UNIVERSITY OF OSTRAVA
FACULTY OF MEDICINE

Faculty of Medicine University of Ostrava

CENTRE FOR EPIDEMIOLOGICAL RESEARCH

CONTENT

CENTRE FOR EPIDEMIOLOGICAL RESEARCH

Epidemiological research is based on the basic assumption that the occurrence of diseases is not accidental but is always directly or indirectly related to the person‘s way of life. It includes factors that play a crucial role in the predisposition, origin and persistence of diseases in the population. And it is just the evaluation of the influences of selected environmental and lifestyle risk factors on the health and of the population that is the goal of research by the Centre for Epidemiological Research (CER) with the support of the Department of Epidemiology and Public Health at the Faculty of Medicine of the University of Ostrava.

#osu #research #HAIE
#healthyaging #environmental
#epidemiology

CENTRE FOR EPIDEMIOLOGICAL RESEARCH

Demographic trends, especially aging of the population is an issue that needs to be addressed in all regions of developed countries. Maintain the physical and mental health to old age is one of the pathways of how to ensure healthy aging. It involves identification of both risk and protective factors of health including biological predictors that may help in early diagnosis of diseases. Main research outcomes are markers of health status including genetic, epigenetic and physiological factors, as well as cardiometabolic, oncological, respiratory, infectious mental and neurodegenerative diseases, and changes in the socio-economic structure of the population and related perception of health risks in relation with increasing age of the population.

