INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)

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Contribution by IVI

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"

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 international organization/UN entity/agency,

The CSTD 23rd 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 24th 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 international organizations, UN entities and agencies on this theme. We would be grateful if you could kindly answer the following questions based on your organization's work at the global level.

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

Vaccine Adverse Effects Information Monitoring System (VAIEMS)

VAEIMS is a vaccine safety platform conceptualized by the World Health Organization and developed by the International Vaccine Institute (IVI). Deployed in a growing number of low- and middle-income countries (LMICs) since 2015, VAEIMS enables local healthcare workers to submit raw data on adverse effects from immunization (AEFI) for any vaccine used in their country. VAEIMS processes the AEFI data into useful information and transfers it to a globally accessible central database. Other healthcare workers, national regulatory authorities (NRAs), and vaccine manufacturers can access the VAEIMS database to track AEFI trends and quickly identify and respond to any emerging vaccine safety issues.

IVI is developing an offshoot of VAIEMS, the centralized Vaccine Safety Database Management System (cVDMS). cVDMS replicates the VAEIMS model to collect and assemble AEFI data from vaccine clinical trials. cVDMS will enable NRAs, vaccine manufacturers, and clinicians to quickly respond to any vaccine safety concerns, while also facilitating the development of risk management plans, new clinical studies, and post licensure pharmacovigilance activities. cVDMS is being used to monitor the safety of dengue vaccine clinical trials with a number of global partners.

While active support by the WHO has facilitated the adoption of VAIEMS, it can be challenging for countries to adopt a standardized terminology and reporting methodology for AEFI data management. To overcome that obstacle, VAIEMS participants utilize MedDRA, or the Medical Dictionary for Regulatory Activities, a clinically validated international medical terminology developed by the International Conference on Harmonisation of Technical Requirements of Pharmaceuticals for Human Use (ICH). MedDRA establishes a standardized set of codes and to uniformly define medical terminology.

2. Could you share specific examples, projects or initiatives that have used frontier technologies (e.g., AI, drones, blockchain, 3D printing, etc.) or other forms of innovation in general in addressing the Covid-19 pandemic?

IVI is partnering with Inovio Pharmaceuticals to conduct phase I/IIa clinical trials in South Korea of Inovio's INO-4800 SARS-CoV2 DNA vaccine. The Inovio DNA vaccine platform uses the Electroporation Delivery Technology, an innovative method of electroporation to ensure that the DNA plasmid is efficiently delivered directly into the body's cells, where it can go to work to drive an immune response. Following the injection of the DNA vaccine, the electroporation device emits controlled, millisecond-long electric pulses. The electric pulses cause temporary and reversible pores in the protective membranes of the targeted cells, allowing the cells to uptake the DNA vaccine. The cells then use the DNA from the vaccine to produce the COVID-19 antigen. If proven successful, electroporation could be used to increase the effectiveness of other DNA vaccines as well as cutting-edge cancer therapeutics.

3. Can you provide examples of policies/projects/initiatives aimed at strengthening health innovation systems at the global level? For example, how does your organization support the building of innovative capabilities through investments in R&D and human capital? What projects are in place to stimulate healthcare innovation and effectively address safety, ethical and other concerns?

IVI is a partner in three consortia funded by Fleming Fund Regional Grants to strengthen the capacities of local, national, and regional health systems in LMICs to track the spread of antimicrobial resistance (AMR) and to share AMR data using a One Health approach:

1. CAPTURA (Capturing data on Antimicrobial resistance Patterns and Trends in Use in Regions of Asia)
2. EQASIA (Strengthening External Quality Assurance for AMR in Asia)
3. RADAAR (Regional AMR Data Analysis for Advocacy, Response and Policy)

These programs assist health systems in LMICs with collecting, digitizing, managing, and analyzing AMR data, and we hire and train local staff to lead the process. . We also work to improve the quality of bacteriology diagnostics for AMR by strengthening the provision of external quality assurance services to national reference laboratories in partner countries.

Through the progress of these programs, we are able to identify the policy bottlenecks to data sharing for regional analyses, and assess which approaches to data collection, sharing, and analysis would be most beneficial for policy discussions. By increasing the demand for, and promoting the uptake of, data for regional analyses and policymaking, the programs will stimulate technological and methodological innovations in AMR data sharing on the local, national, regional, and global scale.

The ultimate end goal of these programs is to improve the quality, and facilitate the regional and global sharing of AMR data, towards preventing the emergence and spread of AMR, nationally and globally. .

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

IVI's development and tech transfers of the world's first low-cost oral cholera vaccine (OCV) is a relevant example. The process of developing, testing, and transferring OCV was made possible by STI diplomacy, as well as South-South and Triangular Cooperation. As a result of our efforts, OCV is manufactured in Bangladesh, India, Korea, and Vietnam and costs as low as $1.20 per dose, the WHO was able to establish an OCV stockpile and Ending Cholera- A Global Road Map by 2030, and over 60 million doses of the WHO-prequalified vaccines made in India and Korea have been deployed to combat cholera outbreaks in over 20 countries.

More details can be found in The Euvichol Story, published in Vaccine :
https://dx.doi.org/10.1016%2Fj.vaccine.2018.09.026

5. Could you suggest some contact persons responsible for projects/policies, related technologies and international collaboration in this context as well as any experts 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.

IVI Director General Jerome Kim could speak at the CSTD intersessional panel and annual session in 2021.

6. Do you have any documentation, references, or reports on the specific examples on the priority theme in your organization?

VAEIMS:

World Health Organization. Global vaccine safety initiative: 2018 meeting report. No. WHO/MVP/EMP/SAV/2019.01. World Health Organization, 2019. https://apps.who.int/iris/bitstream/handle/10665/280125/WHO-MVP-EMP-SAV-2019.01-eng.pdf

Inovio vaccine:

Smith, T.R.F., Patel, A., Ramos, S. et al. Immunogenicity of a DNA vaccine candidate for COVID-19. Nat Commun 11, 2601 (2020). https://doi.org/10.1038/s41467-020-16505-0

CAPTURA:

https://captura.ivi.int/

IVI General Materials:

Annual Reports: https://www.ivi.int/our-impact/annual-reports/
Journal Publications: https://www.ivi.int/our-impact/journal-publications/
Scientific Reports: https://www.ivi.int/our-impact/scientific-reports/

Please send your responses and any further inputs on the theme to the CSTD secretariat (stdev@unctad.org) by 30 October 2020. We look forward to receiving your valuable inputs.

Sincere Regards,

CSTD secretariat