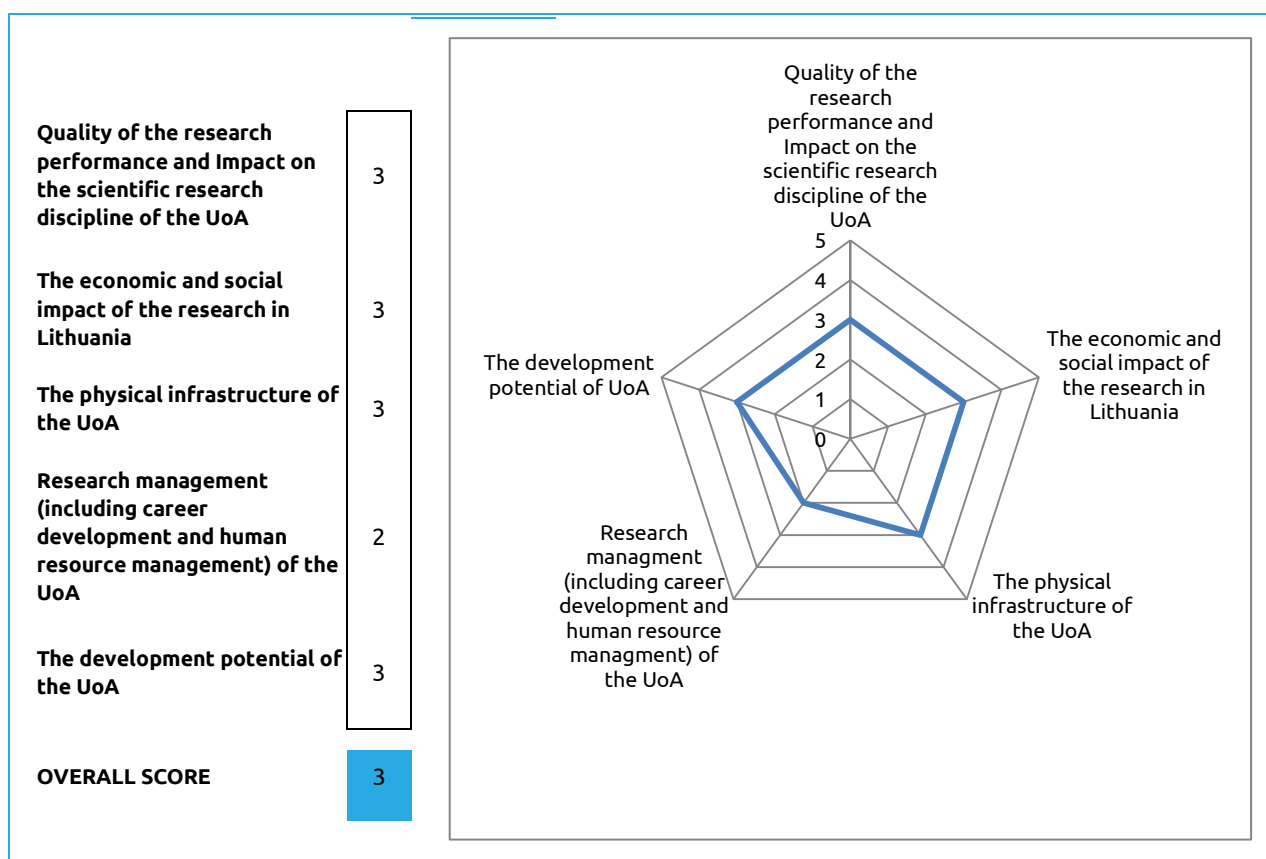
Development potential of the unit is **Very good (4)**. It possess a very good combination of well established laboratories and innovative groups with progressive topics of research. There is a clear and recognizable capability of the scientific environment (critical mass achieved, very clear orientation towards modern research) to support currently selected and any future research. It is estimated that following this path, laboratories will attract even more significant local and international grants and continue development.

Conclusions and recommendations

Institute of Cardiology at The Lithuanian University of Health Sciences is a well established and recognisable research unit with size which possess a very good balance between needed critical mass and rather easily manageable teams. In order to continue its development and maintain the very good level observed, it will be needed to raise at least few more group leaders who will be capable to ensure funds needed for research. Also, more PhD thesis should be written in English, to increase visibility of the Institute. With a constant number of publications with local researchers as the first authors and constant efforts to attract both local and international grants, this unit has a very good and promising future.

National Cancer Institute, National Cancer Institute

Name of the UoA	National Cancer Institute
Name of institution being assessed	National Cancer Institute
Total no. FTE researchers	52,5
Composition of the Unit of Assessment (UoA)	National Cancer Institute



Overall Score

The overall score of 3 (**Good**) is based on some very good research and publications while a number of others with less prestige. Additional reasons for this score include (i) the important responsibility for cancer registry in Lithuania, that may have much higher economic and social impact, if utilised more, e.g. if accompanied by selected tissue and gene banks, as specified below, (ii) a relative lack of active collaboration with foreign institutions, (iii) lack of more targeted research on certain types of malignancies and (iv) a weak research management. The Panel appreciated the nanoparticle approach within the UoA and also some aspects of the management, especially the number of the PhDs.

Quality of the research performance and Impact on the scientific research discipline of the UoA

The value of the 10 articles provided with the self-assessment is variable. In five articles NCI is merely one of the international collaborators. These papers deal with colorectal cancer screening, testicular cancer, alcohol-related malignancies, chemotherapy of non-small-cell lung cancer, and continued use of tamoxifen

in breast cancer (published in (i) Endoscopy, (ii) Annals of Oncology, (iii) Eur J Epidemiol, (iv) Lancet Oncol, (v) Lancet); the first three represent medium prestige journals while the latter two are top journals. However, in none of the above five articles is the NCI “in the driving seat”. Thus in paper (i) NCI is merely one of 87 collaborative units, in paper (ii) NCI is not a real author but only a member of “The EUNICE Survival Working Group”, in (iii) and (iv) the role of NCI is not clear at all, and in (v) NCI is not a real author but merely a member of a “Collaborative Group”. In a sixth paper NCI is represented for once by a real author, published in Eur J Cancer, where the cancer risk after the Chernobyl exposure in Baltic countries is evaluated. The four other articles, published in medium prestige journals, are Lithuania-only but with a major NCI contribution. One of them is not cancer research but is on antibiotic resistance of *Acinetobacter*. Three articles were published in Journal of Biomedical Nanotechnology (high impact factor 7.6) with Professor Ricardas Rotomskis, Head of Biomedical Physics Laboratory, as the senior author. His personal Hirsch index is 15 and one of his papers is “hot” (i.e. cited >100 times). The panel was impressed by his approach during the site visit. The research approach is to use nanoparticles coated with anticancer substances, as “Paul Ehrlich’s magic bullets” targeted to tumour cells. Unfortunately he is approaching retirement age. The Panel felt that it would be good if he could continue research without administrative duties and pass his knowledge and research traditions to his current students. This laboratory was well equipped and most importantly also had enthusiastic students who participated in the interview. Unfortunately this was not the case with much of the other personnel. Apart from the Biomedical Physics Laboratory, NCI had not prepared itself for the site visit and the Panel had to milk the data out of the staff present. All in all, according to Scopus (2009-2013) NCI has 3.4 publications per researcher (rather low value) and 27.7 article citations (excluding self citations) per researcher (a reasonable number).

The economic and social impact of the research in Lithuania

National Cancer Institute is an important institution for Lithuania for diagnostics, health care and education in the field of oncology. Judging from the research projects and publications listed this UoA has already some economic and social impact which is likely to grow with time. This UoA is responsible for cancer registry in Lithuania, a potentially highly important instrument for public health and research. Thus The Lithuanian Cancer Registry could have a high economic and social impact, if taken more seriously (see Recommendations below). Outside the health care area the economic and social impact of research in this UoA is currently rather low, as the self-assessment lists no market oriented or contract research at all. The only promising data is the listing of two start-up companies, where the NCI participated in the launching.

