



INSTITUTO DE HIGIENE E  
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# GHTM | ACTIVITY PLAN 2023/24



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## 1 - GENERAL STRATEGIC OBJECTIVES for 2023/2024:

- **Promote and develop RESEARCH** in the areas of excellence at the center, in the context of the objectives of the research groups (Research Groups -RG) and the priority research lines (Cross-cutting Issues - CCI) of the GHTM / IHMT / NOVA, in line with NOVA's global scientific strategy and IHMT/NOVA;
- **Implement 2023/24 strategy** defined and approved for the GHTM / IHMT / NOVA for 2023-2024 incorporating the improvement proposals of the FCT Evaluation Panel (2022) and the GHTM Scientific Advisory Board (see Annex I), ensuring success of the execution and financing plan approved by FCT for 2019-2023;
  - Promote the **Open Science policy** [<https://novaresearch.unl.pt/en/organisations/global-health-and-tropical-medicine-ghmt>],
  - **Integrated management GHTM / IHMT / NOVA** with the new strategic infrastructures - **security insectary ACL-3 VIASEF** - and the **Biological Resources Center / biobank - Biotropical Resources (BIOTROP)** [<https://www.ihmt.unl.pt/investigacao/biobanco/>] and **BIOHUB**;
  - Framing the research actions of the GHTM / IHMT / NOVA in the **Sustainable Development Goals (SDGs)**;
  - **Focus on the European Union and National Horizon Europe Strategies and Portugal 2030 Strategy**;
  - **Align the objectives for Research at the GHTM / IHMT / NOVA with the objectives for the teaching and training at IHMT / NOVA.**
  - **Co-ordinate and co-manage the Associated Laboratory of the Science and Technology Foundation - [Associated Laboratory in Translation and Innovation Towards Global Health]**, a consortium with NOVA Medical School's [[NOVA Medical School's Comprehensive Health Research Center \(CHRC\)](#)], the National School of Public Health [<https://www.ensp.unl.pt/>], FCT / NOVA's LIBPhys [<https://www.libphys.fct.unl.pt/>] and the University of Évora [<https://www.uevora.pt/>];
  - **Prepare the forecasted 2024 GHTM Evaluation (Contract 2019-2023) and new proposal for 2024-2027**



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## 2 - SPECIFIC STRATEGIC OBJECTIVES for 2023/2024:

**Objective #1** – Promote RG X CCIs joint Projects and activities along the Strategic framework of GHTM/IHMT/NOVA focused on new EU Horizon Europe Calls and NIH Calls. Promote joint activities with FCT-IHMT NOVA [Ciência LP](#), IHMT NOVA - [WHO Collaborating Center](#), [NOVA Saúde Cluster](#), WHO - Partnership for Maternal, Newborn & Child Health ([PMNCH](#)), [NOVA for the Globe initiative - Sustainability](#), and affiliated networks (eg. International Association of National Public Health Institutes ([IANPHI](#)), Association of Schools of Public Health in the European Region ([ASPHER](#)), European Global Health Research Institutes Network ([EGHRIN](#)), International Network of Institutions for Higher Education in International Health ([TROPED](#)), European Society of Clinical Microbiology and Infectious Diseases ([ESCMID](#)), Comunidade dos Países de Língua Portuguesa ([CPLP](#)),) activities with focus on the European Union and National Horizon Europe Strategies and Portugal 2030 Strategy; Maintain alignment of activities with the Sustainable Development Goals (SDGs)

**Objective #2** – Prepare the 2024 GHTM Evaluation (Contract 2019-2023) and new proposal for 2024-2027

**Objective #3** – Completion of the integrated management of GHTM / IHMT / NOVA with the new strategic infrastructures - security insectary ACL-3 VIASEF - and the Biological Resources Center / biobank - Biotropical Resources (BIOTROP];

**Objective #4** – Implementation of a new Associated Laboratory of the Science and Technology Foundation [Associated Laboratory in Translation and Innovation Global Health Towards] and RH management.

**Objective #5** – Promote Open Access Policy, improve quality of GHTM/IHMT/NOVA publications and improve management of GHTM/IHMT/NOVA publication and outputs data at NOVA PURE Research Portal

**Objective #6** – Complete the equipment inventory, sharing process and replacement/renovation with new equipment to support research.

Note:



## RG – IHC

The main lines of action of the IHC group are related to the transversal areas of the GHTM, Global Dispersion of Pathogenic Organisms and Population Mobility, Discovery and resistance to drugs and Diagnosis. The main research themes are: (a) Traveler’s Health, (b) Neglected Tropical Infections, and (c) Sexual and Reproductive Health

ACTIVITIES	EXPECTED OUTCOMES	EVIDENCES ( to be filled in 2024)
<p><b>Research activities already ongoing in 2022/2023 with CCIs:</b></p> <p><b>CCI - Diagnostics (DG):</b></p> <p><u>Research project:</u> Morbidity associated with infection with <i>Schistosoma</i> and intestinal parasites in adults from Mozambique. PhD Thesis, João Tiago Serra. Supervisor: Cláudia Conceição (IHC). Co-supervisors: Silvana Belo e Mohsin Sidat.</p> <p><u>Research Project:</u> Electrochemical biosensor for the rapid detection of SNPs associated with drug-resistant malaria. PI: Ana Tavares (VBD). IHC collaborator: Marcelo U. Ferreira.</p> <p><u>Research project:</u> Prevalence of asymptomatic leishmaniosis in Portugal. PhD thesis, Rafael Amorim Rocha. Supervisor: Carla Maia (VBD). Co-supervisors: Cláudia Conceição (IHC) and Luzia Gonçalves (PPS).</p> <p><u>Research Project:</u> Causes and outcomes of acute febrile illnesses in south Angola: a hospital-based study. PhD thesis project of Helga Vicente. Supervisor: Marcelo U. Ferreira (IHC). Collaborator: Jorge Seixas (IHC)</p> <p><b>CCI - Drug discovery &amp; resistance (DDR)</b></p> <p><u>Research Project:</u> Towards an arsenic-free oral treatment for human African trypanosomiasis due to <i>Tb rhodesiense</i> as a tool for disease elimination. UE/ EDCTP GA nº RIA2017NCT-1846 (2018-2021). IHC researcher: Jorge Seixas.</p> <p><u>Research Project:</u> Towards a pediatric indication for children between 1 and 14 years of age for a safe, effective, all-oral single-dose treatment formulation of acoziborole for first and second stage gambiense human African trypanosomiasis (g-HAT). UE/EDCTP RIA2019PD-2890 (2020-2024). IHC researcher: Jorge Seixas.</p>	<p>PhD thesis to be defended in 2023. Original article to be submitted in 2023.</p> <p>Ongoing. Partial results by the end of 2023.</p> <p>PhD thesis to be defended in late 2023 or early 2024. Original article to be submitted in 2023.</p> <p>Starting date in Lubango, Angola: 06/2023. Currently funded by GHTM and Ciência LP</p> <p>Data analysis ongoing. Final Study Report planned for April-May 2023</p> <p>Clinical trial ongoing. Nine patients aged from 11 to 14 years were recruited and treated (Phase 1 of the trial). Phase 2 to be implemented in the DRC and Guinea in 2023</p>	



<p>Research Project: Identification and prioritisation of <i>Plasmodium vivax</i> vaccine antigens. PI: Julian Rayner (University of Cambridge, UK). IHC collaborator: Marcelo U. Ferreira.</p> <p><b>CCI - Public health information (PHI):</b></p> <p><u>Research project:</u> Vertical transmission of Hepatitis B in Angola: Evidence for political decision making. IHC researcher: Filomena Pereira.</p> <p><b>CCI - Global pathogen dispersion and population mobility (GPPM)</b></p> <p><u>Research Project:</u> Malaria control and elimination: addressing the occult parasite reservoir. PI: Marcelo U. Ferreira (IHC). Funding: FCT (UID/04413/2020).</p> <p><b>CCI - Fair research partnerships (FRP):</b></p> <p>Iniciativa para o reforço dos serviços sanitários de primeiro e segundo nível em Angola. Promoter: Centro per le Malattie Tropicali Ospedale Sacro-Cuore Don Calabria, Verona, Italy, IHMT partner. IHC researcher: Jorge Seixas</p>	<p>Ongoing. One original article to be published in 2023.</p> <p>Ongoing.</p> <p>Ongoing. Two original papers to be published in 2023.</p> <p>Ongoing.</p>	
<p><b>New Research Projects planned for 2023/2024 with CCIs:</b></p> <p><u>Research Project:</u> Individual variation in malaria risk: causes and consequences in Amazonian populations, PI: Marcelo U. Ferreira (IHC); Collaborator, Ana Paula Arez (VBD).</p> <p><u>Research Project:</u> Genomic signatures of malaria parasite adaptation to the New World. PI: Marcelo U. Ferreira (IHC)</p> <p><u>Research Project:</u> Malaria control and elimination in Angola, São Tomé and Príncipe, and Equatorial Guinea. PI: Joana Carneiro da Silva (VBD). Collaborators: Marcelo Ferreira and José Pedro Gil (IHC), Maria do Rosário O. Martins (PPS), Carla Sousa and Ana Paula Arez (VBD).</p> <p><u>Research Project:</u> Child health on Santiago Island, Cape Verde: a cohort study. PI, Maria do Rosário O. Martins (PPS); collaboration with UniCv and Hospital Agostinho Neto. IHC researcher: Marcelo U. Ferreira</p>	<p>Submitted for external funding in December 2022.</p> <p>To be submitted for external funding in June 2023.</p> <p>To be submitted for external funding in April 2023.</p> <p>Study protocol to be submitted for ethical clearance.</p>	



