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Evaluation of LIH-DoPH

Report by the external peer review committee

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Executive summary

This report presents the results of the peer review of the Department of Population Health (DoPH) of the Luxembourg Institute of Health (LIH). The review covers the period 2014-2017 and considers research strategy and quality, scientific and societal impact, and the management and governance.

The audit was performed by an independent external assessment committee, consisting of three internationally renowned researchers in the field of the research of the Department, prof. Patrick Rossignol (chair), assistant prof. Maja Bertram, prof. Francis Guillemin, and prof. Roger Salamon. Janna van Belle and Anke Nooijen (Technopolis Group, The Netherlands) organized the evaluation, moderated the hearings, and supported the committee in their report.

The committee would like to thank everyone involved in preparing and implementing the hearing at the LIH-DoPH, for making the documentation available, and for participating in interviews, which were very open-minded.

The report discusses the expert team's observations gathered during the evaluation process.

The peer review committee acknowledges that DoPH did a really good job as a key player for the international visibility of the LIH (e.g. the teams were successful in research with good leadership, such as the achievement of the population-based ORISCAV-LUVX 1 and 2), in a very short time of reorganisation, taking the benefit of the strong achievement of past structures now gathered together. There is a strong added value of keeping population research and expertise linked within the same department, as they can really enrich each other, although their funding, activities and evaluation should be kept separated.

The peer review committee noticed that DOPH mainly conducts observational research and (almost) no interventional research. It is advised that more interventional activities should be developed, needing additional specific funding. Very strong capacity building has been achieved and represents now a solid ground for developing more original research. Good collaboration with international at the unit level and national partners (DII, DONC, PD, IBBL, CHL) are acknowledged. Three nuggets have grown up over the last 10 years (i.e. HBRU, SMRL, CVRU), which fit with clinical research. Stemming from these three nuggets, there is a potential for developing population research, focusing also on health promotion and disease prevention, but requiring dedicated funds.

In conclusion, population research is at a stage where interventional research now needs to be developed and will require dedicated funding. A joint effort gathering stakeholders (Min Health, Min Research, Min Sports, CHL, CNS, FNR) should examine these needs and secure the funding based on project the DoPH will develop on its own.

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1 Introduction

1.1 Background

This report presents the results of the peer review of the Department of Population Health (DoPH) of the Luxembourg Institute of Health (LIH). LIH has the mission to deliver scientific, economic and societal value for Luxembourg by performing research, studies and developments in the fields of clinically-oriented biomedical research and public health. LIH's activities lead to the generation of new knowledge in disease mechanisms, epidemiology, diagnostics and treatments of human diseases, and they improve the understanding of health determinants and of the financial structures of health care. Since its formal establishment and restructuring in 2014, the DoPH has developed expertise in specific areas central to public health, including biomonitoring, sports medicine and cardiovascular research, in addition to offering services linked to clinical research support and public health expertise.

The peer review is part of an evaluation of the three research institutes under the responsibility of the Luxembourg Ministry of Education, Science and Research (MESR). The evaluations cover the period 2014-2017 and consider scientific performance, relevance for society including client and partner interaction and the governance and organisation as requirement to sustain the ability and suitability for promoting both scientific performance and interaction with clients. The evaluation has been assigned to Technopolis Group (www.technopolis-group.com).

The results of this peer review feed into the evaluation of LIH as an institute and into the evaluation of the three institutes at national level. For this reason, the chairman of the LIH-DoPH peer review also participates in the peer review of LIH at institutional level. The results are intended for MESR to (re)define their relation to the institute; for the institutes to help them to improve their performance further and for other (public) stakeholders to use as they find suitable.

The peer review set-up has been designed by Technopolis Group, based on the Terms of reference from MESR. It aligns with good practices used in many evaluations.

1.2 Composition of the Committee, independence, data provided and procedures followed

1.2.1 Composition of the Committee

The audit was performed by an independent external assessment committee, consisting of four internationally renowned researchers in the field of the research of the Department:

- Chairman: Patrick Rossignol , professor of therapeutics
- Maja Bertram, assistant professor of public health
- Francis Guillemin, professor of public health
- Roger Salamon, professor of public health

Short CV's from all assessment committee members are attached in Appendix A.

Janna van Belle and Anke Nooijen (Technopolis Group, The Netherlands) acted as support for the peer review committee.

1.2.2 Independence

Any existing personal or professional relationships between committee members and programmes under review were reported and discussed in the committee meeting to safeguard an independent assessment of the quality of LIH-DoPH and its research programmes in an unbiased and independent way. The Committee concluded that there were no close relations or dependencies and that there was no risk in terms of bias or undue influence.

1.2.3 Data provided to the Committee

In preparation of the review the peers received the following information:

- A self-assessment report of LIH at institute level
- A self-assessment report of LIH-DoPH at department level
- A background report for the peer review of LIH prepared by Technopolis Group, including a.o. an analysis of the participation of LIH in FNR and EC research projects and a bibliometric analysis of the publications of LIH (by ECOOM).

1.3 Procedures followed by the Committee

The final assessment is based on the documentation provided by the Institute and by Technopolis, including key publications, and the discussions between the peer review committee and the research leaders, researchers and stakeholders which took place during the site visit to LIH-DoPH in Luxembourg on 16-17 September 2018 (programme in Appendix B).