The physical infrastructure of the UoA

NCI is a large institution with a total of 951 employee but has a rather small research component (research personnel 58, FTE research personnel at 31.03.2014 was 52.5). The NCI includes (i) the cancer registry, (ii) basic research (e.g. work towards photodynamic therapy of cancer, see above), (iii) Laboratory of Carcinogenesis and Tumour Pathophysiology, (iv) Laboratory of Immunotherapy, and international “rather passive” collaboration specified above. The equipment listed looks rather standard, apart from the nanotechnology unit, but is probably adequate for the research work currently carried out at the Unit. The National Cancer Institute would benefit from more enthusiastic PhD students and getting more post-doctoral researchers, preferentially at least some of them from abroad. The number of technical personnel is given as 17 which seems to be adequate..

Research management (including career development and human resource management) of the UoA

The self-assessment reflects an inadequate management, which sent for evaluation a document reflecting inattention, poor understanding of the questions, with elementary errors in scientific English. It was the poorest self-assessment document the experts in the panel have ever seen. Based on this document alone the

management score is 1 (one= poor). However, the site visit and detailed study of other material, such as the NCI website improved somewhat the panel's opinion. The management deserves a good mark for the international collaborations evidenced by some of the publications (but not the self-assessment). Doctoral (PhD) training resulted in 13 degrees awarded in 5 years and 8 new enrolments in three years, which is somewhat below what is expected from a national cancer research centre. Judging from the titles some of the dissertation topics look fine while several seem to lack innovation. Unfortunately all dissertations were in Lithuanian language. Within a 5 years period 4 postdoctoral researchers are also described. Visits abroad are short, most frequently not longer than 1 month, except for 3 cases of 2-3 months duration. Such lack of study trips may result in slow or little infusion of fresh experience, methods and ideas.

The units iii and iv (see above) would benefit from focusing in their research activity. They should probably concentrate on only a few types of malignancies, rather than applying a broad-target approach. In general, the focus of the research management seem to be fuzzy, for example 18 topics (research outputs?) are described for a staff with 52 FTE. The age distribution is balanced and 20 researchers in the 25-34 years age bracket is promising.

The international collaboration has not been specified but is simply called "collaborative research", copied for characterization after the names of various institutions. Currently there seems to exist no significant funding from abroad or even significant international collaboration in which NCI would be the driving force. It appears that the (scientific) leadership needs management training or coaching to fulfil its tasks professionally.

The development potential of UoA

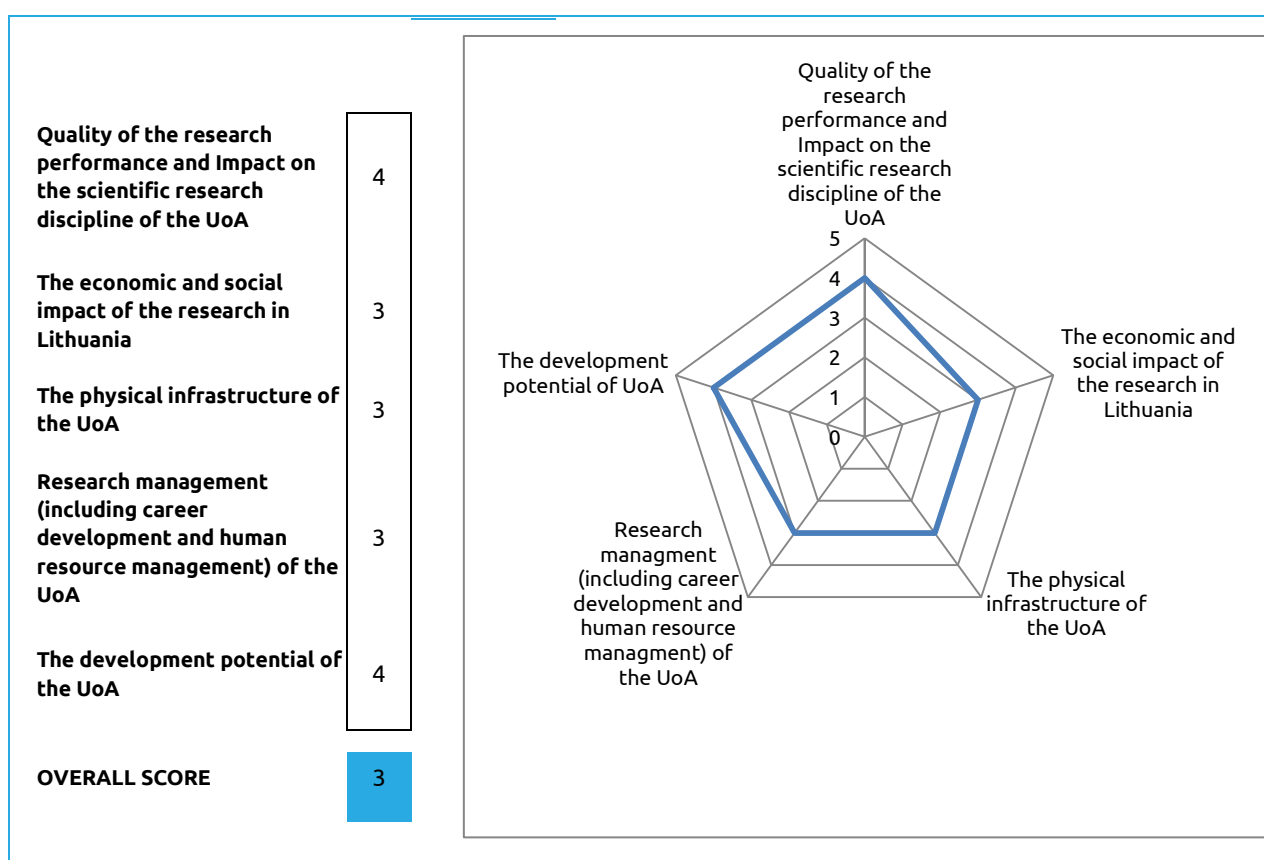
NCI could have a promising future in particular since the age structure as such is balanced. But for this to happen it is mandatory that NCI finally opens its eyes to the more developed cancer research units outside Lithuania, e.g. in Nordic countries. A current introvert attitude seems to be a general problem in Lithuanian biomedical research. The international accreditation of the NCI by the OEIC is a promising factor although it is not clear whether it reflects the quality of the clinical activity or the quality of research or both.

Conclusions and recommendations

The panel feels that this UoA has a good potential but is currently too "self-supportive" and operates in too many unrelated directions. The research management should be improved, the niche areas identified and vigorously cultivated. The panel feels that the National Cancer Institute should (i) start using predominantly English in its communications, dissertations, thesis books should be primarily in English with a short summary in Lithuanian language, (ii) generate tissue and gene arrays (for a few selected types of malignancies) in conjunction with the cancer registry, (iii) focus on less topics, (iv) significantly improve management skills, and (v) try to generate international contacts and collaborations. Foreign PhDs and post-doctoral students should also be attracted.

Faculty of Medicine (Fundamental medicine), Lithuanian University of Health Sciences

Name of the UoA	Faculty of Medicine (Fundamental medicine)
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	28,61
Composition of the Unit of Assessment (UoA)	1. Institute of Anatomy; 2. Department of Biochemistry; 3. Department of Physics, Mathematics and Biophysics; 4. Institute of Physiology and Pharmacology; 5. Department of Histology and Embryology



Overall score

The reasons for the score of 3 are: 1) A good level of research, partly based on results obtained by the predecessor institutions, 2) a relatively good economic impact shown by the list of marked oriented and contract research projects, 3) a good management with some cause of concern for the future and 4) with development potential both in their fields of science and in benefit to the Lithuanian economy, also shown by their potential for generating income for research.

The overall score of 3 (three) means that the Panel sees a good level of research and a very good developmental potential to be further materialised by increasing the number of publications in high impact journals. This UoA has laboratories focused on basic sciences and provides infrastructures and equipment allowing several students to perform PhDs in a good scientific environment. The scientific productivity is good with some publications being highly cited and some appearing in high impact journals. However, the

panel noticed that the UoA appeared relatively fragmented without clear sign of cooperation between the subunits.