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**MEDICINA TROPICAL**  
 DESDE 1902



<p>Birth cohort study in Matola, Mozambique. PI, Maria do Rosário O. Martins (PPS); collaboration with ISCTEM and Regional Hospital of Matola. IHC investigators: Luís Varandas and Marcelo U. Ferreira</p> <p><u>Research Project:</u> Chagas disease on Madeira Island (Portugal): situation diagnosis and implementation of a surveillance system: PhD thesis of Susana Gonçalves. Supervisor Jorge Seixas (IHC), Technical support by WHO (Pedro Albajar Viñas, WHO / UCN / NTD / Chagas disease)</p>	<p>Study protocol to be submitted for ethical clearance and external funding.</p> <p>To be implemented in September 2023.</p>	
<p><b>Congresses/Events:</b></p> <p>6<sup>th</sup> National Congress of Tropical Medicine. Organizing committee led by Filomena Pereira and Jorge Seixas (IHC); Scientific Committee led by Marcelo Ferreira and Luís Tavira (IHC)</p>	<p>To be held at the Institute of Hygiene and Tropical Medicine on April 20-21, 2023.</p>	
<p><b>Publications/Training:</b></p>	<p>At least 12 peer-reviewed publications.</p>	
<p><b>Capacity building:</b></p> <p>Pre-congress courses to be held in April, 2023 (6<sup>th</sup> National Congress of Tropical Medicine): Travelers' health, malaria, and sexually transmitted infections.</p>		
<p><b>Other activities:</b>  <b>Editorial Boards</b></p>	<p>Editorial board of <i>Pathogens and Global Health</i>, <i>Memórias do Instituto Oswaldo Cruz</i>, and <i>Parasite Epidemiology and Control</i>.      Reviewing Editor (BRE) of <i>eLife</i></p>	



## RG – PPS

The main research topics of the PPS group are: Health Policy and Planning; Human Resources for Health; Health determinants of vulnerable populations. The activities planned for 2023/24 fall into the various cross-cutting areas described below:

CCI PHI e FRP

ACTIVITIES	EXPECTED OUTCOMES	EVIDENCES ( to be filled in 2024)
<p><b>PHI - Public health information:</b></p> <p>Non-specific effects of BCG in under-five children”(EXPL/SAU-EPI/0067/2021)</p> <p>BCG vaccine to reduce unplanned absenteeism due to illness of health care workers during the COVID-19 pandemic. A multi-center randomized controlled trial (BCG-COVID-RCT)</p> <p>Impacto da COVID-19 na saúde dos NPT: conhecer mais para intervir melhor (FAMI Parceiros técnicos da AJPAS)</p> <p>Determinantes e necessidades de saúde das crianças migrantes num contexto de pandemia: Um estudo longitudinal para a Região de Lisboa e Vale do Tejo   Health determinants and needs of children on the move in a pandemic context: A longitudinal study for Lisbon and Tagus Valley Region (PTDC/SAU-INF/31990/2017)</p> <p><b>GPPM- Global pathogen dispersion and population mobility</b></p> <p>Addressing Vaccine Hesitancy in Europe (Vax-Trust)</p> <p>Impacto da COVID-19 na saúde dos NPT: conhecer mais para intervir melhor (FAMI Parceiros técnicos da AJPAS)</p> <p>Determinantes e necessidades de saúde das crianças migrantes num contexto de pandemia: Um estudo longitudinal para a Região de Lisboa e Vale do Tejo   Health determinants and needs of children on the move in a pandemic context: A longitudinal study for Lisbon and Tagus Valley Region (PTDC/SAU-INF/31990/2017)</p> <p><b>FRP – Fair Research Partnership</b></p> <p>Non-specific effects of BCG in under-five children”(EXPL/SAU-EPI/0067/2021)</p>	<p>Final report and at least one paper</p> <p>Final report and 3 papers</p> <p>Completar o WP6 on Health Evaluation</p> <p>Terminar a recolha e análise de dados sobre COVID19 nos imigrantes da Amadora (incidência, mortalidade e qualidade de vida)</p> <p>Finalizar a 1ª levantamento de dados sobre a saúde das crianças nativas e imigrantes do Barreiro, Moita, Alcochete e Montijo.</p>	



<p>BCG vaccine to reduce unplanned absenteeism due to illness of health care workers during the COVID-19 pandemic. A multi-center randomized controlled trial (BCG-COVID-RCT)</p>								
<p><b>New Research Projects planned for 2023/2024 with CCIs</b></p> <p>CCI - Public health information (PHI):</p> <p>Joint Action HEROES (Health Workforce to meet health Challenges) (2023-2026)        Estudo de coorte sobre a saúde das crianças na Ilha de Santigado (com UniCv e Hospital Agostinho Neto)        Estudo de coorte Mãe-filho da Matola (com ISCTEM e Hospital da Matola)</p> <p>CCI - Global pathogen dispersion and population mobility (GPPM)</p> <p>Involvement of Tiago Correia and Paulo Ferrinho as external consultants for the funded project: 'The Matrix of) Populist and Denialist Attitudes towards Science' (funded by FCT).</p> <p>CCI - Fair research partnerships (FRP):        Estudo de coorte sobre a saúde das crianças na Ilha de Santigado (com UniCv e Hospital Agostinho Neto)        Estudo de coorte Mãe-filho da Matola (com ISCTEM e Hospital da Matola)</p>	<p>3 fellowships</p> <p>Submeter o Protocolo do estudo ao CNEPS de Cabo-Verde e iniciar a recolha de informação        Submeter o Protocolo do estudo ao CNBS de Moçambique e iniciar a recolha de informação</p> <p>Participation in project meetings and writing of documents</p>							
<p><b>Congresses//Events:</b></p> <table border="0"> <tr> <td>Fórum EDCTP em Paris</td> <td>Novembro</td> </tr> <tr> <td>Congresso da APE no Porto</td> <td>Setembro</td> </tr> <tr> <td>Congresso da Sociedade Portuguesa de Saúde Pública</td> <td>Junho</td> </tr> </table>	Fórum EDCTP em Paris	Novembro	Congresso da APE no Porto	Setembro	Congresso da Sociedade Portuguesa de Saúde Pública	Junho	<p>Membro da Comissão científica do EDCTP (PF): apresentações dos alunos do MEC da UniCv</p> <p>Participação na XLI Reunión Científica SEE y XVIII Congresso da APE, Porto com 3 apresentações</p> <p>Guest speaker</p>	
Fórum EDCTP em Paris	Novembro							
Congresso da APE no Porto	Setembro							
Congresso da Sociedade Portuguesa de Saúde Pública	Junho							





World Congress of Public Health	Maio	Participação no World Congress of Public Health May 2023, Roma com apresentação de 12 posters	
Encontro da Academia de Medicina do Brasil	Março	Guest speaker	
Congresso de Medicina Tropical, IHMT	Abril	Participação na mesa redonda sobre Doenças Crónicas Organização da Sessão sobre Mulheres Cientistas	
<b>Publications/Training:</b>  Publications in several Scientific Journals, Anais do IHMT e livros  <b>Training</b>  Final Seminar on Evaluation of health interventions aimed to address vaccine hesitancy in Europe  Short-term course in evaluation of health interventions in vaccine hesitancy in Europe (part of Vax-Trust H2020 project).  Organization of workshop – Health Evaluation in CPLP (April 2023)  Curso de Ética para a Investigação em saúde (com CNBS Moçambique)-Maio		Publicação de um mínimo de 45 artigos científicos  edição de 2 n° dos Anais; edição de 3 n° da séries Leias;  Ebook Violência contra Profissionais de saúde (Violence against Health workers) 1 suplement Anais (Health Evaluation in CPLP)  Organization of international seminar  Implementação e lecionação do curso  Implementação do workshop  Implementação do curso	
<b>Capacity building:</b> <b>Cape-Verde</b>		MSP com UniCV Mestrado de Epidemiologia de campo da UniCVem CV/GB/STP Reforço de capacidade na área do registo de cancro de base populacional com o Ministério da Saúde de CV	<b>Relatórios</b>



