

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

### Panel Members

Loreto Carmona (Chair)	Instituto de Salud Musculoesquelética, Spain
Aslak Steinsbekk	Norwegian University of Science and Technology, Norway
Antonella Cardone	The Work Foundation, Lancaster University, United Kingdom
Craig Williams	University of Exeter, United Kingdom
Enrique Alegre	University of Leon, Spain
Joanna Bowtell	University of Exeter, United Kingdom
Jørgen Lous	Syddansk University, Denmark
Matt Berriman	Sanger Institute, United Kingdom
Peter Watt	University of Brighton, United Kingdom
Petia Radeva	University of Barcelona, Spain
Susanne Cruickshank	University of Stirling, United Kingdom

### R&D Units

Centro de Inovação em Tecnologias e Cuidados de Saúde (ciTechCare)	Instituto Politécnico de Leiria (IPLEiria)
Centro de Investigação do Desporto e Actividade Física/Universidade de Coimbra (CIDAF)	Universidade de Coimbra (UC)
Centro de Investigação em Actividade Física, Saúde e Lazer (CIAFEL)	Faculdade de Desporto da Universidade do Porto (FADE/UP)
Centro de Investigação em Desporto, Saúde e Desenvolvimento Humano (CIDESD)	Universidade de Trás-os-Montes e Alto Douro (UTAD)
Centro de Investigação em Reabilitação (CIR)	Instituto Politécnico do Porto (IPP)
Centro de Investigação em Saúde e Ambiente (CISA)	Instituto Politécnico do Porto (IPP)
Centro de Investigação em Saúde e Tecnologia (H&TRC)	Instituto Politécnico de Lisboa (IPL)
Centro de Investigação em Tecnologias e Serviços de Saúde (CINTESIS)	Faculdade de Medicina da Universidade do Porto (FM/UP)
Centro de Investigação Integrada em Saúde - Investigação, Educação e Inovação em Investigação Clínica e Saúde Pública (CHRC)	Faculdade de Ciências Médicas (FCM/UNL)
Centro de Investigação, Formação, Inovação e Intervenção em Desporto (CIF2D)	Faculdade de Desporto da Universidade do Porto (FADE/UP)
Centro Interdisciplinar de Estudo da Performance Humana (CIPER)	Faculdade de Motricidade Humana (FMH/ULisboa)
Instituto de Saúde Ambiental (ISAMB)	Associação para a Investigação e Desenvolvimento da Faculdade de Medicina (AIDFM/FM/ULisboa)
NURSE'IN - Unidade de Investigação em Enfermagem do Sul e Ilhas (NURSE'IN-UIESI)	Instituto Politécnico de Setúbal (IPSetúbal)
Saúde Global e Medicina Tropical (GHTM)	Instituto de Higiene e Medicina Tropical (IHMT/UNL)
Unidade de Investigação & Desenvolvimento em Enfermagem (ui&de)	Escola Superior de Enfermagem de Lisboa (ESEL)
Unidade de Investigação em Ciências da Saúde: Enfermagem (UICISA: E)	Escola Superior de Enfermagem de Coimbra (ESENfC)
Unidade de Investigação em Desporto, Saúde e Exercício (SHERU)	Instituto Politécnico de Castelo Branco (IPCB)
Unidade de Investigação em Epidemiologia - Instituto de Saúde Pública da Universidade do Porto (EPIUnit)	Instituto de Saúde Pública da Universidade do Porto (ISPUP/UP)
Unidade de Investigação UFP em Energia, Ambiente e Saúde (FP-ENAS)	Fundação Ensino e Cultura Fernando Pessoa (FECFP)



## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Centro de Inovação em Tecnologias e Cuidados de Saúde (ciTechCare)

**Coordinator:** Maria dos Anjos Coelho Rodrigues Dixe

**Integrated PhD Researchers:** 26

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**Overall Quality Grade:** GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 3
- (B) Merit of the team of Integrated Researchers: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

**Base Funding for (2020-2023):** 291 K€

### Recommended Programmatic Support

PhD Fellowships: 2

Programmatic Funding: 110 K€.

### Justification, Comments and Recommendations

ciTechCare is a new group with 40 integrated members coming from the Polytechnic of Leiria, from the hospital institution, from primary healthcare centres and from food industry, of which 27 are PhD Integrated Researchers. They have established clear objectives for the future: they know what their mission is, both at national and international level and they involve their members in accomplishing it. They provide a very clear description of their achievements and are very well oriented, knowing what is relevant for research, focusing on internationalisation through fostering collaborations - 3 researchers stay abroad - and being aware that they have to supervise more PhD students, even if they cannot run a PhD program, being a Polytechnic.

Considering the small number of Integrated Researchers (26 PhDs), they obtained overall good results.

They have a web page which is very clear, well organised and provides all the relevant information in an easily accessible manner. This is a plus for the Centre.

Their clinical engineering team works on developing bioelectronic devices for therapeutic neuromodulation in metabolic diseases, on digital technology applications for obese adolescents' behaviour changes, with the aim to see if they can be applied to other diseases.

They provide good evidence for 9 research projects and 14 clinical trials funded by national and international agencies (Portuguese Foundation for Science and Technology, European funding, Brazil Science and Technology Agency), multinational pharma companies (Glaxo Smith Kline, Galvani), and regional food companies (Pato Real, FVPfoods, Panidor, Delipan).

One of their core CVs, contributed to the creation of 24 guidelines and consensus documents in the area of cardiovascular diseases. ciTechCare Coordinator and 5 other members produced guidelines approved by the Portuguese General Directorate of Health: "DARE+", to empower nurses and school educators with strategies for life quality promotion of type 1 diabetes children and teenagers, and the "Guideline for Pilgrims Healthy Eating". One of their core CVs is currently coordinating a funded R&D project focusing on the development of bioelectronics devices for therapeutic neuromodulation and metabolic diseases (CBmeter-SAICT-POL/23278/2016).

ciTechCare members produced 35 health status/quality of life assessment tools validated for the Portuguese population and created one of the three institutional repositories in Portugal with these tools.

Members of ciTechCare have been in the Scientific Committee of 31 national and international conferences. They also created the annual online journal "Research and Networks in Health" to promote scientific writing and discussion among students, researchers, practitioners and academia.

Internationally, their researchers are members of the American Heart Association and the European Society of Cardiology.

They were awarded 54 times for scientific achievements in international and national conferences and competitions in the last five years. They presented publications in 23 international conferences, are part of 9 editorial boards, are reviewers of 53 international journals, are member of 19 international conference scientific committees and of 24 international scientific societies.

On advanced training and education, being a Polytechnic, they do not have their own PhD programme. So, they have identified PhD programmes allies, which are on Nutrition (University of Porto), on Health Sciences (University of Aveiro), on Psychology (University of Coimbra), from which they host PhD students to supervise the development of their theses. The Panel believes that the new regulation allowing Polytechnics to have their own PhD programmes will have a positive impact on ciTechCare ability to attract researchers. In any case, they have a very good masters supervision scheme. In fact, they currently have 12 PhD and 88 MSc students theses. They have lectured several postgraduate courses and supervised 21 research grants (12 currently ongoing), despite the current Portuguese legislation does not allow Polytechnic institutions to deliver PhD degrees. PhD students are attracted by the proximity to end-users and the user orientation of the Research Unit, the strong research CVs of PIs, the multidisciplinary team, science transfer, the great relation with industry partners and the good collaborative atmosphere in the working environment.

The Unit has an excellent capacity to develop and implement community programs and influence on policies. They established a strong collaboration with municipalities, schools and primary healthcare centres in the region. Projects results to the general public were regularly promoted in local media and open days in IP Leiria Health School. PhD students are greatly engaged also in the development of the overall strategy.

They address very well knowledge transfer. They are very innovative and responsive to community real needs. They have established collaborations with local industrial players on nutrition and food innovation and the Industry partner reported to be very happy to collaborate with ciTechCare. They have 1 licensed patent (WO 2016072875 A1), and another one patent on revision, 3 registered brands and 6 innovative functional food products developed with regional food industries.

They are aware of the points they need to improve, such as increasing the number of full-time researchers, and they plan to allocate 50% of their resources to it. This is an excellent strategy in their situation, as they have the knowledge, the facilities and the infrastructure (patients, companies, hospitals) and to strengthen their position full time researchers will be critical.

Considering the small number of researchers, the productivity is very good. Their contribution to: 1) elaboration of international guidelines for disease intervention and national recommendations for health promotion; 2) biomedical and clinical engineering devices and applications; 3) development of digital technology applications for healthy living; 4) innovative food products for health promotion, and 5) clinical trial design and implementation, demonstrates the impact of R&D activities that ciTechCare members report in their curricula and the potential for their future success.

They are very well placed in terms of publications. They reported 207 Scopus indexed publications and 95 ISI and other-indexed publications, as well as 581 communications in international and national conferences. Following Open Access National Policy, all ciTechCare members affiliated to IPLeiria deposited their scientific production in the institution repository IOnline, connected to RCAAP, the Open Access Scientific Repositories of Portugal, and the hospital-based members deposited their work in Leiria Central Hospital repository.

ciTechCare members had the opportunity to develop part of their research work abroad (Canada, United Kingdom, Brazil) and they will test their hypotheses in other countries. ciTechCare members are PI in complex intervention trials. Considering that they have been established as Research Unit one year ago, they are doing very well.

ciTechCare plan is clear and ciTechCare members have clear vision, goals and strategies. They reported an outstanding strategy rationalising the aims and objectives and how to achieve them with mechanistic performance monitoring and ambitious sets of goals to be achieved by the end of the next four-year period.

The current organisation and clarity of vision and objectives for the future are excellent. Goals are very clearly specified and defined. They even indicate the percentage of improvement expected, which is not usual in other centres evaluated.

At the same time, the objectives are realistic. They claim they want to become a prominent innovative R&D Unit and clinical trials centre in Portugal, which is very possible. If they continue with this trend they could well become - in the short term - an international reference. It is clear to them that they need to increase funding coming from European projects and from the industry. They have plans to do that.

They know the average productivity and they establish very clear goal per member, for the next period, which is excellent. They have a clear plan for increasing international visibility and disseminate scientific knowledge to the society. They aim to become a national reference in clinical engineering, functional food development and clinical validation and an international reference in health promotion. Their priority is innovative research in disease prevention and healthy living promotion mainly through young people education and NCD patient empowerment and rehabilitation.

They provide a good example of a R&D Unit that will most likely be an international reference in the future, if they receive funding and support for creating the volume of dedicated researchers that allows them to attract international funds from companies and from the European Commission. They are aware of the relevance to diversifying their funding sources so they have a plan throughout 2019-2022 to reduce their dependency from governmental funding in a growing and sustained way. It is also commendable that there is ambition to attract 10% of the budget from international sources.

Their work is particularly original in the country, as they plan to promote healthy behaviours and increase health literacy among youngsters, chronic disease patients and their informal caregivers, through the development of e-therapeutic programs for obesity, alcohol/tobacco consumption prevention and school violence preclusion, as well as assessment tools to monitor health determinants evolution after implementation of respiratory and cardiac rehabilitation programs; to design, validate and register computer aided early-diagnosis and disease monitoring systems, adapted digital technologies and mathematical predicting models to improve clinical decision making, aimed at a personalized medicine approach; to prototype innovative systems to promote functionality, independent living, self-care in patients with reduced autonomy and their caregivers training, with particular focus on technology-based strategies to support ambulatory respiratory and cardiac rehabilitation; to develop functional food products targeted to young people and non-communicable chronic diseases patients, incorporating nutritionally rich native edible fruits and plants of Leiria Region to create gluten free, sugar free and lactose free products, in collaboration with local food industry companies, propelling regional economic innovation, development and competitiveness, thus precluding sustainable rationales and circular economy principles whenever possible; to conduct clinical trials to validate our R&D accomplishments and allow its rapid translation to clinical practice and to the society.

Based on the application and study visit, which included a presentation, followed by a Q&A session, a meeting with PhDs, a meeting with PIs and a visit to the facilities and equipment, the overall quality grade for ciTechCare is Good.

The Unit can decide the areas to which the PhD fellowship are assigned. The awarded Programmatic Funding can be used for equipment, such as the data analyses software licenses (signal processing), short term and permanent laboratory standard equipment.

**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies,  
Rehabilitation and Well-being**

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**R&D Unit:** Centro de Investigação do Desporto e Actividade Física/Universidade de Coimbra (CIDAF)

**Coordinator:** Manuel Joao Cerdeira Coelho e Silva

**Integrated PhD Researchers:** 18

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**Overall Quality Grade:** GOOD

**Evaluation Criteria Ratings**

- (A) Quality, merit, relevance and internationalization of the  
R&D activities of the Integrated Researchers in the R&D Unit Application: 3
- (B) Merit of the team of Integrated Researchers: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 201 K€

**Recommended Programmatic Support**

PhD Fellowships: 2

Programmatic Funding: 190 K€.

**Justification, Comments and Recommendations**

CIDAF is a Unit focusing on four themes of Young People and Youth Sports, Elite Athletes, Exercise and Ageing and Sports Science, Health and Technology.

There was clear evidence of a rising profile of publications in high impact Q1 and Q2 journals, with the majority of publications in the first two quartiles. The average impact factor of publications is also rising from an IGF of 1.4 in 2014 to 2.6 in 2018. There is also a healthy balance between the number of paper published in health sciences and sports sciences, when previously most publications were orientated towards sports sciences. However, research expectations are modest at one paper each in a peer reviewed journal and should be more specific, for example, as a minimum Q1 or Q2 ranked journal.

Research group and themes align to four areas Young People and Youth Sports; Elite Athletes; Exercise and Ageing and Sports Science, Health and Technology. Whilst none of the research groups can claim to be internationally leading, there is an emerging and rising profile in two of the areas; Young People and Youth Sports and Exercise and Ageing. Achievement highlights include research in youth sports and research oriented to detailing methodically the maturational (biological) development of youth athletes and its influence on training in collaboration with several international centres (Texas and Groningen) and the national association of healthy ageing through the Ageing@coimbra consortium. In both of these areas there is considerable opportunity to expand the partners as there are multiple teams around the world interested in and working in these projects. Further partnerships with the Unit include collaborations with the Portuguese Olympic Committee, the European Innovation Partnership on Active and Healthy Ageing and the Portuguese Institute of Youth and Sports. The work related to Olympic athletes is seen in the achievements of the research team pertaining to the biomechanical determinants of kayak paddling performance, track and field, swimming and cycling performance examining effects of heat, humidity and recently aerodynamics for the national cycling teams.

The Panel also noted and wished to applaud the opportunities the Unit has developed within the Medical Faculty. This aspect related not only to research but also in education is a key driver of enhancing visibility, impact factor (for journal publications) and to help with impact of the work. There was evidence of partnership between the Unit and Medicine Faculty staff in a number of projects with further projects planned. For the future this should form a strong basis for continued growth and enhancement of research quality.

There has been good activity led by the Unit for high quality visibility including international conference organisation related to the research findings in the field of youth sport as well as ageing research. The Unit continues to develop its international networks and sees this as a strategy to increase visibility and attract research collaborations. The Unit benefits from an excellent and internationally recognised advisory board Professors Robert Malina (USA), Neil Armstrong (United Kingdom), Maree Gleeson (Australia) and Edilson Cyrino (Brazil). However, it is noted that there

should be further opportunities to refresh the advisory board, particularly if such research areas as ageing or clinical physiology type work take a greater prominence.

The PhD programme has improved from previous reports and is more formally organised for the advanced training at PhD and postdoc level, as well as Master students to research, all of which has helped lift the overall publication profile and graduations. When on campus PhDs and Postdocs report a favourable working environment with weekly meetings and a structured programme of events/tasks to complete. There is evidence of awards for student research including prizes for research in "Sport and Ethics", metabolism, and for training and immunology. PhD and post-docs report encouragement for exchange visits, which although often only partially (or sometimes not) funded, are still undertaken as the future benefits were perceived to outweigh the financial costs. All members of the PhD and Post-doc community reported a positive outlook in terms of career opportunities and having observed previous research members get jobs were encouraged of the future. Reference was made to the Panel by the coordinator and senior investigators, plus post-docs about the connections with Erasmus plus, the Erasmus network and CAPES as ways to continue the internationalisation of the Unit, as well as the recruitment of students.

Community Programmes, outreach and policies show a line of research that is encouraging and with time will mature in order to promote change. Several initiatives linked to ageing@coimbra were highlighted and this should be used as a template for other work. There was clear engagement with youth sports performers in Coimbra, providing an opportunity for students not only in both research and educational but also a vocational experience. Overall there could be greater visibility of these types of activities.

Aspects related to knowledge transfer were limited but will become more of a focus as the Unit develops a stronger portfolio for business engagement. Currently there are limited patents, prototypes or products, which the Panel thought was a missed opportunity, particularly as technology will be an important theme in the future. There is some evidence of knowledge and technology transfer, particularly in the area of support services for national teams, although it is not clear what the impact or success was of these activities. Opportunities for spin-offs, preservation, curation and dissemination of R&D results and data are probably too early in the research cycle and as noted by the senior investigators was also limited at the institutional level. Although not described in the application, the practices of Open Science were discussed during the Panel meetings including financial support for open access publications.