Quality of the research performance and Impact on the scientific research discipline of the UoA

Research by the UoA possesses a very good standard of quality in terms of originality and importance. The UoA reported about 100 research staff, 100 original, anonymously refereed scientific publications cited in SCOPUS and 100 in Journals, Conference Proceedings, Book Series, Books, Trade Publications in SCOPUS which gives the number of 2 publications/year/researcher, being a very good mean value for a UoA. Some of the publications arose serious interest in the international academic community. For instance, the Panel noticed the excellent scientific production of D. H. Pauža who was cited 191 times for his publication in 2000 in *Anatomical Record* (IP 1.3): "Morphology, distribution, and variability of the epicardiac neural ganglionated subplexuses in the human heart". Another scientific highlight was recognized by the scientific production of Edgaras Stankevicius with 38 publications in PubMed one being cited 348 times. Therefore, in terms of impact, the UoA is internationally recognised in its disciplines and is highly regarded as a partner in international research projects and networks.

The economic and social impact of the research in Lithuania

Research of the UoA is important for society. The Unit's interactions with non-academics (i.e. business, policy-makers, and the public) are at a level that is expected of recognised academic institutions. This was best illustrated by the implementation of a common project with the UAB «Baltic Orthoservice», one of the biggest producers of individual orthopaedic devices in Europe and winner of the Business-science partnership competition 2013. Another evidence is given by Dr. Romaldas Maciulis output who is member of the Committee for Advanced Therapies of the European Medicine Agencies and as such produced high impact factor joint publications, one as first author see «Clinical Development of Advanced Therapy Medicinal Products in Europe: Evidence That Regulators Must Be Proactive» published in 2012 in *Molecular Therapy* (Impact factor of 6.4) and already cited 33 times. The Panel estimated that this effort to participate in intergovernmental agencies like European Medicine Agencies has a strong indirect economical and societal impact and should be strongly encouraged and promoted.

The physical infrastructure of the UoA

The Unit is able to provide a research environment that is comparable with globally recognised academic institutions in its discipline. Indeed the whole research infrastructure including an archive of publications on cardiac neuroanatomy (NeuroCor) and a collection of hearts stained for acetylcholinesterase are open access. Within this open access infrastructure the UoA possess an arthroscopic meter available for staff members and visiting researchers confirming the infrastructure open access. During the visit, panel members could indeed verify that this UoA offers a complete open access infrastructure with state of the art confocal microscopes and an electron microscope. The members of the panel could also see that major constructions are in progress which will open new facilities and increase the potential of the infrastructure.

Research management (including career development and human resource management) of the UoA

The Unit of Assessment is a Strong National Player. From bibliometric data, the UoA has a high number of article/researcher (8.6) with 43.7 citations/article. The Panel noticed that although constituted by 5 different divisions (2 Institute and 3 departments) the level of scientific productivity was quite homogenous with a mean h index of 18 giving strong argument for a very good management.

The self-assessment report portrays a management following the accepted/traditional rules of the State. The UoA uses efficiently all the various types of national funding available for basic research (Research Council of Lithuania). In addition thanks to its openness, some of the staff researchers succeeded in getting international grants.

The research staff is mostly full time (as it should be but not observed in all other Lithuanian research institutes) and dedicated to both teaching and research. PhD students are also working but in the Panel's opinion concerted actions to attract postdoctoral fellows will be required. On meeting the PhD students, the visitors had good impressions, although the students were not keen or even aware of the importance for their career of spending a postdoctoral period (at least one year) abroad. At the moment there is a preponderance of staff over 45 years of age, which is not a good sign in "innovative medicine". An infusion of young talent is needed to exploit the opportunities lying ahead.

Research management has a clear vision and a good institution strategy. One can recognise their priorities: investment in higher number of international collaborations, especially for early stage researchers.

The research is structured around major topics that have a clear strategy with a good translational approach having integrated mathematician and bioinformatician in the UoA. The panel recommends that a strong UoA leadership should keep the strategy on track.

The number of visits made by staff members abroad is very diversified and should be maintained.

A general management problem manifested also at this institute: few PhD thesis has been written in English in the past. During the site visit - on direct questioning - several PhD students expressed plans to submit the thesis in English, but clearly most if not all PhD theses in this field of research need to be submitted in English. In a small country it is important to have not only home-grown examiners of the theses which is possible only if the thesis work is reported in English.

The development potential of UoA

The Unit of Assessment is able to maintain itself as a recognised and respected player in the international scientific community within the given scientific discipline. The UoA has already achieved an excellent level of scientific quality which is evidenced by its h index of 18 which gives the position within the top 3 (out of the 16 UoA in Biomedicine). During the visit, the panel noticed the high number of enthusiastic PhD students performing research within the different laboratories, a strong indicator for the development potential of the UoA.

Considering the excellent results in cardiac neurophysiology and the up-to-date equipment needed for this research, the Panel sees good prospect for this ongoing research. The panel also recognized the great potential offered by the « brain back » operated today by the leader of the laboratory of physiology and pharmacology, even the possibility of breakthrough in the next 10 years. The SWOT analysis is rather short but fair in its statement highlighting the hope to develop cooperation with business center of Santaka and Nemunas valley.

The development of an Institute is critically dependent on good management. The real risk of losing focus and the resulting fragmentation of research should be handled by the management; constant focus on the mission of the UoA will be crucial. The focus also should be on acquiring talented, innovative young researchers so that the age distribution be considerably improved. Thus, there is a good potential for development of the UoA, but for the next level, it should attract more significant international grants as well as a good number of promising young researchers.

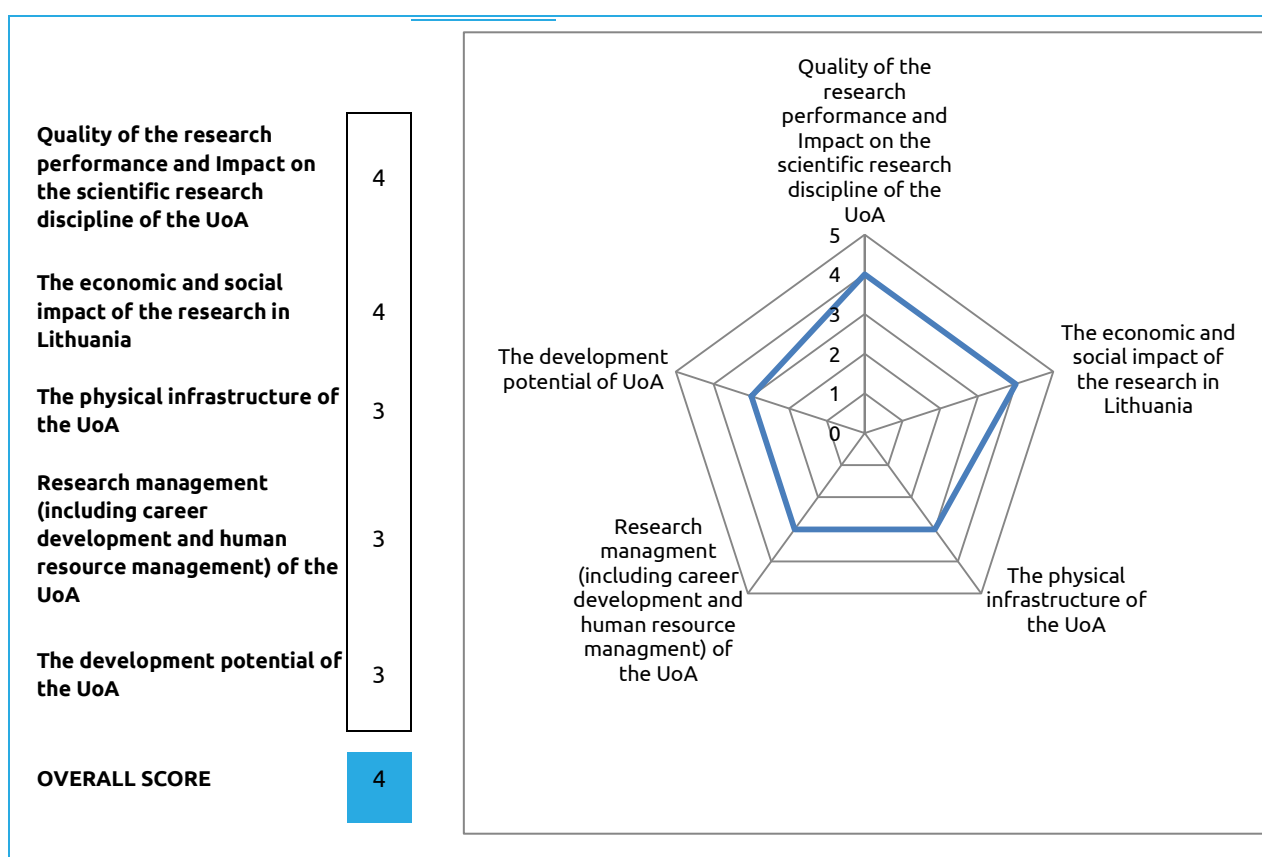
Conclusions and recommendations

This UoA gathers different subunits with different potential, the leading one focused on the neuroanatomy of the heart is internationally recognised but may need some reorientation for future competitive research. It is

