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ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)**

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Contribution by Portugal

to the CSTD 2020-2021 priority theme on “Using science, technology and innovation to close the gap on Sustainable Development Goal 3 on good health and well-being”

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**PRIORITY THEME 2:** Using science, technology and innovation to close the gap on SDG 3, good health and well-being

**United Nations Commission on Science and Technology for Development (CSTD)**

Dear CSTD member,

As you are aware, the CSTD 23<sup>rd</sup> annual session selected “Using science, technology and innovation to close the gap on SDG 3, good health and well-being” as one of the priority themes for its 23rd session (2020-21 period).

Science, technology, and innovation (STI) can play an important role in strengthening the capacity of all countries, in particular developing countries for early warning, risk reduction and management of national and global health risks as described in SDG 3D. Data science, biomedical science and engineering and other technologies can broadly transform health and medicine and specifically support countries and regions in their responses to emerging health crises as well as in their preparedness for future threats. Beyond specific technological innovations, STI policy advice, diplomacy, and international cooperation also play a prominent role in current and future infectious disease preparedness and response. The theme will explore experiences about using STI to strengthen health outcomes as well as approaches to regional and global STI cooperation in this field.

The CSTD secretariat is in the process of drafting an issues paper on the theme to be presented at the CSTD inter-sessional panel meeting. In this context, we would like to solicit inputs from the CSTD members on this theme. We would be grateful if you could kindly answer the following questions based on your experience from your country or region.

1. Can you give examples of projects/policies in your country aimed at using science, technology, and innovation for early warning, risk reduction and management of national risks? What are the main outcomes? And What are the main challenges confronted while trying to implement these projects/policies in your country or region?

FCT, in collaboration with other national institutions, participates/recently participated in international projects aiming at reducing risks to the human health due to:

- Human exposure to chemicals: the HBM4EU initiative is a European Joint Programme (EJP), active from 2017 to 2021, that aims to: a) coordinate and advance human biomonitoring in Europe, by assessing human exposure to chemicals in Europe, to better understand the associated health impacts and to improve chemical risk assessment; and b) establish a dialogue with policy makers to ensure that the results can be used to support the development of policies, to evaluate existing policies and to design measures to reduce exposure to toxic chemicals. This project has been allowing to build capacities to establish a National Hub on Human Biomonitoring in Portugal, which feeds into the several work packages of HBM4EU, in order to establish a European Human Biomonitoring Platform, with the aim of harmonizing human biomonitoring activities in the involved countries so that comparable European data on human exposure to chemicals are generated. As part of the work of the Portuguese National Hub, two national workshops were already organized (11 May 2018; 25 October 2019) and a third workshop (18 November 2020) is now being prepared to bring together researchers, experts in environmental or occupational health, regulators, representatives of chemical industry and other stakeholders to discuss the contributions of human biomonitoring to health and environmental policies and human health risk assessment. These national events have been successful and very well received by the national community interested in human biomonitoring. The strategies for the active involvement of the national stakeholders and for the implementation of a dialogue with the political sector remain as the major challenges.
- Human exposure to radiation: CONCERT was a European Joint Programme (EJP), which took place between 2015 and 2020, that aimed to contribute to the sustainable integration of European and national research programmes in the field of radiation protection, by supporting the establishment of a European research platform in the field of medical radiation protection. FCT contributed to the organization and management of the two CONCERT open calls to

support multidisciplinary and transnational innovative research projects in radioprotection. These funded consortia under CONCERT included members not only from among the CONCERT partners but also from Third Parties and contributed towards a better knowledge of how to minimize the side-effects of radiation and a better level of preparedness for radiation disasters.

FCT also participates in the ERA-NET JPI-EC-AMR, focusing on Antimicrobial Resistance, and on the scope of this ERA-NET, two projects with Portuguese participation were funded:

- “Predicting the Persistence of Resistance Across Environments”: Antimicrobial resistance poses a serious challenge to health care worldwide. Attempts to control resistance by stopping antimicrobial use have met with mixed success. Failures of a critical assumption underlying such strategies – that resistant strains suffer a disadvantage in the absence of drug (the “cost of resistance”) – may be responsible for difficulties in controlling resistance by cessation of drug use. In particular, resistance mutations may be cost free, and hence persist, in some environments or on some genetic backgrounds. Furthermore, even when resistance is initially costly, compensatory evolution – the accumulation of mutations that restore fitness while maintaining resistance – may allow resistant strains to persist. Using two pathogenic bacterial species, we propose to undertake a systematic study of the costs of resistance across multiple genetic backgrounds, as well as across a variety of relevant conditions across the human-animal-environment axis. Moreover, we will determine whether resistant pathogens take the same, or different, routes to compensation in different environments. Taking advantage of evolutionary theory, we will determine the feasibility of predicting the costs of resistance in one environment using information from another environment, which would aid in predicting the persistence of resistant strains using limited information from laboratory studies. The proposed work will provide crucial information for public health policy on strategies for controlling resistance.
- “Risk of companion animal to human transmission of antimicrobial resistance during different types of animal infection”: The close contact of pets with humans provides excellent opportunities for interspecies transmission of resistant bacteria and their resistance genes in either direction. Infections in humans due to antimicrobial resistant bacteria originating from pets are becoming a concern. While any animal-human contact offers a chance of transmission, it is generally accepted that a high bacterial burden and high antimicrobial resistance gene copy numbers are present during an active infection. There is a gap of knowledge on the dynamics of transmission and selection of antimicrobial resistance at the pet-human interface. Animals may exchange antimicrobial-resistant bacteria and resistance genes with humans, but the extent to which this happens is unknown. PET-Risk will evaluate the transfer of antimicrobial resistance between pets and household members during animal infections and determine which type of infection (skin and soft tissue vs. urinary tract infections) presents a higher risk of transmission to humans. Furthermore, in a longitudinal study we will collect samples of infected animals under antimicrobial treatment, and their household members at several time points, which will allow the assessment of critical control points at which interventions could substantially affect the spread of resistance. The causality and directionality of pet-human spread of resistance genes will be established by using state-of-the-art techniques in order to design and evaluate preventive and intervening measures for reducing the public health risks of antimicrobial resistance.

These two projects have ended very recently and the outcomes have not been reported yet. We do not believe there were any major challenges in the implementation of these projects.

In parallel to the National Health Programme, Portugal has established eleven health priority programmes in areas like cardiovascular diseases, cancer, tobacco control and prevention, physical activity, nutrition, etc. Most of these programmes include in their actions the promotion of health research activities to increase the knowledge about the associated health determinants

Example1: The evidence-based research has turned, for instance, Portugal into the first country to issue a law that limits the maximum amount of salt in the bread. Portugal has a high burden of cardiovascular diseases and hypertension that are known to get worse with high salt consumption. This policy measure based on scientific evidence enabled the decrease of the incidence of cardiovascular diseases in the Portuguese population (Data source: INE).

Example 2: The Nutrition Priority Programme elaborated orientations for schools listing the foods that should be given to children, the foods that could be given in limited amounts and foods that could not be given or sold at schools. This measure intended to decrease the childhood obesity that exists in the Portuguese children. In terms of impact, the Childhood Obesity Surveillance Initiative (from OMS/Europe) concluded that childhood obesity had been decreasing in the last decade in Portugal.

2. Can you provide examples of policies/projects/initiatives aimed at strengthening national health innovation systems? For example, how does your country build innovative capabilities through investments in R&D and human capital? What institutional and regulatory arrangements are in place to stimulate healthcare innovation and effectively address safety, ethical and other concerns?

Besides launching national calls in all scientific domains, including in Health domain, FCT has been involved in several European/international initiatives that regularly launch transnational calls for funding of R&D projects, which also includes budget for human resources, in the Health area:

- ERA-CVD (ERA-NET on Cardiovascular Diseases)
- E-RARE-3 (ERA-NET on Rare Diseases)
- JPCOFUND2 (ERA-NET on Personalised medicine applied to neurodegenerative Diseases)
- NEURON Cofund (ERA-NET on Neurosciences-related Diseases)
- TRANSCAN-2 (ERA-NET on Cancer Translational Research)\*
- JPI-EC-AMR (ERA-NET on Antimicrobial Resistance)
- EJP RD (a European Joint Programme on Rare Diseases)
- EuroNanoMed 3 (ERA-NET on Nanomedicine)\*
- FCT also participates in the International Consortium for Personalised Medicine (ICPerMed), aimed at providing a flexible framework for cooperation between its member organisations to work on fostering and coordinating research as a driver for personalised medicine implementation.

Innovation is also being promoted in our national research infrastructures, by the development of innovative services, particularly in collaboration with European research infrastructures, such as EuroBioimaging ERIC, ELIXIR, ECRIN ERIC, EU-Openscreen ERIC and EATRIS ERIC.