At the beginning of the site visit, the Committee was briefed by Robert Kerger of MESR and Janna van Belle and Anke Nooijen of Technopolis Group about the objectives of the evaluation in general and of the evaluation by the committee in particular. During this meeting, several questions were clarified. The Committee also agreed upon procedural matters and specific focus areas of the assessment.

At the end of the site visit and interviews the Committee discussed the conclusions and recommendations. Preliminary draft conclusions were presented to the management of DoPH and LIH and representatives of the Ministries of Research and Health.

A first version of this report was drafted by the peers in the week after the site visit to Luxembourg. The report was finalised through email exchanges. The consolidated version was presented to the Institute mid-October 2018. The reaction of LIH-DoPH was discussed by email by the Committee and led to adjustments of some factual points. The final report was then submitted to MESR.

For the assessment of the quality of the research, LIH-DoPH has been compared at the international level with their peers. Publication and citation records were examined; major achievements were considered and the capacity to be competitive in application to international funding and in attracting highly qualified students and collaborators was discussed. In order to obtain a view of the relevance for science, elements such as recognition as a knowledge centre, participation in expert groups, leadership in EU projects, membership on editorial boards and professional societies were used.

The relevance of LIH-DoPH in relation to health research was judged at both international and national level. Services and expertise rendered to clients and partners both in the private and public domain, and the impact of research performed by DoPH on the general public served to assess DoPH's societal relevance.

The assessment of governance and organisation within LIH-DoPH is based primarily on discussions held with LIH-DoPH staff members about this topic. The findings related to the departmental organisation show adequate robustness, since these findings have been discussed with the most relevant stakeholders during the presentation of the preliminary findings. The findings related to the positioning of the department within LIH and the positioning of LIH in the national and international research landscape reflect the peer's vision of LIH-DoPH but requires further input from other stakeholders inside and outside LIH. Therefore, these findings are considered preliminary and will need to be re-assessed during the evaluation of LIH at institute level.

It has to be noted that the budget- and financial management of LIH/DoPH and its coherence with its missions and scientific program have not been evaluated in detail. This is due to lack of sufficiently precise and specific information related to the "LIH chantiers" made available to the Committee neither in the self-assessment report, nor in the background report prepared by Technopolis Group, nor during the site-review.

2 The positioning of DoPH research: rationale and strategy

2.1 DoPH strategy and targets

The mission of the Department of Population Health (DoPH) is to address major public health issues that are relevant to both Luxembourg and the international community. As part of this mission, the DoPH oversees epidemiological studies, clinical trials, and experimental investigations of chronic diseases, and it conducts research on healthy ageing and major environmental and behavioural risk factors such as nutrition and physical activity. The DoPH acts as a national service provider and performs clinical investigation and research in different focus areas related to public health.

With the arrival of the new LIH-CEO in 2017, the mission of the LIH has been recently refocused and is now more oriented towards translational medicine and clinically transferable applications. To become more in line with the new mission of the institution, the DoPH will push forward its clinical research by reinforcing its ability to support clinical research while strengthening its links with hospitals. It will also refocus its research activities towards innovative exposure measurements and develop interventional research while focusing on LIH and national research priorities. In relation to its health expertise activities and services such as national registries on specific diseases and populations, the DoPH will strive in the next few years to make all collected data sources available so that interoperability, both internally and externally of the LIH, can be achieved.

In order to align DoPH's mission with the LIH strategy, the DoPH has planned a departmental reorganization. This 3-year project aims to create 3 sections, gathering the 6 existing research groups: Epidemiology and Public Health Research Unit (EPHRU), Sports Medicine Research Laboratory (SMRL), CardioVascular Research Unit (CVRU), Human Biomonitoring Research Unit (HBRU), Clinical and Epidemiological Investigation Center (CIEC) and the Health Economics and Evidence Synthesis Research Unit (HEESRU). This new three section structure serves to clarify DoPH's mission and objectives and will focus research on:

1. **population health research**, using the heterogeneity of DoPH as a strength, increasing internal coherence in DoPH, link with other departments and integrate national priorities to build on solid ground (e.g. to measure and modify complex risk factors such as food and nutrition, physical activity and environmental exposure in the focus of LIH and national priorities, while integrating e-health for interventions)
2. **population health expertise**, providing support to national stakeholders, making data available for research
3. **clinical research**, providing full support for LIH translational program, from research question to valorisation

So far 3 transversal research axis are proposed for the next years into which each unit should fit in:

1. Innovative exposure measurement approaches for the study of determinants of non-communicable diseases
2. Improving health through personalized e-health assisted lifestyle interventions
3. Inflammaging

Four out of the six units at the department will have to link for nurturing these axis: the Epidemiology and Public Health Research Unit (EPHRU), the Sports Medicine Research Laboratory (SMRL), the CardioVascular Research Unit (CVRU), and the Human Biomonitoring Research unit (HBRU).

Furthermore clinical research will be reorganized considering strong links between DoPH and the Centre Hospitalier de Luxembourg (CHL) with 2 main organisations: the planned Clinical Translational Center (CTC) with IBBL and the planned Clinical Research Centre (CRC) in-door of CHL for clinical trials. A new governance discussed after preparation of the report during the summer was presented at the meeting.