expected that the “flambeau” is to be taken by the leaders of the laboratory of physiology and pharmacology. The UoA attracts many students from the Faculty of Medicine but also from the Faculty of Pharmacy. Such attractiveness is a good indicator of the dynamism and potentiality of the UoA. The Panel would recommend that in the future, the students should increase their practice of English within their seminars and write their PhD thesis in English as first language. Foreign PhDs and Postdoc students should be attracted. The thesis should be in English. It is also expected that Pr. Edgaras Stankevicius, chief editor of the Medicina (Kaunas) Journal will either increase the impact factor of the Journal (current impact factor being 0.55) or considered merging with another international journal for reaching a much higher impact factor. This recommendation is based on considering that the energy and efforts needed to be the editor in chief which should be efficiently used considering competitiveness and the ratio effort/efficiency (the efficiency indicator being the impact factor of the Journal).

Faculty of Sport biomedicine, Lithuanian sports university

Name of the UoA	Faculty of Sport biomedicine
Name of institution being assessed	Lithuanian sports university
Total no. FTE researchers	28,32
Composition of the Unit of Assessment (UoA)	Faculty of Sport biomedicine



Overall score

The score of 4 is justified by the excellent level of science developed by the UoA which is comparable with good European Sport Institutes. The panel acknowledges the very good level of research driven by charismatic leaders attracting many enthusiastic PhD students. The panel also noticed the high number of grant applications made and the success rate. The panel was also impressed by the strong and productive scientific collaborations made with European and American laboratories specialised in sports research and education (Karolinska Institute, University of Worcester, Massachusetts).

Quality of the research performance and Impact on the scientific research discipline of the UoA

Research accomplished by the UoA possesses a very good standard of quality in terms of originality and importance. Work at this level aroused serious interest in the international academic community with publications in international journals. In terms of impact, the research outputs of the UoA are published in the leading international forums of the respective discipline, and they have a considerable impact on the

development of the discipline worldwide; the UoA is highly valued as a partner in international research projects. In particular the UoA is partner of an international project dealing with molecular targets within obesity and diabetes and also partner of the international project « Citrate synthase » granted by the European Foundation for the Study of Diabetes. The panel would like to highlight the excellent scientific productivity of Albertas Kurvydas with 67 publications refereed in PubMed with one published in 2005 in *Acta Physiologica Scandinavia* and cited 57 times (impact factor of 2.6) and the young leader Marius Brazaitis with 43 publications refereed in PubMed (5 in 2014 and already 3 in 2015) in international journals such as *Plos ONE* having an Impact factor of 3.5 (2 publications in 2014) and in 2015 in *International Journal of Hyperthermia* with an impact factor of 3.5.

The economic and social impact of the research in Lithuania

The economic and social impact of this Unit is high in Lithuania considering that one of the strategic research area is focused on physiological and social aspects of empowerment of disabled and conducted by a disabled professor. The Panel recognized the high societal impact reached by the UoA performing applied research on the strategic area on Adapted physical activity responding to the « Convention on the Rights of Persons with Disabilities »

The Panel also noticed that the UoA is also granted by the Lithuanian National Olympic Committee Sport Centre for testing performance potential of athletes.

The physical infrastructure of the UoA

The Unit is able to provide a research environment that is comparable with globally recognised academic institutions in its discipline. Some of the equipment was designed and adapted for disabled people which is rather unique and is a strong exclusivity. During the visit, the panel was concerned about the molecular biology unit which has a minimum of equipment. The Panel was also concerned by the “ageing” equipment.

Research management (including career development and human resource management) of the UoA

The self-assessment report was very well written which constitutes for the Panel already an indicator of a clear vision and the efforts made to analyse in depths the governance, to give a clear resume of the UoA mission and how to reach it. The Panel noticed the young mean age of the governing staff which is exceptional. During the visit, the Panel noticed the reactivity of the staff and the high number (more than 15 in one year) of applied grants at the national level which constituted a good indicator of the dynamism and competitiveness. The panel noticed and appreciated the success of the UoA in getting 100,000 Euros from the European foundation for the Study of Diabetes EFSD. Some researchers are conducting innovative research validated by very good publications in well ranked journal (i.e. *Journal of applied Physiology* with an Impact Factor of 3,4). A consequence is the attractiveness for young people to start a PhD (26 thesis accomplished within the UoA) which is a good indicator for a good management. The panel noticed the efforts to maintain and launch new international cooperation which results in joined publications (see for instance: “The repeated bout effect of eccentric exercise is not associated with changes in voluntary activation” published in *Eur J Appl Physiol.* in 2010 by Kamandulis S, Skurvydas A, Brazaitis M, Skikas L, Duchateau J. The panel strongly encourage such policy. The flexibility to allow the creation of new research group within the direct strategy is also acknowledged. The maintenance with regular updating of a very informative LSU web page is a plus for a modern management with fast adaptation.

Considering the future and strategies (at short and medium term), the management is of good quality with concrete target such as aiming to acquire a modern ultrasound system for assessment of tendon and ligament damage. The strategy to approach research experiments using both human and animal model (mice), although challenging, is scientifically sound and needed for innovative results. However the panel noticed

that the use of the library, the slow access to articles should be improved and highly qualified ICT personnel should improve it.

The development potential of UoA

The panel estimated that the young and highly motivated staff, the good strategy at short and mid term, the high capacity to attract PhD students, the great capacity to establish high quality international collaboration and the implementation of applied research on the strategic area on Adapted physical activity responding to the « Convention on the Rights of Persons with Disabilities » gives a high potential for development.

In conclusion, over the next 5-10 years the Unit of Assessment will be able to strengthen (or maintain) its position in the international scientific community as a convincing actor and a trustworthy partner within international collaboration networks. The numerous collaborations established by the staff with foreign Institutes of very good quality and in particular the Institute of Sport & Exercise Science of the University of Worcester should be not only maintained but strengthened.

Conclusions and recommendations

This Unit is on the right track to reach a competitive level in international sports research. The Unit already established strong collaborations with Units in Europe (Manchester, Nottingham, Oslo, Brussels, Stockholm, Aberdeen) and with USA (Worcester, Massachussets). This should be maintained and enriched by promoting exchange programmes between the UoA and the partners.

It is thus recommended to maintain and reinforce such collaboration by launching innovative research programme able to attract young researchers from those European Institutions. The invitation should cover the travel and lodging for the researcher to spend at least 1 month to perform experiments.

In that vein postdoctoral studies should be better promoted and Lithuanian researchers should take advantage of those collaboration to go for postdoc abroad and applied for postdoctoral grants (i.e. Marie Curie grants).

The infrastructure of the lab of Molecular Biology should be either increased or a collaboration contract should be established with the Santaka valley for instance.

The PhD thesis should be written in English. The exchange of PhD students from abroad should be increased.