The health status of people from industrial region is dependent not only on the elimination of risk factors of the environment but also on a healthy lifestyle. Preparing for active aging requires individual contribution to maintain self-sufficiency until the highest possible age. „*Determining the impact of the real effects of the health risks caused by the polluted environment, lifestyle and their perception, especially in connection with the aging of the population, is the main goal of our research activities*," the head of CER, RNDr. Vítězslav Jiřík, Ph.D., describes.

The Centre for Epidemiological Research employs experts, postdoc students, including doctoral students, and laboratory staff involved in several research projects. The CER consists of five interdiscipline research groups addressing the following issues:

- Epidemiology of aging
- Epidemiology of the younger generation
- Psychosocial and socio-economic health determinants
- Molecular epidemiology
- Physical health determinants

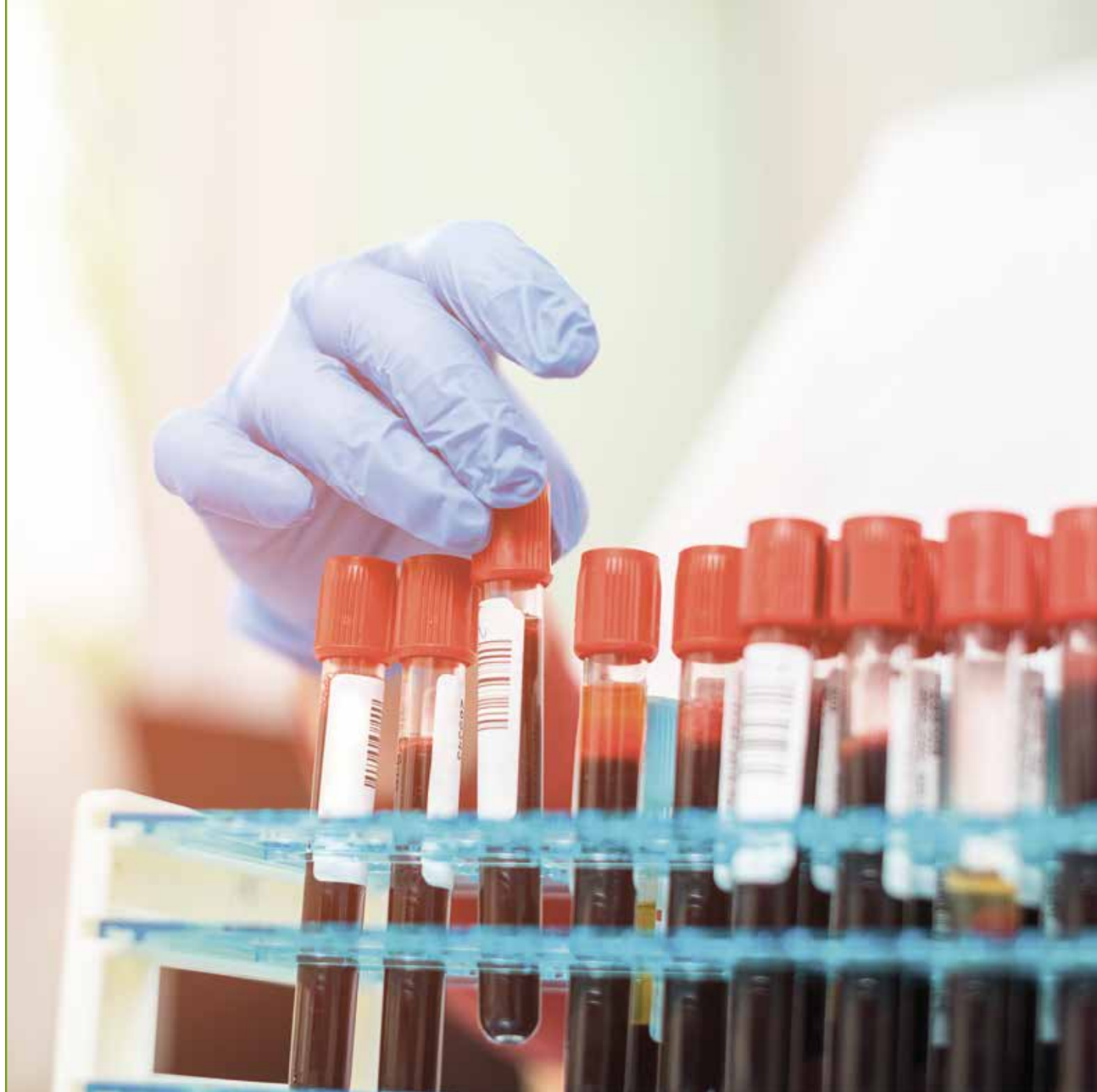
An important initiative of the research team is the establishment of longitudinal cohort studies, which means long-term monitoring of the above-mentioned indicators of the health status and lifestyle of the population in the environmentally polluted and non-polluted areas.