**INSTITUTO DE HIGIENE E  
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DESDE 1902



<p><b>GB</b> Specialization Course in Public Health, inserted in the project IANDA-Guiné</p> <p><b>MZ</b></p> <p><b>Angola</b> post-graduate training in Health Management.</p>	<p>MSP na Guiné-Bissau Completion of the Specialization Course in Public Health, inserted in the project IANDA-GB</p> <p>Mestrado em Estatística e Planeamento em Saúde com ISCISA, MZ Curso de Métodos de Investigação com INS-MISAU</p> <p>Scientific support to Angolan institutions to undertake specialized, post-graduate training in Health Management.</p> <p>Reforço de capacidade na área do registo de cancro de base regional com o Hospital do Lubango e Direção Provincial de Saúde</p>	
<p><b>Other activities:</b> Contribute to the NOVA4theGlobe</p> <p>Editorial Boards</p>	<p>Ensure the representation of PPS in the NOVA4theGlobe structure Align the action plan of NOVA4theGlobe with the and expertise by the PPS members Coordenação do Consórcio de Escolas de Saúde Pública do centro Ciência LP</p> <p>Editor in Chief of BMC Human Resources for Health Editor in Chief of International Journal of Health Planning and Management/HPM Editor principal de duas séries temáticas para HRH Journal e IJERPH Member of the IEA Associate Editor of Frontiers in Public Health Associate Editor of Plos One Membro do Comité de Etica da Sociedade Europeia de Matemática</p>	



## RG – THOP

The overarching aim of the THOP group is the molecular epidemiology, diagnosis, study of drug-resistance mechanisms, drug discovery and control of tuberculosis (TB), HIV and opportunistic diseases on a Global Health perspective in an era of antimicrobial resistance, chronic immunosuppressive diseases and now the COVID pandemic. The activities planned for 2023/24 fall into the various cross-cutting areas as described below.

ACTIVITIES	EXPECTED OUTCOMES	EVIDENCES ( to be filled in 2024)
<p><b>Research activities already ongoing in 2022/2023 with CCIs:</b></p> <p><b>CCI - Drug discovery &amp; resistance (DDR)</b></p> <ul style="list-style-type: none"> <li>• Project TMC207 Calib financed by Becton&amp;Dickinson (Completion in 2023)</li> <li>• Project Breakpoint Calibration for DLM, BDQ, LZD, MOX against <i>M. tuberculosis</i> financed by EUCAST, Becton&amp;Dickinson and ThermoFisher (Completion 2023)</li> <li>• Aetiology and epidemiology of <i>Acinetobacter baumannii</i> through genomics to track global antimicrobial resistance – UI/BD/151063/2021 (ongoing until 2024)</li> <li>• Gilead TB&amp;HIV nanodiagnosics (Completion 2023)</li> <li>• Inhibition of efflux in <i>M. tuberculosis</i> persister cells during dormancy – CEECIND/02562/2017 (ongoing until 2024)</li> <li>• Immunotargeting efflux systems for therapeutic modulation of multidrug resistant bacteria (w/ UCoimbra) (ongoing 2023)</li>   <li>• Efflux mediated resistance in staphylococci</li> <li>• Project DREBI - Exploring efflux inhibition to counteract antimicrobial resistance and biofilms in staphylococci (FCT). Start in 2023, ongoing 2023-24.</li>   <li>• Molecular epidemiology and antimicrobial resistance of <i>S. aureus</i> causing bloodstream infections in children in Mozambique</li>   <li>• GHTM exploratory project (PI: LRodrigues; ongoing): Study of the activity of repurposed drugs against <i>Neisseria gonorrhoeae</i>: targeting membrane transport and energy metabolism.</li>   <li>• Study of efflux-based resistance mechanisms in <i>N. gonorrhoeae</i></li> </ul>	<p><i>3 articles Q1 within CCI DDR – 2023</i></p> <p><i>1 PhD thesis completed in 2024</i></p> <p><i>2 MSc Thesis completed in 2023</i></p> <p><i>4 articles Q1 within CCI DDR – 23/24</i></p> <p><i>2 PhD Thesis initiated in 2023</i></p> <p><i>3 MSc Thesis completed in 2023</i></p> <p><i>2 MSc Thesis completed in 2024</i></p> <p><i>2 national/international project submitted</i></p> <p><i>1 PhD Thesis concluded</i></p> <p><i>2 Articles in Q1</i></p> <p><i>2 Poster communications</i></p>	



<ul style="list-style-type: none"> <li>• Molecular detection of antibiotic resistance in <i>Mycoplasma genitalium</i> (w/ IHC)</li> <li>• Genetic diversity and primary resistance to integrase inhibitors in human immunodeficiency virus type 1 (HIV-1) in Angola. (JP)</li> <li>• Survey and in vitro studies of medicinal plants with anti-parasitic activity (OM/FC)</li> </ul> <p><b>CCI - Diagnostics (DG):</b></p> <ul style="list-style-type: none"> <li>• Diagnosis of sexually transmitted diseases (w/ IHC)</li> <li>• Development and application of electrochemical biosensors for the rapid detection of SNPs associated with drug-resistant tuberculosis and malaria (Collaboration with The Universitat Rovira i Virgili, Spain and LSHTM, UK)</li> <li>• SARS Cov2 serological survey analysis</li> <li>• Project EUCARE: European Cohorts of Patients and Schools to Advance Response to Epidemics</li> <li>• Development of new tools for diagnosis and molecular characterization of opportunistic, emergent and re-emergent pathogens.</li> <li>• Molecular epidemiology of infections by: <i>Pneumocystis jirovecii</i>, <i>Toxoplasma gondii</i> and intestinal parasites in humans</li> <li>• <i>Cryptosporidium</i> and <i>Giardia</i> in commercial vegetables in the city of Maputo, Mozambique: is it a public health concern?" (IHMT/ Nova SBE/ Faculdade de Veterinária, Universidade Eduardo Mondlane-Moçambique)</li> <li>• "Caracterização genética e fatores de risco para aquisição de infeção por <i>Cryptosporidium</i> spp. e <i>Giardia duodenalis</i> em crianças até 14 anos com sintomas gastrointestinais em Moçambique" (IHMT/ Instituto Nacional de Saúde-Moçambique)</li> <li>• "Infeção por <i>Pneumocystis jirovecii</i> em doentes seropositivos para VIH e suspeita de tuberculose pulmonar na Guiné-Bissau"</li> </ul>	<p>1 MSc dissertation in Medical Microbiology          1 paper</p> <p>4 MSc Thesis completed in 2023          1 article</p> <p>1 MSc Thesis to be completed in 2023          1 review; 2 original articles</p> <p>1 article Q1 within CCI D – 22/23          1 Training period in Universitat Rovira i Virgili          1 international project submitted in 2023</p> <p>1 article Q1</p> <p>3 articles (ongoing)          2 MSc Thesis completed in 2023          2 Oral/poster presentation + article          At least 1 new MSc student and 1 PhD student</p>	
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<p><b>CCI - Global pathogen dispersion and population mobility (GPPM)</b></p> <ul style="list-style-type: none"> <li>• Project WasteWaterVir - Integrating metavirome analysis of wastewaters into tools for surveillance of infectious diseases – GHM internal funds</li> <li>• Phylogeography, dispersion of HIV and resistance to antiretrovirals in Portugal, with a special focus on vulnerable populations (migrants and PALOPs).</li> <li>• Project MARVEL: Minimizing the emergence and dissemination of HIV-1 drug resistance in PALOPs through an evidence-based portable high-throughput sequencing and computational approach.</li> <li>• Project EUCARE: European Cohorts of Patients and Schools to Advance Response to Epidemics</li> <li>• Prevalence and genotypic analysis of rotavirus infection in Angola (CC)</li> </ul>	<p>3 publications</p> <p>1 PhD thesis ongoing 2 publications</p>	
<p><b>New Research Projects planned for 2023/2024 within CCIs:</b></p> <p><b>CCI - Drug discovery &amp; resistance (DDR)</b></p> <ul style="list-style-type: none"> <li>• Study of antimicrobial resistance and genotypes of <i>M. genitalium</i> (planned to be submitted to FCT 2023) (WITH CCI DDR)</li> <li>• Antibacterial drug resistance in staphylococci and (...)</li> <li>• Clarifying the role of efflux and mobilome on antimicrobial resistance and virulence in staphylococci (subm to Programme for Cooperation in Science between Portugal and Germany, 2023-24)</li> </ul> <p><b>CCI - Global pathogen dispersion and population mobility (GPPM)</b></p> <ul style="list-style-type: none"> <li>• Project application submitted to laCaixa in 2022: “Towards wastewater-based genomic surveillance of arboviruses in African resource-limited settings” (SS)</li> <li>• Project application submitted to ERC Consolidator “HINVEST: INtegrated HIV-1 genomic, clinical and Epidemiological Surveillance to inform evidence-based prevention and Treatment strategies: a global health perspective”</li> <li>• Project ORIGHAM: ORIGins of HIV infections Among Migrants</li> <li>• .Projet RSV Pfizer</li> </ul>	<p>Start of at least 1 newly approved project</p> <p>At least 2 proposals submitted to GHM’s internal call 2023</p> <p>At least 4 national projects submitted (LRodrigues + DMachado + SSCosta + OMatos)</p> <p>At least 3 international projects submitted (LaCaixa, SS; ERC – AAb; EDCTP-AAb)</p>	