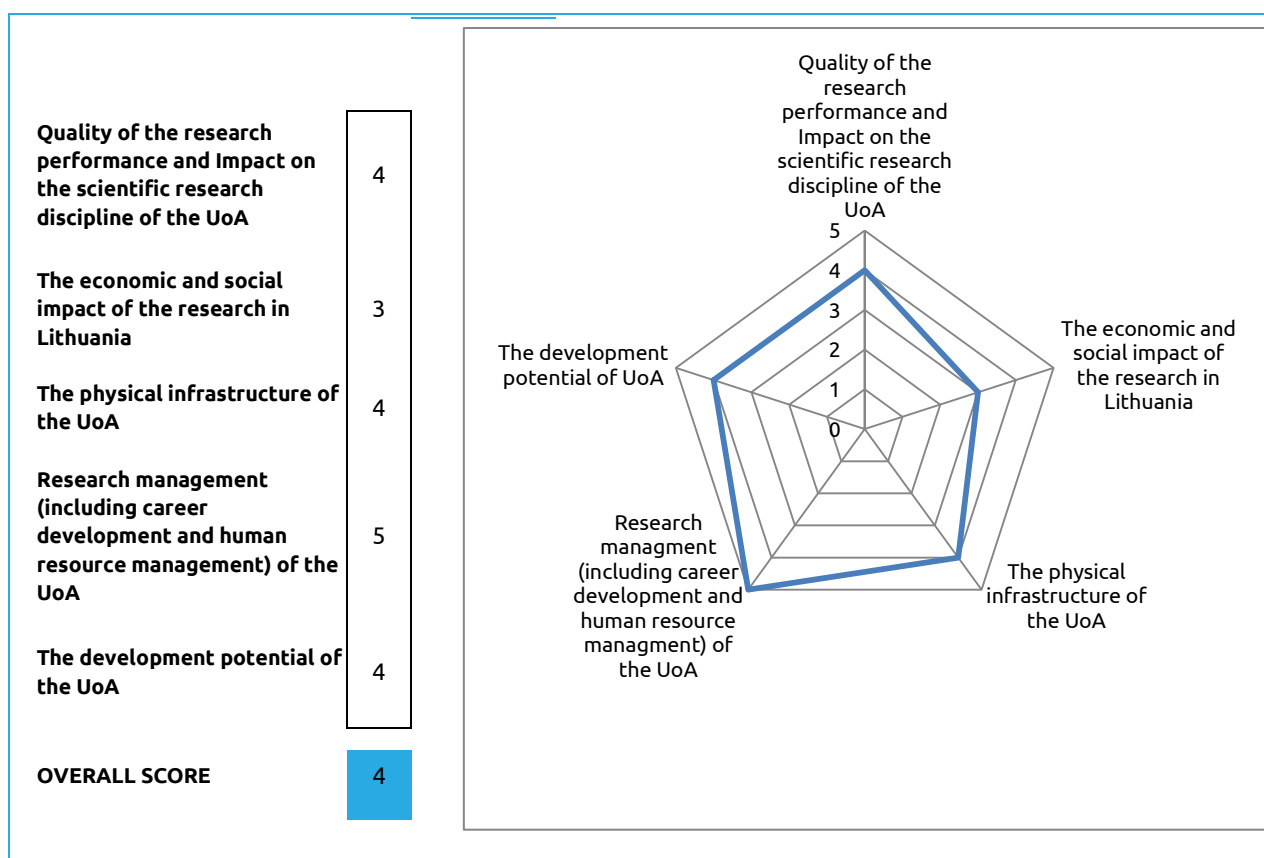
The new library should be more frequented by students. It was completely empty of students/researchers when the panel visited it.

FURTHER COMMENTS

The lack of communication between the Faculty of Sport Biomedicine and the Institute of Sports Science and Innovations introduced confusion as a consequence the Panel could not have a clear view of who is who and who is doing what in the Institute vs the Faculty. This illustrates the absolute need to merge the Institute and Faculty which should be done without delay under an upper Authority.

Neuroscience Institute, Lithuanian University of Health Sciences

Name of the UoA	Neuroscience Institute
Name of institution being assessed	Lithuanian University of Health Sciences
Total no. FTE researchers	30
Composition of the Unit of Assessment (UoA)	1. Laboratory of Biochemistry; 2. Laboratory of Biophysics and Bioinformatics; 3. Laboratory of Molecular Neurobiology; 4. Laboratory of Neurophysiology; 5. Laboratory of Neurooncology and Genetics; 6. Laboratory of Neurotoxicology; 7. Laboratory of Ophthalmology; 8. Laboratory of Clinical Research; 9. Laboratory for Research of Pharmacological Regulation of Pathological Processes and Metabolism of Medications



Overall score

The overall score of 4 (four) is based (1) on a very good level of research, visible tendency of improvement in the last 3 years, (2) excellent infrastructure and conditions for further improvements, (3) a management which is vigorous, appears to have a good vision and research focus and which willing to take up the challenges of forming an internationally good research institute and (4) the good developmental potential. The Panel expects a bright future for the UoA provided the present tendencies will be maintained and national and international funding will be obtained.

Quality of the research performance and Impact on the scientific research discipline of the UoA

The Institute has been established in 2011 by concentrating resources already existing into areas of basic and clinical neuroscience relevant to the clinical care at the university. Recent and past research by scientists at

the UoA possesses a very good standard of quality in terms of originality and importance. Work at this level can arouse serious interest in the international academic community, and international publishers or journals with the most rigorous standards of publication (irrespective of the place or language of publication) could publish work of this level. In terms of impact, the UoA is internationally recognised in its discipline and is highly regarded as a partner in international research projects and networks. This is evidenced by, for instance, the former article of one researcher: Nitric oxide inhibition of mitochondrial respiration and its role in cell death published in 2002 and cited 209 times (Web of Sciences). The output of publications and the citation rate place this UoA right behind the best, with the static indicators for productivity (5.6 publication/5 years/researcher and 26.1 citations for 5 years/researchers). During the site visit, gradual improvements were shown by the presentation of the dynamics of the publication activity by the leading researchers, for the period of 2011-2014. All this indicates good potential.

The Neuroscience Institute is a young institution which is still in the early phase of development. Number of researchers is rather small (30 FTE in 2014) and considering the facilities there is room for further expansion. It is noteworthy that in a number of selected articles (e.g. PNAS, PLOS ONE), Lithuania is not mentioned indicating that the institute present staff has potential not developed in the predecessor institutes of this newly organised UoA.

During the site visit the presentation about the productivity of the leading researchers (Borutaitė V. and Bunevičius A.) of the UoA convinced the Panel members that its research quality is much better than it was deduced from the static data of the written self-assessment.

The economic and social impact of the research in Lithuania

Research of the UoA is important for society. The research activities of the unit are characterised by a low level of interaction with non-academics (i.e. business, policy-makers, and the public). Indeed, although the UoA collaborate with University hospitals and other Institutes, there are not yet any industrial partners, nor any spin-off. However this is a natural consequence of the institute still in developing phase with a rather low level of contacts with industry and general society. One would recommend widening of these activities in order to obtain increased visibility and progress towards more important player in the fields of economy and social domain. Neuroscience can attract attention and it can be successful in social impact, since brain and brain diseases represent one of the most important topics in the human health systems. This is not used enough and should become a regular part of communicating the institute activities.

The physical infrastructure of the UoA

The Unit is able to provide a research environment that is comparable with globally recognised academic institutions in its discipline. The UoA is still very young (3 years old) but has transferred from an old to a novel building with excellent facilities and state of art instrumentation for the projects in its strategy. They seem to possess most of the instrumentation needed for their present activities, however in the fast moving field of neurosciences some instrumentation may become obsolete relatively fast and further investment might be needed relatively soon as their research moves ahead.

The information needs of the institute are served by the university's central subscriptions to databases, which are good in general but may require additional investment as the research activity is expanding in the neurosciences. The proportion of technical to research staff seem to be adequate as the research plans do not involve activities in need of specialist technical support.

The UoA has established a biobank of brain tumour tissues which should be maintained and even expanded as a resource for their own research as well as providing samples for other research as well.

Research management (including career development and human resource management) of the UoA

The institute for neuroscience had a steady stream of international publications in the last several years and its programme is well defined. It is gradually narrowing its focus to those subfields in neuroscience which are in its strategic plan and which have potential to attract international funding.

