**University Unit Evaluation Report**

First Faculty of Medicine

1. **Unit-specific Research Reports**

The First Faculty of Medicine (1.LF) of CUNI is by size and history the largest and one of the most important among the five faculties of medicine of the university. It is traditionally viewed as the founding institution of all the medicine in the country and all other faculties of medicine (inside as well as outside of CUNI) view it as a benchmark. The major research areas that are the most important at 1st faculty of Medicine and represent a flagships have been presented in details in the Research Area Report that was submitted to the faculties in November 2020.

Generally, the publication activity of all faculties of medicine of CUNI is quantitatively comparable. Somewhat surprising, when normalized to the number of researchers, the relative output of the 1.LF is lower than at other faculties, approx. one half of the value of the comparable benchmark universities (see Bibliometric support).

The most important research areas in terms of quantity and quality of output as well as research resources invested in it are the following:

**1.1 MED: Medicine and Medical Disciplines** (Basic Medicine, Clinical Medicine, Other Medicine and Health Sciences)

**CARDIOLOGY AND CARDIAC SURGERY**

As stated before, the cardiovascular research is rather active in the First Medical Faculty and takes place in the **2nd Department of Internal Medicine**/ Cardiology, led by Prof. Ales Linhart, currently president of the Czech Society of Cardiology. The department has approximately 60 physicians and 3 full professors of cardiology, covering different specialties.

The department shows reasonably high H-index of 35 that reflects the visibility of the research at this department in the medical literature. As many as 30 out of 70 papers from the D1 decile according to WoS in the area of cardiology and cardiac surgery are authored by the researchers from the First Faculty of Medicine. It seems that the clinical service of the department has 2 cardiac catheterization laboratories at its disposal and offers all diagnostic and therapeutic interventions for cardiology except cardiac transplantation, which is only performed in the Czech Republic at IKEM in Prague and the University Hospital in Brno.

The faculty works on rather unique clinical model of Fabry disease (a large cohort of 220 patients with this rare cardiac condition).

Furthermore, at the First Faculty of Medicine cardiovascular research is also performed in the **Institute of Physiology** (Head: Prof. Ottomar Kittnar). This department performs experimental studies in pigs, with a well-established experimental catheterization laboratory, allowing for the study of cardiogenic shock and the effects of extra corporeal membrane oxygenation (ECMO), resuscitation and arrhythmias.

The analysis of **arterial hypertension** led by Professor Jiří Widimsky focuses on secondary forms of hypertension, such as primary aldosteronism. However, the relevance of this path of research seems be declining in the international due to the lack of major trials and new drugs.

Finally, cardiovascular prevention and in particular hypertension is also a focus for the **Centre of Preventive Cardiology** in the Thomayer Hospital in Prague, led by Dr. Renata Cífková, who is very active in the leadership of the European Society of Hypertension. Of concern is a recent decline in citations which might reflect reduced scientific productivity or shift of the focus in the international literature.

**Cardiovascular surgery** is led by Prof. Jaroslav Lindner. His research focus is on thromboembolic pulmonary hypertension, aortic root and peripheral artery surgery.

Grade B

**CLINICAL NEUROLOGY**

Clinical neurology at the First faculty of Medicine of CUNI represents the most productive part of the neurology at CUNI (out of total 96 papers in the D1 in Clinical Neurology, 49 are from 1.LF). The **Department of Neurology** in the 1.LF should be considered as a leading department in this research area. The most important research direction in Clinical Neurology involves multiple sclerosis (25 papers from 1. LF are co-authored by Prof. Eva Havrdova, 10 by Dana Horakova). It should be noted, however, that most key papers have only single or few authors from the 1. LF and just a few have the leading author from the faculty. With 6 papers in the field of sleep medicine, Prof. Karel Sonka has published on the highest scientific level (three papers in Lancet Neurol). He is located in the General Teaching Hospital of 1.LF. Prof. Sonka can be considered as an influential researcher in sleep medicine.

Grade A

**ENDOCRINOLOGY & METABOLISM**

1.LF is a CUNI stronghold in Endocrinology & Metabolism, closely followed by 2.LF, 3.LF, and LFHK. The works of Jan Skrha on insulin resistance and glucose homeostasis are internationally recognized. However, the trend seems to be stagnating showing need for the recruitment of young researchers.

Grade B

**NEPHROLOGY**

Among top 10% of papers in nephrology, there are a 14 out of total 18 papers from 1.LF.

Grade A

**Psychiatry & sexuology**

The authors from 1st Faculty have the largest number of publications in general. They cover a broad spectrum of subfields in psychiatry including sexology, without a clear leading research topic.