CER researchers also collaborate on several research projects, the most important of which is „Healthy Aging of Environmental Medicine" (HAIE), where the Centre also collaborates with the Institute of Molecular Epidemiology of the Czech Academy of Sciences, with the Veterinary Research Institute and with the Human Motion Diagnostic Centre of the University of Ostrava. This is the most extensive research involving four research cohorts (i.e. groups of people showing identical values of specified characteristics) numbering almost 8000 people of different age categories.

TASK OF THE CENTRE FOR EPIDEMIOLOGICAL RESEARCH

The main tasks of the Centre for Epidemiological Research are:

- Implementation of the scientific research activities in the field of the selected infectious diseases epidemiology, in the field of the epidemiology of priority non-infectious diseases and in the field of the occupational and environmental epidemiology in the form of scientific projects supported by grant agencies in the Czech Republic and abroad.
- Integration and coordination of research activities and capacities within the Faculty of Medicine of the UO, and identification of possible new directions of research.
- Providing the professional consulting activities in the field of scientific projects implementation and initiating new scientific teams' creation for these projects.

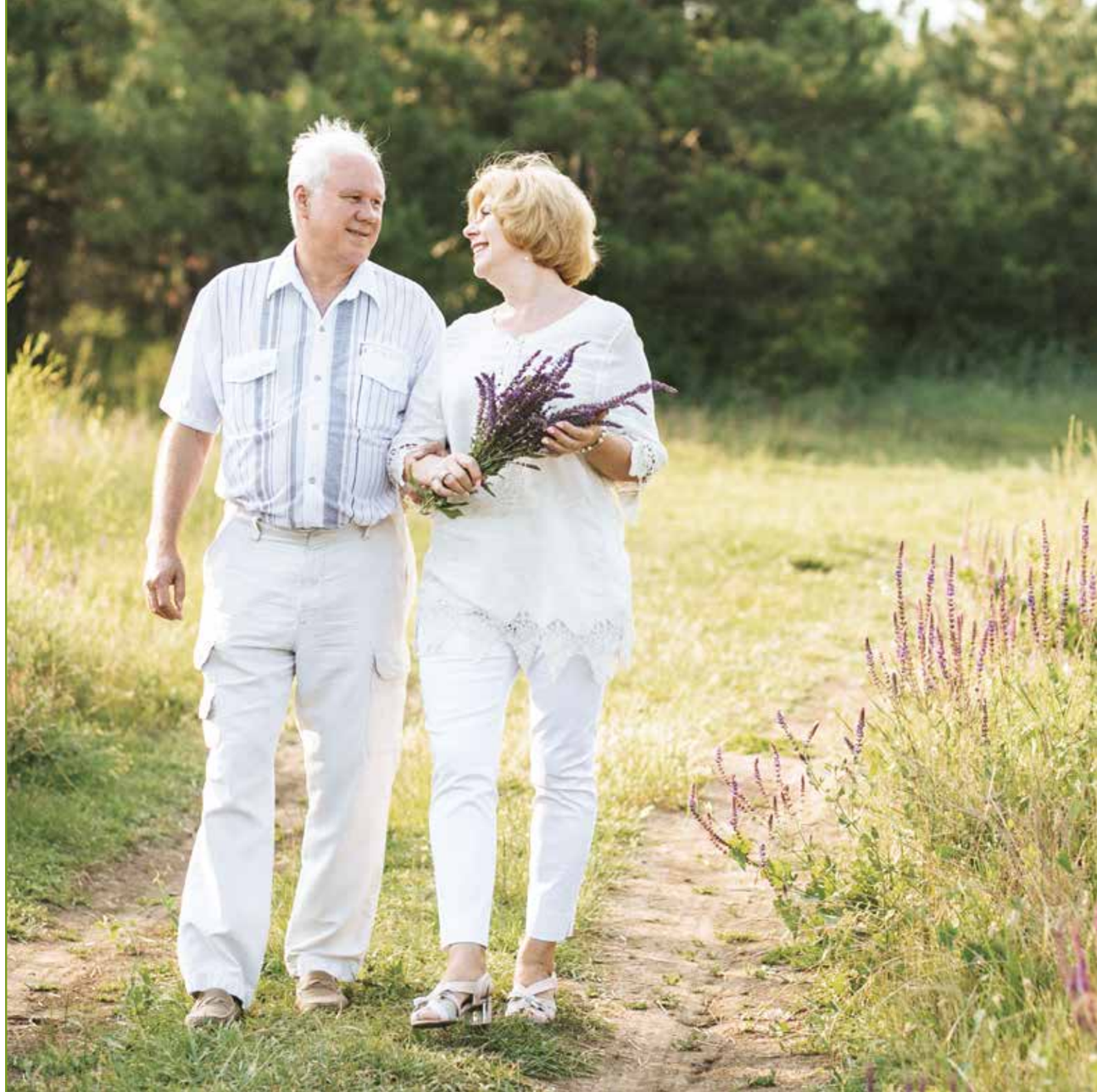


RESEARCH AREAS

The individual teams mutually cooperate in a total of five research groups.