During the site visit, the Panel members met with a dynamic management (and staff scientists) working on amalgamating the activities of the predecessor research units into a team with coherent research agenda in a unified institute and planning to further reduce the number of present research projects to achieve critical mass by concentrating on a few important fields within neuroscience.

It is a positive sign that the institute has a well-defined strategy for education of PhD students, although after the transition period the number of PhD students and early postdoctoral researcher will have to be increased. The management plans to recruit more PhD students, though the availability is uncertain. At the moment, the institute has an optimal staff-age distribution with 29 people under the age of 45 and 21 at or over the age of 45. The management is aware of the advantage in maintaining a good age distribution. Handling any cohort effect in career development seems to be a task to be handled in 5-10 years.

The development potential of the UoA

The institute has good potential that require continued management attention to the weaknesses which they already identified themselves. Institute is in a developing phase having excellent new infrastructure, the potential of which will likely boost the research activity of the dedicated staff, especially if an increasing number of PhD students can be recruited. In case new students will appear, the UoA will have no problem with career planning for a considerable period of time because of the favourable age distribution. As with most young institutions, a „cohort effect“ may appear in 10-15 years, when the problem will have to be solved by the actual management.

The unit already has about 30 FTE in neuroscience which is close to critical mass in case the management will promote concentrated staff participation in the research themes. This institute has a considerable expansion potential considering its facilities and the fact that we are in the „Decade of the Brain“ i.e. the period where neurosciences are in the forefront. The research orientation of the institute involves important and timely topics, which promises expansion if the national funding environment is also favouring the international trends.

The SWOT analysis in the self-assessment is realistic and the management appears to consider all the implications to exploit the opportunities and to avoid the threats.

Over the next 5-10 years the Unit of Assessment should be able to strengthen its position in the international scientific community as a convincing actor and a trustworthy partner within international collaboration networks. To reach this level, the UoA should overcome their weaknesses, in particular lack of collaboration with SMEs and relative paucity of EU grants. The impressions at site visit, as obtained from the presentation by the management and the interviews with the staff made the Panel optimistic concerning the intended actions of the management and staff.

Conclusions and recommendations

This UoA is a young but already strong player in its field of research. It has a strong leadership and strong staff with a few excellent researchers leading some of the laboratories. Focusing on a few research fields is one of the comparative strength and the management persuaded the visiting Panel members that they plan to maintain focus also in the future. The development potential is very good.

More postdocs and PhD students could be involved in the research projects of the UoA. As a relatively young institute efforts should be directed to attract the next generation of researchers, who may benefit from a dynamic research environment.

The lengths of the PhD in the self-assessment was always longer than 4 years, as observed from start to the date of receiving the diploma. This seems to be a general problem with the PhDs in Lithuania and efforts should be directed to reach 48 months (the EU standard). In a dynamic research environment of this young Institute this should not be too difficult, though may require improved mentoring and also applying realistic requirements, which may depend on the regulations of the universities.

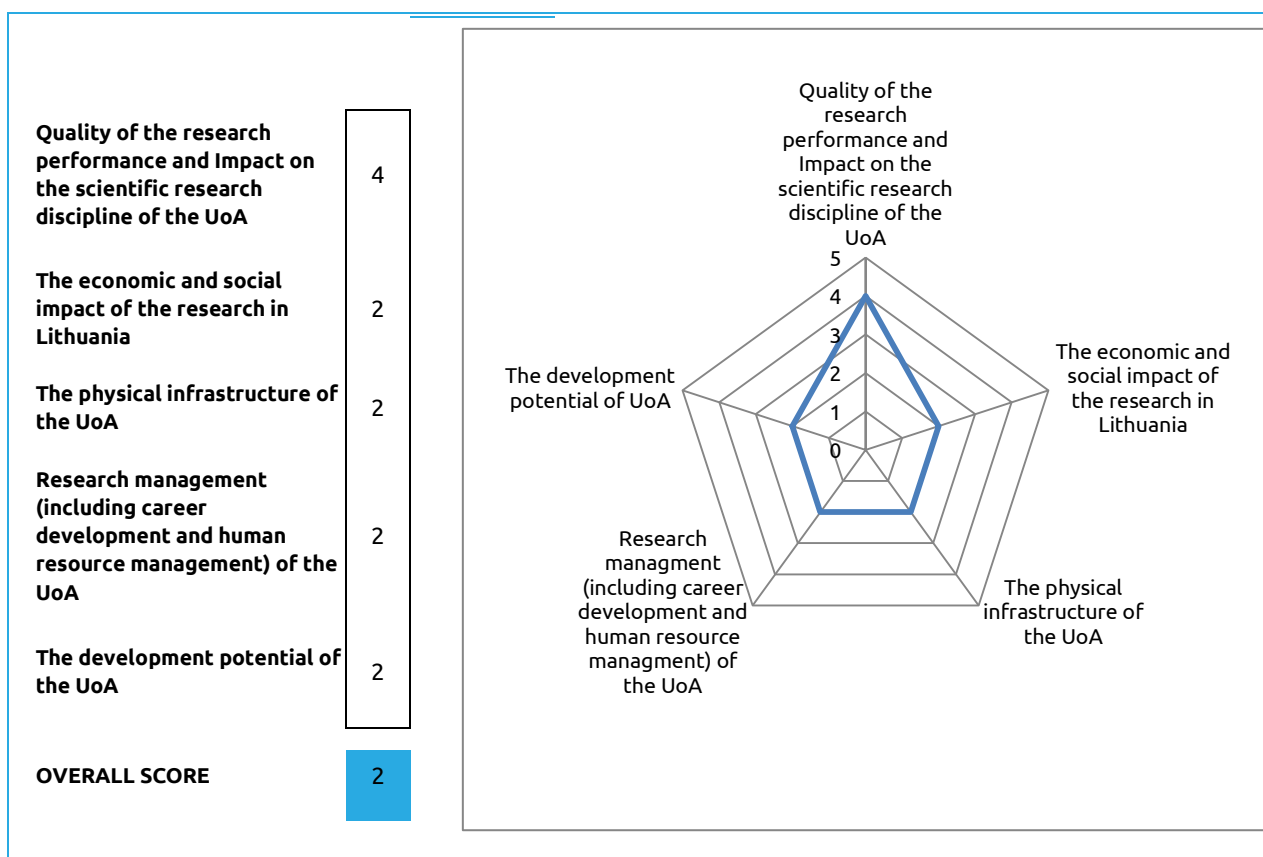
The Panel recommends strengthening contacts with the health industries in order to obtain increased visibility and progress towards being a more important player in the fields of economy and social domain.

Similar international institutes usually have a small international board of advisors, who help keeping the research on track with occasional (yearly) inspections. Organizing such a board of respected scientists would boost the potential of the UoA.

The Panel emphasizes that strong management has to be maintained so that the staff could resist challenges to involve further projects which might result in research fragmentation. The staff might be constantly challenged to explore new avenues where the institute does not have the critical mass and/or the particular expertise to carry basic science results through applied research to innovations.

Institute of Sports Science and Innovations, Lithuanian Sports University

Name of the UoA	Institute of Sports Science and Innovations
Name of institution being assessed	Lithuanian sports university
Total no. FTE researchers	19,2
Composition of the Unit of Assessment (UoA)	Institute of Sports Science and Innovations



Overall score

The Unit of Assessment is a Satisfactory National Player. The management needs improvement and the infrastructure needs renovation. The merging of the Institute with the Faculty is recommended.

The overall score of 2 (two) for this UoA is based on the average level. Additional reasons for such scoring were the poorly written self-assessment and the lack of SWOT analysis which unfortunately could not be compensated by the on site visit and the confusion between the Institute and the Faculty.