The most prestigious publications of the 1.LF in this research area that belong to the D1 (3 papers in the evaluated period) from Department of Eating Disorders under the lead author of Dr. Hana Papežová. The papers, while very important for the development of the field, represent international collaboration focused in providing the genetic material of properly diagnosed patients. The significance of this article for CUNI is the recognition of this department as a reliable partner for international cooperation and co-authoring in highly recognized journals. As the impact factors of these journals are high, the involvement of the author/department in this study confirms the recognition of the author and the institution by the international research community. However, an original research contribution authored/initiated by the researchers from 1.LF would be more valuable.

Grade B

**SURGERY**

The 1.LF appears to be most productive faculty also in this research area and the sub-specialty of General Surgery is the most actively published area. 55% of D1 + Q1 outputs of the CUNI are produced at 1.LF, 40% of senior authorship of these papers comes from 1.LF. The following are a recommendations that address the relative paucity of quality publications by most clinical and especially surgical departments.  Firstly, most clinicians are usually paid by a fee-for-service arrangement, with a large patient workload, therefore it leaves very little time for quality research.  In order to rectify this, the funding model needs to change to at least partial hard funding, along with protected research time.  And secondly, the curriculum of residency training should include compulsory research time, as is done in North America.  Each resident should be expected to produce several projects over their training, with view to publication.  This has a "trickle up" effect of increasing overall output of clinical/surgical departments and also cultivates further research productivity.

Grade C+

**1.2 SCI: Biology** (Experimental Biology)

In the Experimental Biology, 1.LF follows as the second in terms of the number and quality of outputs among all CUNI . Nevertheless, 1.LF appears to has a troublingly high level of publications in non-AIS journals, probably due to incorrect incentives for publications (budget distribution, PhD and other grades and academic positions etc – see below).

GradeC+

**1.3 MED: Pharmacy** (Pharmacy and Toxicology)

In Toxicology alone the 1.LF is a flagship faculty with 1 D1 paper, 5 Q1 papers, 8 Q2 papers, 5 Q3 papers and 4 Q4 papers published in the 2014-2018 period. The subfield Toxicology is strongly presented at the Department of Occupational Medicine, Toxicology Informational Centrum of 1.LF (Pelclova Daniela, H index 25, 1297 pure citations, 10.07 citations per item, 88 papers published in the 2014-2018 period, H-index 19 and Sergey Zakharov, H index 14, 261 pure citations, 6.61 citations per item, 54 papers published in the 2014-2018 period, H-index 14). Methanol poisoning (Zakharov Sergiy, Pelclova Daniela) is the main research field at 1.LF.

Grade B

**1.4 SOC: Psychology**

The overall quality of the research papers in the area of Psychology is not quite satisfactory. It seems that only between 55% and 62% research personnel of the 1.LF in this area contributed at least a single research paper in the evaluating period. It remains to be seen whether low productivity of PhD students is part of the problem. Moreover, only approx. 25% of the outputs are published in the 1st or 2nd Quartile.

First Faculty of medicine has a PhD program in Psychology (area Medical Psychology and Psychopathology).

Grade C+

**1.5 Oncology and haematology**

In terms of comparison with international benchmark, the field of haematology and oncology at the 1.LF belongs to its weaker research areas. According to the bibliometric analysis available, it seems to be performing less well even in comparison to other medical faculties. This situation is reflected in terms of  internal and external grant income of the 1.LF CUNI oncology researchers. However, there is evidence of growing collaboration with haematology and oncology researchers from 2.LF.

1.LF also runs **Centre of Tumour Ecology** (headed by Karel Smetana, MD, DrSc). The centre was cofounded by European Union Structural and investment Funds and the Ministry of Education, Youth, and Sports of the Czech Republic. Its main mission is to implement comprehensive research of the cancer microenvironment which supports cancer growth and spread. Karel Smetana belongs to well established researchers in the field of oncology (h-index 31) and initial publications although mostly Q1-2 form a good basis for improvement in the next period.

Grade B

**Top researches of the First Medical Faculty:**

The faculty lists some highly productive and internationally recognized researchers in the research fields briefly overviewed above. In the area of cardiology and cardiac surgery, Aleš Linhart is the second best rated cardiologist and President of the Czech Society of Cardiology (308 PubMed listed publications) and h-index of 43.

Jaroslav Lindner (with a moderate h-index of 12) is one of the three most productive cardiovascular surgeons on the international standing within Charles University.

In the field of nephrology, Dr. Vladimir Tesar is a an accomplished clinical trialist in nephrology with over 400 publications, many in high quality journals.

Prof. Karel Sonka of the First Faculty of Medicine has published on the highest scientific level (three papers in Lancet Neurology) and can be considered an influential researcher in sleep medicine.