In short, the peers have made several important observations:

- 1. The new organisation and presentation improve the visibility of the project and the various domains of activity of the DoPH. It is relevant and appropriate to the general mission of the DoPH within the LIH umbrella**
- 2. DOPH mainly conducts observational research and (almost) no interventional research.**
- 3. Population health expertise should make data available for management of health in population and it seems necessary to have some information back from the ministry allowing evaluation of the utility of the expertise**
- 4. In line with population health research, the units are more clinical research oriented in their current activities**
- 5. The understanding of public health should better distinguish between clinical research on patient and population health targeting more on people in the population.**

Importantly, the peers were presented very preliminary information depicted as “chantiers” in the self-assessment report. A lot of relevant additional information was presented during the review, such as the proposed plans for the CRC and TRC, and the composition of the Scientific Steering Committee (at the Institute level).

2.2 DoPH clients and stakeholders

The DOPH does successfully address both the international research community, and the national population as represented by its stakeholders we spoke to: *Decathlon, Novartis, Ministry of Sports, Directorate of Health and CHL*.

The valuation of DoPH by the international research community will be addressed later in the context of DoPH’s research performance.

With regards to the national population, our conclusions are twofold. First, we had the opportunity to meet with various stakeholders from the public domain and received from them an informal review on activities undertaken by DoPH. The department seems to do very well based on these opinions. However, the existence of potential indicators and related feed-back from the stakeholders was lacking to support an informed appreciation. Based on DoPH feedback on this report it appears that such indicators were not requested prior to the DoPH assessment.

Second, based on the reviewed documents and discussions with stakeholders, it is felt that the public health aspect of research done by the department should have a higher priority than is currently the case, and better cover prevention, health promotion research and related needs for Luxemburg population. It should emphasize both international research investment and population health service to the Luxemburg population.

3 Assessment of LIH-DoPH

3.1 Research quality

As can be seen in the table below, DoPH had the highest publication output of all the LIH departments, with 374 Web of Science (WoS)-indexed journal articles in the period 2010-2016 and 5,708 citations up to the end of 2017.

Table 1 Number of LIH publications and citations

Department	Publications	Citations in 3 year window	Citations up to 2017
DII	261	1,753	4,363
DONC	213	3,559	8,785
DoPH	374	2,160	5,708
IBBL	45	142	374
LIH	871	7,352	18,647

Based on a bibliometric assessment provided to the committee, it is considered that the researchers at DoPH, similar to other LIH departments, publish on average in high impact journals (with respect to their field) and receive more citations than expected for these journals. For DoPH specifically, this finding was even stronger when considering international co-publications.¹

When considering only articles where DoPH researchers were first or last author, there is a trend in recent years for an increase in publications in high impact journals (>5) from 10 in 2014 to 16 in 2018, and concurrent decrease in the number of publications in low-impact journals (2 < IF < 5) from 29 in 2014 to 15 in 2018. This is seen as an increased focus on quality over quantity, and this should be maintained.

3.2 General description and assessment

Overall, based on the bibliometric assessment and the research programs presented during the evaluation, the quality of the research of DoPH is good enough to be internationally visible.

Very strong capacity building has been achieved (experienced staff recruited, organization, quality process, expertise in the platforms) and represents now a solid ground for developing more original research. Good collaboration is taking place with international partners and national partners (DII, DONC, PD, IBBL, CHL) at the unit level. Three high potential groups ('nuggets') have grown up over the last 10 years (i.e. HBRU, SMRL, CVRU) which fit with an increased focus on clinical research. These groups contribute to the international visibility of DoPH. Stemming from these three nuggets, there is a potential for developing population research, focusing also on health promotion and disease prevention, but requiring dedicated funds.

Population research is at a stage where interventional research now needs to be developed and specifically funded. Whilst observational research contributes to scientific knowledge, interventional research translates research evidence to applied science in the population. In a joint effort the stakeholders (Min Health, Min Research, Min Sports, CHL, CNS, FNR) should examine these needs and secure the funding based on project the DoPH will develop on its own.

¹ A link between two countries is established, whenever the two given countries co-occurred in the corporate addresses in the by-line of a publication. Consequently, institutional affiliation is decisive, not the nationality of authors. Papers that have been published in co-operation of at least two different countries will be called *international* papers

One major impediment in considering the extent to which DoPH's research addresses societal challenges is the fact that national priorities in the field of health have not been communicated. Compared to other western countries, where the most common behavioural and environmental risk factors for chronic diseases are identified, it is unclear to what extent this is the case in Luxembourg, or to what extent these drive national health priorities.

So far DoPH has been a partner- but not a leader -in several EU-funded research programs, which suggests that DoPH is well aligned with several EU research priorities.

ORISCAV-LUX 1-2 is a unique initiative at the national level, with consistency over time, providing unique health and exposure information. Its potential, which is that there could be the population based ORISCAV-LUX3, should be encouraged and funded, in particular when linked with the 3 nuggets (see above) and because it can address original questions in the 3 transversal research axis.

In the following paragraphs some remarks are provided about the functioning of the groups of LIH DoPH.