Quality of the research performance and Impact on the scientific research discipline of the UoA

As it was not possible to distinguish the research performance of this Unit (LSU_SMII) and the other LSU_SBF Unit (one is the Faculty the other the Institute) working in the same building with the same researchers we thus allocated for the quality of research the same score and same comments for both:

Research accomplished by the UoA possesses a very good standard of quality in terms of originality and importance. Work at this level arouses serious interest in the international academic community with publications in international journals. In terms of impact, the research outputs of the UoA are published in the leading international forums of the respective discipline, and they have a considerable impact on the development of the discipline worldwide; the UoA is highly valued as a partner in international research projects. In particular the UoA is partner of an international project dealing with molecular targets within obesity and diabetes and also partner of the international project “Citrate synthase” granted by the European Foundation for the Study of Diabetes. The panel would like to highlight the excellent scientific productivity of Albertas Skurvydas with 67 publications refereed in PubMed with one published in 2005 in *Acta Physiologica Scandinavia* and cited 57 times (impact factor of 2.6) and the young leader Marius Brazaitis with 43 publications refereed in PubMed (5 published in 2014 and already 3 in 2015) in international journals such as *Plos ONE* having an Impact factor of 3.5 (2 publications in 2014) and in 2015 in *International Journal of Hyperthermia* with an impact factor of 3.5. It is positive to observe that the topics of these published articles vary and cover the field from molecular biology, physiology, genetics to population analyses.

The economic and social impact of the research in Lithuania

Although the general quality of the research is good, when taking in account only the Institute of Sports Science and Innovations, as the unit separated from the Faculty, the impact of the Unit on society is rather low. Research topics and idea presented to reviewers were very focused, but still not developed up to the level of practical improvement of everyday life. For example, the system for EMG and EEG recordings dependent on the temperature of the body (body immersion in the tub) or the temperature of the head (a special helmet) and the ultrasound system for recognition of cartilage changes in long run were not developed to the stage where external investors would be interested to develop those approaches further on commercial bases. There are only some isolated examples of sportsmen coming to use some pieces of equipment, but mostly on a free-of-charge basis, which is a kind of institutional tradition. Thus, the research activities of the unit are characterised by a low level of interaction with non-academics (i.e. business, policy-makers, and the public) and deserve a modest score.

The physical infrastructure of the UoA

The Unit of Assessment is a Satisfactory National Player which fits with a score of 2, but to reach a higher score, many improvements would be needed. It was symptomatic to hear several times from the personnel showing reviewers laboratories that “the equipment is old, but still working”. For example systems for ultrasound and EMG recordings or controlling the body temperature by one tub with hot and cold water situated behind the curtain in one big laboratory are rather obsolete. The most advanced units are laboratory for various improvements for life of handicapped people and the molecular biology laboratory. When asked what was the main activity of the molecular biology laboratory, the answer was PCR genotyping of the mouse strains, which indicated that the activities performed there are still on the basic level, as mouse genotyping in average laboratories is a routine practice performed by technicians and does not count for research activity.

Research management (including career development and human resource management) of the UoA

The Unit’s research environment is still evolving to achieve a level that is expected in the international scientific community of a respected institution in the given discipline. More specifically, the self-assessment was poorly written without any clear SWOT analysis. In addition and regrettably, the Panel could not get much more information during the site visit. The overlap of publications refereed with the LSU_SBF introduced confusion. During discussion with both management and senior researchers we could not detect

any significant bottom-up running projects and any real enthusiasm to apply for them. When discussing with PhD students they had no clear vision what was their development roadmap, which is at least partially the responsibility of the management politics inside the Institute. The theses are not in English, the research topics appeared rather trivial without lack of ideas for future projects.

The development potential of UoA

The Unit of Assessment is capable of being (or remaining) a visible local player in its area of research, which is mainly the consequence of sport tradition which is an important activity of Lithuanian society. Although it was positive to recognise the optimism and friendly attitude of the management members, for the significant progress and improvements of the research quality, more focused approach would be needed. At the moment it was hard to recognise activities which would yield increased budget needed for investment in new equipment and we could not detect innovative ideas which could be a driving force for accessing an upper level of quality. In the case that the general strategy and philosophy towards grant application and focused approach would not change, no significant development could be expected.

Conclusions and recommendations

The lack of communication between Faculty of Sport biomedicine and Institute of Sports Science and Innovations introduced confusion as a consequence the Panel could not have a clear view of who is who and who is doing what in the Institute vs the Faculty. This illustrates the absolute need to merge here Institute and Faculty which should be done without delay under an upper Authority.

Summary of the Institutional Assessments

General observations on research in Lithuania

During its work with the 16 units of assessments in biomedicine the Panel made observations which may be applicable to majority of the research activities in Lithuania.

Research in various settings: Institute versus Department

Research in a university department is marked by diverse activities and may appear to be fragmented because teaching requires staff with expertise in subdisciplines which naturally may lead to research activity in the subdisciplines. In contrast, research in a professional research institute may be more concentrated, it has to achieve a critical mass and preferably deals with problems which cannot be easily tackled in a university teaching or clinical department. Projects in need of a larger number of experts, markedly interdisciplinary personnel, which span a longer time interval or require uninterrupted attention from a number of experts are easier to pursue in an institute with staff having lower teaching obligations.

Organisation and changes

Examples of both promising, recently (re)organised research institutes (score 4) and suboptimal arrangements (score of 2) were encountered. Details are described in the evaluations. It is important to note, that the three institutes with scores of 2 are considered in need of close scrutiny and they are a strong candidates to be merged with their natural partners.

The Panel encountered a number of the UoA where their structure/organisation markedly changed during the period evaluated. Where the changes involved mergers and/or marked investment in the new entity, the past or present performance may not predict the prospects for the near future. The assessment methods geared to established entities cannot be used as planned when there is a marked change (an inflection point) in the natural history of the entity.

The individual researchers with an established career are expected to be performing well in a new setting, but the role of the management's vision, skill and tenacity may markedly influence the outcome for the institute as an entity. In two cases (Neuroscience Institute, Institute of Cardiology) the Panel is confident in its evaluation, in the case of the Centre for Innovative Medicine the level of uncertainty is much higher which is reflected in the score of 3.

Doctoral (PhD) training

The self-assessments and the other information presented to the Panel made it practically impossible to evaluate the quality of the PhD dissertations, only the titles were available for scrutiny. This certainly has to be changed and full transparency of the PhD programs at the European level (i.e. at least in part in English) should be a requirement.

During meetings with the PhD students it became clear that their stipend is not sufficient for subsistence and most if not all of them have to seek part-time employment or other income. Because of insufficient stipends they seem to be employed for various research, teaching and patient care tasks. The different work roles divert their attention from their studies and research, especially when clinician specialists are becoming "PhD students". It would be a better situation if the PhD students received a stipend for 3-4 years sufficient for the cost of living, without the need of external work contracts. External work contracts may be limited by regulation. The requirements for a PhD may be tailored so that studies may be completed in 4 years, including writing and final examinations.

From LUHS doctoral regulations: “Article 43. Dissertation is written in Lithuanian or, if the doctoral committee has agreed, in other foreign language. Summary part of dissertation is written in other language than the main text of the dissertation or monograph” and

“Article 51. The dissertation is defended at a public session of the Defence Council. The session goes on in Lithuanian. If session is in another language, it is to be translated to Lithuanian.” Such regulations may discourage students and faculty from arrangements closer to the European norms.

The impression gained by the Panel from the interviews with PhD students was favourable but even with this (probably) selected sample it was evident that only a few of them realised the benefits in writing dissertation in English.

Participation in the international scientific community should start during the doctoral studies. DART-Europe E-theses Portal (endorsed by LIBER) shows 2336 Lithuanian dissertation in February 2015, which is a good number compared to countries of similar size and past, however, the accessibility is severely restricted, because even an English summary is seldom available, and the most recent entry dates from 2010!

Recommendations: (1) An extended English summary (about 10 pages) should be compulsory, even if the dissertation topic is of Lithuanian interest only, (2) All dissertations should be uploaded by the university to the Dart-Europe portal so that the theses and their authors have international exposure, (3) in case the dissertation is in English international reviewers should be used in the examination/thesis defence, (4) For safeguarding the Lithuanian scientific language and terminology, those PhD candidates who published their thesis research in international scientific journals should write a review type publication also in a respected Lithuanian language professional (not scientific) publication (professional journal, edited book or a chapter in a higher education textbook).