Currently the contributions for knowledge advancement and/or application appear to be modest but incremental in their gains. The Panel noted that the publications per staff for a Unit, which appears small, relative to other R&D Unit, are modest with just over 1 per integrated researcher, with many of the main contributions being descriptive rather than cutting-edge. The Panel found the integrated researchers to be committed and motivated and who were productive in terms of outputs, across a range of media. There are a number of senior investigators Coelho-e-Silva and Teixeira who have good international visibility, with the challenge now to continue the enhancement of other integrated members profiles.

Internationalisation is variable and appears to be more firmly grounded at the national and local level. Panel discussions outlined the potential for new links and several key members of the team are well placed internationally to drive the Units and institution profile higher. Four of the Unit members were recognised with either Presidential, elected membership or honorary positions on esteemed international organisations (Teixeira, Pinheiro, Figueiredo and Colheo-e-Silva). Overall, educational programmes with an international perspective especially those connected to Mexico and Brazil were well managed and certainly appreciated by post-doc and PhD students. In the Panel meeting, there were discussions about how to maximise the international collaborations that can be developed with PhDs encouraged to be the bridge (an ambassadorial role) between laboratories here and abroad. Whether the students should be formally trained in this role was not ascertained, but could form an important strategic direction.

Currently, the likely impact of the research is mostly limited to a national level rather than global, but the ageing@coimbra does hold good potential as this scheme is now being rolled out across Europe. It should be maximised to ensure that the Units role in its advancement is recognised and subsequent evaluation work of the initiative performed. There was recognition of the Unit visibility in organising two major conferences, the European Group of Paediatric Work Physiology in Coimbra and the International Society for Exercise Immunology.

It is clear that the work of Professor Ana Teixeira and the work of the ageing and exercise programme is gaining good traction both here in Portugal and in Europe and fits the Healthy Ageing agenda so central to many countries research strategy around the world.

The plan of research is achievable and reflects careful analyses of the Unit strengths and weaknesses. There is probably more scope to try to formalise how, for example, a business plan that could be operationalised to maximise potential for technological related research work, in order to exploit industrial cooperation. The Panel noted that the lack of a clear operationalised plan for its industrial strategy, given the emphasis on technology is a weakness and suggests that one be constructed. The Panel noted that the Unit had been both realistic in its request, with a key priority for the PhD studentships.

It is clear there is a strong and well valued by staff leadership and management. Management appeared to be reflective, inclusive and flexible in approaches to develop the strongest performance for the Unit. Other senior investigators around the main Coordinator were supportive of the structures and strategic changes. The Panel wished to highlight that the Unit were responsive to the past evaluation of the FCT Panel and it was refreshing to see such critique but more importantly that the Unit appear to have turned the corner and are on an upward trajectory. PhD and post-docs were highly complementary of all the efforts of the Unit and remarked how hard they worked as a group.

A second strength was in the changes that have occurred to restructuring governance, which will help to enhance and maintain a pipeline of research activity.

One weakness noted by the Panel was there should be consideration of an interconnected strategy that fulfils the vision of the Unit. For example, there appeared to be little connections across the plans for industrial, impact, internationalisation and there is considerable scope to align these and operationalise them in order to maximise opportunity and enhance quality.

A second weakness was the lack of funding that could be applied to attend conferences, workshops for the PhD and post-docs.

The Panel certainly felt there is potential for more interdisciplinary work, especially related to health, but maybe even considering the connection to business and political science to maximise the opportunity for influencing change in policy or practice.

Two PhD fellowships are awarded, which the Panel recommend be focused on the youth people and youth sports and the exercise and ageing research themes, however the Panel recognises that the Unit can decide where the fellowships would have most impact. Several pieces of key equipment were requested and the awarded Programmatic Funding can be used to partially cover such needs.



**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies,  
Rehabilitation and Well-being**

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**R&D Unit:** Centro de Investigação em Actividade Física, Saúde e Lazer (CIAFEL)

**Coordinator:** Jorge Augusto Pinto da Silva Mota

**Integrated PhD Researchers:** 30

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**Overall Quality Grade:** VERY GOOD

**Evaluation Criteria Ratings**

(A) Quality, merit, relevance and internationalization of the

R&D activities of the Integrated Researchers in the R&D Unit Application: 4

(B) Merit of the team of Integrated Researchers: 5

(C) Appropriateness of objectives, strategy, plan of activities and organization: 5

**Base Funding for (2020-2023):** 353 K€

**Recommended Programmatic Support**

PhD Fellowships: 4

Programmatic Funding: 483 K€, including for 2 (Auxiliar) New PhD Researchers Contracts.

**Justification, Comments and Recommendations**

The Centro de Investigação em Actividade Física, Saúde e Lazer (CIAFEL) is a Health Science Research Unit created 15 years ago, hosted by the Faculty of Sport at the University of Porto, Portugal, in partnership with 12 institutions, including Polytechnics, Universities, a Foundation, Schools, a Hospital and a Cooperative focusing together on sport and health science. It can also count on a well-established network of national and international collaborators or associate members, as well as on an Advisory and a Scientific Board with internationally known members.

CIAFEL has a very good track of scientific activity, including 30 research projects funded by FCT and 4 by other national agencies and 9 projects funded by international institutions. In this context, particularly relevant are the health promotion projects on the International Physical Activity and Environment Network (IPEN) in the International Study of Built Environments and Physical Activity and the EU funded projects, such as ERASMUS+ SPORT - European Collaborative Partnership on Sport and Health Enhancing Physical Activity - EPHEPA; the European Food Safety Authority (EFSA) - EEA Grants Public Health Initiatives, and Healthy Europe through Learning Practice (Grant EC-LIFELONG LEARNING PROGRAMME-LEONARDO DA VINCI Transfer of innovation, 2011-2013); H2020 Marie Skłodowska-Curie Innovative Training Networks (mitoFOIE GRAS: Non-invasive Profiling of Mitochondrial Functioning in non-Alcoholic Fatty Liver Disease, 2016-2019 and Bioenergetic remodelling in the Pathophysiology and Treatment of non-Alcoholic Fatty Liver Disease, 2017-2020).

On advanced training, the PhD programme and associated masters programme is functioning very well with successful graduates and in good numbers. Training appears comprehensive and is proposed to be a continued focus for the future. CIAFEL runs 2 PhD programs: The Physical Activity and Health PhD program and the Physiotherapy PhD program, which is unique in Portugal, both with international applicants from Brazil, Peru, Colombia, Spain, Thailand, Serbia and Israel. Most of these students have received PhD Grants either from FCT or from other international funding bodies. CIAFEL is running 3 master courses: Physical Activity and Health, Physical Activity for the Elderly, and Adapted Physical Activity. Admirable is CIAFEL's effort to promote student's mobility outgoing with 19 students who spent between 3 and 6 months in the past period abroad in Israel, Spain, France, Brazil, Germany, Belgium, UK, Denmark, Australia and USA. This clearly shows their attention to internationalisation, as hosting and sending students abroad increases international reputation and networking.

In the past evaluation period (2013-2017) CIAFEL also hosted 74 researchers from 15 countries (Brazil, USA, South Africa, Australia, Colombia, Spain, Chile, Belgium, UK, Israel, Norway, Iceland, Italy, Denmark) for seminars and researches and 86 CIAFEL's researchers travelled to 17 countries to seminars or researches.

CIAFEL has implemented a number of very good community based programmes, including Exercise and Health for Elderly (Mais Ativos Mais Vividos); the ACORDA project for obese youth, which already has a school-based extension (ZARCOFIT). They were funded for "Football and Health," an intervention program targeting obese children and

supported by a UEFA grant. They also started clinical trials based on interventions with bariatric surgery patients (BaSEIB) study.

In partnership with Porto Municipality, CIAFEL is involved in the programme Society, School and Research a program for dissemination of scientific research and promote research skills in secondary school students.

It is starting the cancer patients (CACTUS) and the Exercise and Mental Health, an intervention programme for people with schizophrenia.

CIAFEL members have a very good track record in implementing significant consultancy and services work. They are expert consultants in the development of global and national strategies, policies, position statements, and guidelines, and as office bearers and national representatives on international and national professional organizations.

At the national level CIAFEL members participated in FCT Evaluation Panels for calls of research projects and individual grants; and have integrated the Panel of experts for the FCT Thematic Agenda for Research and Innovation 2020-2030 under the topic of Health, Clinical and Translational Research.

CIAFEL members have also been involved in initiatives promoted by national authorities for the promotion of a healthy lifestyle and disease prevention such as the National Program Sports for all (Ministry of Health) and the National Observatory of Physical Activity and Fitness (Ministry of Education), the National Programme for Enhancing Physical Activity (Ministry of Health). They have also collaborated with municipalities for professional certifications of human resources and public services.

At an international level, CIAFEL members have been frequently requested by the European commission to serve as evaluators in EU H2020 grants, Erasmus+ sport and Marie Curie programmes. These demonstrate the international reputation of some of its members, which is reinforced by them being in the scientific board of the International Society of Physical Activity and Health (ISPAH) and in editorial boards and act as editors of relevant scientific journal including: Journal of Science and Technology; International Journal of Sports Medicine; Journal of Novel Physiotherapy and Physical Rehabilitation; Open Access Journal of Science and Technology; Revista Andaluza de Medicina del Deporte; Revista de Investigaci\_n en Educaci\_n; Reports in Public Health (Brazil); Preventive Medicine; BMC Public Health; Obesity Diagnosis and Treatment; Journal of Sports and Health Research; Journal of Nutrition and Metabolism; Annals of Applied Sport Science; Spine Research; International Journal of Physical Therapy and Rehabilitation.

On the knowledge transfer, a very good result is one patent internationally registered (use of polymyxin as an antidote for intoxications by amatoxins). Under the project FCT/FCOMP-01-0124-FEDER014697/PTDC/DES/11807/2009 a technological tool for assessing physical activity on parks and recreation, was developed. CIAFEL also developed the iSOPARC, which is a Mac app that implements the SOPARC protocol (System for Observing Play and Active Recreation in Communities) in an effort to assist the researchers and practitioners to gather, store, process and export data. This app will allow the development of new features for the iSOPARK application, funded by NC State University. In partnership with the faculty of Engineer (UP), CIAFEL developed a calliper to assess body composition (LipoTool=Adipsmeter & LipoSoft (<http://lipotool.com>)). A new project is starting on exertional monitoring for organic overload in army special forces.

CIAFEL has clearly a strong team of researchers with a good output record and the team has attracted significant income over the past period. There are clearly strong esteem indicators too including contributions to national guidelines, invitations to review for EU funding schemes including H2020 and there seem to be a number of international partnerships.

The team are conducting high quality research in relevant and high importance areas, as is evident by both the publications and the track record of national and international funding to support their work. There are two successful PhD programmes which support the high level of productivity. Overall the Centre is rated VERY GOOD because of the number of international partners; however, the Centre is not an international reference.

CIAFEL integrated members have published 458 articles in scientific peer-reviewed journals, which is an extraordinary achievement given the small number of integrated researchers that CIAFEL has and averaging over 3 articles per researcher per year. Extraordinary is also the quality of the articles published and 80% of them are between 1st and 2nd Quartile. The Journals in which they publish are of high international reputation, such as the Lancet.

In the Shanghai Ranking's Global Ranking of Sport Science Schools and Departments, the research Unit is ranked 15th in Europe and 1st in Portugal. Their plan is excellently detailed under each key strategic priority by goals, strategy and expected indicators. Each member of CIAFEL has a clear understanding and full ownership of the plan for the future and it is perfectly aligned.

CIAFEL has a clear operational structure based on projects and a new hire strategy balanced between PhD students, fellows and researchers.

They are looking for new patents and commercialisation of products although their main priorities are on the Production and Dissemination of Scientific Knowledge, Advanced Training, Community Intervention, and Advocacy and Services Provision.

The Unit shows that it can attract funding from the European Commission, and it is confident of continuing to do so. The identified increased target of 20% in income is realistic as CIAFEL is already well placed to reach it.

Based on the application and study visit, which included a presentation from the Deputy Director of the Centre as the Director is on sabbatical, followed by a Q&A session, a meeting with PhDs and Post Docs, a meeting with PIs and a visit to the facilities and equipment, the overall quality grade for CIAFEL is Very Good.

In the past period between 2013 and 2017, Integrated PhD Researchers have succeeded to secure 43 projects of which 9 International and funded by NIH and the European Commission for about 1,8 million Euros.

These achievements are enhanced by a passionate and highly motivated team of researchers, strengthened by very strong CVs of the leaders and main PIs, showing that the majority of the team of Integrated PhD Researchers has performed innovative research of recognized quality and merit at national and international level. The main strengths of CIAFEL lie in the leadership of a very well established and consolidated Research Unit aligned with passionate and highly motivated young researchers. The multidisciplinary team and the large collaborators network is also an asset of CIAFEL. The main weaknesses concern their interaction with enterprises in research project which could be strengthened.

The Unit can decide which areas for the PhD fellowships. Programmatic Funding is for hiring two new PhD Researchers and to partially cover equipment needs, such as an ultrasound for assessment of blood flow, cardiac and muscular functions, a water purification system, Portable-R3 G02AltitudeHypoxicator, NIRS-Portamon, Artinis, Rapid Cuff Inflation System, Hokanson and an OROBOROS Oxygraph-2k02.

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Rehabilitation and Well-being**

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**R&D Unit:** Centro de Investigação em Desporto, Saúde e Desenvolvimento Humano (CIDESD)

**Coordinator:** António Jaime Eira Sampaio

**Integrated PhD Researchers:** 64

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**Overall Quality Grade:** VERY GOOD

**Evaluation Criteria Ratings**

- (A) Quality, merit, relevance and internationalization of the  
R&D activities of the Integrated Researchers in the R&D Unit Application: 4
- (B) Merit of the team of Integrated Researchers: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 930 K€

**Recommended Programmatic Support**

PhD Fellowships: 4

Programmatic Funding: 479 K€, including for 2 (Auxiliar) New PhD Researchers Contracts.

**Justification, Comments and Recommendations**

The application of this Unit is well documented in the CVs and the description of the activities that the majority of the team of Integrated PhD Researchers have performed innovative R&D of recognised quality and merit in a national and international perspective.

The objectives and strategy of the Unit for 2018-22 are coherent and mostly in line with the work that they are doing. It is clear that the Unit has the capability to pursue and achieve the objectives, strategy, plan of activities and organisation for 2018-2022, the plans are reasonable and will enhance the standing of the Unit. Whilst it is important to disseminate the work the focus on international conferences seems to neglect other means to spread the message and engage with other researchers. It is clear that if the policy of the Unit is to publish in international journals then support for the fees associated should be considered.

In general, the Unit has a clear plan and rationale for the proposed objectives in 2018-2020. The Unit has good facilities and some of the equipment requested may not fulfill all of the strategic aims and some of the equipment requested has not been articulated against research projects, e.g. ultrasound, isokinetic dynamometer, computerized treadmill. The case for computer hardware is clearer. The numbers of studentships requested are large and there was a case made in the meetings with PhD students and post docs that the current supervisors were reaching a position of being overloaded, adding to this with many more PhD students and no further supervision will not solve the problem. The Unit should make a more coherent case for some of the equipment and staffing requested. Sci Why looks like good idea and should be encouraged to develop.

The Unit has been established for some time, has performed consistently well and has faced challenges internally and externally with restructuring of funding support and adjustment of research staff numbers. These challenges have had an effect but do not appear to have inhibited the function of the Unit or sub-units and there is evidence of good performance despite the economic and structural changes faced.

There have been some important research publications and the Unit leaders are well recognised in their field as internationally competitive and well cited in scientific literature. The external advisory board is composed of two internationally recognised scientists with research perspectives of relevance to many of the research aims of the Unit. The Unit has been successful in attracting funding from a variety of sources and they have shown to be proactive in engaging with research income generation and working with diverse agencies such as health providers and professional sports. The Unit has also hosted several focused international congresses with good attendance figures, showing the attractiveness of the R&D Unit and their work to research scientists nationally and internationally (attendees from Portugal, Spain, Brazil, England, Belgium, Australia, and Chile).

There are also annual seminar meetings for MSc students and opportunities for PhD research dissemination through seminars and webinars.

The research priorities, on collective behaviour, sports performance and physical activity and health across the lifespan, particularly issues around chronic diseases are producing evidence of research at a very good level with application and impact. Community focus is centred around providing infrastructure and education on exercise for health. CIDESD also hosts undergraduate, masters and PhD programmes focused on sport and health. The PhD program was clearly effective, the students we met were enthusiastic and enjoyed the range of experiences that they were presented with and the excellent support provided by their supervisory teams and peers. All students understood the process involved in carrying out a PhD training and what they were entitled to, as well as having opportunities to go to international conferences and to start their own networks. Some of this, though, seemed to be funded personally and showed a great commitment of the students to their own research career. These factors show very good characteristics embedded within the research culture and research team.

Areas of expertise, recognisable as having research influence at national and international levels are present in the Unit and include: collective behaviour of teams and groups, sports performance and its analysis, health across the lifespan and the influence of exercise on cardiovascular health and chronic kidney disease, this latter area producing a good, evolving, collaboration with an important R&D Unit at the University of Leicester in the UK. Despite these connections, the Panel does not consider that CIDESD is yet an international reference.