3.2.1 Clinical and Epidemiological Investigation Center (CIEC)

The CIEC aims at promoting, supporting local projects and helping researchers to consolidate experimental findings through quality-assured clinical research involving patients and healthy individuals. The CIEC has a good team of well-trained professionals, with a high level of quality processes and practices attested by several certifications. The team delivers excellent support for national and international research projects (examples are the National Center for Excellence in Research on Parkinson's Disease (NCER-PD), ECRIN projects), indicating that DoPH compares well with other institutes. Designing their own studies will help them take the lead and improve recognition further. It represents an opportunity for LIH and DoPH researchers to develop their own clinical and epidemiological projects.

3.2.2 Epidemiology and Public Health Research Unit (EPHRU)

The EPHRU covers a wide range of research and service activities in the field of epidemiology and public health, diseases which are prevalent in Luxembourg, Europe and worldwide, and the lifespan: from antenatal care, to the health of young people, adults and the elderly. EPHRU has a solid and dynamic team, with good international visibility and network. It has good tracks of research with a number of projects of which certain have good visibility. The research topics could be less scattered to gain excellence. A suggestion could be to focus on strengths built up with registries and on connections with hospital to set up cohorts for clinical research, and on public health expertise for running research on deleterious behaviours like addictions, on nutrition and on determinants of chronic diseases.

3.2.3 CardioVascular Research Unit (CVRU)

The cardiovascular research unit aims to identify novel personalized strategies to diagnose and treat cardiovascular disease. The focus is on the development of heart failure following myocardial infarction and on cardiac arrest. The CVRU has very well focused research conducted with consistency, which brings the research performed by this unit at the international level. The team would benefit from an increase in the number of permanent scientists, ideally including medical doctors. The CVRU is part of international network, with the ambition to submit collaborative projects. Critical size is not achieved yet and the number CVRU's research projects with international visibility has to be improved.

3.2.4 Human Biomonitoring Research (HBRU)

The HBRU's primary research goals are the development of biomarkers for the identification of human exposure to different occupational and environmental pollutants such as pesticides, polycyclic aromatic hydrocarbons and persistent organic pollutants. The work of the HBRU is considered original work. It's expertise on hair analysis helped this unit reach international recognition, bringing value for Luxemburg. Owing to the increasing importance of environmental exposure suspected of threatening health, this unit may reach a level of excellence and should be strengthened. The work achieved opens the way for a lot of applications and strong partnerships.

3.2.5 *Health Economics and Evidence Synthesis Research Unit (HEESRU)*

The HEESRU aims to develop and promote the application of state-of-the-art economic methods to improve health and health care in Luxembourg. The HEESRU unit has developed and provided a serious expertise in its field. This unit is in charge of gathering important data on health in the general population (surveys) and in some chronic conditions (registries) at the national level. The peers committee has been informed that the recruitment attempt over the past two years of a team leader for HEESRU at the international level has failed. To preserve proficiency of staff members for the benefit of research at the institute, the biostatistician and health economist will join the CCMS, while other structures (registries) will be maintained independently. The remaining health information organisation will be shared with another institute.

3.2.6 *Sports Medicine Research Laboratory (SMRL)*

The SMRL aims to provide decisive information and new solutions for prevention, therapy and sports-related issues to patients, athletes of any level, trainers, physical therapists, medical doctors and decision makers in sports and public health. SMRL's expertise is in clinical work with patients with knee injuries and on early diagnosis and prevention in this population. Their research is based on a serious physiological approach. There is a high potential for applications of the research in this group in public health yet to be developed, especially for tertiary prevention in chronic disease. It has already demonstrated improved international visibility based on high level of publications, including a clinical trial implemented with private partnership.

3.2.7 *Competence Center for Methodology and Statistics (CCMS)*

The CCMS aims at supporting LIH research units and international pharmaceutical industry players by providing them with high quality methodological and statistical services. The CCMS has an indispensable team, with very strong involvement in national research programs. They offer a good support for international projects. It is necessary for this team to keep its internal visibility and maintain the high quality of service they deliver. The development of N-of-one trials by Prof S. Senn was good work, however he is now retired. It is advised that CCMS focusses on applied statistics in connection with other teams. Clinical trials in Africa may be (or not) an option (this point must be considered by the department management).

3.3 Societal impacts

According to its self-assessment DoPH aims to introduce innovative approaches (hair, biomarkers, sensors, etc.), using more objective, accurate and reliable methods to assess determinants in order to provide new evidence in epidemiological research. The findings should lead to the definition of more efficient prevention and intervention policies. Also announced in the SAR is DoPH's introduction of research projects on e-health/m-health to investigate how these innovative tools are going to improve patients and population health. In addition, the DoPH is currently developing an innovative clinical research organization to support translational research.

In terms of patenting activity, four patents have been filed for biomarkers indicating heart failures. Two patents are granted, two are pending, the latter two together with co-applicants. It is said in the SAR DoPH: "These patents are the origins of ERA- NET and Eurostars projects to translate discoveries from basic research into practical clinical applications, aiming to personalize healthcare of patients with cardiac conditions." Therefore, it seems that actual commercialisation of these patents is still some time ahead. No reports have been issued as to whether these patents have been licensed.

Observational research conducted at CRP mainly contributes to cognitive scientific knowledge while interventional research would bring evidence for applied science in the population. CIEC does contribute to a number of international studies as partner within European research networks, such like ECRIN, indicating that DOPH compares well with other institutes. Designing their own studies will help them take the lead and improve recognition further.