<p><b>• Congresses//Events:</b></p> <ul style="list-style-type: none"> <li>• European Congress of Clinical Microbiology &amp; Infectious Diseases (2023 and 2024) - Copenhagen, Denmark on 15 - 18 April 2023.</li> <li>• 6<sup>th</sup> National Congress on Tropical Medicine (April 2023)</li> <li>• Update on Sexually Transmitted Infections Course (pre-National Congress on Tropical Medicine 2023)</li> <li>• Gordon Research Conference - Multi-Drug Efflux Systems - Targeting the Mechanisms and Regulation of Transporters for Advancing Health During a Pandemic - March 26 - 31, 2023</li> <li>• European Society of Mycobacteriology Meeting, ESM (2023 and 2024) – Tirana, Albania -25-28 June 2023</li> <li>• MICROBIOTEC 2023 – 7 and 8 December 2023 – Universidade da Beira Interior</li> <li>• ISSSI (Int. Symp Staphylococci &amp; Staph infections), 2024</li> </ul>	<p>At least:</p> <p>1 invited oral communication on a NIH sponsored Gordon Conference</p> <p>3 oral communications.</p> <p>15 posters in international conferences</p> <p>12 posters in international conferences</p>	
<p><b>Training:</b></p> <ul style="list-style-type: none"> <li>• Development and application of electrochemical biosensors for the rapid detection of SNPs associated with drug-resistant tuberculosis and malaria (Collaboration with The Universitat Rovira i Virgili, Spain and LSHTM, UK)</li> <li>• Bioinformatics course planned: “Python Aplicado às Ciências Biomédicas”</li> <li>• Summer School on Antimicrobial Resistance in an OneHealth perspective (2024)</li> </ul>	<p>3 training initiatives accomplished by the end of 2023</p> <p>At least 4 new PhD students enrolled in GHTM-THOP group by the end of 2024.</p>	
<p><b>Capacity building:</b></p> <ul style="list-style-type: none"> <li>• Consolidation of the <i>G. mellonella</i> Research Hub for in vivo model for pathogenicity studies and drug discovery at GHTM (within CCI's DDR and DG)</li> <li>• Collaborative projects w/ Angola and Mozambique on STIs and pre-natal care involving PhD students (w/ IHC).</li> <li>• Organization and implementation of a Molecular Epidemiology Course in Angola for the CPLP countries – “Workshop de Evolução Microbiana e Epidemiologia Molecular de Doenças Infecciosas” (Academia BAI, Angola)</li> <li>• Capacity building in SARS-CoV2 sequencing and molecular epidemiology in Cape-Verde- Joint-venture with Instituto Nacional de Saúde Dr. Ricardo Jorge. (postponed for summer2023)</li> </ul>	<p>1 Article in Q1/Q2          1 Msc thesis</p> <p>1 project submitted</p> <p>September 2023. Endorsed by CPLP with the financial support of Fundação BAI</p> <p>Summer 2023 – Support GHTM and INSA – Portuguese Health Ministry</p>	



<ul style="list-style-type: none"> <li>• Curso de atualização a médicos 'Resistências na coinfeção VIH/Hepatites (com APECS/GEPCOI)</li> <li>• Curso Internacional de Especialização em Saúde Pública (Guiné-Bissau)</li> <li>• Completion of assessment, depositing and incorporation of well characterized mycobacterial stains in GHTM BIOBANK (within CCIs DG and GPPM)</li> <li>• Deposit on GHTM's Biobank of reference strains on efflux-driven antimicrobial resistance</li> </ul>	<p>At least 10 well characterized <i>M. tuberculosis</i> strains deposited by the end of 2023</p> <p>At least 4 well characterized bacterial strains deposited by the end of 2024 (<i>S. aureus</i>, <i>E. coli</i>, <i>N. gonorrhoeae</i>, <i>A. baumannii</i>)</p>	
<p><b>Other activities:</b></p> <ul style="list-style-type: none"> <li>• Participation at IHMT-NOVA Open Day</li> <li>• Participation at International Microorganism Day - September 2023</li> <li>• 5th GHTM Antimicrobial Resistance Awareness Day (2023)</li> <li>• Organization of GHTM Session within several CCIs</li> </ul>	<p>Participation of THOP members in at least 4 open science initiatives/year</p> <p>At least 4 GHTM sessions organized by THOP members</p>	



## RG – VBD

The Strategic objective of VBD is the reinforcement of local and global capacity to control vector-borne diseases. Major research competences include molecular, genetic, and eco-epidemiological studies, mechanisms of drug and insecticide resistance, transmission and vector/host-pathogen interactions, host-pathogen microbiome, vector bioecology and control, and development of diagnostic and surveillance/control innovative methods.

ACTIVITIES	EXPECTED OUTCOMES	EVIDENCES ( to be filled in 2024)
<p><b>Research activities already ongoing in 2022/2023 with CCIs:</b></p> <p><b>CCI - Diagnostics (DG):</b></p> <p>Rapid detection of Single Nucleotide Polymorphisms (SNPs) associated with drug-resistant malaria using electrochemical biosensors (GHTM Exploratory Project RESMALDETECT) – <b>WITH THOP and IHC</b></p> <p>Environmental DNA detection methods for trematodes (<i>Fasciola hepatica</i>, <i>Schistosoma</i>) and their intermediate hosts.</p> <p>Comparison of diagnostic methods for filariases in Angola, Lunda South.</p> <p>New approaches for immunodiagnosis of <i>Strongyloidiasis</i> (partner UF Bahia-Brazil)</p> <p>Development of <i>Schistosoma mansoni</i> recombinant antibodies for serodiagnosis of human schistosomiasis</p>	<p>Development of a prototype point-of-need tool on nanodiagnosis of drug-resistant malaria</p> <p>1 publication / 1 oral/poster presentations / collaboration with industry</p> <p>2 MSc theses; 2 publications</p> <p>1 MSc thesis; 1 publication</p> <p>1 publication</p> <p>1 MSc thesis; 1 publication</p>	
<p><b>CCI - Drug discovery &amp; resistance (DDR)</b></p> <p><u>Drug discovery &amp; resistance</u></p> <p>Efficacy of synthetic compounds against <i>Babesia ovis</i></p>	<p>Using <i>Babesia ovis</i> cell cultures we will test the efficacy of synthetic compounds on Babesia inhibition, in collaboration with both the University of Oporto and the National Research Institute for Agriculture, Food and Environment.</p>	