Epidemiology of aging

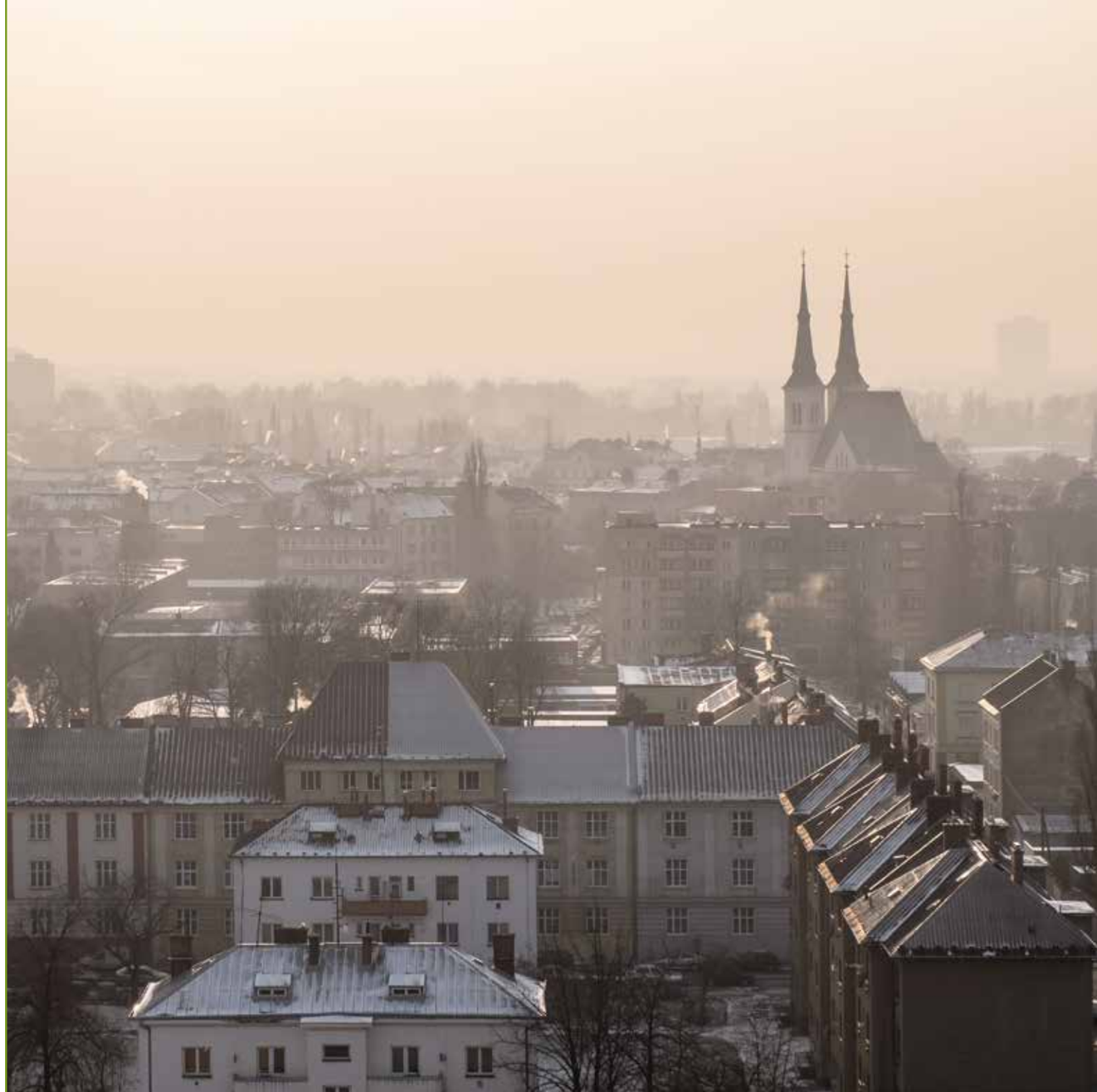
The content of the epidemiological study is the evaluation of association between exposition towards external environmental factors and factors of lifestyle with their impact upon health and aging amongst middle-aged individuals. The influence of the combination of exposure towards polluted air and lifestyle upon selected diseases (cardiovascular diseases, respiratory diseases, metabolic diseases, selected oncological diseases, and diseases of the immune system) are also a part of the research. Several past and present projects, such as „Genetics and Epidemiology of Alzheimer‘s Disease“, „Genetics and Epidemiology of Mild Cognitive Impairment“, „Epidemiological Study of New Anticoagulants“, „Evaluation of the Validity of the Ankle Brachial Index in Diabetics“ and many others have addressed this issue. As part of the excellent HAIE research, a cohort of 4,000 middle-aged people (35-65 years) will be established and their health status, in relation with their lifestyle, psychosocial and socio-economic factors and exposure to long-term air pollution, will be monitored. The impact of air pollution on the population health is also the main goal of the Czech-Polish project „HealthAir“, in which, based on population data, researchers estimated the number of the years of life lost due to premature death or life with dissability.



Epidemiology of the younger generation

Within the epidemiology of the younger generation, researchers are primarily focusing on the evaluation of lifestyle factors, the environmental factors and socio-economic factors that are fundamentally shown in the development of lifestyle diseases during adulthood. Within the HAIE research, a cohort of 2,000 mothers and their new-borns is being established, for whom the Institute of Molecular Epidemiology will evaluate the effect of polluted air on their genome.

Currently, the CER pilot study „Risk assessment of thrombophilic mutations amongst young women“ is focused on the evaluation of the frequency occurrence of all risk factors leading to the increased blood coagulation amongst young women, alternatively on the search of the connection between the occurrence of venous thromboembolic disease in the family history and the presence of thrombophilic mutations.