Dr. Daniela Fischerova, with an H index of 23 and 132 publications and Dr. Michal Zikan (h-index 27) publishing in gynaecology and obstetrics represent the leading personalities in this field.

In the field of molecular and structural biology and biochemistry, one of the leading scientist is prof. Pavel Martasek (director of BIOCEV) with seminal papers on NO-synthase and h-index of 49, and Tomas Zima (h-index of 34) with his contribution on biochemistry of renal diseases and alcohol intoxication.

In Endocrinology, Professor Jan Škrha from the Third Medical Department and Laboratory for Endocrinology and Metabolism of the First Faculty of Medicine has published ~200 peer-reviewed papers and hold a h-index of 31.

1. **Organisation, internal structure of the unit and major research directions**

The organisation structure of the faculty seems to be rather complex (the self-evaluation report suggests that there are more than 80 individual units and clinical departments. While the heads of the departments are clearly chosen in an open tender it is unclear how many of them are recruited in an open, international call.

High interest is devoted to the selection process of for the new professors and associate professors (77 new associate professors and 46 new full professors in the evaluation period). It is unclear how many of them come to the university from outside or abroad and how many are internally selected experts that get promoted. Much higher emphasis must be given to the use of internal (PRIMUS program) as well as external programs to recruit promising young scientists from abroad.

**INFRASTRUCTURE**

According to the self-evaluation report, 1.LF has a rather extended and up-to –date technological infrastructure at its disposal. The important centres and facilities involve Centre for Advanced Preclinical imaging [CAPi], National Centre for Medical Genomics [NCMG], Centre for Biomedicine and Medical Nanotechnologies [CBMN], Czech Bio Imaging, European infrastructure for Translational Medicine (EATRiS-CZ), Biobanking, and Biomolecular Resources Research Infrastructure of Czech Republic (BBMRi), some of which are involved in European research infrastructures.

 The problem is that many of these infrastructures are located in the old buildings that are very costly to maintain and rebuild. 1. LF takes part in the joint research centre Biocev (together with the Faculty of Science and several institutes of the Academy of Science). The new facilities of this research institute represent a major potential for growth and recruitment of young researchers that must not be neglected.

For the future, the plans for “Kampus Albertov”, a new major facility in the historical heart of Albertov, seem to be chance not to be missed. Very careful plans as to what will be the recruitment system, who will decide on the research agenda and how the facility will be used need to be very carefully prepared. It would be a unfortunate if this opportunity is missed and the new buildings would be a mere extension of existing facilities.

**FINANCING**

1.LF suffers from what seems to be a more general problem of Czech research: very low proportion of the institutional vs grant research funding. The institutional budget is distributed through so called PROGRS prom, apparently mostly based on the bibliometric indicators. This board have not seen many strategic decisions in terms of opening new vistas for research or recruitment of excellent researchers from outside. Part of the reason is (as the self-evaluation report suggest) a combination of low institutional financing and three-year budget-limited grants that does no allow for long-term planning.

1. **International collaboration and visibility**

**Visibility and reputation**

The self-evaluation report lists examples of 10 persons serving on editorial boards of international journal and a number of invited lectures in both directions (~10 good examples provided); 10 examples of significant elected members of international societies.

The 1.LF seems to enjoy most international projects from the all CUNI medical faculties, and the funds raised by the conducted projects have also been the highest (2 million €). Unfortunately, most of the international projects are not led by the researchers from 1.LF, the faculty participants are mostly collaborators, sometimes providers of the clinical specimen or other research materials.

According to the self-evaluation report, 1. LF had about 29 international projects, 11 of them from FP7/H2020, all of them as partners (none as PI), with total income 2.2M euro. It represents more than half of all international research grants (within the CU medical faculties) and 10% of the overall grant funds of the faculty. This should be increased in the future.

On the other hand, the international mobility of 1.LF students and researchers is well established and institutionalized. In 2014—2018, 207 members of academic staff of the Faculty travelled abroad within the framework of the mobility programme. Very importantly, the 1. LF participates in the strategic international cooperation supported by the Charles University (such as very important 4EU+ scheme).

There are many international students in the study programmes of 1. LF, the Faculty runs highly prestigious and competitive programmes in General Medicine and Dentistry in. Also the list of visiting professors is rather long and contains interesting and respected individuals.

However, it is striking to realize that this major research faculty has no single ERC grant recipient. It is absolutely required that the faculty increases its effort to recruit first-class young researchers from outside and provide them with space, facilities and funds to enable them to successfully apply for some of the ERC grants.

1. **Environment for junior researchers and PhD students**

**Specific programs and recruitment.**

1.LF operates 22 doctoral programmes which seems to be far too many for international standards. PhD students join research teams and may participate in international mobility (585 students used Erasmus scheme in 2014-18). There are no fees for students studying in English. The overall completion rate (~35%), but it is substantially higher in medicine (80%). There is some additional funding for a few projects / students.