Postdoctoral fellows

One of the features observed by all Panel members is that postdoctoral researchers have not been detectable in the site-visited institutes, with only a few exceptions. Interestingly and importantly, rare examples of postdoctoral researchers or researchers with postdoctoral experience have been regularly detected among the most efficient employees of institutions. On the contrary, in many countries with established research systems the postdoctoral age groups (up to 5 and 10 years after the PhD degree or 25 to 35 years of age) are in the focus of scientific management as they form the best workforce in research as well as they will be the source of the next generation of the scientific elite.

Postdocs were lacking in the institutes/departments and various explanations were given why the management – even if it tried to find them – could not employ them. We suggest that 3-5 years postdoctoral research grants as well as opportunities to employ postdocs in grants for senior scientists should be available in the Lithuanian grant system. The best and most creative postdocs within 2-10 years after receiving their degrees (with allowance for family leaves, when applicable) should have an opportunity to apply for a sizable research grant running for 5 years, approaching in amount the ERC Starting Grant scheme (where according to the ERC statistical information on the web, no grant from Lithuania is listed since 2007). The availability of a small number of high value Lithuanian grants could alleviate the brain drain and even may result in a net brain gain. It should be noted that such a scheme would put a marked strain on the research system, but might give it a considerable boost if successfully maintained for a number of years.

Lithuanian science journals

Professional journals in Lithuanian may be important to cultivate the language and disseminate knowledge. In contrast, *science* journals in Lithuanian, are a waste of money, especially in biomedicine. Without an international readership they may promote an inbreeding culture. The scientific publications should be edited

by an international editorial board with participation of international reviewers so that international feedback should be available.

General overview and recommendations for Biomedicine in Lithuania

The Panel scored the 16 institutions from 4 to 1, having found no global leaders.

There are 5 UoA with a score of 4 (very good level of research). In each case, the Panel found individual laboratories which compare favourably with the best international counterparts.

Most of the UoA are scored 3 (good level of research) and had some subunits with international recognition. Some of these UoA have good development potential to become International Players.

All the 4 UoA with a score of 2 may be considered in need of some change to move them up to a good level in research. Organisational changes, mergers may be considered, for various reasons:

- Institute of Endocrinology
- Behavioural Medicine Institute
- Faculty of Public Health
- Institute of Sports Science and Innovations

The research quality of the Faculty of Odontology (LSMU_OF) is poor having negligible research output and no promise for a change to the better in its present state. Decision makers will face difficult choices. Odontology research is in a precarious state in many Central and Eastern European countries, partly because of the competition of the proliferating private dental practices. At the same time, international odontology research develops fast in various branches of odontology.

Research quality

The elite of the Lithuanian biomedical research whom the Panel met were up to high international standard in all respect. Their achievements as shown by their publications and citations are high, with worldwide personal acceptance in their subfields. The apparent quality of the majority of the research by people just behind the elite is also good in case they work in units with a few elite scientists and a good management.

The country appears to have the human capital to boost its research potential in case the science policy will aim higher. To improve the research in general should involve structural changes in case of the overlapping and fragmented units, concentrating resources for the benefit of most promising areas, research units and (young) scientists.

At the same time if the fragmented part of the research system prevails, the improvements may be much slower and fragile because the best people might be attracted to work elsewhere.

Strategic management

The Panel found good management in a few of the highly scoring UoAs. These UoA have either long tradition or are recently (re)organised institutes. Research management skill were not widespread and for some of the researchers in leading positions as well as the next generation of research leaders it may be worthwhile provide opportunities to learn about the management challenges in research.

Overview of research performance across the Biomedicine Panel' coverage

Medicine

Evaluation of the research in medicine should be considered in two, slightly overlapping main sections: basic biomedical sciences and clinical sciences.

Research in Clinical Medicine Faculties

The elite at the two faculties evaluated has very good research, as described in the individual evaluations. Unfortunately, the faculties were presented as a UoA with about 100 or 150 FTEs. Under these conditions, the quality of the long list of individual clinical research units could not be individually evaluated by the Panel because of the characteristics of the RAE: Small UoA received careful scrutiny while very large faculties of medicine could not be investigated in a similar depth. The weak departments, if any, evaded scrutiny.

The Institute of Endocrinology can be regarded as an organisational remnant of the past which has not yet found its proper place in research. Being almost entirely involved in clinical research with no appreciable activity in basic or translational endocrine research and having few original research lines with all the staff working part-time in the next building of the Department of Endocrinology, it is an almost foregone conclusion that a science politician in another country would say that a merger of the Institute into the Department of Endocrinology has no real alternative. The few strong characteristics should be retained after merger and the management should be given the option to reorganise the Department so that all of its physician staff be involved in research is a portion of their FTE. As the Department of Endocrinology was not scrutinised by the Panel, it is possible that maintaining the Departments quality of care as well as research capability may require investment in equipment and modern technology.

Basic biomedical research

Research classified as basic was encountered in many different organisational form, in a university faculty, in institutes linked to clinical departments or in a state research institutes. Excellent research was found in all types of organisation, apparently related to the human resources, or to recent reorganisation and investment.

Odontology

Odontology is a special case of clinical medicine. The faculty's 5 department had an overall score of poor (1), the worst out of the 16 units assessed. Although odontology experiences difficulties in most of the Central and Eastern European countries of the EU, the present state of research in this faculty is worse than elsewhere. A faculty wide problem may difficult to handle within a few years. However, the University and the health authorities may want to improve the situation. Depending on the intentions a number of options can be explored, suggestions are beyond the scope of this Panel.

Pharmacy

The Faculty of Pharmacy of the LSMU is about the size needed for teaching its subjects and has good doctoral training. Its research is fragmented and seems not to have management intervention, or faculty level planning, with each department having separate management without significant research interaction with either local, national or international partners. Significant investment in facilities and instrumentation occurred recently, which might be the basis to improve research prospects at present lagging behind the opportunities.

Public health

Public health related research is conducted at numerous places, the main unit being the LSMU Faculty of Public Health, with additional research found at other places, such as the Klaipeda University, the Behavioural Medicine Institute, Institute of Endocrinology, even at the Institute of Cardiology. Even in its fragmented state it is the Panel's opinion that public health research is of good quality in the country and that it would benefit from some careful concentration of effort and collaborations within the country. The Panel specifically inquired about the interactions between university research and the government public health authorities but could not locate positive interactions that characterise the public health field in some other countries.

Sports Science

Sports related research has also been found at several places, the major player being the Faculty of Sports Biomedicine, with very good research. It was surprising how the Institute of Sports Science and Innovations being in the same building with markedly overlapping staffs could present itself in such a poor manner while the Faculty scored quite well. The sports sciences clearly need to be concentrated somehow, a country with a population of less than 3 million should not have sports research at many institutions, including the Faculty of Nursing, The Lithuanian University of Health Sciences. Consolidating all sports related research in a single institution would benefit the country and the sports related research, although achieving it may be a delicate science policy task.

Nursing

Nursing is a relatively new discipline in university education at the MS and PhD level. The Faculty of Nursing of LSMU is the key institution in this respect, having good publication record in nursing, and offering also PhD in Nursing. A few other UoAs also mentioned nursing as one of their activity, but the Panel found the only evidence for appreciable nursing research at the Klaipeda University, where more emphasis need to be on nursing. The Faculty of Nursing has all what is needed for focusing on, and specifically developing nursing research, which is very much in need in the aging European and Lithuanian population.

General observations for clinical and basic biomedical research

Clinical work, teaching and research are different but related work roles, however, teaching and clinical research should not be separated from clinical practice. Seldom are physicians or other professionals employed only for patient care or only for teaching in a university setting. University teaching should be done by staff also active in research. For reasons such as lack of suitable personnel it may be necessary to employ people for teaching only, but such teachers should be a minority component of the university staff. A separate institute for basic research is a viable solution in case a clinical discipline such as cardiology or clinical neuroscience also needs close basic science and translational links. A dysfunctional example is the Institute of Endocrinology, which seems to function as an outpatient clinic and a (small) clinical research arm of a Department of Endocrinology, which seems to be involved in only patient care.