Good examples of international collaborations are shown in the International Masters in Performance Analysis of Sport, a collaboration between the Otto-von-Guericke University of Magdeburg (Germany), the University of Trás-os-Montes and Alto Douro (Portugal) and the Lithuanian Sports University (Lithuania), an effective inter-institutional network and opportunity to integrate students in different environments and increase sport industry-based work placements. Developing sports talent (Talentódromo Desportivo) works with the Portuguese Olympic Committee, the Portuguese Institute of Sport and Youth and the Vila Real Town Hall. The project concerns identifying and developing sport talent and performance monitoring for promising athletes and sportspeople and supporting their coaches. It also promotes sports and active living for all abilities and skills. The project is co-funded by CIDESD and the Vila Real Town and supports approx. 700 training sessions to 140 participants per year from several different sports, genders and age groups.

Skills4Genius was developed to encourage creativity and engagement in sports, defining incremental stages (beginner, explorer, illuminati, creator, and genius) and uses multidisciplinary approaches for coaching and training with researchers and coaches across the globe. Alongside this insights and applications to talent identification have been gained.

The Unit shows good application of new technologies to human health and function research (NanoStima). This project is led by INESC-TEC (Institute for Systems and Computer Engineering, Technology and Science), CIDESD leads one research line of the project, related to health data collection and interpretation. The project is a start towards multi faceted monitoring and application of multiple sensors to measure real time or chronic changes in human function with application to health and wellbeing. The technologies may open new areas of research and could help integrate and inform medical record collection and treatments or therapies.

Related research has been supported in the project Deus ex Machina, aimed at investigating symbiotic use of technology for societal gains. CIDESD lead a work package related to activity monitoring. In terms of developing sports research specialty the Unit has had very good success in providing consulting and evidence based applications to support national and international sports performers. They have engaged in prototype testing, for validity and reliability and provide customised reports for clients. The group is currently developing systems and software to analyse basketball performance and have raised the interest of readily recognised professional teams, e.g. Futebol Clube do Porto, Manchester City Football Club, Fútbol Club Barcelona, Real Madrid Club de Fútbol, Maccabi Tel Aviv Football Club, Aspire Academy, San Antonio Spurs, Los Angeles Lakers.

Other evidence comes from involvement with the Portuguese Olympic Committee and Portuguese national sports federations, academies, clubs and national teams, particularly in swimming and athletics. The Unit has made contributions to Strength and Conditioning evidence and have around thirty articles in peer reviewed journals highlighting their work may be applied to improve performance in high-level athletes, young children and for Exercise & Health. Some work has started, with the support of the Portuguese Paralympic Committee, on para-olympic athletes, a group of athletes not well researched. This group also interacts with elements of the sports industry, developing equipment and helping improve design of swimwear and development of kayak and canoeing vessels.

Several impacts have arisen relating to health, Passus Saudáveis – developed personalised exercise prescription effective for peripheral arterial disease – extended to developing, testing and using a mobile application to aid exercise

prescriptions adherence and to monitor pain levels and fitness. There is evidence the groups work with partner institutions, a good example the development of community-based exercise program for patients with type 2 diabetes. Initially set up at UBI-Covilhã in partnership with local health and government authorities, now expanded to 4 other consortium institution sites. The project has been upscaled and this program is running autonomously.

The Unit has good outreach and range. They communicate through a variety of media and outlets. The Unit has an established and well run PhD programme, important for sustaining a vibrant research culture. Post graduate students and post doctoral fellows work well together and within each of the Units. All are involved in a range of research cultures and are encouraged to become independent.

The Unit published 338 full text articles in peer-reviewed scientific journals between 2014 and end of 2017, which is a substantial number from 64 integrated researchers and 14 PhD students and 31 collaborating research scholars. There has been an output of over 1 publication per integrated researcher per year since 2008 and a significant proportion of them have been published in Q1 and Q2 journals. The ethos in the Centre was to use publication metrics with caution and not to ascribe this as a main determinant of success. The Centre has a good balance between quantity and quality of publications and productivity is distributed across the R&D Units, this is good and realistic.

The research groups appear to be well set up with clear aims and objectives, most have a critical number of integrated researchers. All groups do work of good international standard and there is an ethos of aspiring to publish in higher impact journals. The research community cooperate nationally and internationally, have clear goals and have delivered important scientific and societal contributions. Their impact on society is exemplified by engagement with the community through engagement in local projects and dissemination of research to end-users as well as other research groups. The R&D Unit has received recognition in several forms, invitations to aid national sports, collaborate on international projects, consultancy and involvement with professional sports and grant income. The major strengths are a united group of researchers, with a very enthusiastic group of PhD students indicative of a strong academic environment. The work undertaken has many elements of originality and application to exercise and sport. They have good infrastructure and are developing new and innovative ways to carry out research in sport and health. The number and quality of the PhD students and young researchers gives confidence that the mechanisms and structures for support, development and relationships in the Unit are very good.

The major weaknesses identified concerned the remote location and reliance on other institutions and organisations for some of the computer software and technical development. The external advisory committee could be expanded to better reflect the areas of research being undertaken.

Some of the supporting text did not clearly identify the strategic needs of the equipment, some of the items requested could not be supported as they did not meet the criteria. Several key pieces of equipment were requested. Programmatic Funding is for hiring two new PhD Researchers and to partially cover equipment needs.

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Centro de Investigação em Reabilitação (CIR)

**Coordinator:** Manuel Rubim Silva Santos

**Integrated PhD Researchers:** 17

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**Overall Quality Grade:** GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 3
- (B) Merit of the team of Integrated Researchers: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 3

**Base Funding for (2020-2023):** 198 K€

### Recommended Programmatic Support

PhD Fellowships: 1

Programmatic Funding: 130 K€.

### Justification, Comments and Recommendations

The Research Rehabilitation Center (CIR), led by full Professor Manuel Rubim Silva Santos, is a new Unit. CIR is a multi-disciplinary R&D Unit composed of 17 integrated PhD researchers, and is the first Portuguese R&D Unit in Rehabilitation Science. These researchers with different specialisms (including biomechanics, motor control and learning, rehabilitation of movement system dysfunction, cognitive and psychosocial rehabilitation and neuromodulation, community intervention in specific populations involving mental health issues), work in 2 main focus areas psychosocial rehabilitation and human movement system rehabilitation.

It is clear that the Unit has been established from the ground up with PhD students, junior postdoctoral researchers and PIs providing clear descriptions of the inclusive process, and all highly committed to the missions and objectives of the Unit. This process is also strongly supported by more senior management, with the Dean of the Faculty present and speaking clearly and with real understanding of the strengths but also the challenges faced by the Unit. There is a high degree of institutional support and enthusiasm for the establishment of the Unit. CIR is able to perform applied research and then translate effectively to clinical practice since the researchers are in many cases performing clinical work and are also training the new clinical professionals through their education programmes (BSc and MSc) in which the principles of research led teaching are embedded.

The team were extremely frank about the outcome and feedback from their previous bid for FCT R&D Units funding program in 2012. They were able to take each of the weaknesses highlighted in 2013 and clearly describe the strategies that were put in place to address them. These strategies have been successful in achieving the desired goals:

- Teachers and researchers now have PhDs;
- Project grants have been submitted and successes achieved;
- Internationalisation activity has increased with involvement in EU funded projects;
- Quality of outputs has increased, and distributed evenly across the two focus areas;
- PhD students are conducting their research in the Unit, with supervision from the Unit staff, although formally registered with other Universities.

In the period 2013-17, researchers published 140 papers in journals with impact factor and of these 54% were Q1/Q2 journals and this trajectory and focus on quality has been maintained in 2018/19 with 28 papers published thus far, again with 54% in Q1/Q2 journals. In the highlighted articles, notable journals are Schizophrenia Research (Impact factor: 4.8) and Archives of Physical Medicine and Rehabilitation (Impact factor 3.1), and there is a balanced selection of outputs across the psychosocial and human movement system research areas. This is a high degree of productivity, considering the relatively small team. There is still room for improvement in terms of the proportion of papers published in Q1 journal, and with international co-authorship.

Despite the fact that Polytechnics are not yet able to offer a PhD programme and formally register PhD students, over the period 2013-17, 36 PhD students have been conducting rehabilitation research utilising the facilities in the Unit and

with co-supervision from researchers integrated within the Unit. The PhD students were extremely complementary about the supervision and support that they receive from the Unit, notwithstanding the challenges and difficulties of completing a PhD whilst continuing to perform clinical work and/or teaching. There seemed to be an inclusive and supportive culture within the Unit, with good team cohesion. The Unit also delivers a BSc and MSc programme and operates Rehabilitation Clinics in which students gain clinical experience. It is also clear that the education programme adopts a research-led approach, which ensures that changes to clinical practice can be rapidly achieved on the basis of new evidence to the benefit of the patients.

Over the period 2013-17, integrated researchers within the Unit submitted 29 grant applications, of which 24 were awarded, but with only 11 providing funding to the Unit. There is evidence of continuing growth and success in attracting project funding to support the work of the Unit. Eighteen applications have been submitted thus far in 2018/19 with 8 awarded all of which will result in funding to the Unit. There are still some decisions pending. There is focus on work with industry within CIR, including validation of existing products e.g. MBT and Adidas. Increasingly the researchers are working with industry to develop new products with a shared IP and licencing approach that will generate royalties to support continued activity. The Unit receives some central support from the Polytechnic for negotiations and contracting with industry, and they are working with Tecnalia as a key partner in this commercialisation pipeline. However, to date no new products have yet been launched.

Other funding sources include N2020 and EU funding for several projects that utilise simulation to support the development of clinical reasoning and decision making for training health professionals, as well as support for children with autism and developing psychosocial skills. This shows evidence of some international visibility and recognition in this field, as the researchers were invited to participate in this component of the projects. The Psychosocial Rehabilitation team have an advisory role and responsibility for the community programmes for mental health and social inclusion in the Porto metropolitan area, which indicates local and regional reference status for this Psychosocial rehabilitation area.

In summary this is a very promising R&D Unit that is performing good quality work some of a regional reference standard. This is despite the absence of programmatic funding in the last period. The Unit is engaging effectively with industry and developing an innovation ecosystem between researchers, clinical need and industry. They are showing good progress in increasing their international visibility and recognition, have improved the quality of their research output, are attracting project funds and are building a good research culture in the Unit. The access to Clinics provides a pipeline for the Unit to rapidly translate their research to clinical practice, and a strong potential to have a major societal impact.

The focus areas for this first Rehabilitation R&D Unit are Psychosocial and Human Movement System Rehabilitation, and the researchers have a wide range of expertise and skills from engineering to motor control.

The research output quality is good as evidenced by the proportion of papers in Q1/Q2 journals (54%), there are some examples of excellence but to achieve a higher merit rating a greater proportion of publications in Q1 journal would be expected. The Panel commends the R&D Unit on the progress made since 2013 despite the limited investment in research time.

There is a positive trajectory for grant submission and capture, and the work with industry is also highly commendable. When the first product developed with CIR is taken to market this will provide an excellent advertisement for their capabilities and will support continued growth in this innovation ecosystem.

International visibility is growing, as evidenced by the invitation to join the consortia for the EU projects in the simulation/Psychosocial area. International profile will develop with outputs from ongoing and planned work, but the team is not yet an international reference for their specialist areas. The eminent and well-connected advisory group have been used to good effect to support CIR internationalisation efforts.

As described above, CIR has made good progress since 2013 by following a strategy that responded to feedback from the last review process. This has allowed them to achieve an overall rating of Good despite the absence of Programmatic Funding that time.

The future strategy is appropriate, although the priorities and how they would be delivered and achieved were presented much more clearly during the visit than on paper submission. The Panel considers that 13 objectives for such a small team of integrated researchers are excessive, and in addition it was not entirely clear how these objectives would be operationalised and achieved. The focus on industry partnership in terms of product validation and product



development is strategically sensible, and is showing some dividends. The use of think tank sessions with local companies to identify problems to be solved with new products is innovative, and the developing partnership with Tecnalia is a good approach for commercialisation of IP.

The publication targets for MSc (1 English paper) and PhD students (3 English papers) should facilitate further reinforcement of the research culture, and certainly there has been a step change in the quality of the paper outputs to achieve a rating of Good.

There has been considerable investment in the laboratory facilities that the R&D Unit have access to, with a high specification and professional presentation of the laboratory suite that will facilitate work with Industry. The Psychosocial lab has immersive VR, as well as VR and AR head sets and with the programming skills of the team they are able to programme their own environments for different projects and applications. The Human Movement System lab equipment includes motion capture, force plates, electromyography and electrical stimulation. These facilities are equivalent or better than their national competitors. To fully capitalise on the opportunities available to CIR it is clear that investment in Human Resources is now paramount alongside some small equipment additions and this is the priority highlighted within the strategy.

International profile needs further development, and extension of the advisory board to add other areas of expertise would be sensible. The hosting of an international conference such as the proposed Neuropsychology conference will help to develop international visibility, as will external missions to EU networks in order to facilitate invitations to consortia.

Based on the above assessment, the overall quality grade is Good.

This is based on the overall quality of the portfolio of papers, growth in grant submission and capture, innovative approach to working with industry, and international visibility. As set out above there is still significant room for improvement in each of these areas, but in light of the limited human resources available for research activity, this is an achievement for which the team should be highly commended. CIR are already achieving societal impact for their mental health community programmes in the Porto metropolitan area in particular, and there is great scope for CIR to build upon this work both in terms of national and international reach, and breadth of activity.

The main strengths are:

- Cohesive and committed multidisciplinary team of researchers all of whom have contributed to the development of the strategic plan and are strongly invested in the CIR objectives;
- Involvement of private companies and NGOs in projects at all levels;
- Strong connection between education \_ research \_ clinical practice- industry partners providing a network for rapid translation of research to practice;
- Growing portfolio of industry partnerships for product validation and innovation;
- Very good laboratory facilities on a par with national competitors;
- Support of Faculty senior management.

The main weaknesses are:

- Limited human resources due to high teaching loads and lack of dedicated research staff;
- Lack of in house PhD programme;
- Limited international profile;
- Limited grant income.

The Unit can decide to which programs the PhD fellowships are assigned. Programmatic Funding is to partially cover equipment needs, such as a QTM camera and the upgraded software licences necessary to work with the equipment and an instrumented treadmill.

**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies,  
Rehabilitation and Well-being**

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**R&D Unit:** Centro de Investigação em Saúde e Ambiente (CISA)

**Coordinator:** Agostinho Luis da Silva Cruz

**Integrated PhD Researchers:** 18

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**Overall Quality Grade:** WEAK

**Evaluation Criteria Ratings**

(A) Quality, merit, relevance and internationalization of the

R&D activities of the Integrated Researchers in the R&D Unit Application: 2

(B) Merit of the team of Integrated Researchers: 2

(C) Appropriateness of objectives, strategy, plan of activities and organization: 2

**Justification, Comments and Recommendations**

CISA is a R&D Centre in Health and the Environment at the School of Health of the Polytechnic of Porto that gained its own lab facilities in 2017. The Centre has 18 integrated PhD level researchers but the 11 of these scientists are still at a relatively junior stage having only completed their PhD studies in the last few years. Despite the small number of researchers involved, the Unit has managed to achieve visibility in some areas through EU funded projects and partnership developed. However, the overall quality was judged to be weak due to the low level of national/international recognition. The Centre is clearly in an establishment phase and the team, and indeed the Centre, have not yet reached their potential.

Amongst their notable achievements, CISA members organized and participated in activities to initiate scientific research and its dissemination to young people, namely NaOCI Project, Ocupação Científica Jovens nas Férias, and several different activities implemented in secondary schools. They have also established a portfolio of projects with potential for future impact, such as NASYTHOR - Novel Natural and Synthetic Compounds for Treating Hormone Resistant Tumors. The Centre collaborates on several Erasmus+ funded international projects: in the projects THERAPY 2.0 they collaborate with Greece, Germany and Croatia; in Smart patients – they collaborate with Ireland and Greece; and in PETRHA (Physiotherapy E-Training Re-Habilitation), they collaborate with others in Portugal and Spain.

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heir work links well with their intentions to undertake applied health research and the learning and research are woven well together.

Five publications were highlighted in the application. All were in international journals and three have been well cited by others. This is a good indicator that several of the Centre team members are producing research of a good international standard. However, the overall level across the 18 integrated researchers was felt to be lower.

The Centre presented almost no scientific plans but instead focused on efforts to increase its research capacity and engagement. The management plans are well laid out and are achievable and the Panel were impressed with the commitment and planning for engagement with school children to attract young researchers is commendable. The External Advisory Board is currently made of only Spanish representatives and the Panel recommends that a broader base should be considered, perhaps also by including industrial advisors.

A key strength of the Unit is the ease in which industrial partners can work with the Centre. This was evident in the site evaluation – industrial partners took part in the review and described a positive, long term project. The Panel recommend that the Centre takes a proactive approach to further developing this niche, rather than waiting for industrial partners to approach them.