<p>Malaria pre-elimination in São Tomé and Príncipe: parasite population characterization</p> <p>AMAZonian snake toxins: creating value from bioresources        CIRCNA/BRB/0281/2019</p> <p>Artificial intelligence approaches to accelerate antimalarial drug discovery for prophylaxis and transmission-blocking (to submit FCT)</p> <p>Future antimalarials: towards multi-stage compounds for treatment and transmission-blocking (to be submit GHTM)</p> <p>The anthelmintic activity of Guinea-Bissau ethanolic extracts using <i>Caenorhabditis elegans</i> as a model</p> <p>Study of medicinal plants used for the treatment of schistosomiasis in the Huambo region Angola (Partner: Faculdade Farmácia, ULisboa)</p> <p>Potential of spirooxadiazoline</p>	<p>Ongoing MSc thesis of Bernardo Aguiar. Snake venoms as antimalarials. Mestrado em Parasitologia Médica IHMT-NOVA.</p> <p>Submitted papers:</p> <ol style="list-style-type: none"> <li>1) Unlocking the potential of snake venom-based molecules against the malaria, Chagas disease, and leishmaniasis triad.</li> <li>2) Disclosure of chloroquine bile salts as triple-stage antimalarial hits</li> </ol> <p>To develop new technologies artificial intelligence-driven in silico drug screening for accelerating the discovery of lead candidates to promising multi-stage antimalarials.</p> <p>To proceed to hit-to-lead optimization of promising compounds already discovered for us, further analysing their activity against sexual blood stages through in vivo efficacy experiments.</p> <p>1 MSc thesis; 1 publication</p> <p>1 PhD; 3 publications</p>	
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<p>Oxindoles as anti-Leishmania chemotypes (with Faculdade Farmácia, UL)</p> <p>Adjusting CRISPR/Cas9 protein tagging in Leishmania infantum Portuguese strains (with WCIP, Glasgow University, UK)</p> <p><u>Insecticide discovery &amp; resistance</u></p> <p>Levels and mechanisms of insecticide resistance in the malaria vector <i>Anopheles coluzzii</i> of São Tomé and Príncipe (STP)</p> <p><u>Host/Vector – Pathogen interactions and Microbiome</u></p> <p>Microbiome of <i>Aedes albopictus</i> from different field populations</p> <p><i>Ixodes ricinus</i> microbiome</p> <p>DogIPM   Immune precision medicine as a new opportunity to control canine trypanosomatid diseases</p> <p>Tackling trypanosomiasis cardiomyopathy with microRNAs and tridimensional (3D) models -miT3D (FCT – PeX)</p> <p>Achieving new frontiers through trypanosomatid exosomes (EXOTRYPANO)</p> <p>Vaccine for prevention and treatment of Trypanosoma cruzi infection (CRUZIVAX)</p> <p>Collaboration with Aga-Khan University, Pakistan</p> <p>Study of bacteriome in flies with impact on human, animal and environmental health (to submit to GHTM)</p>	<p>Second round of susceptibility assays performed in the rainy season. Genotyping of major resistance associated loci</p> <p>On-going work to be published in 2023</p> <p>Under a PhD work plan, we aim to continue the study on the <i>Ixodes ricinus</i> microbiome using Minlon equipment initiated in 2022 and analyse other tick samples such as male tissues.</p> <p>Ongoing</p> <p>Project implementation</p> <p>Conclusion of the project</p> <p>Webinar implementation</p> <p>Ongoing</p>	
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<p><u>Beyond vectorial diseases:</u></p> <p>Prevalence and risk factors of <i>Strongyloides stercoralis</i> in an immigrant population, Portugal.</p> <p>Prevalence and risk factors for soil transmitted helminths in Guinea-Bissau.</p> <p>Detection of intestinal parasites in water treatment effluents and muds and in vegetables and fruit consumed raw.</p> <p>Risk of environmental contamination by <i>Toxocara</i> spp in the Praia city, Santiago Island – Cape Verde.</p> <p>Identification and distribution of intermediate host snails in the island of Santiago - Cape Verde.</p> <p>Intestinal parasites in children from two communities in the municipality of Seixal.</p>	<p>1 MSc thesis; 1 publication</p> <p>1 MSc thesis; 1 publication</p> <p>2 MSc theses; 2 publications</p> <p>1 MSc thesis; 1 publication</p> <p>1 MSc thesis; 1 publication</p> <p>1 MSc thesis; 1 publication</p>	
<p><b>CCI - Public health information (PHI):</b></p> <p>MosquitoWeb (NOVA Health)</p>	<p>Continuing collaboration with the NEWSERA project (<a href="http://newsera2020.eu/">newsera2020.eu/</a>).</p> <p>Publications in social media.</p> <p>Integration of existing dataset on GBIF and continuous update (<a href="http://gbif.org">gbif.org</a>)</p>	
<p><b>CCI - Global pathogen dispersion and population mobility (GPPM)</b></p> <p>Epidemiology of tick-transmitted pathogens</p>	<p>Epidemiologic assays will be performed in order to identify pathogens in tick samples collected in Brazil and in Poland.</p> <p>We will participate in a working group of 22 European universities aiming to generate a questionnaire “to study the general knowledge and the degree of awareness of European citizens regarding ticks and tick-borne diseases”.</p>	



<p>Dispersal and establishment of mosquito's species into new regions</p> <p>"CLIMOS: Climate monitoring and decision support framework for sand fly-borne diseases detection and mitigation with COST-benefit and climate-policy measures". Funding: Horizon Europe, Cluster Health (HE-HORIZON-HLTH-2021-ENVHLTH-02- 101057690) and United Kingdom Research and Innovation.</p> <p>Prevalence of asymptomatic leishmaniasis in blood donors from mainland Portugal (PhD thesis: Rafael Rocha; SFRH/BD/GHTM/DTM2020)</p> <p>Morphological and molecular characterization of mosquitoes from West African countries, Guinea-Bissau and Cameroon, and potential vectors of arboviruses and avian malaria.</p> <p>Analysis of the diversity of hematophagous arthropods in Spain (in collaboration with Daniel Bravo-Barriga and Eva Frontera/FacMedVet, Univ Estremadura, Spain)(SDG: 3-Good Health and Well-Being).</p> <p>Screening of potential zoonotic pathogens in mosquitoes and other arthropods in Spain (in collaboration with Ignacio Ruiz-Arrondo/Center for Biomedical Research of La Rioja, Logroño, Spain/Center of Rickettsiosis and arthropod-borne diseases, Univ Estremadura, Spain)(SDG: 3-Good Health and Well-Being).</p> <p>Sequencing, genetic characterization and analysis of the spatiotemporal dispersion of serotype 3 dengue viruses circulating in 2022 in the Democratic Republic of São Tomé and Príncipe (SDG: 3- Good Health and Well-being; 4-Quality Education).</p>	<p>On-going work to be published in 2023 under the scope of two PhD projects.</p> <p>First year of sand fly and canine field work for the detection of sand fly-borne pathogens</p> <p>Determination of <i>Leishmania</i> seroprevalence in blood donors from mainland Portugal and associated risk factors</p> <p>Update of culicid fauna of Guinea-Bissau and Cameroon, and biodiversity characterization, with finding of potential vectors of arboviruses or avian malaria.</p> <p>Characterization of new arthropod species and analysis of their diversity and dispersal</p> <p>Detection of viruses in hematophagous arthropods, including bona fide arboviruses and insect-specific</p> <p>Identification of the origin of the 2022 outbreak and reconstitution of the spatiotemporal dispersal of identified DENV-3. Involves the complete sequencing of two viral genomes and the partial sequencing of 4 others.</p>	



<p><b>CCI - Fair research partnerships (FRP):</b></p> <p>SUBFAM protocol: Submicroscopic <i>Plasmodium falciparum</i> infections in Guinea-Bissau: a barrier to eliminate malaria? (with Bandim Health Project, Guinea-Bissau) – ALSO WITHIN CCI GPPM</p>	<p>ongoing PhD thesis of a local student</p> <p>2 publications</p>	
<p><b>New Research Projects planned for 2023/2024 with CCIs:</b></p> <p><b>CCI - Diagnostics (DG):</b></p> <p>Proposal submission to FCT (or other) on the point-of-need nanodiagnosis of drug-resistant malaria</p> <p><b>CCI - Drug discovery &amp; resistance (DDR)</b></p> <p><u>Drug discovery &amp; resistance</u></p> <p><u>Insecticide discovery &amp; resistance</u></p> <p>INOVEC - Research &amp; InNOvation Partnership for enhancing the surveillance and control of mosquito VECTors of emerging arboviruses. RISE Program /EC</p> <p>Vector competence studies in the framework of the University of California Malaria Initiative.</p> <p>Study of microorganisms with medical/veterinary relevance in flies (Order Diptera, Suborder Brachyera (to submit in 2023)</p> <p>The study of insects of biomedical importance in Portugal, from Portuguese entomological collections and online databases (to submit in 2023)</p>	<p>Implementation of WP4 (advanced training and education). Task leaders in WP3 (social sciences) and WP4.</p> <p>Vector competence analysis of <i>Anopheles coluzzii</i> from São Tomé and Príncipe to <i>Plasmodium falciparum</i>.</p>	