They contribute to international DOPH visibility. LIH should grant their own studies as a leverage to become leaders in their topics.

3.4 Management and governance

3.4.1 *Human Resource policy and performance*

Organisation changes have encountered some reluctance of people to change. Clarification of the governance will help reassure the staff. Gender balance is well achieved at the management level. Supervision both locally and with universities of affiliation is efficient and PhD are well trained. LIH contributes to mobility across Europe (and abroad) with currently 36 nationalities represented in the staff. It is important that people should be recruited with proficiencies fitting with scientific project which should be validated by the external scientific committee.

3.4.2 *General working conditions and infrastructure, campus*

DoPH is located in a very nice environment. The spread of buildings in at least 4 places was a limitation to efficiency. The recent relocation to one location will without doubt improve the interactions and effectiveness of certain units of the LIH. In particular, clinical research and service will greatly benefit of the new physical organisation at CHL. Overall, the DOPH is well equipped. IBBL is not within the DoPH, but closer work with its team will be facilitated by recent relocation. For the near future integration into the translational research center is a great opportunity.

Structures and channels for internal communication is the only area that might be improved to make sure that all staffs feel informed on activities in the department.

3.4.3 *Governance and post-merger development*

The performance indicators fit with the objectives of the contract. Overall, the DoPH has achieved its new contract objectives after one year. National priorities have not been communicated to the committee. The project for the next years goes very well in the right direction, and should be fully supported by the executive committee and the scientific committee.

3.4.4 *Management and organization*

The management team has inspired a positive dynamic within the DoPH. At management level, there is a strong leadership and communication. Communication should be further developed with the staff now that the scientific orientations are well defined.

3.4.5 *Research and innovation culture*

Intellectual property assets are fulfilled (ad hoc recruitment for the whole LIH). See above publication track records. A culture of research and innovation is spread through a PhD day, and public awareness through open days.

In conclusion, very strong capacity building has been achieved and represents now a solid ground for developing more original research. Good international collaboration at unit level and with national partners: within LIH (DII, DONC, IBBL), CHL, and dedicated research programs (NCER-PD).

Despite a high number of changes over the past 3 years, some strong coherence persists within actors of the units within the department, and much efforts have resulted in solving the structure remodelling into a new organisation of which governance is currently being organised. Promising links are announced like joined committee LIH-CHL and partnership. As a result, a shared research director between CHL and LIH is a brilliant idea for reinforcing collaboration and consistency toward clinical research implementation.

The recruitment of Pr Laetitia Huiart as director one year ago has been very successful for giving an impuls to a new dynamic DoPH. She has leadership and a true vision of the potential of the DoPH, its team, and of the directions to take for reaching excellence in research and in public health expertise.

4 Conclusions

The mission of the Department of Population Health (DoPH) is to address major public health issues that are relevant to both Luxembourg and the international community. As part of this mission, the DoPH oversees epidemiological studies, clinical trials, and experimental investigations of chronic diseases, and it conducts research on healthy ageing and major environmental and behavioural risk factors such as nutrition and physical activity. The DoPH acts as a national service provider and performs clinical investigation and research in different focus areas related to public health.

A plan has been presented for the next 3-year project, encompassing with 3 sections:

1. Population health research, using the heterogeneity of DoPH as a strength, increasing internal coherence in DoPH, link with other departments and integrate national priorities to build on solid ground.
2. Population health expertise, providing support to national stakeholders, making data available for research.
3. Clinical research, providing full support for LIH translational program, from research question to valorisation.

The peer review committee acknowledges that DoPH did a really good job as a key player for the international visibility of the LIH (e.g. the teams were successful in research with good leadership, such as the achievement of the population-based ORISCAV-LUVX 1 and 2), in a very short time of reorganisation, taking the benefit of the strong achievement of past structures now gathered together. There is a strong added value of keeping population research and expertise linked within the same department, as they can really enrich each other, although their funding, activities and evaluation should keep separated.

The peer review committee noticed that DOPH mainly conducts observational research and (almost) no interventional research. It is advised that more interventional activities should be developed, needing additional specific funding. Very strong capacity building has been achieved and represents now a solid ground for developing more original research. Good collaboration with international at the unit level and national partners (DII, DONC, PD, IBBL, CHL) are acknowledged. Three nuggets have grown up over the last 10 years (i.e. HBRU, SMRL, CVRU), which fit with clinical research. Stemming from these three nuggets, there is a potential for developing population research, focusing also on health promotion and disease prevention, but requiring dedicated funds.