Another strength of the Centre is the physical proximity of each group, making interactions easy. This was evident during the visit, with the team describing shared projects and continuous interactions.

A major weakness of the Centre is that the each investigator has a heavy teaching workload. Considerable energy and imagination has been put into incorporating research into the teaching but the staff at the Centre felt severely hampered by the Centre small size.

**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies,  
Rehabilitation and Well-being**

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**R&D Unit:** Centro de Investigação em Saúde e Tecnologia (H&TRC)

**Coordinator:** Rui Miguel Duque de Brito

**Integrated PhD Researchers:** 23

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**Overall Quality Grade:** GOOD

**Evaluation Criteria Ratings**

- (A) Quality, merit, relevance and internationalization of the  
R&D activities of the Integrated Researchers in the R&D Unit Application: 3
- (B) Merit of the team of Integrated Researchers: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 3

**Base Funding for (2020-2023):** 273 K€

**Recommended Programmatic Support**

PhD Fellowships: 1

Programmatic Funding: 190 K€.

**Justification, Comments and Recommendations**

The Health and Technology Research Centre is an R&D Unit created in 2016, coordinated by Prof. Rui Miguel Duque de Brito and focused in Medical and Health Sciences. The Centre is organized in four research areas: (i) Genetics and metabolism, (ii) Environmental Health, (iii) Gerontology and Geriatric Health and (iv) Radiation and Health that has its origin in four research groups from the ESTeSL created in 2004. The Centre is composed of 23 PhD researchers, 19 of them full-time professors and other three PhD students that are involved in nine undergraduate courses and in five master courses. The Polytechnic Institute doesn't have a PhD program, which impacts negatively on the number of PhD candidates they are able to access.

The members of the Unit published 80 articles in the last five years Q1 and Q2 journals. Given they are 27 Integrated Researchers, it means that each researcher produced 0.59 publications of quality per year, which is a good number of publications particularly taking into account that it is a new Unit and is the first time they apply to this call. They are aware that some of the senior members have been completely centred the last years in managing administrative positions, reducing their research productivity. Considering the size of the Unit, the number of published articles is good but the Unit has to focus on increasing these figures, both in quality and quantity.

About the PhD and student training, three out the four Integrated Researchers who do not hold a PhD degree are PhD students. The Unit also supervises about 30 master students. At this moment the Unit has 8 PhD students that are enrolled in doctorate programs in other Universities because the Instituto Politécnico has not – and is not allowed to run any – doctorate program. In the interviews, PhD students said that they were in other R&D Units previously and that they chose to come to H&TRC because the collaboration between disciplines in this Centre is very strong and they considered as something very attractive the opportunities and the potential of working at H&TRC.

In relation to the seminars organized by the Centre, PhD students and junior researchers declared that usually they have organised meetings once a month per knowledge area and that they have plenary meetings every four or five months.

The Unit is planning to transfer skills and technologies that will benefit society and ageing as an objective of the Gerontology and Geriatric Health area.

About Patents and intellectual property registrations, they have applied for one patent in 2017 and they registered a software application in the same year. The PhD students were asked about the procedures of the Unit in protecting research results by patents or similar and they declared that most of them do not have knowledge about how or when to file a patent. Therefore, the Centre has to consider organising informative sessions related to protection of research results. Considering that the Unit is based in a Polytechnical Institute, they have to increase the knowledge of its members in this regard and the number of results, whilst increasing the activities related to transferring the developed knowledge.

The Unit is working in subjects that are relevant to society, such as the links between nutrition, genetics and epigenetics with the purpose of developing new therapies.

The Unit obtained funding from a Lisboa2020 project aiming the development of "Next generation sequencing" technologies applied to health, which allowed them to buy an NGS equipment worth 500.000€. Additionally, they also were PI of more than ten research project in the area of genetics and epidemiology, funded by Gates Foundation, FCT, FCG and BP. They are running several small research projects funded by the Instituto Politécnico de Lisboa and, apart from the previously mentioned European Union grant, most of the economic resources are coming from FCT. They need to create more collaborations with industry and also look for alternative funding sources, as can be international projects.

The Unit has not a good visibility in part because its web page is integrated inside the web page of the Politécnico de Lisboa and the information is only in Portuguese. To develop a clear external and internal identity it will be better to have an independent web page where all the information about the Unit, as the mission, objectives, members, services and main results, are available.

The composition and merit of the team are heterogeneous. There are few senior researchers that are active and with a good register of publications in international journals but, there are also some of them that are less active and enthusiastic. In contrast, the young researchers and PhDs are very oriented to gain projects, publications and also to create new international relationships. Actually, they have several strategies for doing that. They are using the Erasmus+ stays for establishing new research collaborations with universities as Groningen (The Netherlands), the Kyoto University (Japan), the University of Massachusetts (USA) and other universities and centres in Spain and Angola. It has to be highlighted the activity of the Coordinator, Miguel Brito, both in encouraging people to join the Unit and from a scientific perspective.

The majority of the team has no international experience or relationships apart from attending international conferences. But young researchers have strong initiative and are capable of looking for partners for European Projects and, after that, submit applications. They need to work in increasing the number of research stays and internships with renowned research groups abroad.

As an additional value the Unit relies in the research carried out by master students. They are running several master programs and they require from them to perform research aligned with their research interests.

One of the most relevant characteristics of the Unit is its multidisciplinary approach and the easy and strong collaboration among its members. They created links between nutrition, genetics and epigenetics with the purpose of creating new therapies. They are also studying the sleep jointly with nutrition, pharmacology and genetics.

In the application, the Centre presented a description of several objectives that mainly consist in continue doing the same research that they did before: (i) Obesity, (ii) Diabetes and (iii) Studies in Hemoglobinopathies and increase studies in the field of Biopsychology and start studies at psychoimmunology. They also propose to (viii) Develop Geriatric Health, (ix) Introduce solutions based on medical imaging and (x) Continue developing scientific projects related to Health Technologies. All these objectives are aligned with some of the strengths of the Centre what can be considered as positive.

They are also planning to increment the funded projects and the number of PhD and Master students. The problem with these objectives is that they do not present a clear strategy for some of them. Apart from the increment of Master students, which is based on the new masters incorporated into the School, the Unit does not describe any strategy to follow for increment the number of funded projects. The description of the objectives is not presented in terms of something quantitative that has to be achieved, are very descriptive, general and without specifying what are they going to do to fulfil them.

About the organisation, as was mentioned before, the Unit is articulated around four research areas. One of the strategies named by the coordinator during the visit was to incorporate more full professors without mention how they will be selected. It will be convenient to consider how could be the integration with the current research areas

The Panel considers that the Unit has to have a clearer strategy for increasing the internationalization of its researchers, reinforce and create new collaborations with complementary research groups in other countries. In this way, the Unit will promote research stays and will also have partners for applications in international calls.

Another important factor that the Unit has to consider is in increasing the collaborations with industry. At this moment they provide services but they are not establishing long term collaborations that allow to transfer the Unit knowledge or to collaborate in solutions to social problems.

Furthermore, it will be convenient to have concrete objectives that could be measured to analyse its evolution.

The Panel felt that the Unit has a clear quality at national level and even some of its members at international level. But the Panel considers that internationalization will need to be developed significantly to move beyond the GOOD rating.

Strengths of the R&D Unit:

- The multidisciplinary approach to problems like sleep, nutrition and genetics.
- Very enthusiastic young researchers with high scientific standard, very motivated and
- The equipment is sufficient for most of the projects they could want to accomplish.
- The support and collaboration of senior researchers, some of them with international impact.

Weakness of the R&D Unit:

- Most of the researchers are, at the same time, teachers in the Politecnico, what reduces the time dedicated to research.
- They have not a doctorate program what is a limitation to recruit candidates for working as researchers and also PhD students.
- The number of the PhD students is low
- Some researchers are integrated in other R&D Units

The Panel recommends

- Increase interaction with companies, looking for long-term collaborations.
- Carry out research stays of at least one month to increase collaboration with other centers abroad.
- Establish yearly objectives in terms of publications.
- Increase the number of publications in high ranked journals (Q1 and Q2 in JCR).
- The Panel considers that the Unit can spend the Programmatic Funding to cover some of the needs they indicated in their application. Among them, they expressed the need for equipment, considering the Panel that it has to be invested in the research lines that are the most strategic and productive in the future, among them the related to the interaction among sleep therapists, nutrition, genetics and epigenetics. Given the need demonstrated by the Unit in having Junior researchers and other human support, part of the budget can be spent as well in human resources that, following the criteria of this call, can help the Unit in that regard and also in the other needs indicated in the application.

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Centro de Investigação em Tecnologias e Serviços de Saúde (CINTESIS)

**Coordinator:** Altamiro Manuel Rodrigues da Costa Pereira

**Integrated PhD Researchers:** 198

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**Overall Quality Grade:** VERY GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 4
- (B) Merit of the team of Integrated Researchers: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 3

**Base Funding for (2020-2023):** 2519 K€

### Recommended Programmatic Support

PhD Fellowships: 20

Programmatic Funding: 803 K€, including for 2 (Auxiliar) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

CINTESIS, being a national-based, multidisciplinary R&D Unit and comprising 198 Integrated PhD Researchers, has the critical mass and potential to convert in a highly performing and efficient environment for health sciences and healthcare high quality research. The Unit is quite unique covering a wide geographic area of Portugal, and relying on a decentralised management structure, supported by administrative and technical staff from 46 institutions, including 8 local management sites at 5 universities and 1 polytechnic. The Central Management Unit performs mainly administrative tasks and contains science and innovation managers, financial managers and communication and media experts.

Regarding the scientific merits of CINTESIS, it is worth to emphasize different factors proving the quality of its research. One of them refers to the high number of scientific publications with special emphasis on Q1&Q2 publications. Moreover, having a significant percentage of them in collaboration with international co-authors is another indicator of quality. This would lead to an average rate of publications per PhD (4.76) for the period of 2015-2018 or 1.2 per year that is considerable. It is very satisfactory to see that the international collaboration in scientific publications covers many different areas like: gastroenterology, general internal medicine, cardiology, geriatrics, neuroscience, nursing, psychology, allergy, computer science, etc. Although these numbers are showing very good quality of research, it would be of interest to see what is the strategy of the Unit to improve even more these indicators increasing the number of publications in Q1/Q2, decreasing the difference in research excellence between the groups of the Unit and spreading and disseminating the excellence between the researchers within and out of CINTESIS (on national and international level).

CINTESIS shows very good participation in European projects and international networks where some of them implied collaboration with Industrial-Health, ICT and Food-partners. The fact that some of the groups have participated in national and international multi-centric clinical trials, assuming roles of national coordinators, as well as participated in steering/protocol redactor committees or investigator roles is a real evidence for the potential of CINTESIS for internationalization capacity and impact in policy making. It is highly desirable to promote and provide support of such initiatives as well as to increase the number of European projects coordination in order to augment the international scientific impact of the R&D Unit. While the output was good, the Panel was not provided evidence that the Unit was an international reference at any specific area.

It is worth to highlight the fact that CINTESIS researchers have created and are coordinating several PhD Programs as well as participating in different PhD Programs. The coordination of Msc programs by CINTESIS researchers shows their good capacity and skills for high quality education. The Panel acknowledges the presentation of high number Masters (120) and doctoral theses (57, ratio of 0.24/PhD) presented during the period under evaluation. PhD students appreciated the wide spectrum of specialities covered by CINTESIS that allows them easy multidisciplinary research. Also PhD students have easy access to different installations and facilities necessary for their research. Formation is based

mainly on interaction with the supervisors and other members of the team as well as informal meetings between students.

A very interesting and specific merit of CINTESIS is the promotion of spin-offs that opens a different channel of professional realisation of young researchers. The Unit is quite unique in this context being able to create already 7 spin-offs. Moreover, members of the Unit participated in EU events to promote entrepreneurship that definitely is a good indicator for the Unit capacity and excellence. Other achievements worth to highlight by the Panel are the cooperation with external private and public national and international entities, the registration of patents, Licensing Agreements, Trademarks, and Copyright Registrations.

It is encouraging to see that the funding of CINTESIS shows a constant growing covering all aspects: public and private funding, national and international (European), PhD and postdoc covering, etc.

An aspect of the Unit worth to highlight is its organisation in 3 thematic lines where the third line includes a relatively new research area as Health Data science and Information technologies. This line definitely can strengthen the scientific achievements of the Unit and open new horizons for research in healthcare. Moreover, the Unit included several new research groups during the last period that can help it to assure broad coverage of scientific topics and opportunities for multidisciplinary research as long as CINTESIS guides the groups to follow global strategy for research management assuring quality and excellence.

CINTESIS shows that it has the potential to do highly complex research and to address current societal challenges. It is highly positive to see that the Unit covers important areas that are often neglected in terms of research funding like nursing, primary care and preventive research. By maintaining a constant growth in research quality, it appears as a national Unit of reference for other Units across all regions of Portugal.

The Unit contains several members and groups of very high scientific quality operating at an international competitive level in fields such as gastrointestinal oncology, inflammatory bowel disease and asthma. Some of the groups of the Unit have very high scientific production like NursID and participated in numerous projects, with national and/or international funding.

There is a big difference between those distinguished scientifically members and groups and many others with much lower ratio of publications and citations. It is highly desirable that all members maintain their ORCID ID / SCOPUS record updated in order to ease the evaluation of their scientific quality. Moreover, it would be of interest to define clear rules to promote and maintain high scientific quality production among most members of the Unit.

Other achievements of members of the Unit are related to receiving positions in international and national organizations and participating in policy making (as the position of Head of the Scientific Committee (2017-2020) of SESAM - Society in Europe for Simulation Applied to Medicine; National representative of EACH - International Association of Communication in Healthcare; the integration in the UNESCO Chair in Bioethics and in the conception of a proposal for a Universal Declaration of Gender Equality presented in the UNESCO, founders of the Cochrane Portugal).

A special merit of members of the Unit is the production of mHealth applications (InspirerMundi, Allergy Diary, Allergy monito) that achieved high rate of internationalization and users adherence. These products are successful examples of the capacity for internationalization of the research outputs by the team members. The Unit is encouraged to promote and disseminate such story successes to other groups and thus to consolidate their quality of being national reference group as well to achieve international recognition.

The Panel acknowledges that CINTESIS is strongly aligned with the Portuguese and European research and innovation agendas, addressing the 'Horizontal' and 'Territorial' Objectives of Portugal 2030, in terms of Business Innovation, Scientific Knowledge, Job and Training, and the societal challenges. It is a good decision to define the three thematic lines corresponding to national and international health research priorities, agendas and the 2030 Horizon since this fact can help them in collaborating with best international teams, participating in consortium of European networks and projects, and interchanging high quality researchers. However, having the decentralized multidisciplinary infrastructure, it does not become clear if this organization in the three thematic lines is a consequence of the strategic planning of the Unit or a consequence of a bottom-up agglomeration of the existing groups. There is no concrete strategic plan to visualize how scientific excellence is to be promoted as well as how the Unit will be guided in order to address societal challenges. The Unit can improve even more its scientific and knowledge transfer results and prestige, if there is stronger and closer to the Unit guidance linking their activities with the strategic aims of the Unit.

The Unit is highly encouraged to pursue what it proposes in the application to develop benchmarks aiming to assess research impact (impact factor, citations), high quality publications (specially of young researchers), and indicators of excellence (e.g. prizes, awards and nominations). Such benchmarks should be detailed and combined with incentives of the groups in order to make them efficient.

Regarding education, the Unit has an ambitious plan aiming to consolidate its role as a leading provider of advanced education programs and to improve their internationalization. Additional effort is expected to be spent to improve the scientific environment of Young investigators by increasing formation events and involving them.

Although there are a number of agreed rules and procedures, the decision-making process is mostly delegated at the Research Group level, aiming to increase the active participation of all researchers. While keeping activities monitored, CINTESIS promotes research group's autonomy as well as individual self-accountability. The Panel expects that the management team also elaborates mechanisms to guide the different groups and their interaction towards the strategic goals and mission of CINTESIS as a R&D Unit.

CINTESIS is characterized by many strength points, namely:

- a) Broad spectrum of healthcare specialities that easy multi-disciplinary research and knowledge transfer.
- b) High international scientific achievements especially in the field of gastrointestinal oncology, inflammatory bowel disease and asthma, etc.
- c) Organization of the groups in three thematic lines that correspond to European and national strategic agendas for Health, Clinical and Translational Research. The Thematic line on Health Data and Decision Sciences & Information Technologies is especially innovative and can help the Unit to achieve excellent scientific and technological results with international clinical impact.
- d) Innovative business model to promote knowledge transfer that led to several patents and the creation of spin-offs with very successful market results.
- e) Excellent capacity of some of the groups to attract funding from European and national, public and private sources proved by its growing tendency in most aspects.

Weaknesses:

- a) The growing number of researchers and groups can easily convert to a threat for the Unit if there is no clear strategic plan and guidance towards well defined strategic goals and mission.
- b) There is no clear and concrete plan to promote the groups interconnection and to avoid the fragmentation of the Unit.
- c) There is no benchmark to evaluate, maintain and promote scientific excellence, and thus there is a big difference in the scientific production of the members and the groups.