Example 1: Portugal has been involved in a process of establishment of Research and Innovations Agendas in several areas, including health. The Research and Innovation Agenda - Health, Clinical and Translational Research was finished in 2019 and presents the orientations and research priorities up to 2030. This first agenda for health research is a very important initiative because we have limited resources, either from funding, infrastructural or human, and this enables the prioritization of the research areas that should be funded.

Example2: Another important national initiative was the foundation of AICIB – The Agency for Clinical Research and Biomedical Innovation. AICIB is constituted by four partner, being two the Ministry of Health and the Ministry of Science and Technology. The alliance between these two ministries is a determinant step for the evidence-based policies.

In terms of ethics and other regulatory frameworks, Portugal is aligned with European initiatives.

3. Could you share case studies of regional and international cooperation that have strengthened health capacities, particularly in developing countries? Can you provide success stories involving regional or global cooperation in academic research networks, STI diplomacy, or initiatives to make healthcare innovations accessible for all?

FCT represents Portugal as a founding member of the European and Developing Countries Clinical Trials Partnership (EDCTP), established in 2003 as an European response to the crisis provoked by the three main poverty-related diseases (HIV/Aids, tuberculosis and malaria), which altogether constrain prospects of human and social development. EDCTP emanates from Article 185 of the Lisbon

Treaty, and aims at promoting an integrated approach to clinical research towards prevention and treatment of those diseases, particularly in Sub-Saharan Africa, the worst affected region in the world.

EDCTP goals are accomplished through manifold means. The major one is through the development of research projects and other activities that emanate from the calls for proposals launched by the EDCTP secretariat, mostly in linkage with other funders. However, they are also achieved through projects and activities implemented under the auspices of other funding schemes, including national calls. The Portuguese contribution to the EDCTP goals comprised several research projects, doctoral and postdoctoral grants funded under various FCT national calls. In Sub-Saharan Africa, research was done in such countries as Angola, Cape Verde, Democratic Republic of Congo and Mozambique.

Portugal maintains several collaborations in health with many Portuguese speaking countries. We present some examples:

Example1: Portugal has capacitated Mozambique in epidemiological surveillance.

Example 2: Portugal and Guiné-Bissau had a great cooperation project for a twinning laboratory in the National Institute of Health from Guiné. This twinning laboratory initiative was first established for Ebola and then further extended to other infectious diseases.

Example3: In Angola, Portugal has cooperated directly with the Ministry of Health for the development of the health system and the definition of health policies. Other cooperative areas with Angola covered Newborn screening, tuberculosis, health research, entomology, quality control, etc.

4. Could you suggest some contact persons of the nodal agency responsible for projects/policies, related technologies and international collaboration in this context as well as any experts (from academia, private sector, civil society or government) dealing with projects in this area? We might contact them directly for further inputs or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

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5. Do you have any documentation, references, or reports on the specific examples on the priority theme in your country or region?

Documents on the participation of FCT in some of the above initiatives:

- Participation of FCT in HBM4EU:

<https://www.hbm4eu.eu/wp-content/uploads/2017/06/3rd-HBM4EU-Newsletter-September-2018.pdf>  
(pages 3-4)

- Participation of FCT in CONCERT

[https://www.concert-h2020.eu/-/media/Files/Concert/AIR2/Infrastructures\\_AIR2\\_Bulletin\\_26\\_April\\_2018.pdf](https://www.concert-h2020.eu/-/media/Files/Concert/AIR2/Infrastructures_AIR2_Bulletin_26_April_2018.pdf) (page 1)

Thematic Agenda for Research and Innovation for Health, Clinical and Translational Research, with some priority themes for research in Portugal (available only in Portuguese):  
[https://www.fct.pt/agendastematicas/docs/Agenda\\_Saude\\_Investigacao\\_Clinica\\_e\\_de\\_Translacao\\_Versao\\_Finalizacao.pdf](https://www.fct.pt/agendastematicas/docs/Agenda_Saude_Investigacao_Clinica_e_de_Translacao_Versao_Finalizacao.pdf)

Please send your responses and any further inputs on the theme to the CSTD secretariat ([stdev@unctad.org](mailto:stdev@unctad.org)) by 7 October 2020. We look forward to receiving your valuable inputs.

Sincere Regards,

CSTD secretariat