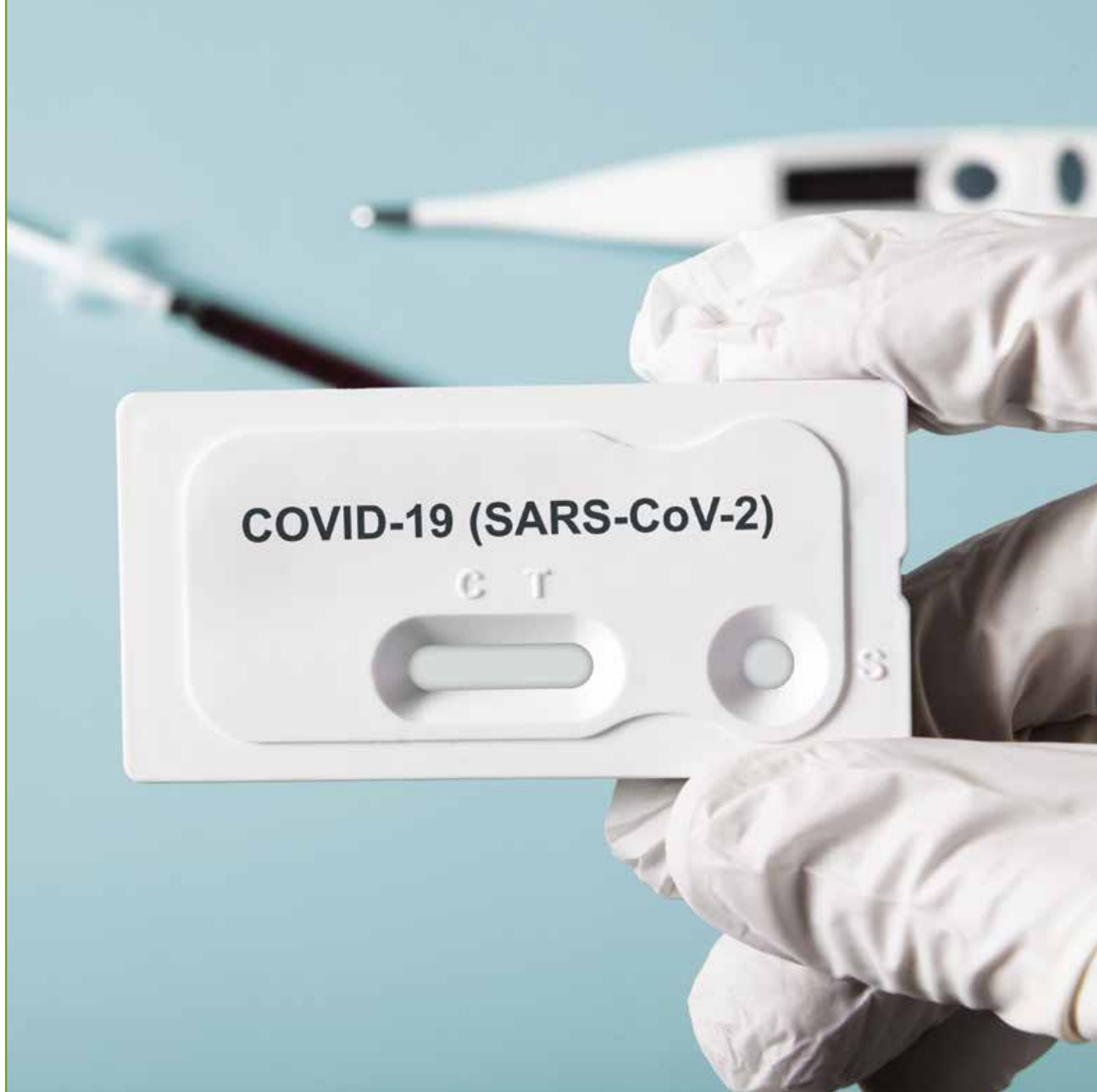
Psychosocial and socio-economic health determinants

Researchers of psychological and socio-economic health determinants focus on the assessment of the risk perception of environmental, lifestyle and psychosocial factors in relation with health and healthy aging. The study of these determinants is based on the assumption that personality characteristics, as well as the conditions in which people live, influence the perception of risks, and thereby predetermine the choice of the lifestyle, the health status and the approach to maintain the well-being to the late age.