Most of the applied funding is for human resources that is reasonable taking into account the main mission and goals of the Unit. The amount the Unit applied for, taking into account the size of the Unit is very reasonable. The budget for equipment covers what the Unit asked for in regard to computer equipment, including personal computers (either desktops or notebooks), and software that needs to be replaced or upgraded every 2/3 years, including specific software for data analysis, statistics and biostatistics, such as SATA, SAS and Matlab. The item "Equipment" also includes some laboratory equipment needed for some research groups that can be bought if it is for shared use of R&D Unit researchers.



**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being**

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**R&D Unit:** Centro de Investigação Integrada em Saúde - Investigação, Educação e Inovação em Investigação Clínica e Saúde Pública (CHRC)

**Coordinator:** Helena Cristina de Matos Canhão

**Integrated PhD Researchers:** 125

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**Overall Quality Grade:** EXCELLENT

**Evaluation Criteria Ratings**

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 5
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 1793 K€

**Recommended Programmatic Support**

PhD Fellowships: 15

Programmatic Funding: 1462 K€, including for 4 (Auxiliar) New PhD Researchers Contracts.

**Justification, Comments and Recommendations**

The Comprehensive Health Research Center (CHRC) - Research, Education, Training and Innovation in Clinical research and Public Health, led by full professor Helena Cristina de Matos Canhão, is a new Unit. CHRC is a multi-disciplinary, multi-institutional R&D Unit composed of 125 integrated PhD researchers from 5 management centres and 23 affiliated institutions. These researchers are organized in 17 groups, belonging to four thematic lines, with different fields of clinical research: from health promotion, sport sciences, through mental health, infection, up to health services research and equity.

The overall quality grade is Excellent. The Centre provides a compelling description of focused activities in some specific areas that obviously has led to high quality of R&D activities among the Integrated PhD Researchers in 2013-17. This is complemented with very strong CVs from all the leaders and main PIs, showing that the majority of the team of Integrated PhD Researchers having performed innovative R&D of recognized quality and merit in a national and international perspective. Both the output of publications and the attraction of funding, as well as the international cooperation, hold a high international standard. Several of the activities concern areas with large societal impact. It is a particular strength that the Unit has been involved in many cross-country projects, leading to some high-profile publications. The Unit has been active in dissemination, including supporting spin-off and gaining patents. They are an international reference evidenced by their ability to be attractive for international partners leading to international academic partnership on one PhD program and four courses and training programs, participation in 16 international reports and 8 international guidelines. Their work with setting up epidemiologic studies including large national cohorts and chronic disease registers is worth mentioning as a factor making the recognisable internationally. They also have researchers invited to participate in international organizations, of which they mention WHO, World Bank and international advisory boards. In the scientific area, their work on rheumatology and mental health stands out as being internationally highly visible. The objectives and strategy of the Unit for 2018-22 show a clear understanding of what it takes to establish a new Unit, with clear priorities of the tasks at hand. Combined with their sensible vision and mission statements, it shows an ambition to become an influential Unit. It is no doubt that the Unit has the capacity to be able to pursue objectives, strategy, plan of activities and organization for 2018-2022 which are adequate to the R&D activities. A clear sign of very good plan is that it provided names for all who will have different roles and positions in the Unit. It is reassuring to see such detailed planning for a new Unit.

The Panel was told about a bottom-up process in the setting of the Unit. This was evident from all the separate meetings (PhD, junior researchers, senior researcher), who told of both being asked for input and having the research groups growing out of or being continuation of already established cooperation. This process was supported by the top management, ensuring institutional support and agreement.

Junior research and PhDs students were very excited about the Unit. They emphasised the opportunity of closer cooperation and support. Also, the senior researchers and others talked to during the visit were strongly in agreement and engaged on behalf of the Unit.

They have a high number of scientific publications, with very good evidence of Q1 journal outputs (41% among the 818 peer-reviewed papers from 19 of their researchers) including publications in the highest-ranking journals. This quality can be seen in the summary list of SCI-indexed journals, including journals like Lancet and Plos Computational Biology. They are affiliated with 4 PhD programs, and the PhD output is very good with more than 1 per integrated researcher over the past 5 years. They have an extensive range of MSc students in 12 MSC programs across 4 higher education institutions. They are providing good opportunities for advanced study links to international learning partners in Switzerland, WHO, Lisbon. They also have a MSc programme funded by EU.

Members of the CHRC have organized many scientific meetings, including 21 large-scale international conferences. There are some very strong output and entrepreneurial activity along with other achievements. CHRC achieved 2 entrepreneurship achievements: The Sleep & Nature Hotel and SAUDE.COME. Developing new areas like the app for seniors could really benefit society due to their relevance to both national, and in some cases, international health needs. Their Patient innovation project is especially worth mentioning as an innovative and both national and international outreaching activity, strengthening the role of the patient. Their slogan of "patient2entrepreneur" nicely illustrates this.

CHRC shows in their vision a willingness to respond to outreach and societal challenges. They have worthy research topics, which addresses important public health issues and has evidence of delivering current thinking into practice. Such activities are supported by evidence of national impact through having co-authored a high number of national and international guidelines and reports of different types. This type of activities are commended as valuable to ensure the societal impact of the work done in the Unit.

There is a clear international orientation also in other areas than those mentioned above, with international outreach evidenced and developing. The Unit demonstrate significant acumen in attracting international partnerships. They have a good partnership with external organisations, e.g. participation in the elaboration of the WHO report on Aging and Health (2015) and the Living Lab (Alentejo).

The Advisory Board consist of international highly renowned members from all over the world. However, it was unclear in the discussions during the visit how they would be used.

Although with variation across the research groups, the Unit has a very good funding stream in total with several large grant captures. However, to maintain and hopefully increase the activity of the Unit, it is recommended that they have a strong focus on becoming even more competitive in raising funds.

Initiatives like Reuma.pt and INTERDEM are a good example of internationally recognised and active groups and projects and the scientific merits of the team in average are high. All the research groups look to be operating well with good evidence of outputs and outcomes and with a range of national and international partners. Within the team of 125 researchers, one can find outstanding publications further strengthening the scientific merits.

CHRC is definitely a national reference in many fields of clinical care. This includes areas, such as establishing and running cohorts, quality register and some specific clinical areas. In addition, some of the groups have participated in different European initiatives (Horizon2020, etc.) what shows that they are an attractive Portuguese partner for international groups.

Furthermore, there is some good evidence of outputs of projects from different teams that has an impact on society. The impact alone of the Mental Health work is exemplary. Also an exemple is the contribution to design health literacy interventions, testing the adequacy and effectiveness of messages and policies for production, distribution and access to healthy foods. Focus on specific groups such as socioeconomic disadvantaged families and immigrants, and investigations into healthy ageing are other potential area to have possible impact on Portuguese society. They have also produced a book specially dedicated to older population with educational contents easy to understand, to increase health literacy which is now being tested. Yet another good example is the creation, using new technologies (internet, apps, smart TV) as educational and motivational tools as well as tools to improve health and monitor diseases. This includes a 12-week home-based intervention program using an interactive TV app to improve dietary habits and a physical activity level among old population with food insecurity was developed.

They have a clear and concise strategy with some objective numbers to increase their achievements. There is a clear plan for the support required. There appears to have been some thought for outreach involvement of patients and industrial partnerships which bodes well for strengthening this type of work in the Unit. They have made excellent consideration for the thematic links, as well as their clear priority setting. Thus, it is a very strong plan with clear objectives and description of actions to achieve those goals. This shows an understanding of strategically prioritising.

It is an exciting idea to establish an intellectual power house to foster excellence. Also having positions which support the research groups can contribute to improved quality and cooperation. The work is sensibly organised and the coordinator is highly skilled in managing large scale strategic governance and cooperation. The division into the four thematic lines is also a sensible choice, but it is not clear why innovation with only one research group (to be increased in the coming years) is a separate line when it is argued that this should permeate the other lines.

It is a big Unit and could potentially be unwieldy. However, the management structure may help divide up the load. Being a new Unit, the application was impressively detailed. Nevertheless, the plan of activities is given in generic way. It delineates correctly the main mission and strategic steps of further research of the groups. It is a likely challenge to get this macro-level plan of activities customised within each group in order to allow scientific progress and high-quality achievements.

The Unit can decide to which areas dedicate the PhD fellowships. Funding for several new PhD Researchers was requested and funds for 4 were awarded. The rest of Programmatic Funding can be partially used for participation in ECRIN, and in various international networks mentioned in the application, and also to cover equipment for the CHRC biobank which will benefit many of the groups in the Unit.

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Centro de Investigação, Formação, Inovação e Intervenção em Desporto (CIFI2D)

**Coordinator:** António Manuel Leal Ferreira Mendonça da Fonseca

**Integrated PhD Researchers:** 24

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**Overall Quality Grade:** GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 3
- (B) Merit of the team of Integrated Researchers: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 2

**Base Funding for (2020-2023):** 273 K€

### Recommended Programmatic Support

PhD Fellowships: 1

Programmatic Funding: 109 K€.

### Justification, Comments and Recommendations

Based on the application, supporting materials and study visit, which included a presentation followed by a Q&A session, a meeting with PhDs and Post Docs, a meeting with PIs and a visit to the facilities and equipment, the overall quality grade for CIFI2D is Good.

These achievements are clearly reflected by a passionate and highly motivated team of researchers, strengthened by very strong CVs of the leaders and main PIs, showing that some of the team of Integrated PhD Researchers have performed innovative research of recognized quality and merit at national and international level. The Centre of Research, Education, Innovation and Intervention in Sport (i.e., Centro de Investigação, Formação, Inovação e Intervenção em Desporto: CIFI2D) is a newly proposed R&D Unit, hosted by the Faculty of Sport of the University of Porto, Portugal.

The CIFI2D aims to promote and to carry out research, and education and training of researchers, primarily in the domain of sport and to transfer and apply knowledge to many different sport contexts and dimensions. CIFI2D carries out research in multiple related sport areas, education and training of national and foreign postgraduate students, specialists and technician, continuing education and dissemination of scientific evidence to practitioners, consulting, evaluation and diagnosis in its sports and community services and interventions. The Unit has an Executive Board (5 Principal Investigators), a Scientific Board (all integrated members), and an Advisory Board (currently 10 are listed, from many countries and many with strong international identities and reputations). The CIFI2D intends to devote much of its efforts to sport in national and international collaboration and partnerships, developing its activities in close cooperation with several researchers, individuals and institutions sharing knowledge and competencies.

The work so far generated by the members of CIFI2D has been of a good standard and there are good examples of national and internationally recognized outputs and impact. It is a well organised team of 24 integrated researchers and a high number of PhD students advised by the integrated members. There is a wide range of representations by members on various journals and editorial boards. There also is an extensive involvement in projects at the regional and national level with several international research projects.

Income from and engagement in research projects is evident, members of CIFI2D are engaged in 45 research projects funded by FCT and other national institutions and were involved in some aspect of several other projects, e.g. funded by QREN, H2020, Compete2020, FEDER, UE, Pennington Biomedical Research Center, Ministerio de Economía y Competitividad de España, Generalitat de Catalunya Research Group, CAPES, Ministério da Educação da República de Cabo Verde, or Federación de Salvamento e Socorrismo de Galicia.

The facilities are good and use some cutting edge technologies and applications to sport performance and analysis.

The doctoral programme appears to attract a high number of international students. Several patents registered related to aquatic sports. There is further evidence of national interventions in several different locations e.g., schools and community halls. Several members have performed evaluations of research grant programmes and other H2020 and Erasmus schemes.

There is little focus on science engagement and open access for communities seen in the submission. There was a good seminar programming and awareness of attendance and engagement was recognised as a good factor.

Discussions with the PhD cohort showed that the students appreciated the facilities, courses laid on, peer support and supervisory time and expertise. They felt cherished and challenged, the only issues were about some funding delays and decisions about enrolment. Post doctoral researcher impressions were good and most of them had a mentor and work well with them to carry out research and career development. The post doctoral fellows and PhD students felt they had sufficient freedom and autonomy to make decisions and influence research direction and outcomes. The Post doctoral fellows and students were ambitious (applications to international and national grants e.g. Uefa, etc.) and there was good organization within teams and communication between research areas. There is good cooperation and communication for project applications and interchange and informal feedback on grants applications (successful and unsuccessful) was carried out. The declining number of PhD students is a concern. The group runs a Master program in collaboration with Spain (U. of Vigo). It is good to see this level of international students' participation.

Community engagement was clear and there was good evidence of working with communities and sports performers.

The group achieved 2 patents, although it is not clear if there is a plan for their exploitation.

Limited detail was provided for some of the information requested, e.g. no Table of FCT funding for 2013-17, knowledge transfer and product development and whether these generate income streams, community programmes and contribution to policy. The extent of internationalisation is not clearly evident for all of the team, there are some indicators that there is, as there is some attraction for international student engagement on the doctoral programme (Brazil, Chile, France, Italy, Iran, Mozambique, Poland, Spain, Thailand, Turkey).

Research production in terms of volume looks impressive, 500 articles in peer-reviewed scientific journals, there was a range of quality, as assessed by Q1 and Q2 criteria of journals relevant to the discipline. Many members of the integrated Panel contribute. Some publications were seen as important in their field, with some good impact factors and multiple citations. The selection of best outputs did not present the best aspects of the work. There are many publications, but the evidence is not clear enough to indicate the scope and range of publications (books, newspaper, peer reviewed, governmental or international reports/recommendations).

Some members of the team have good international reputations and representation on international bodies and professional organizations; this is not the case across all of the integrated members. Overall the plan looks adequate but the case is not clearly made for some aspects and some seem to be loosely rationalised. The case for staffing (4 people), for example, to have a person employed to manage and write a database, software support, data reduction, and presentation seems overly large for the outcomes.

The main strengths lie in the main research leaders and the facilities available, alongside the enthusiastic and strong team/work ethic. The research leaders are productive and address important issues in sports. Leadership qualities seem to be very good and based on a position of strength in enabling and directing rather than pulling. Research Unit has passionate and highly motivated young researchers. The main weaknesses concern their focus on sport and the admitted, by some members of the group and other Units researching Sport in Portugal, difficulty of obtaining funding against health related projects when in open funding competition. Only 4 of the 5 identified important contributions highlighted in the Unit applications were relevant.

The Panel considers that the Unit can spend the Programmatic Funding to cover some of the needs they indicated in their application. Among them, they expressed the need for equipment; the Panel considers that it has to be invested in the research lines that are the most strategic and productive in the future, among them that related to the interaction among sleep therapists, nutrition, genetics and epigenetics. Given the need demonstrated by the Unit of having Junior researchers and other human support, part of the budget can be spent as well in human resources that, following the criteria of this call, can help the Unit in that regard and also in the other needs indicated in the application.

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Centro Interdisciplinar de Estudo da Performance Humana (CIPER)

**Coordinator:** Luis Fernando Cordeiro Bettencourt Sardinha

**Integrated PhD Researchers:** 60

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**Overall Quality Grade:** VERY GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 4
- (B) Merit of the team of Integrated Researchers: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 3

**Base Funding for (2020-2023):** 876 K€

### Recommended Programmatic Support

PhD Fellowships: 4

Programmatic Funding: 483 K€, including for 2 (Auxiliar) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

The CIPER group explores and develops interesting and some innovative approaches for the measurement, mechanism and intervention strands to tackle physical activity, sedentary behaviour and non-communicable disease prevention.

The overall grade is judged as VERY GOOD. The objectives, strategy, plan of activities and organisation for 2018-2022 are adequate to the R&D activities.

There was clear evidence of publications in high impact Q1 and Q2 journals. One of the main contributions CIPER highlights as strength is in regarding the high productivity in Master and PhD training. CIPER has a good Master and PhD production, although it is challenging to maintain its numbers (179 Master students and 76 PhD students i.e. approximately 3 Master per researcher and more than 1 PhD defence per doctor member of the group). PhD students reported good supervisory relationships and good access and availability to equipment. PhD students experienced grant writing workshops and were positive about cross project participation with other researchers. There appeared to be no major choke-points that could delay or inhibit their proposed research plans. There was evidence for further examples found in support of very good educational experiences, including undergraduate scholarships to initiate research as well as undergraduate internships that allow students to observe the work of PhD researchers and their support teams interacting with the participants. The Panel noted good interactions and cooperation with medicine.

The perspective of a multidisciplinary approach is evident throughout the project work and how the R&D Units collaborate and share facilities. The approach of multi-disciplinarity is also reflected in the PhD and Masters students approach to their research. This multi-disciplinary approach to fulfil the vision of expertise in measurement, mechanism and intervention is a key strength of the Unit. In particular the proposed future includes the research areas of sitting and sedentary behaviour research, which is a very topical theme at present and was well outlined for its importance and relevance to society. There are two groups which are noteworthy internationally, namely computer modelling and analytics and Sports Performance with specific reference to the work with the Olympic Organisation. Very good quality highlighted outputs, evidence of significant contribution to the field, addressing important topics that has attracted significant EU funding, good internationalisation activity, involvement in policy making and organisation of international conferences.