- In conclusion, population research is at a stage where interventional research now needs to be developed and will require dedicated funding. A joint effort gathering stakeholders (Min Health, Min Research, Min Sports, CHL, CNS, FNR) should examine these needs and secure the funding based on project the DoPH will develop on its own.
- DoPH has performed very well in the short time since the last reorganisation. It has made important contributions in enhancing international visibility of the LIH, making optimal use of the strong achievements of previously dispersed structures which are now brought together in DoPH.
- Internal communication across units and the staff level warrants improvement to facilitate the information exchanges between researchers and between doctorates students
- Three nuggets have grown-up over the last 10 years (i.e. HBRU, SMRL, CVRU). The committee recommends keeping these three nuggets, and other units should link with them to help growing, e.g. whilst designing and running together interventional studies. There is a strong added value of keeping population research and expertise linked within the same department, as they can really enrich each other, although their funding, activities and evaluation should keep separated.
- The teams were successful in research initiatives, e.g. achievement of the population-based ORISCAV-LUVX 1 and 2. It is considered important that more interventional activities should be developed, needing additional specific funding. The Parkinson Disease programme is promising and it may be a good opportunity to extend this program on questions of risk factors and primary care and also around questions about way of living with Parkinson

- The Ministry of health does not appear to be sufficiently involved in research. Key stakeholders are underrepresented and insufficiently active in DoPHs operational decisions and funding.

5 Recommendations

Our recommendations to the DoPH to improve performance are:

1. Request that LIH priorities obtain support from its external scientific committee and implement for the next 5 years
2. Put incentive on supporting interventional research
3. Favour collaboration with LISER for developing social public health research focusing on health promotion and disease prevention
4. Rely on the high quality of facilities and support, which have great expertise and certification.
5. Favour internal communication within LIH and departments
6. Make the scheduled collaboration between research partners and stakeholders like CHL and LIH operational
7. Encourage exchange with ministry of health to better delineate what are the priorities in research for the LIH to become strong team on focused targets (e.g. Stemming from the three nuggets, there is a potential for developing population research, focusing also on health promotion and disease prevention, but requiring dedicated funds) and how to reinforce missions in population health expertise in respect of public health needs in Luxemburg.
8. Involve more stakeholders and share financial load (e.g.: PHRC program in France involving NHS and Ministry of Health became a reference for academic-led research in Europe)

Appendix A Members of the Assessment Committee

A.1 Patrick Rossignol (Nancy, FR)



Patrick Rossignol, MD, PhD, is professor of Therapeutics, Nephrologist and Vascular medicine specialist, head of Nancy Plurithematic Clinical Investigation center (CIC)-Inserm, France. He has participated/is participating in several EU FP6-7 programs (Ingenious Hypercare: Coord A; Zanchetti; MEDIA: Coord: W. Paulus; HOMAGE & FIBROTARGETS: Coord F. Zannad, Nancy CIC). He is coordinating a French network of excellence endorsed by F-CRIN (French Clinical research Infrastructure Network, the French affiliate of ECRIN/ERIC: Cardiovascular and Renal Clinical Trialists (INI-CRCT www.inicrct.org) since 2014. He is coordinating the University Hospital “French Government Investment for the Future” Fighting Heart Failure program (2016-2020). He is the PI of the ongoing double blind (spironolactone vs. placebo) cardiovascular outcome randomized controlled trial in hemodialysis (ALCHEMIST: ClinicalTrials.gov Identifier: NCT01848639) and carotid barostimulation in resistant hypertension trial (ESTIM-rHTN NCT02364310), and steering committee member of several international randomized clinical trials. He is serving in several DSMCs and event adjudication committees. He is a EURECA-m (cardiorenal working group of ERA-EDTA: The European Nephrology Dialysis Transplantation Association) member since its creation in 2009 and got elected as board member (2013-2016). Since 2016 he is a Heart Failure Association of the European Society of Cardiology “Translational” and “Cardiorenal” board member. He currently participates in the ASN KHI. He is the co-founder of CardioRenal.

A.2 Maja Bertram (Odense, DK)



Maja Bertram is currently working as an assistant professor in the Unit for Health Promotion Research, Department of Public Health at University of Southern Denmark (SDU). She holds a PhD degree in Health Science and a Master of Science degree in Public Health.

Maja Bertram is Head of Studies in Public Health at SDU. Her research is mainly focusing on implementation complex community interventions and how to enhance the use of evidence in developing and implementing health policies on health promotion and public health.

Maja Bertram is president of the Danish Society for Public Health. This Society is working for promoting the health of Danes via making an effort to influence the political agenda on health promotion and public health. Furthermore, the Society aim at facilitating knowledge sharing and collaboration between research, policy and practice within public health in Denmark.

A.3 Francis Guillemin (Nancy, FR)



Francis Guillemin, MD, PhD, is epidemiologist and rheumatologist, professor of public health at the University of Lorraine. He is the Director of the School of Public health, Faculty of medicine, in Nancy. He is the coordinator of the interregional Master of Public health. He has implemented teaching programs on clinical epidemiology, health measurement, and health economics. He is the Director of the Research unit EA 4360 APEMAC “Adaptation, measure and evaluation in health. Interdisciplinary approaches” at the University of Lorraine, Nancy. His area of research is in measurement for patient-reported outcomes and health service research in chronic conditions. He is heading the Inserm Clinical Investigation Center, as well as its clinical epidemiology center, at Nancy University Hospital, France.

A.4 Roger Salamon (Bordeaux, FR)



Roger Salamon, MD, PhD trained mathematics at the Ecole Normale Supérieure in Cachan, and Medicine in Paris. He is currently Professor of public health at the School of public health (ISPED) at the University of Bordeaux (France). He was creator and director of ISPED (2005-2010). He created at Bordeaux a research unit of INSERM (institut pour la recherche médicale) and his own research was in the field of Epidemiology (with applications in Alzheimer disease or Aids). He was (2010-2014) president of ADELFI (international association of French speaking epidemiologists). From 2007-2017 he was president of the High Council of Public Health (HCSP) in France.