**Training and research.**

Doctoral studies are provided either in a full-time or combined form, both in Czech and in English. The programmes specialises not only in biomedical research but also in bioethics, history of medicine, medical psychology and psychopathology, and addictology.

Students join scientific teams that work on grant projects, including international ones, they publish their results in internationally respected journals.

The most successful students are, however, those who participate in combined MD—PhD programmes, in which they can earn both a PhD and a MD titles in areas related to medicine. In these programmes, the success rate (students who complete their programme) exceeds 80%. Unfortunately, there is only handful of such students due to the lack of funds.

1. **Overview of research outputs**

The Faculty itself considers as top results achieved in 2014-2018 following projects:

- **Centre of Tumour Ecology** (https:[[cne.cuni.cz[en[), Professor Karel Smetana, MD, DrSc. The centre was co-funded by European Union Structural and investment Funds and the Ministry of Education, Youth, and Sports of the Czech Republic. Its main mission is to implement comprehensive research of the cancer microenvironment which supports cancer growth and spread.

- National Centre for Medical Genomics, Professor lng. Stanislav Kmoch, CSc. This centre’s objective is to work on developing next-generation sequencing platforms and linked technologies of human genome analysis and to facilitate expert use of these technologies in biomedical research and translational medicine in Czech Republic.

- Centre of Advanced Preclinical Imaging (https:[[capi.lf1.cuni.cz[en), RNDr. Luděk Sefc, CSc. This institute was created to apply the most advanced imaging technologies for basic and applied biomedical research. Last year, the CAP] had become member of Eurobioimaging consortium.

- PROGRES Q25 programme, funded by institutional PROGRES Support for 2017—2021, focuses on complications of metabolic diseases and is coordinated by Professor Ian Skrha, MD, DrSc. The project, which focuses on analysis of new biomarkers of metabolic diseases, represents one of the key directions of biomedical research implemented at the 1st Faculty of Medicine.

- ABIRISK project is part of a European network focused on analysis of immunogenicity of biopharmaceuticals used in the therapy of multiple sclerosis. At the 1st Faculty of Medicine, the project is coordinated by Professor Eva Kubala-Havrdova, MD, CSc.

1. **Strategic planning**

An important plan for the future involves use of the facilities in Biocev and, especially, the planned new building of Kampus Albertov. It is instrumental that these new structures are used for the recruitment of excellent researchers from abroad that might bring in new methodologies, research ideas and models.

1. **Recommendations, summary**

The board suggests that at the internalisation of the research staff of the faculty is increased. Utmost effort must be made to bring in talented new and also senior researchers from outside the university. Much better use of the Primus program as well as national grant schemes for young researchers (GACR Junior grant and others). The faculty of the tradition and international standing of 1. LF should have multiple recipients of renowned international grants such as ERC Starting or Consolidator grants.

The PhD program is quite clearly too fragmented. It needs to be concentrated to several programs so that the intellectual capacity and other resources of the faculty/CUNI are appropriately used.

Considering the sub-optimal financial resources, the workload in teaching and clinical duties of academic staff, the overall research output of the Medical faculties of CUNI is remarkable. There is a potential for improvement to match with benchmark universities. The panel presented general recommendations valid for all five medical faculties:

* Increase amount of institutional grants to allow long term strategic planning of research programs by financing postdocs and PhD's.
* Funding model for clinicians, i.e. surgical disciplines needs to change to at least partial hard funding, along with protected research time.  The curriculum of residency training should include compulsory research time,.  Each resident should be expected to produce several projects over their training, with view to publication.  This has a "trickle up" effect of increasing overall output of clinical/surgical departments and also cultivates further research productivity.
* Stimulate collaboration among the five faculties focusing on multi-centre studies, i.e. RCT's.
* Introduce systematic training in research methods (study design, data analysis) and in writing grant applications and scientific publications for PhD students and junior members of staff to improve the quality of research and publications.
* Stimulate and reward participation in international research activities and European projects with Czech scientists in leading positions.
* Award high quality publications in Top 10% AIS Journals. Quality above quantity.

The system of five Medical Faculties in one University is unusual and unique. Advantages of this system include the ability to pool resources and patient populations, as in the Prague Trials. Disadvantages include the difficulties of organization of long-term research. For long-term research strategy it is questionable if this system is justifiable. One Research Advisory Board for all five faculties might be more efficient. The advisory board could identify central core units, identify areas of expertise, identify novel clinical research question. Especially identify areas which are unique to Prague, in order not to compete with other much richer research groups. If we do not go from description to helping, co-designing novel research strategies, all the work done in this assessment will be vane.