Some good to very good links to networks and consortiums including EI-Health, with good evidence found in the site visit for opportunities for national and international conference attendance, particularly for the PhD students. Post-doctoral students in the site visit felt well supported with opportunities to develop their profiles and experiences, including opportunities for exchange visits. There was good evidence through the site visit and talking to the PhD and Post-doc students that engagement and community collegiality was high. International PhD students, whilst in a low number, are being recruited, funded and integrated into the Unit through links to societies such as the American College of Sports Medicine, European PhD partnerships and industrially funded PhDs. This latter area is one that the Unit can exploit to greater effect.

The internationalisation strategy is to prioritise ongoing collaborations, also depending on the competences, mixing long-term and short-term partnerships. There is good involvement of the external advisors who give advice and classes in PhD programs furthering the visibility not only with international scholars, but the Units attraction to international collaborators.

There is very good evidence of international and national activity regarding grant capture with project funding awarded from the IOC, H2020, CAPES and FCT. A further 8 research projects funded by the Portuguese Institute of Sports and Youth were noted, and there was very good evidence of international cooperation with institutions in Scotland, the Netherlands and Norway. The European Commission source funding was the largest contributor and there was some, albeit modest income capture from companies, industry and other private sources not based in Portugal.

The 5 research laboratories cover sensible areas, with potential for combining research collaboration as required, but with a different research emphasis, there is clear evidence of contributions across the groups that improve the quality of the work. There was also evidence of new emerging paths of research such as health behaviour change, a new tract for the obesity intervention change, but that this would present a challenge given the primary focus on physiology, biomechanics and psychology.

One challenge is how to encourage and promote excellence across all integrated researchers, as most of the high impact work comes from a few senior people, so strategies to balance and enhance other researcher profiles would be advantageous. For example, where publications have senior researchers as co-authors and multiple authors, publications were of high quality. Where fewer authors were cited, there was less impact. All the leads for the disciplines are good and have good international and national links and there was some clear recognition for others. But other researchers were not yet at that level, therefore, it would be good to strategise particularly about aims for peer support and how best to develop other staff links and opportunities to bring more junior members of the research team to the fore.

It is clear that the work of the Self-Regulation in Physical Activity, Nutrition and Obesity group led by Professor Pedro Teixeira demonstrates the potential of the research for impact on society. His appointment as Director of the National Physical Activity Promotion Programme (Portuguese Health Ministry), allows this work to be translated and up-scaled for the real-life promotion of physical activity and reduction of sedentary behaviour. This is a good template and exemplar for the Unit to follow.

The plan of research is ambitious and challenging. It is well detailed and long-term. The requirement for new researchers (PhD and postdocs), as well as for new infrastructure are well intended and logical. CIPER has a clear vision how to continue creating high quality research in the field of human behaviour, these are all relevant and important aims but more operational details need to be articulated to ensure these are fulfilled and to evaluate their success. For example, reference is made to a plan for a “web-based platform development and maintenance, which will employ a problem-based socially innovative approach to the challenge of understanding and optimising the implementation process” but this is a requirement for an entirely different set of expertise and researcher skills. It was not specified how this was to be achieved. Discussion was provided by the senior team regarding European PhDs and for example, links to international PhD students and collaborations with Brazil, laboratory internships and industrial funded PhD. All of these initiatives should be maximised in order to increase capacity.

The aspect of having a much more operationalised and explicit strategy is equally important at the management level, for example, the strategy committee is led by four senior leaders and although a democratic process was highlighted for deciding the strategy, it could be more detailed and operationalised and utilise other staff. The Panel noted that it was a missed opportunity not to include more of the senior investigators in the last Panel session of the day to provide a broader perspective of the work of the Unit and how other members of the team are included in decision making. Additionally, it was not evidenced that there was an industrial/business strategy to exploit some of the business relationships and to build on the possibilities such as the previously discussed industry funded PhDs.

It is clear there is a strong leadership and management by the main Coordinator and supplemented by the three other research leaders. However, there is a challenge that there is opportunity to bring through other junior and senior researchers and not to have the same personnel being responsible for all key roles.

One weakness is that there was no formal training in the PhD programme to do research provided by the Unit, although skills are developed by working in projects, they can attend short informal courses of the Lisbon University. Postdocs

acknowledge that it would be helpful to have some formalised courses. One of several notable areas could be related to the topic of complex behaviour interventions as proposed by the MRC or one about technology and patent utilisation.

There is potential for more interdisciplinary work, especially related to health, but maybe even considering the connection to business and political sciences to maximise the opportunity for influencing change in policy or practice. As the Unit is proposing more of this type of work, it is the next logical step to complete the pathway for evidence based practice. There is considerable potential for more clinical trials especially aligning with methodologists.

Four PhD fellowships are awarded, which the Panel recommends that the Unit decides where they feel the fellowships would have most impact. The recommendation for hiring two Assistant Researchers is to be applied in areas at the discretion of the Unit and is based on the requests for coordination of scientific implementation, advancement of new methodology and research translation. A large amount of key equipment was requested. Programmatic Funding, besides the contribution to hiring new researchers, has been granted for part of that request.



## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Instituto de Saúde Ambiental (ISAMB)

**Coordinator:** António Vaz Carneiro

**Integrated PhD Researchers:** 50

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**Overall Quality Grade:** VERY GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 4
- (B) Merit of the team of Integrated Researchers: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 486 K€

### Recommended Programmatic Support

PhD Fellowships: 2

Programmatic Funding: 298 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

### Justification, Comments and Recommendations

ISAMB is a R&D Unit on Environmental Health at the Faculty of Medicine that was recognized for FCT funding in 2016. The Centre has 87 integrated PhD level researchers.

The Centre is already serving as a national reference in some areas of environmental health, as evidenced by the Portuguese government enlisting its help to advise on food labelling policy. Moreover, the Centre is growing rapidly and there was good evidence that internationalisation is being achieved in many areas. Several important international projects are in an establishment phase with very real potential to deliver on a large scale. The Centre aspires to be a WHO centre of environmental health and the Panel felt that this considerable achievement would elevate the Centre to being considered an international reference.

The Centre has only recently been established and has made very promising progress with prominent achievements reflecting all five of their RGs. Of particular note, the Centre organised a WHO workshop in 2017 that resulted in an international report on setting research priorities in environmental health. Several prominent projects have been established including those that promote mental health of adolescents and support health in elderly tourists visiting Portugal. In another project involving 28 countries, the Centre led tasks providing data on chemical exposures that result in health effects.

The Panel were particularly impressed with the level of industry involvement. A PhD program was previously established with funding from 12 industry partners and FCT. The first round has 12 PhD students covering all areas of the Centre research groups. One of the industry partners that spoke on behalf of the Centre is an Integrated PhD Researcher.

Some of the Centre top 10 papers demonstrate their inclusion in international consortia – not as named authors – but as Portuguese studies linked in with these global efforts. On several other papers, study leadership was clearly demonstrated.

The Centre has demonstrated an impressive track record in obtaining external funds. The Panel noted a benzodiazepine discontinuation study; the ALHTOUR project, to look at improving health of elderly tourists; Adventura Social Project that is part of the HBSC WHO Project to look at risk behaviours in young people; and the BOLD initiative to collect data on the prevalence of chronic obstructive pulmonary disease as well as on risk factors and the burden of COPD.

The Centre has a very good team of Integrated Researchers. Although, the overall number of internationally competitive publications is not as high as should be expected for ~90 Integrated Researchers, the Centre is still developing rapidly. The leadership team is strong. For instance Prof. Carneiro, from the Faculty of Medicine, is the Centre Director and highly experienced, having published numerous books, chapters and reports throughout his career. He is a regular contributor to the Cochrane (Portugal) library and database and has published regular papers with implications for Portuguese national health. The leaders of the 5 research groups are also highly successful scientists. In particular, Prof.

de Matos is the lead-coordinator on the social adventure project that has been running for 30 years and is integrated into a much larger international study on health behaviour in school-aged children. She is a prolific author with a long list of recent books chapters and research articles. Her public list includes many with her prominently listed, suggesting a driving role. Prof. Bárbara also stands out; she has many papers in international journals that provide evidence of her expertise in sleep apnea and chronic obstructive pulmonary disease. She was a contributor to the Airways paper that is listed as one of the top contributions for the Centre. Her research leadership is demonstrated by last authorship positions in several papers in 2017.

The overall budget is approx. 1M€ with 50% of funding from FCT. Given its current connections with WHO and international initiatives, the Centre appears to be making good progress in its aim to become a WHO centre of excellence. The Centre presented convincing plans to strengthen its position in Environmental Health research and training by increasing its international recognition, expanding its student population, expanding its research networks and by focusing on outputs that support policy/decision making.

A major strength of the Unit is the already close interaction with several industrial partners.

The Panel felt that inconsistency across the programmes is a minor weakness and felt that RG4 (“Environment and Infectious Disease”) and RG5 (“Ecogenetics and Human Health”) were not operating at the same high level as the other research groups. The Panel were also somewhat concerned about the diversity of the portfolio – particularly pronounced in RG4 and RG5 – and the lack of projects that cut across multiple research groups.

Funding is provided for two PhD Fellowships to be appointed into any of the research groups based on merit. Funding is also provided to appoint a critically needed statistician.

**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies,  
Rehabilitation and Well-being**

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**R&D Unit:** NURSE'IN - Unidade de Investigação em Enfermagem do Sul e Ilhas (NURSE'IN-UIESI)

**Coordinator:** Lucília Rosa Mateus Nunes

**Integrated PhD Researchers:** 23

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**Overall Quality Grade:** INSUFFICIENT

**Evaluation Criteria Ratings**

- (A) Quality, merit, relevance and internationalization of the  
R&D activities of the Integrated Researchers in the R&D Unit Application: 1
- (B) Merit of the team of Integrated Researchers: 1
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 2

**Justification, Comments and Recommendations**

This R&D Unit is still in its infancy. The Panel were impressed with the enthusiasm of the team, their collaborative approach to working and their overall mission to build nursing research capacity. Their honesty and reflections on their journey to this point shows a group that has lots of potential. The lead co-ordinator, Lucília Rosa Mateus Nunes is a very experienced doctoral supervisor and provides a central figure to the group. The Integrated Researchers are all at an early stage in their research careers and do not have the level of expertise required to form a R&D Unit yet.

The majority of integrated researchers have not performed R&D of quality and/or merit recognised nationally and internationally. This is evident through their limited research projects and publication record (n=1) in any journals associated with impact (Q1 and Q2). The description of work they do is primarily linked to their teaching and clinical expertise. The researchers are credible and highly experienced nurses who understand clinical practice. However, they have limited experience of undertaking quality research. They need to decide what their research strengths are and focus their collective efforts on realising some success in these areas.

The Panel would recommend the Unit focus on strengths and target funding, publications and outputs accordingly. The Panel recognised the unique challenges of bringing 6 institutions from different parts of Portugal together, all with their unique history. However, to function effectively as a R&D Unit they need to find a common path to direct their research activities, regardless of whether it is clinically applied or educational research. One option would be to work with more established nursing researchers from across Portugal.

They have good researchers on their advisory board but there is little evidence of how they have informed and supported the direction of this R&D Unit. One of the criteria to demonstrate the Unit is undertaking quality research is the ability to publish in impact journals within their field. Unfortunately they presented limited evidence to the Panel. The Panel recommends introducing a publication strategy that actively supports the researchers. Without a significant improvement in this area, they would be unable to function as a R&D Unit. Funders increasingly ask for dissemination strategies, including publishing. They have experience of publishing, albeit in books, chapters, conferences and professional journals. The next step is to focus on research journals.

The R&D Unit has good support from their institution and have well established relationships with hospitals in the 6 geographical areas. The collaborations they have with community stakeholders and external international partners through ERASMUS are very good but are focused on teaching rather than research relationships. Including a research internationalisation strategy alongside their publication one would allow them to identify how and where they could collaborate.

The Unit has strengths moving forward, including:

1. They talk and behave like a team, are supportive of each other and keen to make a difference in nursing research
2. There are some good examples of collaboration on FCT projects in the area of palliative care, and experience in mental health, older people, history of nursing and ethics.
3. The institutions they work with are supportive of their mission

The weaknesses are;

1. The quality of their research is difficult to judge as their dissemination through published work is limited.

2. There are too many research groups. They need to ensure each one is active in research.
3. They are inexperienced in the area of research and this puts them at a disadvantage going for funding.
4. Partnering with more experienced nursing researchers in Portugal would be helpful.

In summary, the vision this R&D Unit proposes is a good starting point. However, further organisation of people, groups and skills are required to raise the level of work to become an R&D Unit.

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Saúde Global e Medicina Tropical (GHTM)

**Coordinator:** Paulo de Lyz Girou Martins Ferrinho

**Integrated PhD Researchers:** 84

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**Overall Quality Grade:** EXCELLENT

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 5
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

**Base Funding for (2020-2023):** 1143 K€

### Recommended Programmatic Support

PhD Fellowships: 12

Programmatic Funding: 1048 K€, including for 4 (2 Junior, 2 Auxiliar) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

The GHTM Centre for Global Health and Tropical Medicine was created in 2015, it has 84 Integrated Researchers organised in four research groups, including one that has been formed as part of a recent reorganisation. The Centre broad portfolio includes research performed in Portugal but also has a strong overseas focus in the community of Portuguese-language speaking countries (CPLC). Of the Centre external funding, 40% is from overseas and the workforce includes international students and researchers – especially from the CPLC – including 25 PhD students from Angola and several other registered students that carry out their lectures and training remotely from Mozambique. The Centre successfully combines strong basic science approaches with matching clinical and applied research.

The GHTM Centre was deemed to be Excellent by the Panel. Its success in operating as a global centre is proven and it has internationalisation at its core. With its travel clinic, the Centre is also a national reference for tropical medicine. A major strength of the Centre is the breadth and depth of in-house expertise in vector biology. Indeed, the Centre clear status as an international reference for medical entomology is demonstrated in a number of ways. First, their expertise in vector biology has resulted in basic science breakthroughs, one of which (blood-free feeding of mosquitoes) has been internationally recognised by funding from the Bill and Melinda Gates Foundation. Second, entomologists from the Centre have been called to help with vector control in Angola, Mozambique and Cape Verde, by national control agencies and the World Health Organisation. Third, the Centre entomologists are part of a WHO/TDR executive committee on insecticide resistance. And last, the Centre contributed to the largest multicentre description of mosquito genome variation that was published in the best known international scientific journal. A further example of their influence was provided by a recent invasion of Portugal by the mosquito species that transmits Zika virus, where the Centre experts advised the Directorate General of Health.

The GHTM is unique in Portugal. Moreover, the CPLC connection gives the Centre a unique role and responsibility amongst other global health centres. Building equitable partnerships with CPLC partners is a strong theme that is deeply embedded in the Centre and is reinforced by an exceptional track record in this area amongst the senior investigators.

The team is split across 4 areas: vector borne disease, TB, HIV and opportunistic pathogens, population health policies and services, individual healthcare. Each area is producing world leading work, there has been significant growth in the team since 2013 (50%) and an increased number of research contracts. The quality of the selected work and contributions is excellent. There is evidence of engagement with open science, conference organisation, internationalisation, and knowledge. The Centre has also formed spin-off companies and developed multiple new lines of research.

Specific examples of high profile achievements presented to the review Panel, included: drug testing against malaria and Leishmaniasis parasites in vitro and in vivo; selection of a drug resistant isogenic Schistosoma line, in collaboration with Brazilian partners; participating in several EU networks to develop databases and analysis tools; development of some novel diagnostics; elucidation of early transmission of HIV from central Africa; involvement in the international

anopheles gambiae 1000 genomes project; WHO-funded training workshops for international attendees organised and a new MSc established in collaboration with Brazil.

Portuguese language and the CPLC provide a natural route for specific collaborations, but also a unique Global Health responsibility in capacity building within specific African countries. Several of the listed papers were from studies based in Africa.

International sources account for 28% of the budget, mainly the EU, including the Bill and Melinda Gates Foundation, Min. of Health Angola, Gulbenkian Foundation, and industry.

The Centre Director Prof Paulo Ferrinho has an impressive CV by any standard. He has had a long and productive career and published on primary care, epidemiology and health policy. In addition to being Director of the Centre and of IHMT, he has had many other key strategic positions including Deputy Director General of the Ministry for Health. He demonstrates continuing influence on health strategy and policy throughout his CV, for instance coordinating the WHO group that is writing major health policy for Guinea Bissau until 2022.

The previously established research groups each have leaders with established international track records in their fields: De Pinto (VBD group), Viveiros (THOP), and Marting (PPS) each have recent last author papers in international journals demonstrating that the research in their areas is very much driven by them. The new RG (IHC) is led by Dietz, who has demonstrated productivity in translational research that includes Leishmaniasis clinical trials, TB and Zika.

The work of the RGs is supported by numerous other talented investigators. For instance, Perez with only 3 yrs post PhD already had an excellent CV including a Marie Curie prize for excellence. He has recently published on the HAItoolkit for antimicrobial stewardship and has a new interest in the microbiome – indicated by a recent review in that area. Lapoa also adds considerable strength to the human resources and medical informatics area and Campino is an accomplished Leishmania researcher with expertise in leishmaniasis and molecular epidemiology.