Appendix B Site visit programme

Day 0 (no presence of LIH required) – September 16

Time	Programme	By
late afternoon, early evening	Arrival of peers in Luxembourg	
19:00 – 22:00	Get together of the panel (over dinner), inform peers about peer review goals and approach, presentation of preliminary analysis	peers, client (MESR)

Day 1 – September 17

Time	Programme	By
08:30 – 09:00	Transfer to institute: Strassen, 1A, rue Thomas Edison	
09:00 – 11:00	General introduction to the institute and the department (and critical self-assessment of the department); discussion	<p>Department management, preferably also institute director</p> <p>Dr Ulf Nehrbass CEO LIH</p> <p>Dr Frank Glod Chief of Scientific Operations</p> <p>Prof Laetitia Huiart Director Department of Population Health</p>
11:00 – 12:15	Tour around the department	
12:15 – 12:30	Time scheduled for meeting client/partner - Directorate of Health with Dr Jean-Claude Schmit - Director	
12:30 – 13:30	(Simple) Lunch	<p>In presence of department management</p> <p>Prof Laetitia Huiart Director Department of Population Health</p> <p>Dr Ulf Nehrbass CEO LIH</p> <p>Dr Frank Glod Chief of Scientific Operations</p> <p>Dr Simone Niclou</p>

		Deputy Director Department of Oncology Dr Catherine Larue CEO IBBL
13:30 – 15:45	Presentation and discussion on theme 1 ‘Public Health Research’ , based on max. 45 min short presentations Overview Prof Laetitia Huiart – Head of Public Health Research ad interim A tour of the Expertises 13:30-13:37 (7 min) Myocardial Infarction Associated Circular RNA <i>Dr Yvan Devaux - Head of Unit, Cardiovascular Research Unit</i> 13:37-13:44 (7 min) Biomonitoring of human exposure to pollutants - The Luxembourg story of hair analysis <i>Dr Brice Appenzeller - Head of Unit, Human Biomonitoring Unit Research</i> 13:44-13:51 (7 min) A personalized health care approach for patients sustaining an Anterior Cruciate Ligament injury <i>Dr Daniel Theisen - Head of Unit, Sports Medicine Research Laboratory</i> 13:51-13:58 (7 min) Cardiovascular Health in Luxembourg - The ORISCAV-LUX1 study <i>Dr Ala’a Al Kerwi - Principal Investigator, Epidemiology & Public Health Research Unit</i> Cross-Disciplinary Research Axes: Current programmes and Future perspectives 13:58-14:06 (8 min) ORISCAV-LUX2 and iIMPACT.LU <i>Dr Laurent Malisoux - Scientist, Sports Medicine Research Laboratory & Dr Maria Ruiz-Castell - Scientist, Epidemiology & Public Health Research Unit</i> 14:06-14:14 (8 min) Construction of new DoPH Research Axes <i>Dr Isabelle Ernens - Project Coordinator, Department of Population Health</i>	4-5 researchers on theme 1, including research theme leader, excluding department manager Prof Laetitia Huiart Head of Public Health Research ad interim Dr Yvan Devaux Head of Unit Dr Daniel Theisen Head of Unit Dr Brice Appenzeller Head of Unit Dr Ala’a Al Kerwi Principal Investigator Dr Laurent Malisoux Scientist Dr Maria Ruiz-Castell Scientist Dr Torsten Bohn Principal Investigator Dr Isabelle Ernens DoPH project coordinator Dr Gloria Aguayo Scientist

		Dr Magali Perquin Scientist Dr Hanène Samouda Scientist
15:45 – 16:00	Tea/coffee break	
16:00 – 17:15	Presentation and discussion on theme 2 ‘Public Health Expertise’ , based on max. 20 min. short presentations 16:00-16:02 (2 min) Introduction <i>Dr Sophie Couffignal - Deputy Head of Unit, Epidemiology & Public Health Registry Team</i> 16:02-16:12 (10 min) National Registries <i>Dr Sophie Couffignal - Deputy Head of Unit, Epidemiology & Public Health Registry Team</i> 16:12-16:20 (8 min) IT Strategic Development to Support Public Health Expertise and Research <i>Dominique Brault - IT Registries Manager - Registry IT</i>	4-5 researchers on theme 2, including research theme leader, excluding department manager Dr Sophie Couffignal Deputy head of Unit Dominique Brault IT manager Aline Lecomte Scientific collaborator Dritan Bejko Scientific collaborator Dr Maria Ruiz-Castell Scientist Stéphanie Saleh Scientific collaborator David Marcic IT Specialist Dr Isabelle Ernens DoPH project coordinator
17:15 – 17:30	Tea/coffee break and posters	
17:30 – 18:30	Informal group meeting (with e.g. PhD students or trainees) 17:30-18:10 PhD students group meeting	5-10 young researchers (e.g. PhD students, trainees: max. 5 years experience in institute), no management present PhD Students: Torkia Lalem (CVRU) Mohammed Iddir (EPHRU-ST)