<p><u>Host/Vector – Pathogen interactions and Microbiome</u></p> <p>BabRed: A toolbox to decipher the cross-talk between <i>Babesia ovis</i> and the host cell</p>   <p>Exploring the mechanisms of the protective effect of pyruvate kinase deficiency against malaria – submitted to La Caixa (partners IHC GHTM, IMM and IST)</p> <p>Collaboration with AKU, Pakistan</p> <ul style="list-style-type: none"> <li>• Participation on proposal for an International Centers of Excellence for Malaria Research (National Institute of Allergy and Infectious Diseases (NIAID))  <a href="https://grants.nih.gov/grants/guide/rfa-files/RFA-AI-22-067.html">https://grants.nih.gov/grants/guide/rfa-files/RFA-AI-22-067.html</a></li> <li>• Erasmus+ Visit to AKU</li> </ul> <p><b>CCI - Global pathogen dispersion and population mobility (GPPM)</b></p> <p>Variação individual no risco de malária: causas e consequências em populações amazônicas – submitted to FAPESP by IHC</p> <p>Participation on proposal for an International Centers of Excellence for Malaria Research (National Institute of Allergy and Infectious Diseases (NIAID))  <a href="https://grants.nih.gov/grants/guide/rfa-files/RFA-AI-22-067.html">https://grants.nih.gov/grants/guide/rfa-files/RFA-AI-22-067.html</a> – Proponent Univ of Maryland; Partners VBD, IHC and PPS, Angola, São Tomé Príncipe, Equatorial Guinea</p>	<ol style="list-style-type: none"> <li>1) Generation of a high-quality annotated <i>B. ovis</i> genome, providing a deep genetic insight of the parasite, supporting future basic and applied studies, ultimately representing an invaluable asset for the scientific community focused in vector borne diseases.</li> <li>2) Identification of key proteins for <i>B. ovis</i> invasion and multiplication in the erythrocyte. Here a catalogue of differentially represented proteins during <i>Babesia</i> asexual stage will be obtained, representing potential targets for downstream studies.</li> </ol>	
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<p>2022.01349.PTDC - The Alqueva reservoir, climate change and migrant birds: a dangerous liaison for emerging snail borne diseases?</p> <p>Evaluation of <i>Strongyloides venezuelensis</i> heterologous antigen in the immunodiagnosis of human strongyloidiasis: a study between Brazil, Peru and Portugal (FAPESP – Brazil)</p>	<p>1 MSc thesis; 2 publications</p> <p>To identify specific antigens for accurate immunodiagnosis of strongyloidiasis; 2 publications</p>	
<p><b>Congresses/Events:</b></p> <p>15th International Symposium on Ticks and Tick-borne Diseases          Kick-off meeting of INOVEC          Final AIM-COST meeting          17th CVBD® world forum symposium          European congress of Veterinary Parasitology          1 oral/poster presentation at XLVIII Annual Meeting of the Portuguese Society for Immunology          1 oral/poster presentation at 18th IUIS International Congress of Immunology          Pre-congress event: Workshop "Women in Tropical Health" linked to the Congress in Tropical Medicine (IHMT NOVA) – <b>with PPS and THOP</b>          33rd ECCMID -15-18 April 2023 Copenhagen, Denmark</p>	<p>Oral presentation: Carolina Silva,, Teresa Carreira, Mónica Franco, Maria Luisa Vieira, Ana Armada.. Antimicrobial mechanisms employed by macrophages exposed to pathogenic spirochetes responsible to Lyme borreliosis</p> <p>Poster: Ana Armada, Wilmer Fernnades, Teresa Carreira, Maria Luisa Vieira. Optimization and application of an indirect immunofluorescence test for the diagnosis of leptospirosis in conventional laboratories</p>	
<p><b>Publications:</b></p> <p>1 Publication under a special issue on "Tick classic papers"</p> <p>1 publication on tick and parasite interactions</p> <p>2 publications on tick vaccine development</p>		



<p>2 publications on tick-parasite epidemiology</p> <p>1 publication on Babesia sp. inhibition assays</p> <p>1 publication on the effect of the compound 2,3-diphosphoglycerate (2,3-DPG) on the <i>Plasmodium falciparum</i> development – transcriptomics analysis.</p> <p>1 publication on the influence of genetic variants of ICAM1 and CD36 on the phenotypic variation of sickle-cell disease and malaria in Angolan children</p> <p>1 publication on the characterization of a cohort of Angolan children with sickle cell anemia medicated with hydroxyurea</p> <p>Science dissemination book “Bioinspiration: Insect colour driving innovation”</p> <p>At least 4 research papers on sand fly-borne diseases</p> <p>At least 3 research papers on malaria pre-elimination in São Tomé</p> <p>4 publications on canine trypanosomatid diseases</p> <p>1 publication on Application a deep learning-driven protocol to identify multistage compounds with potential for malaria treatment</p> <p>1 publication on Looking into 4-aminoquinolines as multistage antimalarials</p> <p>1 publication on Quinazolines as potential inhibitors of NIMA-related kinases of <i>Plasmodium falciparum</i></p> <p>1 publication on Development of PKG inhibitors as antimalarials</p> <p>1 publication on Repositioning one approved antipsychotic drug (TZ) in chemosensitizing resistant parasites to chloroquine (CQ)</p> <p>Review on “Advances and challenges of environmental DNA detection of trematodes and their intermediate hosts”</p> <p>Research article on “Detection of non-patent infection with <i>Schistosoma haematobium</i> in populations of <i>Bulinus</i> sp. as risk factor for urinary schistosomiasis in the province of Zambezia, Mozambique</p> <p>Research article on “Total Phenolic, Triterpene, Tannin Content, Antioxidant Activity, Phytochemical Profile and in vitro Cercaricidal Activity of Aqueous and Hydroethanolic Extracts of <i>Vernonia britteniana</i> Root on <i>Schistosoma mansoni</i> Larval Stage”.</p>		
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Research article on "Evaluation of POC-CCA performance for diagnosis of schistosomiasis in Chókwe district Mozambique"

Hornemann A, Marschall M, Metzner S, Patoka P, Cortes S, Wubbeler G, Hoehl A, Ruhl E, Kastner B, Elster C. Compressed AFM-IR hyperspectral nanoimaging of single Leishmania parasites. 2022. ACS Omega (under review)

Book Chapter under the History of Leishmaniasis (with FCT NOVA and Fundação Oswaldo Cruz,RJ)

4 publications on new drugs anti-*Leishmania*

**Training:**

**PhD Students**

Wilson Tavares. Plasmodium falciparum population structure in Angola, using whole genome sequence data from field isolates. Biomedical Sciences. IHMT NOVA. In collaboration with Univ. of Maryland. Ongoing

Ronise Silva. Low-density malaria infections: are they important to sustain malaria in Guinea-Bissau? Tropical Diseases and Global Health IHMT NOVA, in collaboration with Bandim Health Project, Guinea-Bissau Ongoing

Mariana Delgado. Gut Microbiome Analysis in Patients with Sickle Cell Disease. Biomedical Sciences. IHMT NOVA. In collaboration with ESTeSL/IPL. Ongoing

Brígida Santos. Identificação de modificadores genéticos em crianças com Anemia de Células Falciformes numa área endémica de Malária, Angola. Human Genetics and Infectious Diseases IHMT NOVA in collaboration with ESTeSL/IPL and INSA. Conclusion

1 PhD dissertation on trypanosomatid diseases - conclusion

Mbueno Nzila. Clinical and parasitological response on day 7 after treatment of *Plasmodium falciparum* malaria with ACTs and their correlation with molecular markers of resistance in Banga, Angola. IHMT-NOVA in collaboration with Univ. Agostinho Neto, Luanda.

Denise Duarte. *Plasmodium falciparum* redox system: the role of heterocycle thiosemicarbazones derivatives as potential regulators. IHMT-NOVA in collaboration with Universidade Federal de Pernambuco (UFPE), Recife - Brasil.

Clemente da Silva. Resistance to antimalarials in Mozambique (?): Characterization of molecular markers and assessment of susceptibility of *Plasmodium falciparum*.



<p>IHMT-NOVA in collaboration with Instituto Nacional de Saúde, Maputo, Moçambique.</p> <p>Valéria Chicamba. Serum leptin and malnutrition in children with severe malaria in Mozambique. IHMT-NOVA in collaboration with Faculdade de Medicina da Universidade Eduardo Mondlane, Moçambique.</p> <p>1 PhD student on Looking into 4-aminoquinolines as multistage antimalarials. Ongoing</p> <p>1 PhD student on Quinazolines as potential inhibitors of NIMA-related kinases of <i>Plasmodium falciparum</i></p> <p>Manuel Tomás da Silva. Vectorial capacity of <i>Aedes albopictus</i>: risk of arbovirus outbreaks in southern Portugal (FCT - 2022.13476.BDANA). Tropical Diseases and Global Health IHMT-NOVA.</p> <p>Bárbara Pocongo. Impact of primary resistance and emerging secondary resistance to Dolutegravir therapy in Angola (Thesis plan to be submitted to CC in 2023). Biomedical Sciences IHMT NOVA.</p> <p><b>MSc Students</b></p> <p>Ana Balau. Effect of the compound 2,3-diphosphoglycerate (2,3-DPG) on the <i>Plasmodium falciparum</i> development – transcriptomics analysis. MSc Biomedical Sciences, IHMT. (2022-2023)</p> <p>Irina Matos – Influence of genetic variants of ICAM1 and CD36 on the phenotypic variation of sickle-cell disease and malaria in Angolan children. MSc Biomedical Sciences, IHMT. (2022-2023)</p> <p>1 MSc student - Molecular analysis of antimalarial resistance of <i>Plasmodium falciparum</i> in São Tomé and Príncipe (2022-2023).</p> <p>3 Master thesis on canine trypanosomatid diseases - conclusion</p> <p>Ana Cândido. Estudo da atividade anti-malária de endoperoxidos Mestrado em Ciências Biomédicas do IHMT-NOVA.. Ongoing 2022/2023.</p> <p>Bernardo Aguiar. Snake venoms as antimalarials. Mestrado em Parasitologia Médica IHMT-NOVA. Ongoing 2022/2023.</p> <p>Ana Dias. Marcadores moleculares de resistência a anti-malários em amostras de malaria importada em Portugal. Mestrado em Parasitologia Médica IHMT-NOVA. Ongoing 2022/2023.</p>		
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<p>Soraia Rodrigues. Malaria grave: causas e consequências. Mestrado em Saúde Tropical do IHMT-NOVA. Ongoing 2022/2023.</p> <p>1 MSc student. Screening and hit evaluation of the PT-Open screen library against asexual blood stage <i>Plasmodium falciparum</i></p> <p>Ana Saltão. Sequencing, genetic characterization and analysis of the spatiotemporal dispersion of serotype 3 dengue viruses circulating in 2022 in the Democratic Republic of São Tomé and Príncipe. MSc in Medical Microbiology (NOVA). Ongoing</p> <p>Marta Falcão. Bagaza Virus - Phylogenetic Analysis, Development and Validation of Molecular Diagnosis Methods. MSc in Biomedical Sciences (IHMT-NOVA)</p> <p>Melanie Alves. Microbiological safety assessment of greenhouse-grown raspberries. MSc in Biomedical Sciences (IHMT-NOVA)</p> <p>MSc student from Angola (MSc in Medical Parasitology, Univ Katyava Bwila, in Helminthology – parasitological and molecular detection</p> <p><b>Other</b></p>		
<p><b>Capacity building:</b></p> <p>1 pos-doc (researcher). 40 days. Tick pathogen detection by qPCR and transcriptomic data analysis. Departamento de Genética da Secretaria de Agricultura e Abastecimento, Instituto de Zootecnia, São Paulo, Brasil.</p> <p>1 MSc student, 12 months on <i>Babesia</i> sp cultures: inhibition studies</p> <p>1 pos-doc (Professor). 2 weeks. Erasmus +. Tick pathogen detection by qPCR. Faculty of Biology and Biotechnology, University of Warmia and Mazury, Poland</p> <p>1 PhD student. 1 month. Erasmus. Tick microbiome assays. Faculty of Biology and Biotechnology, University of Warmia and Mazury, Poland</p> <p>Course “Insect collections, medical and forensic entomology”, to be held September, IHMT, Lisbon, Portugal.</p> <p>Course “Public Health and Vector Borne Diseases”. February 2023 (25 hours). Course held by videoconference for students of the “Master and Ph. D Program in</p>		