The combined outputs from the investigators have been impressive, including 117 papers in international journals in one year. Numerous prizes have been awarded to GHTM Scientists including: Gilead G\_nese (3), Pfizer (2), Ant\_nio Arnaut (1), L'Oreal Women in Science (1), GICD/Bayer (1), Santander/Totta (2).

The leadership team are exceptionally well qualified to drive basic science discoveries through to public health implementation, with experience advising governments and health policy. The Panel was impressed that the direction of the GHTM is overseen by a board elected from IHMT members. It also noted that the Advisory Committee has taken an active role in shaping the Centre.

The leadership of Ferrinho is clear and impressive both in terms of the success of the Centre but also during the review process: he had a thorough insight into all of the Centre activities but was keen to bring other members of the team into the spotlight during the evaluation. The Panel was impressed with the previous review of the travel clinic and its strategic role (or lack of). Based on the review findings the current clinical RG was formed.

The insectories of the Centre are key assets and their use/exploitation was explored by the Panel. The plans to upgrade capabilities by including CL3 will place the Centre in a unique position to explore infection and transmission biology for a range of pathogens. Being a high risk region for new mosquito borne diseases, the Panel regarded the planned high security and state-of-the-art insectory to be a critical part of Portugal infrastructure – and a vital part of the Centre scientific portfolio.

The Centre plans to establish a birth cohort in Africa and a cohort of migrant/refugee children in Portugal. Both of these plans are strategically well aligned to the Centre goals and have enormous potential to yield major advances in understanding the developing of disease and healthy states. It will be really important to link where possible to other cohorts, where possible, by agreeing to common metadata standards with other groups.

Given the massive global importance of vector borne disease, and the potential for vectored disease to cause major epidemics, the VBD focus is extremely important nationally and internationally. The upgraded insectory will enhance the Centre ability to carry out drug screening. In particular, potentially transmission-blocking drugs against deadly falciparum malaria can be developed. The Centre already has partnerships with local medicinal chemistry and with GSK Tres Cantos in Spain to test candidate drugs. A much sought-after success in this area could have a major global impact.

A minor perceived weakness is that the number of drugs tested to date is relatively low and the Centre should ensure that its specialised position in the overall drug discovery landscape is better made clearer externally. The Panel noted that the Centre was perhaps poorly equipped to drive validated candidates through to subsequent steps of the drug development pipeline. However, increasing progress and growth of the new IHC programme may give the group greater future capability to drive drugs through to the clinic.

The Centre is highly collaborative in nature and a minor weakness was that it was not always easy to determine who was leading the work. It was noted that the Centre maintains several other neglected vector systems (e.g. ticks) that were not really considered in the review process. Some of these areas represent an ongoing risk in terms of impact when only traditional publishing metrics are considered. Due to the very small size of the international research communities in some of these areas, impact is hard to achieve. Nevertheless, there are few other places globally with such a diversity of vector capabilities, so this work needs to continue, given the ongoing health risks associated with viruses and parasites borne by ticks (e.g. Lyme disease) and other vectors.

Programmatic funding is included for PhD fellowships across the 4 existing programmes. The Unit may decide into which programme the PhD fellowships are awarded. Funding is also provided to support the recruitment of a bioinformatician to support sequence analysis (along with sequencing hardware and computational infrastructure); a freezer and curator to support critical biobank infrastructure; a statistician and one additional PhD-level investigator to support the design and implementation of overseas dispersion, mobility and population health studies. Funding is also included for establishing and maintaining birth cohorts.

**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies,  
Rehabilitation and Well-being**

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**R&D Unit:** Unidade de Investigação & Desenvolvimento em Enfermagem (ui&de)

**Coordinator:** Maria Antónia Miranda Rebelo Botelho Alfaro Velez

**Integrated PhD Researchers:** 41

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**Overall Quality Grade:** WEAK

**Evaluation Criteria Ratings**

- (A) Quality, merit, relevance and internationalization of the  
R&D activities of the Integrated Researchers in the R&D Unit Application: 2
- (B) Merit of the team of Integrated Researchers: 2
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 1

**Justification, Comments and Recommendations**

The mission of this Unit is to undertake nursing research that gathers under the umbrella of “Caring and Empowering through Life” seemed appropriate and relevant to society needs. Unfortunately the documentation and subsequent presentation did not convey the steps to achieve this mission; nor the synergy between the expertise of the integrated researchers with PhDs and their strengths to build research capacity across the many research areas identified, nationally and internationally.

The clinical nursing credibility of the integrated researchers is very visible and there is considerable expertise in the knowledge and practice of nursing. Some of this has been translated into research projects and publications but many areas of research appear to be in their infancy. This means that few Integrated Researchers have performed R&D of national and international quality and the other researchers have performed R&D of limited quality. The main publications authored by integrated researchers in 2013-2017 reflect different types and quality of papers (Q1 or Q2). Some good papers are published in the area of elderly care (falls prevention and medication practices) and mental health. Within each, there are strong methodological approaches underpinning all the work. These areas of research are not showcased within the research areas proposed. In addition, the documentation does not link this work with the key health priority areas in the Portugal 2020 agenda. The Panel found it difficult to identify where the Unit's major strengths lie and as a consequence, their ability to grow and internationalise their work.

Supervising Masters and PhD students is an important opportunity for Integrated Researchers. It is noted that 6 Integrated Researchers are members of the nursing scientific council of the University of Lisbon. As a collaborator with the University of Lisbon, they have built a considerable amount of expertise in supervising at doctoral level. It was therefore surprising that this is not translated into more quality publications and research engagement. During the Panel visit, the PhD students spoke positively about undertaking their PhD in nursing and the importance of translating their findings into their clinical practice. The Unit contribution to growing nursing researchers is evident. However, the PhD projects appear to be driven by students rather than aligned with the Unit objectives more strategically. The Panel believed this to be a missed opportunity as it has the potential to strengthen their own research profiles.

The research funding success is minimal and where they have gained external funding it was associated with teaching, particularly ERASMUS programmes. The teaching rather than the research expertise of individual researchers was clear.

The Panel acknowledge the challenges of publishing in English but would discourage the continuation of the Unit journal unless it can be internationally indexed. Its purpose and organisation are not clear. The opportunity for Portuguese nurses to read about research in their native language is important in any dissemination strategy, but the responsibility and time it takes to produce the journal may be lost if the work cannot be viewed beyond the immediate geographical area. It also limits the opportunities to promote their nursing research beyond the field of nursing and shared work with other professional groups in healthcare.

The 41 Integrated Researchers have limited international and national recognition in research and appear to primarily publish in Portuguese. Few appear to have, or have had grant income. Although a few of the researchers describe being involved in organising international conferences (i.e. EANS), this is not visible on their profiles. Most CVs are not populated and the few that are, provide little background to the expertise of the researcher. Ensuring these are up to date will strengthen their external profile.



The strategy for the R&D Unit was very vague and extremely broad. It has a strong focus on creating a model based on education, research and innovation, but it fails to adequately explain how the mission will be achieved through the people (Integrated Researchers expertise), the research areas and subsequent outputs.

The Panel could not easily see how the expertise of the researchers is reflected throughout the research areas and expected outcomes. While it is clear they want to undertake research across the lifespan, the steps to achieve this are not reflected in the strategy. As a consequence, the enthusiasm and competence of individual researchers may be lost. The challenge for the Unit currently is the lack of clarity about what they want to influence, the process to achieve this, and the impact on the end user (nurse, patient or society). Either nationally or internationally, the ambitions are quite muted.

The Unit describes in the application that they are performing a re-organisation phase. It was not evident during the site visit that this had begun. It has the potential to resolve some of the issues highlighted in this report.

The Advisory Board includes a number of very experienced academics. It is unclear how they contribute to the overall strategy and ambitions of the Unit. No supporting letters were provided and limited reference was made to their role during the visit. The Panel recommend they engage these members to strengthen their position, and/or look for advisors who can help.

In summary, the Unit has a number of strengths:

1. There are a few individual Integrated Researchers who are doing some good quality work. Next steps would be to focus efforts to strengthen and build teams around them.
2. There is significant experience of PhD supervision.
3. The Master programme is exemplifying the opportunities to research in clinical areas through action research approaches.
4. Plans are in place to increase JBI/Cochrane affiliations, although the Panel noted that none of the publications highlighted for this review indicated a level of expertise in the use of this methodology.

The weaknesses include:

1. The overall strategy has serious flaws and does not reflect the ambitions of the Unit to thrive and influence research in nursing.
2. It is unclear how the individual researchers complement each other and lead research areas.
3. The application described lots of intent but the steps to achieve it are underdeveloped.
4. The overall organisational structure of the Unit is unclear.

The Unit has many ideas to take forward research but needs to focus on a strategy that can achieve this successfully.

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Unidade de Investigação em Ciências da Saúde: Enfermagem (UICISA: E)

**Coordinator:** Manuel Alves Rodrigues

**Integrated PhD Researchers:** 131

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**Overall Quality Grade:** VERY GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 4
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

**Base Funding for (2020-2023):** 1898 K€

### Recommended Programmatic Support

PhD Fellowships: 7

Programmatic Funding: 683 K€, including for 2 (Junior) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

UICISA-E provides an exemplary training programme to encourage nurses to engage, participate and lead research across 10 priority topics. These topics are derived by the European agenda, societal challenges and ability of nursing research to impact on health improvement and economic growth. The strategic development axes which promotes the cross cutting model of research activities was extremely impressive. Their proactive approach to embed research within nurse training programmes (BSc upwards) through their “Young Researchers Window” was highly visible throughout the site visit; when meeting students and in dialogue with Integrated Researchers. Their vision to undertake research that impacts on societal health issues was clearly articulated through their Model, enabling them to encourage synergy between the research groups, overlapping connections and PhD students.

The panel acknowledge that they cannot run their own PhD programmes due to Portuguese law. However it is clear that their expertise in nursing research, coupled with a clear vision to conduct research that contributes to knowledge advancement in health care, places them as leaders in fostering evidence informed nursing practice. PhD students spoke of the excellent support they receive in the Unit and the opportunities afforded to them (nationally and internationally) through the networks established by the Integrated Researchers.

The opportunity to collaborate locally with the University of Coimbra Faculty of Medicine in a Doctoral Programme in Nursing would further strengthen their position. There are many opportunities (formal and informal) for students to engage and they described a supportive and nurturing environment to undertake nursing research. The profiles of PhD students reflect their professional roles in clinical practice. Although there were a couple of FCT studentships, most students continued to work during their PhD studies, and one student spoke about the industry sponsorship they had secured. This allowed the student to take research leave from practice. The students spoke about the importance of returning to clinical work and embedding findings into patient care. There was an example of International students joining research groups in the department from Brazil but this was limited. This is partly a symptom of them not being allowed to offer a PhD programme but does not appear to diminish the international travel/engagement opportunities for students generally.

As the Portugal Centre for Evidence Based Practice, operating as one of 70 networks across the world, their work is considered excellent in this area. Systematically reviewing evidence is an important stage in health research and their expertise in JBI/Cochrane methodology has grown significantly since their last review. As a JBI collaborating centre, they demonstrate strongly the importance of building an evidence base in nursing. Their contribution to the scientific synthesis of evidence is recognised and has been instrumental in establishing the methodology to systematically review mixed methods research effectively.

The research outputs reflect the range of research areas they work in and their broader expertise. The quality of the outputs singled out for review by the panel is in high impact (Q1 and Q2) journals. Indeed, the majority of Integrated Researchers contributed to high quality publications. Their strength does not only come from this area, but also through

their Journal of Nursing Referencia. This journal offers a bridge between publishing high impact research papers and translating the findings into a language that is easily accessible for nurses working directly with patients. During the site visit we met the journal team and saw first hand the outputs included. The quality of the summary reviews and external papers accepted was excellent. As they move to an online edition (Portuguese and English), their reach will extend internationally. The engagement of students (specifically a Masters student) in the publication process was an example of a good learning opportunity.

UICISA-E is one of only 8 WHO collaborating centres in Europe (3 are in the UK) and reflects their International outlook in all aspects of their work. As a WHO collaborating centre they support the work of the WHO in transforming health professionals' education and training in support of Health 2020 in the European region. This makes them a key national reference area. The co-ordinated approach to training is clearly linked through their research synergies and makes them leaders in this area.

There is good evidence of collaborations across Europe and they have been increasingly successful in securing industry and European grant income, particularly in the area of TecCare. The clear and targeted approach to funding calls is illustrated by their high levels of success in this area, an achievement they can be very proud of. Moving forward, their growth will be linked to their ability to continue to grow external income sources but also their ambitions to place the research closer to the end user through implementation. It will be important that they continue to seize opportunities to both collaborate and co-ordinate grants.

Significant international and national work evidenced through their journal, JBI training and collaborations. The work undertaken is highly relevant to the field of nursing beyond Portugal. The Unit has attracted some highly accomplished nursing researchers; Rodrigues, Fernandes, Mendes, Ananda Fernandes, Cruz, Rosário are all examples of researchers that bring a balance of expertise, grant capture experience and outputs of quality that would be expected in a Unit of this size.

The strategy and plan of activities to achieve their overall objectives for 2018-2022 is impressive. They have built upon previous FCT and Advisory Board recommendations to connect, consolidate and define their research work effectively. The Unit has strong leadership and the comments from a new Integrated Researcher during the site visit illustrated the clarity in which this strategy is articulated and embraced by those associated with the Unit. This is particularly important due to the large number of partnership institutions, Integrated Researchers and collaborators aligned to this Unit. It provides a platform to grow and ensure new research topics are clearly aligned to the mission of the unit.

In summary, this Unit is a very good example of what working collaboratively across nursing can do to improve research culture.

The research Unit can decide which PhD programme the awarded PhD fellowships are attached to. This includes the new programme under review in collaboration with the Faculty of Medicine, University of Coimbra.

The Unit identified the areas the researchers are needed including a new area in implementation.

The awarded Programmatic Funding, besides the contribution to hiring two new PhD researchers, can be partially used for participation in networks such as the JBI/Cochrane collaborations and to cover equipment, goods/services that will benefit many of the groups in the Unit.

**Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies,  
Rehabilitation and Well-being**

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**R&D Unit:** Unidade de Investigação em Desporto, Saúde e Exercício (SHERU)

**Coordinator:** João Manuel Patrício Duarte Petrica

**Integrated PhD Researchers:** 11

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**Overall Quality Grade:** WEAK

**Evaluation Criteria Ratings**

(A) Quality, merit, relevance and internationalization of the

R&D activities of the Integrated Researchers in the R&D Unit Application: 2

(B) Merit of the team of Integrated Researchers: 2

(C) Appropriateness of objectives, strategy, plan of activities and organization: 2

**Justification, Comments and Recommendations**

Based on the assessment, the overall quality grade is Weak. This is based on the overall quality of the portfolio of papers, limited grant submission/capture or work with industry, and international visibility. We appreciate that the limited human resources available for research activity constrain SHERU research capacity and, as a consequence, we strongly recommend that the Unit focuses their efforts on 2 or 3 stronger areas to generate a national/international reputation.

SHERU should be commended for their excellent partnership working with their local community, which is clearly having societal impact in the municipality.

The Sport, Health & Exercise Research Unit (SHERU) led by João Manuel Petrica is composed of 11 PhD researchers, 3 PhD student researchers and 2 PhD collaborators, most of whom are teachers at the Instituto Politécnico de Castelo Branco (IPCB). This is a new Unit with a young and enthusiastic staff, mostly with recent PhD awards who are working in a diverse range of topics including sport and training, children's motricity, gerontomotricity and aging, adapted sport, sports pedagogy and others.

The Integrated Researchers who are employed at IPCB have teaching responsibilities for 80% of their time, which clearly constrains research capacity within SHERU. In addition as a Politécnico, there is no PhD programme within the Unit, although SHERU staff are co-supervising students who are registered at other institutions including Universidade da Beira Interior.

There is evidence of a growing volume of publications since 2013 up to ~3 per person in 2017. However, most of the research cited in the contributions is of a low national level.

The Panel was not able to meet any of the 15 PhD students whom SHERU staff are co-supervising and no post-doctoral researchers currently, although many of the Integrated PhD Researchers have been awarded their PhDs within the last 6 years. There is no project funding currently awarded, although there is one project under evaluation for validation an in-helmet oximeter for firefighters.

SHERU clearly have excellent relationships with the local community across the lifespan from kindergarten to old age, and also with the local sport teams and elite teams such as national basketball and Benfica. This work is yielding some excellent longitudinal data sets including ECG of youth football players, however human resources are needed to process these data to produce high quality publications.

A very diverse range of current or potential project areas were described including:

- Fitness testing and physiological profiling of national guardsman and fire fighters.
- E-project in teenage obesity leading to app development.
- Assessment of physical activity and lifestyle habits in 3 municipalities (n=16000 participants).
- Physical activity and oncology.
- Measurement of arterial pressure in the local community.
- Pre-season testing in local sport teams.
- Adapted sport.