	18:10-18:30 Young researchers group meeting	Tatjana Makovski (EPHRU-ST) Michael Schnell (EPHRU-RT) Alba Iglesias Gonzalez (HBRU) Young Researchers group: Dr Antonio Salgado Somoza Doctoral Fellow (CVRU) Dr Maria Ruiz-Castell Scientist (EPHRU-ST) Dr Susanne Schmitz Doctoral Fellow (CCMS) Dr Jonathan Cimino Clinical Researcher (CIEC) Eric Besenius Research Assistant (SMRL)
18:30 – 19:00	Draft conclusion of the first day	Peers only
19:00 – 20:00	Transfer to hotel, free time	
20:00	Dinner	In presence of department management Prof Laetitia Huiart Director of DoPH Dr Yvan Devaux Head of Unit Dr Daniel Theisen Head of Unit Dr Brice Appenzeller Head of Unit Dr Manon Gantenbein

		<p>Head of Unit</p> <p>Dr Michel Vaillant</p> <p>Head of Unit</p> <p>Dr Sophie Couffignal</p> <p>Deputy of Head of Unit</p> <p>Dr Isabelle Ernens</p> <p>DoPH project coordinator</p> <p>Location : Restaurant Come à la Maison (entry by Robin du Lac) 70 Route d'Esch L-1470 Luxembourg</p>
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Day 2 – September 18

Time	Programme	By
08:15 – 08:45	Transfer to institute: Strassen, 1A, rue Thomas Edison	
08:45 – 10:30	<p>Presentation and discussion on theme 3 'Clinical Research' based on max. 30 min. short presentations</p> <p>Overview</p> <p>Prof Laetitia Huiart – Head of Clinical Research ad interim</p> <p>08:45-08:50 (5 min)</p> <p>Evolution of the Competence Center for Methodology and Statistics</p> <p><i>Prof Stephen Senn - Scientific expert, CCMS</i></p> <p>08:50-08:55 (5 min)</p> <p>Research in Methodology - Example of N-of-one trials</p> <p><i>Prof Stephen Senn - Scientific expert, CCMS</i></p> <p>08:55-09:05 (10 min)</p> <p>Organisation and Activities of the Clinical and Epidemiological Investigation Center (CIEC)</p> <p><i>Dr Manon Gantenbein, Head of Unit, CIEC</i></p>	<p>4-5 researchers on theme 3, including research theme leader, excluding department manager</p> <p>Prof Laetitia Huiart</p> <p>Head of Clinical Research ad interim</p> <p>Dr Manon Gantenbein</p> <p>Head of Unit</p> <p>Dr Michel Vaillant</p> <p>Head of Unit</p> <p>Prof Stephen Senn</p> <p>DoPH Scientific expert</p> <p>Dr Myriam Alexandre</p> <p>Clinical Research Manager</p>

	<p>Large National Programs</p> <p>09:05-09:09 (4 min)</p> <p><i>National Center for Excellence in Research on Parkinson's Disease - NCER-PD</i></p> <p><i>Prof Krüger Rejko, Luxembourg Center for Systems Biomedicine</i></p> <p>09:09-09:13 (4 min)</p> <p><i>Patient Functional Profiling in Oncology - PFP</i></p> <p><i>Dr Ulf Nerhbass- CEO, LIH</i></p> <p>09:13-09:17 (4 min)</p> <p><i>A Centre of Excellence in Digital Health and Personalised Healthcare - CLINNOVA</i></p> <p><i>Dr Markus Ollert, Director, Department of Infection and Immunity</i></p>	<p>Dr Nancy De Bremaeker</p> <p>Clinical Research Coordinator and European correspondent for ECRIN</p> <p>Dr Jonathan Cimino</p> <p>Clinical Researcher</p> <p>Aljosa Celebic</p> <p>Data manager</p> <p>Anna Schritz</p> <p>Biostatistician</p> <p>Dr Isabelle Ernens</p> <p>DoPH project coordinator</p>
10:30 – 10:45	Tea/Coffee break and posters	
10:45 – 11:45	<p>Time scheduled for meeting clients/partners of the department</p> <p>Decathlon - Dr Nicolas Delattre, Research & Development Engineer</p> <p>Ministry of Sports - Mr Thillen (TBC)</p> <p>Novartis (TBC)</p> <p>CHL - Dr Marc Schlessler, Director of Research</p>	5-10 clients/partners of the department
11:45 – 12:15	Time reserved for clarification of questions from the peers	<p>Department management</p> <p>Prof Laetitia Huiart</p> <p>Director of DoPH</p> <p>Dr Yvan Devaux</p> <p>Head of Unit</p> <p>Dr Daniel Theisen</p> <p>Head of Unit</p> <p>Dr Brice Appenzeller</p> <p>Head of Unit</p> <p>Dr Sophie Couffignal</p> <p>Deputy head of Unit</p>

		Dr Manon Gantenbein Head of Unit Dr Michel Vaillant Head of Unit Dominique Brault IT manager Dr Isabelle Ernens DoPH project coordinator
12:15 – 13:15	(simple) Lunch	Peers
13:15 – 14:45	Time to draft preliminary conclusions	Peers
14:45 – 15:00	Tea/coffee	
15:00 – 16:00	Presentation of preliminary conclusions and discussion on possible recommendations	To the department and institute management, client (MESR) and others where relevant
16:00	End of programme, transfer to train station/airport	

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