<p>Biodiversity Informatics”, at the Faculty of Agricultural Sciences, University of Abomey-Calavi (Benin).</p> <p>Course “Python applied to biomedical Sciences”, to be held 8-12 May 2023, IHMT, Lisbon, Portugal.</p> <p>Training program on IHMT for National Tuberculosis Reference Laboratory of STP technicians in medical and molecular microbiology.</p> <p>Workshop on molecular techniques associated with diagnostics on Instituto Superior de Ciências da Saúde Vitor Sá Machado da Universidade de São Tomé e Príncipe</p> <p>Co-supervising of a PhD student from the PhD in Biosciences and Public Health of Faculty of Medicine of the Eduardo Mondlane University- Irina de Sousa. Study of the association of HIV infection with the severity of malaria, prevalence of parasitic populations resistant to antimalarials and innate susceptibility of patients at the Hospital Provincial da Matola</p> <p>Logistic and technical support of laboratory work to be carried out within the framework of the Doctoral Thesis proposed by Lúcia Chambal, PhD student in Biosciences at the Faculty of Medicine of the Eduardo Mondlane University</p> <p>Theoretical-practical course in Molecular Malacology</p> <p>Hands-on course Gene editing in <i>Leishmania</i>- second edition</p> <p>Courses on article and project writing for women scientists in PALOP: Mozambique and Cape Verde (MulhereSTrop) – with PPS and THOP</p>		
<p><b>Other activities:</b></p> <p>COST Actions: CA21170 (Prevention, anticipation and mitigation of tick-borne disease risk applying the DAMA protocol (PRAGMATICK)), CA21111 (One Health drugs against parasitic vector-borne diseases in Europe and beyond)</p> <p>Tick Mitochondrial Genome Network</p> <p>"Training in Science Communication and Dissemination" (<a href="https://www.nativescientist.com/institutions">https://www.nativescientist.com/institutions</a>) addressed to institution's goals and internal researchers interested in science outreach activities.</p>	<p>Formalization of a group of researchers committed to science communication activities. Development of a new science dissemination and educational offers to the "Community" (in the website <a href="https://www.ihmt.unl.pt/">https://www.ihmt.unl.pt/</a>)</p>	



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<p>Participation in science dissemination activities, such as the NEI, IHMT Open Day, etc</p> <p>Lectures on: "Genetics: how it interferes in our health." (year 9) and "The importance of nucleic acids in our lives – diagnostics and discovery of disease agents" (years 10 and 11) to the Secondary School António Inácio da Cruz, Grândola Municipality.</p> <p>Project "Ciência Viva": Helminths around us.</p> <p><b>Urgent completion</b> : Design and implement a Business Model (Canvas model) with implementation plan for VIASEF</p>	<p>To be completed and implemented in the 1st semester of 2023</p>	
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DESDE 1902



## CCI – DIAGNOSTICS (DG)

The Main Goal of the CCI Diagnostics (DG) is to develop novel diagnostic tools for epidemiological assessment and surveillance, to improve precision treatment and to provide affordable, rapid and sensitive diagnosis to field settings and/or travel medicine. This has been achieved by research activity on molecular diagnostics, biomarkers, point-of-care testing and devices, lab-on-a-chip technologies addressed to infectious diseases carried out mainly by IHC, THOP and VBD Research Groups.

In addition to the activity that has already been ongoing in previous years (please refer to the Diagnostics section in the 2022 report), which is planned to continue for the remainder of 2023 and 2024, we highlight new studies on the surveillance of Chagas Disease on Madeira Island (IHC), and on the detection of helminths both in human populations and in the environment in a One Health perspective (VBD).

Research on Diagnostic methods are increasingly important around the world as a first defense against the spread of infectious diseases. Updated diagnostics tools are a requisite for the early, rapid, and accurate detection and surveillance of diseases and changes in drug resistant or more virulent pathogens. Diagnosis has a considerable impact on health care worldwide but low- and middle-income countries where infectious diseases are a heavy burden often lack infrastructure and appropriate methods for an efficient diagnosis.

For this reason, research activity in this specific area continues to be relevant to the strategy and mission of GHTM. However, long term thinking, the volume of work done may not justify the existence of a CCI or thematic line per se. Its essential characteristic of applied research may evolve for the integration into a broader line regarding Implementation and translational research, where diagnostic development, vector and pathogen control and new monitoring tools and strategies could be considered together.



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MEDICINA TROPICAL  
DESDE 1902



## CCI - DRUG DISCOVERY & RESISTANCE (DDR)

In terms of our main core scientific objectives and their associated workplans, for the the remainder of 2023 we expect to keep up to schedule, whilst start preparing novel fields of scientific intervention within DDR, to be implemented in a medium to- long term. Also, we understand that even though most activities ran according to plan in 2022 and previous years, there is room for strategic improvement in some areas. With this brief reflection in mind, the activity plan described herein, will be divided into three sections, as described below.

### 1. **Main ongoing scientific activities that have been running successfully and should be further boosted:**

- . Computer-Aided Drug Discovery (CADD) and Drug Repurposing for novel antimicrobial, antiparasitic and antiviral treatments
- . Research on the genetic and molecular determinants of drug resistance in microbes, parasites, and viruses.
- . Molecular monitoring of drug resistance in natural populations of microbes, parasites, and viruses.
- . Phenotypic and molecular studies on insecticide resistance in vectors of tropical diseases.

### 2. **New areas of scientific intervention proposed:**

- . Genome-wide Association Studies (GWAS) with natural populations of pathogens from Portuguese-speaking countries, towards identifying drug resistance traits.
- . Collaboration with the recently created PT-OPENSREEN infrastructure of which we are partners and where thousands of new molecules are freely available for biological screens against the different pathogens studied at GHTM.

### 3. **Areas that require strategical improvements:**

- . Improving ability to undertake clinical trials autonomously or engaging as partners in clinical trials carried out by other Institutions.
- . Encouraging patent applications for some of the new antimicrobial, antiparasitic and antiviral molecules being discovered at GHTM.
- . Rethinking fund-seeking strategies, mainly due to a low success rate in 2022.
- . Installing capacities to analyze whole-genome data autonomously.
- . Fostering research on natural products as a source of new potential treatments, especially owed to our privileged and unique access to a biodiverse panoply of these resources in Portuguese-speaking countries.



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## CCI – PUBLIC HEALTH INFORMATION (PHI)

While maintaining our intersection with the research groups and cross cutting issues by developing and implementing new research, in pursue of the objective of supporting health decision making and adopting a market, sustainable and open science approach, for the remaining of 2023, we aimed at

- creating an intelligence center for Global Health and Tropical Medicine;
- promote good clinical research practices among GHMT members;

The Intelligence Center for Global Health and Tropical Medicine is a “service” for collection, analysis, and exploitation of information to support global public health policies and actions that can be distinguished by focusing on a specific “niche”: African Lusophone Countries and Tropical Medicine.