„*It is important to find out the mechanism influencing the selection and receipt the information from experts, to find out the extent to which the measures implemented for the protection of public health are understood and accepted*“, the research group leader, Mgr. Hana Šlachtová, Ph.D. describes. For example, the emergency associated with the outbreak of a new type of coronavirus (SARS-COV-2) has led the researchers to prepare and conduct a questionnaire survey on the perception of health risks and the launched measures related to the spread of COVID-19. The survey will help to clarify the level of willingness the restrictions accepting by the population, the population concerns, the trust in crisis management, and the hopes placed by people in resolving the complex situation.

Molecular epidemiology

Molecular epidemiology researchers study the relationship between the exposure to environmental factors, lifestyle factors, and their impact on genetic and epigenetic parameters of health status and aging. Planned analyses include, for example, the determination of mean telomeres length or miRNA levels which affect several processes in the organism including the regulation of the gene expression or the development of aging.

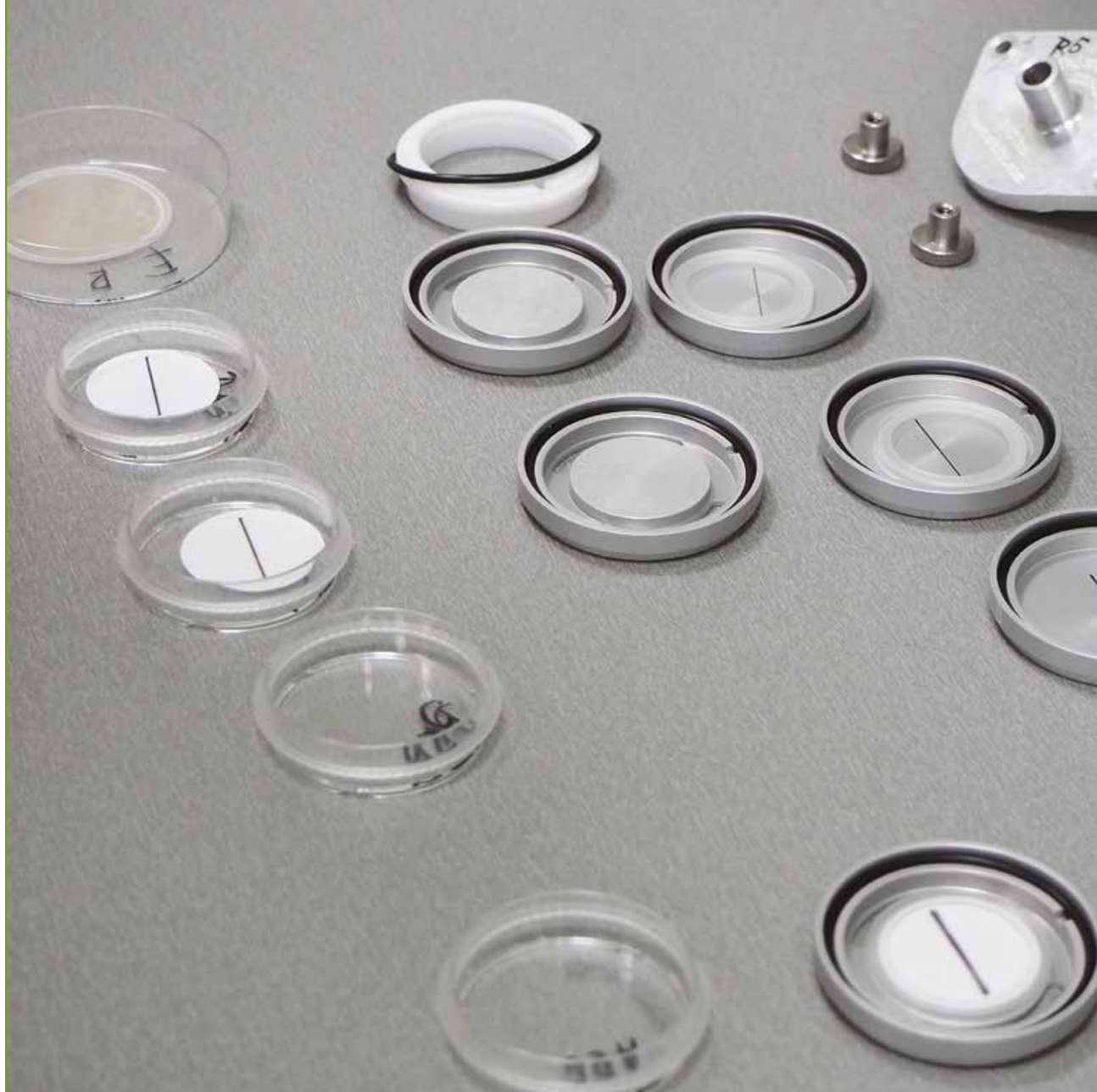


The researchers together with the students have been launching a study focused on the comparison of the concordance of DNA analyses results for two types of biological materials after invasive and non-invasive sampling. In particular, the quantification of the gene coding Factor V Leiden, which occurs in the entire population, nevertheless, it may occur in some individuals with a point mutation, will be evaluated. Among other things, the research participants will get a result whether it is just them who carry the relevant gene mutation posing a risk of worsening the blood coagulation process.

Physical health determinants

The study of physical factors focuses on the evaluation of the effects of the air pollution, noise, electromagnetic field and radiation in relation with possible serious diseases of mass occurrence. As a part of the study of association between air pollution and the population health, the HAIE project mainly evaluates long-term exposure to harmful substances in the air, but, moreover, does also the sampling of particulate matter and the evaluating the impact of the short-term exposure.