It is extremely challenging to conduct international quality in such a diverse range of topic especially in such a small and young team of researchers. Although we understand that due to the demands of the teaching curriculum it is necessary to have diverse range of expertise, we would strongly encourage the team to identify those areas where they can capitalise on their skill set, enthusiasm, rural setting, proximity to Spain, ageing community and excellent relationship with and access to the local community to develop an international reputation. The facilities within the Health Sciences School are truly excellent and we would encourage the SHERU team to take advantage of this unique facility to generate novel data sets that will attract national and international collaborators.

The team utilise the ERASMUS partnerships that have been established via IPCB, and their students are acting as ambassadors to develop and extend their international network. In addition, SHERU have hosted international network meetings with their partners and others.

In summary, this is a young and enthusiastic team who are currently performing some good quality work of a regional or national reference standard, but there is only a small amount of Q1/Q2 papers, the majority is Q3/Q4 currently. This can partly be attributed to the diversity of research topics under investigation, and lack of research time for this committed team of young staff with high teaching loads. The Panel would like to commend SHERU for the work that they have accomplished in these less than optimal conditions. The Panel encourages the team to continue their efforts, as they truly have a unique environment in which to conduct good research, but more strategically focused approach is required and we would encourage involvement of a broader set of external reviewers for their research strategy development and plans. The research output quality is currently weak overall, although there are some examples of national quality work.

The Panel encourages the team to continue and extend their efforts in applying for research funding and developing industry partnerships to validate existing or develop new products. There is limited international visibility currently and we would recommend diversifying their Advisory Group in order to broaden SHERU internationalisation efforts. The future strategy is weak and is currently too broad for such a small team, thus making it impossible to gain traction/visibility on the national or international stage. It was also not clear in some instances how the strategic objectives set out would be operationalised and achieved. However, the creation of publication targets should further reinforce the research culture, and certainly there has been a step change in the quality of the paper outputs.

The Panel would recommend collectively identifying two areas in which to focus their collective efforts. In our view, SHERU have the potential to be the national reference centre for adapted physical activity and aging in the rural environment. This would allow them to capitalise on their unique setting, expertise and excellent facilities.

The Panel would suggest SHERU broaden their External Advisory Board to support their endeavours. There has been considerable investment in the laboratory facilities that the R&D Unit have access to, with a high specification and professional presentation of the laboratory suite. These facilities are very different from those that the Panel saw in other sport Units and we recommend that the Unit strategizes on how they can capitalise on these unique features.

International profile needs development, and extension of the advisory board would be sensible, using ERASMUS to full advantage.

The main strengths are:

- Cohesive and committed multidisciplinary team of researchers.
- Facilities.
- Excellent relationship and access to the local community.

The main weaknesses are:

- Limited human resources due to high teaching loads and lack of dedicated research staff.
- Lack of in house PhD programme.
- Limited international profile.
- Stretched too thinly by the lack of strategic focus within the research areas.

## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Unidade de Investigação em Epidemiologia - Instituto de Saúde Pública da Universidade do Porto (EPIUnit)

**Coordinator:** José Henrique Dias Pinto de Barros

**Integrated PhD Researchers:** 70

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**Overall Quality Grade:** EXCELLENT

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 5
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 981 K€

### Recommended Programmatic Support

PhD Fellowships: 10

Programmatic Funding: 532 K€, including for 2 (1 Junior, 1 Principal) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

The Epidemiology Research Unit is located at Institute of Public Health, University of Porto and led by professor José Henrique Barros. It covers the population, clinical and translational aspects of epidemiology, and currently they have 83 integrated PhD members organized into 7 research groups. They have partnership agreements with 17 participant Institutions.

The overall quality grade is excellent. It is well documented in the CVs and the description of the activities that the majority of the team of Integrated PhD Researchers have performed innovative R&D of recognized quality and merit in a national and international perspective.

They are judged to be an international reference due to the quality of their cohorts and the capability of their researchers, which makes them an attractive partner in international consortia. This is evidenced in their participation in several internationally funded projects and high ranking publications. The Coordinator academic history, international engagement and current role as the President of the International Epidemiological Association (IEA) also make them visible internationally. Importantly they are visited by a high number of foreign PhD students, which is a clear sign of being internationally attractive. The objectives and strategy of the Unit for 2018-22 is coherent and in line with the work that they are doing. It is no doubt that the Unit has the capacity to be able pursuing objectives, strategy, plan of activities and organization for 2018-2022 which are adequate to the R&D activities.

The Unit published 298 full text articles in peer-reviewed international scientific journals in 2018, which is a very good number with approximately 85 integrated researchers and 63 research scholars and PhD students. There has been a steady increase the last years. The publication list demonstrates excellent range of publications with some in leading world journals e.g., Lancet. It appears there is an active publication culture with significant support for Open Access. Around 75% of their articles are published in Q1 and Q2 journals, which is good considering the competitive fields they are publishing in. Thus, overall, they have a good balance between quantity and quality when it comes to publications.

Some, but not all, groups are very productive from a research point of view, especially the Nutrition and Obesity Epidemiology Research Group (a mean of 5 international published papers per researcher per year), Non-communicable diseases epidemiology and Perinatal & Paediatric Epidemiology.

The Unit runs 2 PhD and 2 Master programs, including the oldest Master of Public Health program in Portugal. They have a good record of PhD completions within 4 years. They have received fellows and post-doctoral students from 20 countries (low, middle and high income). It was mentioned that access to high interest cohorts attracts PhD students and that graduated students have a good standing in the labour market. There is substantial evidence of high quality training at all the levels.

The Unit clearly encourages and succeeds in creating interaction between its members. The PhD students community is settled in the same building as the researchers (a little crowded, but this facilitates interaction), are requested to be present, which facilitates everyday informal meetings in addition to weekly and monthly seminars. At these seminars, international researchers appear regularly. A highlight of the internal working of the Unit is the systematically organised peer review of scientific manuscripts before submission; manuscripts are distributed among groups of the Unit members. This also includes PhD fellows. In general, the integration of PhD students into the Unit is of exceptionally good quality, with corresponding exceptional engagement among the PhD students.

National and international recognition is partially demonstrated in several awarded national FCT projects plus international ones through the EU including FP7, H2020 and Fulbright schemes. Evidence of this is also demonstrated by involvement in international organisation and organising the Systems Science and Public Health Research course.

The Unit has two patents, one granted and one awaiting approval. They have interacted with food industry, by being approached due to their epidemiological data on consumption. However, they have limited cooperation with business enterprises, arguing that such cooperation could compromise their credibility in public health or raise ethical issues. This position is easy to defend in cases where such cooperation would go against evidence based public health knowledge, but it is nevertheless recommended that the Unit look for avenues for business and public cooperation to access long term income.

The Unit shares their data in an exemplary way by giving outside researchers access to cohort data after a simple application procedure.

The Unit has good outreach and range. They communicate through a variety of media and outlets, e.g., research on social determinants of health and inequalities has the potential to generate knowledge which can impact policy change, and the Unit has a track record of doing so.

One clearly progressive area with respect to large epidemiological studies is patient and public involvement. They have a system of informing research participants about the results and are currently running a project co-designing a model for involvement in health data governance. This is a brilliant example, which sets an example for others.

It is evident that there is a strong international orientation. Inclusion in international projects is a good marker of the work. They have ongoing collaborations with European and American research groups with long-term agreements under international financed projects and also within multiple COST actions. They are also present with executive roles in international research and professional associations, with the Unit coordinator being the current President of the International Epidemiological Association (IEA). This type of active involvement on the international arena is both a sign of a good international standing and is commended as an activity worth continuing.

The Unit has achieved substantial external founding, both nationally and internationally. It was stated that 94% of their funds were won in competition. Despite never received specific programmatic funding, they managed to maintain data collection including establishing a biobank with over 200.000 samples, which is a huge achievement and evidence of a commitment to prioritise this core activity. It is recommended that the Unit continue their work to convince relevant stakeholders of the need for stable funding to maintain cohorts.

As stated above, the Unit has established and run several relevant cohorts, which is an important activity to build a strong milieu. The cohorts cover the major epidemiological areas according to the period of life, disease or exposure. It is recommended that they continue nourishing their cohorts, as they will become even more valuable in the future.

The research groups appear to be well set up with clear aims and objectives, most have a critical number of integrated researchers (infectious diseases group is the smallest with 5), but otherwise appears to have good membership. All groups do work of good international standard. They cooperate nationally and internationally, have clear goals and have delivered important scientific and societal contributions. The nutrition and obesity, along with the perinatal and paediatric research group seem particularly strong, with larger national and international projects. Also, the research groups on non-communicable diseases and social epidemiology stands out. The research group on social epidemiology includes qualitative research which opens for methodological plurality and interesting mixed methods studies and must be said to be innovative in an epidemiological R&D Unit.

As stated above, they have provided examples of awards and prizes being won. Their work on life course approach and tracking of obesity in adolescents trajectories of BMI and body fat was awarded a prestigious national prize on clinical epidemiology.

Their impact on society is exemplified by engagement with the community through dissemination of research, but also working in cooperation with public institutions on public health. They have been recognised by WHO and ECDC for their work on establishing what has been considered new and innovative services for vulnerable populations, including men who have sex with men. It is expected that a public health Unit have active involvement with society on all levels, and this Unit seems to be in the forefront of this.

In general, the Unit has a clear plan and rationale for the proposed objectives in 2018-2020.

The plans of the seven research groups are of good standard, with their short and medium-term objectives in research. The report from the External Advisory Board suggested that the Units work was too diverse and there were too many research strands, but as all appear to be productive and contributing, this is not seen as a problem given the strategic choices made. Even so, the Unit is recommended to regularly evaluate their strategy to ensure a strategy that allows prioritisation.

In the Unit application it is stated a plan to develop seven thematic lines, with specific leaders, but this work has not begun and is not rooted among the senior researchers.

However, the four strategic streams across the research groups is clearly integrated in the Unit. They mentioned the process of their development and several examples were given of how this played out in practice, showing that the strategy is well founded in the Unit. The streams themselves are relevant and even if they cover broad goals, they are of both scientific and societal relevance.

The Unit has a clear commitment to continue to improve in terms of public engagement, dissemination and outreach. This is strongly recommended as an important area for the future success of the Unit.

The general perspectives on how to grow the members of the Unit is very good, which is in line with the strong current work.

The major strengths are a united group of researchers, with a very enthusiastic group of PhD students indicative of a strong academic environment. They have excellent data to work with due their ongoing cohorts that they have managed very well. The number and quality of the PhD students and young researchers gives a very good foundation for future recruitment.

The major weaknesses (or more correctly threats) are the lack of stable funding for the research activities, especially the challenge of having resources to do new follow-up waves of their cohorts. Also, the possibility to link data which is limited by Portuguese law and culture limits opportunities for new research areas based on their cohorts.

Funding is awarded for a principal researcher specialist in causal inference methods / epigenetics. The Unit can decide which areas the awarded PhD fellowships are assigned. Part of the rest of Programmatic Funding is for ultra-freezers (equipment) which is needed to maintain and increase their biobank activities.



## Evaluation Panel: HEALTH SCIENCES - Public Health, Nursing, Health and Sports Technologies, Rehabilitation and Well-being

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**R&D Unit:** Unidade de Investigação UFP em Energia, Ambiente e Saúde (FP-ENAS)

**Coordinator:** Manuel João Lemos de Sousa

**Integrated PhD Researchers:** 37

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**Overall Quality Grade:** WEAK

### Evaluation Criteria Ratings

(A) Quality, merit, relevance and internationalization of the

R&D activities of the Integrated Researchers in the R&D Unit Application: 2

(B) Merit of the team of Integrated Researchers: 2

(C) Appropriateness of objectives, strategy, plan of activities and organization: 2

### Justification, Comments and Recommendations

FP-ENAS is a Centre for research on environment, energy and health that was created in 2013, coordinated by Prof. Manuel João Lemos de Sousa. The researchers are organized in 2 research groups that aim to link numerous aspects of the environment to health. The researchers include multiple disciplines including, microbiology, toxicology, geology, and some clinical epidemiology. Much of the research strategy is built from the ground up, largely drawing upon existing expertise and using some of the Centre funds to pump prime those project areas deemed by the staff to be the most significant or cross cutting.

The Centre has a small community of junior researcher and PhDs students but they were enthusiastic about the approach taken by the institute and emphasised a good flow of skills and ideas between areas. The senior researchers talked extensively about the struggle to achieve more than proof-of-concept funding in research area and felt that this resulted in much of the work being stuck in a vicious circle where scaling up and translating ideas was extremely challenging.

Overall the Panel felt that the Centre is weak; although it has some good quality elements it is failing to deliver a synergistic interdisciplinary portfolio of research. Numerous examples were provided by the team on how they can link toxins and pollutants to health issues, and how they can identify biological risk factors for health but the current structure does not manage to thematically draw these elements together.

The Centre is not very large and shows evidence (senior author positions, multiple authors) of driving the science in discrete areas. However, the overall number of publications in internationally recognised journals is below that expected for the number of integrated investigators. Sustained progress is being made in toxicology, microbiology, analysis of environmental samples and combating CO<sub>2</sub>. The Scientists of the Centre have also authored three significant reviews in international journals (on toxicology, drug delivery and environmental health), demonstrating some opinion-leadership in these areas. The Panel noted that this weak performance is exacerbated by the high level of commitment to other activities (e.g. teaching) that were reported by staff.

A lot of potential scientific projects were presented by this Centre in their documents. During the evaluation visit the Centre presented an update where five projects had been selected based on internal peer review and consultation with the Centre External Advisory Committee. Each of these prioritised projects had been pump-primed with additional FCT funding (up to 20k euros) in 2017-2018. The projects covered discrete aspects of epidemiology, environmental risk factors associated with viral transmission and IBD, air quality in healthcare, environmental toxicology. Each area had some preliminary data that could be regarded as some level of proof of concept but in almost all cases, the Panel felt the projects were at an extremely early stage. For these projects, the pathways to developing solid links between the environment and health, would take a considerable investment in the development of in-house expertise (or collaborations) in basic and applied science including genomics, microbiome analysis, epidemiology. The projects would also need to be up-graded to a larger scale, requiring more samples, cohort design, complex statistical modelling, control groups, etc.

In terms of where the Centre operates, their science is largely on a local scale but there are notable exceptions. The Centre Coordinator works on CO<sub>2</sub> sequestration in Portugal and some African countries and some of the Centre

microbiology work had involved multiple hospitals in Portugal and Africa. However, the Panel were not convinced about how the CO<sub>2</sub> research fits and recommend that the work be removed from the scope of the Centre R&D portfolio.

Passion and commitment to the Centre were clearly demonstrated by each of the investigators. The publications from the Principal Investigators were in discrete areas, reflecting the breadth of subject matter that is a feature of this Centre. Some notable examples were presented from individuals with impressive publication track records. This included the characterisation of some bacterial lineages that are important for antimicrobial resistance; reducing bacterial biofilms by changing the material used for some clinical devices; contribution to the discovery of potent inhibitors for potentially managing neurodegenerative disease such as Alzheimer's and Parkinson's; and toxicological work on psychoactive substances from Toddlers toys and on the neurotoxic effects of some legal-high products.

Researchers of the Centre also reported work on petrol station pollution and local health-risk levels. The Centre Coordinator is a late-career scientist with an impressive CV of papers, books and chapters that demonstrate his expertise in geology. Although, he is involved in international efforts to capture CO<sub>2</sub> to mitigate against climate change, and has published a meta-analysis on the subject, the Panel could not see a direct link between this area and other work carried out by the Centre.

The Centre presented in their documentation a long list of possible topics to be covered, rather than a coherent plan or strategy. Five core projects were subsequently selected as part of an internal re-focus but as stated above. All of these had merits, but were at a very early stage. Some areas did show conceptual linkage, for instance, a project linking pollution to health risk factors and another project linking the pollutant to human health and infectious disease susceptibility. In the long term, these would have potential to influence urban planning but it was not clear whether the pathway to drive through changes to policy were understood.

Linking the disparate areas of the Centre is a challenge that has been noted by a previous Panel and by the Centre's External Advisors. It was reported that a previous "energy" component has been removed from the Centre but "energy" is still included in the name of one of the groups. A large body of work in that area falls under the leadership of the Centre Coordinator. The Coordinator remaining work on CO<sub>2</sub> sequestration is important and interesting; rising levels of CO<sub>2</sub> are leading the planet to an environmental catastrophe that will clearly have an impact on global health. However, in a Centre that is focused on finding solid, direct, causal links between the local environments (hospital, rivers, polluted land) and health, the Panel questioned how well the Coordinator work fits. The Centre aims to be interdisciplinary but this does not simply mean multiple disciplines. The Panel recommends the Centre finds projects that draw together the talents of multiple investigators and then focus explicitly on them to demonstrate synergy and impact. The Panel noted that epidemiology had previously been proposed as a linking theme (by the advisory group) and agreed that this theme should be strengthened.

The strategic planning process at the Centre is impacted by its organisational structure. There is some ground-up development of projects and subsequent ranking by peers. However, the Panel found no evidence that the personal project of the Coordinator had followed the same route. The Panel felt that this mixed approach of building strategy is not working.

The leaders of research groups are elected and the linkage of projects into the two groups is moderated by a Coordinating panel that also includes the non-elected Coordinator. The effectiveness of the Coordinating Panel is therefore compromised and a change is highly recommended.