The goal of this initiative is to support global public health policies and actions. This center is going to be fed by data and information resulting from GHTM research projects, missions/ consultancies to countries, thesis and other academic work as well as capacity building, will integrate already existing resources such as RUN, REDCap and POLEN and produce tailored, evidence-based information, guidelines and policy dialogues and data for further analysis from prospective researchers and/or students.

To achieve this, we will:

- create an anonymized data repository for all non “bio” data collected that can be used for later analysis / metanalysis – in line with recent directives on using available data to do research.
- register and give visibility to ongoing systematized reviews supporting research and academic work and to make them available to the GHTM community – in line with open access policies.
- optimize existing online repositior for information (e.g., papers, patents, etc)





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DESDE 1902



### CCI - GLOBAL PATHOGEN DISPERSION AND POPULATION MOBILITY (GPPM)

Objective: addresses global dispersion of infectious diseases using transdisciplinary and integrated approaches in collaboration with partners in endemic countries. Our aim is to understand the factors that underpin the spread or containment of infectious diseases globally and locally, particularly environmental changes and population mobility, in control or elimination contexts.

In the last year, some important steps have been taken in the setting up of new topics of research within GPPM. Through these steps, we have established networks that will allow to implement such topics in other research projects:

- Genomic surveillance in wastewaters, through project WasteWaterVir, which is ongoing and has resulted in submission of other research projects concerning genomic surveillance in wastewaters to LaCaixa and to FCT.
- Through Eucare project, we have advanced with the establishment of children and adolescents cohorts in schools to perform surveillance of SARS-CoV-2 infections. We expected to extend these cohorts to the surveillance of transmission of other viruses in school settings, through additional funding in other calls.
- Through projects MARVEL and HITOLA, we have established genomic surveillance of HIV-1 in Portuguese speaking African countries, namely Cape Verde, Sao Tomé and Principe, Mozambique and Angola. These projects will help to track dissemination of HIV-1, as well as to track/detect antiretroviral drug resistance in these PALOPs as well as in Guinea-Bissau and Brazil.
- The establishment of cohorts of migrant children and adults in the regions of Lisbon and Amadora has been ongoing. Furthermore, new projects have been established and/or planned to start cohorts of individuals in Portuguese-speaking African countries.
- CLIMOS project has started and will assist mitigation of climate-change induced emergence, transmission and spread of vector-borne and zoonotic pathogens based on Eco-health and One Health approaches. This will be achieved by quantifying climate and environmental-related drivers of sand fly vector populations and the sand fly-borne diseases (SFBs) across Europe. The obtainance of this project also paves way for the leadership role of GHTM in this research field.

We expect to be successful with the at least one of the international funding proposals that were submitted last year and will submit at least four new project proposals for national and international funding.



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MEDICINA TROPICAL  
DESDE 1902



## CCI – FAIR RESEARCH PARTNERSHIPS (FRP)

Global Health Partnerships are often a shelter for asymmetric relationships and unfair distributions of power, resources, and wealth within and between partners, if unequal power relations are not mitigated. One way to change imbalances in relationships between partners is to strengthen skills, empowering all partners in a global health context, actively contributing to achieving sustainable development. This is exactly the main objective of CCI Fair Research Partnerships.

The activity that has already been ongoing in previous years (please refer to the Fair Research Partnerships section in the 2022 report), and the projects that will continue in 2023 and 2024 (e.g., cohort studies and European Joint Action HEROES) are examples of how we can achieve high levels quality of evidence and maintain equitable and fair partnerships.

There are new opportunities to develop partnership evaluation research projects (e.g., assessment of development support projects in Guinea Bissau), but also plan to carry out an internal evaluation of ongoing research partnerships of GHTM projects.

The GHTM continues to have an increased responsibility, as a partner in research projects, in the relationships that the center maintains with partners at different levels of development, but also as an institution that trains future leaders, new researchers and health systems key-stakeholders, in countries of the Global South. These are the reasons why we plan to continue offering training about Fair and Equitable Partnerships.



**BIOLOGICAL RESOURCE CENTER (BRC) / BIOBANK – BIOTROPICAL RESOURCES (BIOTROP)**

ACTIVITIES	EXPECTED OUTCOMES	EVIDENCES ( to be filled in 2024)
<p><b>Research activities already ongoing in 2022/2023</b></p> <p>Pursuing activities described at the Strategic Plan 2021-2023 (<a href="http://ihmtweb.ihmt.unl.pt/Download/BIOTROP/BIOTROP_2021-2023_STRATEGIC_PLAN_vsf.pdf">http://ihmtweb.ihmt.unl.pt/Download/BIOTROP/BIOTROP_2021-2023_STRATEGIC_PLAN_vsf.pdf</a>), namely:</p> <ul style="list-style-type: none"> <li>- Establish collaboration with potential stakeholders at Portuguese-speaking countries (especially PALOP and Brazil)</li> <li>- Implement a sample quality plan</li> <li>- Promote the integration/usage of collections</li> <li>- Create a BIOTROP microwebsite</li> </ul> <p>Under evaluation Submission of Expression of Interest regarding RNIE by both networks (Pt-mBRCN /MIRRI-PT and Biobanco.pt), FCT</p>	<p>Establish a <b>Portuguese-speaking network of biobanks</b> under the coordination of BIOTROP Increase the use and integration of biological resources, as well as sample quality monitoring Create the microwebsite to promote resources and services within the national and international scientific community and biotech industry</p> <p>Funds from FCT as RNIE networks member</p>	
<p><b>New Research Projects planned for 2023/2024:</b></p> <p>Develop and implement the Business Model Design the Strategic Plan 2024-2026 Participation as partner, together with INIS Angola, in the proposal submitted to NIH Research Project Grant Program (R01), <i>Plasmodium falciparum</i> demography in Angola, a country with highly heterogenous malaria incidence, by University of Maryland Participation as partner, together with INIS Angola, National Centre of Endemic Diseases STP and Equatorial Guinea Malaria Vaccine Initiative (EGMVI) in the proposal submitted to NIH International Centers of Excellence for Malaria Research, ICEMR 2023, by University of Maryland</p>		
<p><b>Congresses/Events:</b></p> <p>National scientific conference - Microbiotec'23 15th International Conference on Culture Collections (ICCC15), World Federation for Culture Collections (WFCC) Internal scientific sessions - GHTM Session – Sample management</p>	<p>1 Oral/Poster communication 1 Oral communication</p>	
<p><b>Publications/Training:</b></p>		
<p><b>Capacity building:</b></p> <p>Collaboration with INIS to monitor the implementation of a local biobank</p>		
<p><b>Other activities:</b></p> <p>Participation in science outreach activities (e.g. Noite Europeia dos Investigadores, Open Day IHMT, Ciência VIVA FCT, etc)</p>	<p>Dissemination of biobank activities to general public, especially targeting “young scientists”</p>	



**VIASEF**

ACTIVITIES	EXPECTED OUTCOMES	EVIDENCES ( to be filled in 2024)
<p><b>Research activities already ongoing in 2022/2023</b></p> <p>Support to the development of Aires Moura PhD</p> <p>Vector competence studies in the framework of the University of California Malaria Initiative.</p> <p>Establishment of reference colonies of <i>Anopheles gambiae</i> ss and <i>An. coluzzii</i></p> <p>Bioassays related to the development of the project Repel+ New Mosquito Repellent Solutions for Malaria Control (Patent P2020)</p>	<p>Establishment of West Nile Virus extrinsic incubation cycle through <i>Culex quinquefasciatus</i> artificial infection</p> <p>Establishment of <i>Plasmodium falciparum</i> extrinsic incubation cycle through <i>Anopheles coluzzii</i> artificial infection</p>	
<p><b>New Research Projects planned for 2023/2024:</b></p> <p>Support to Filipe Monteiro PhD</p> <p>Screening of all VIASEF resident colonies regarding insecticide resistance and genetic inbreeding parameters</p>	<p>Establishment of dengue extrinsic incubation cycle through <i>Aedes albopictus</i> artificial infection</p> <p>WHO insecticide resistance tests as well genetics analysis will be carried out on reference colonies of <i>Aedes aegypti</i>, <i>Aedes albopictus</i>, <i>Anopheles gambiae</i> ss, <i>Anopheles coluzzii</i>, <i>Anopheles atroparvus</i> and <i>Anopheles stephensi</i></p>	
<p><b>Congresses/Events:</b></p> <p>Publicization at: Kick-off meeting of INOVEC and Final AIM-COST meeting</p> <p>Integration on the VBD media publicization plan</p> <p>Participation on IHMT's Open Day</p>		
<p><b>Publications/Training:</b></p>		
<p><b>Capacity building:</b></p> <p>Short training course</p>	<p>Security in BSL3 and ACL3.- to be implemented in the 1st semester of 2023</p>	
<p><b>Other activities planned for 2023/2024:</b></p> <p>Design and implement a Business Model (Canvas model) with implementation plan</p>	<p>To be completed and implemented in the 1st semester of 2023</p>	