The establishment of the Laboratory of Electromagnetic Fields which is used for the study of the relationship between the exposures to low-frequency magnetic fields and acute childhood leukaemia was the part of these activities. It is a CER effort to maintain the direction of this research by establishing international cooperation and preparing new research in the field of experimental studies on animals in connection with the construction of a new vivarium at the Faculty of Medicine. Currently, the Centre is engaged in the research of the radiation exposure due to radon leakage from the geological subsoil of dwellings, which may contribute to the oncological disease onset.



SIGNIFICANT PROJECTS

Healthy Aging in Industrial Environment

HAIE project aims to study the impact of selected environmental risk factors and lifestyle upon the health and aging of the population in an industrial region (Moravian-Silesian Region) and outside of this region (South Bohemian Region).

More about the project: haie.osu.cz/

HealthAir

The HealthAir project deals with the impact of air pollution on the population health on the Czech-Polish border. The main goal is to increase, through information and educational activities (seminars, conferences and monographs), the awareness of the population, public authorities and other stakeholders of the dangers that air pollution poses to human health.

More about the project: healthair.eu/cs/

In the cooperation with the Institute of Epidemiology and Public Health, the projects „Genetics and Epidemiology of Mild Cognitive Impairment“ and „Genetics and Epidemiology of Alzheimer‘s Disease“ took place between 2016 and 2019.

Current student grant projects:

- Effect of long-term exposure to air pollution and lung function on cardiopulmonary mortality in aging women.
- Comparison the concordence of the results of DNA analysis for two types of biological materials after invasive and non-invasive sampling.
- Risk assessment of thrombophilic mutations in young women (pilot study).

CONTACTS

RNDr. Vítězslav Jiřík, Ph.D.
Head of Centre for Epidemiological Research

MUDr. Radim Šrám, DrSc.
Scientific Consultant, Project HAIE Leader

Prof. MUDr. Vladimír Janout, CSc.
Scientific Consultant

Mgr. Hana Šlachtová, Ph.D.
Group Leader of Research of Psychosocial and Socio-economic Determinants

Mgr. Ondřej Machaczka, Ph.D.
Group Leader of Air pollution exposures

Mgr. Andrea Dalecká
Group Leader of Epidemiology of the Younger Generation
CER secretariat

Centre for Epidemiological Research

Published: University of Ostrava
Centre for Marketing and Communication

Editor: Ing. Petra Čubíková
Redactor: Mgr. Andrea Černá
Grafic Design and Rate: Mgr. Štěpánka Zámečníková

1st Edition, Ostrava 2020

UNIVERSITY OF OSTRAVA
FACULTY OF MEDICINE

lf.osu.eu

EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research,
Development and Education

MINISTRY OF EDUCATION,
YOUTH AND SPORTS

The bulleting is financed by the project HR Excellence in Research at the University of Ostrava, project registration number: CZ.02.2.69/0.0/0.0/16_028/0006225