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â??A strong pipeline of vaccines is under development with nearly 8 different vaccines targeting the critical priority pathogens of AMRâ?•

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Dr Renu Swarup, Former Secretary to the Government of India, Department of Biotechnology (DBT), Ministry of Science & Technology, was recently appointed as a member of the International Centre for Antimicrobial Resistance Solutions (ICARS) Board of Directors. Dr Renu Swarup, with almost three decades in the DBT, brings a wealth of knowledge and experience to support ICARS in its mission to combat antimicrobial resistance (AMR) in low- and middle-income countries (LMICs). She has played a key role in formulating Indiaâ??s Biotechnology Vision and Strategy and is credited with setting up Indiaâ??s largest Microbial Resource Centre. BioSpectrum spoke, at length, with Dr Renu Swarup about her new role as Vice Chair with ICARS and tackling AMR. Edited excerpts;



How is the International Centre for Antimicrobial Resistance Solutions (ICARS) working towards addressing this silent pandemic called AMR?

Antimicrobial resistance (AMR) is rightly termed the silent pandemic. We have all faced the worst pandemic of centuries and the urgent need for investing in global public health has been well recognised. We have also witnessed the strength of collaborations and science based innovations in fighting this war against the virus. AMR is not a new post-pandemic threat, but has been on the rise for many years now and has drawn global attention to develop action plans and strategies to tackle this major global threat and mitigate the risks associated with it.

AMR is, today, one of the greatest threats to the health of societies and economies the world over and the World Health Organisation (WHO) has listed it in the top 10 threats to Global Health. Having faced the severe impact of COVID-19, it is not difficult to recognise the special attention that is needed to avert another threat, a silent pandemic whose threat is looming large if appropriate action is not taken on priority.

Taking cognisance of this, and considering the need to address the health priority through concerted global collaborative efforts, a dialogue between the World Bank, the WHO and the Danish Health Ministry led to the setting up of the International Centre for Antimicrobial Resistance Solutions (ICARS), Copenhagen, Denmark. ICARS is a unique organisation, set up by the Danish Health Ministry and supported by World Bank and WHO focussing on co-developing solutions to mitigate AMR in Low and Medium Income Countries (LMICs).

Working with LMICs, the effort of ICARS is to identify country-specific issues, work with the local government, develop the required need-based solutions through interventions and implementation research. ICARS provides a funded partnership, collaborating with the country to co-develop evidence-based, context specific, cost-effective and sustainable solutions to combat AMR, advancing each country's National Action Plan (NAP).

Country wise, how is AMR spreading? Where is India placed in this scenario?

The recent reports by the WHO and the Lancet Review 2022 bring out the Global burden of AMR. We have some alarming data. The Lancet Review in 2019 studied the deaths and DALYs attributable to, and associated with, bacterial AMR for 23 pathogens and 88 pathogen drug combinations covering 204 countries. An estimated 4.95 million deaths were associated with bacterial AMR and 1.27 million deaths were directly attributed to bacterial AMR. 6 bacterial pathogens are directly responsible for nearly 70 per cent of the deaths.

To address this growing global health priority The World Health Assembly, in 2015, had endorsed a Global Action Plan for AMR and individual countries were called upon to develop and implement their own National Action Plan. The UN General Assembly on October 5, 2016, adopted the Resolution of the Political declaration of the high level meeting on AMR held on September 21, 2016, wherein it was reaffirmed that the blueprint for tackling AMR is the Global Action Plan of the WHO. In its General Assembly in May 2019, the UN, while reviewing the follow up of Political declaration, stated that "Antimicrobial

resistance is a global threat to health, livelihoods and the achievement of the Sustainable Development Goals."

India developed a comprehensive National Action Plan (NAP) 2017-21, which has six strategic priorities and there is a well developed governance framework to ensure effective implementation. The key aspects of the NAP focus on surveillance, awareness, reducing the incidence of infection, optimising use of antibiotics, promoting research and development and building India's leadership. For effective implementation, state governments are being encouraged to draw up their own respective action plans depending upon state-specific issues. Today three states have developed their action plans. Many of the national missions launched directly or indirectly, are connected with the AMR initiatives and contribute to implementation of identified priorities under the NAP —these are the Swachh Bharat Mission, National Health Missions - Digital Health and Ayushman Bharat, the national targets on TB eradication by 2025 and other such missions. From surveillance to new diagnostics, therapeutics and vaccines there have been major breakthroughs and achievements in the progress made. However we need to do much more with a greater sense of urgency and we can today take advantage of the learnings from COVID-19.

What is required to tackle AMR in the coming years, particularly in India?

As given in our National Action Plan and the road map and strategy for its implementation, there is anurgent need to focus on effective implementation to ensure full compliance to each of the strategic priority action points. While surveillance has to be our first action point, it is imperative that a concerted effort is made to support R&D efforts to develop a strong product portfolio for new diagnostics, antibiotics and vaccines. There are special efforts made in this direction to fuel the innovation pipeline. While the COVID-19 pandemic took up all our attention, the learnings and experience gathered have given us a great deal of confidence that innovative products will be available and make a significant impact in the AMR space.

The Government of India has given special impetus to AMR and the Department of Biotechnology and Biotechnology Industry Research Assistance Council (BIRAC) launched a special AMR Mission in 2018 wherein the main focus was finding novel solutions to address the challenges faced. In the area of new and effective diagnostics, the focus has been on Point of Care diagnostics and molecular tests for early diagnosis of some priority pathogens. We have had some very encouraging results and a number of new diagnostics have successfully been launched after completing the clinical validation. A very successful partnership with the Longitude Prize being steered by Nesta (formerly NESTA, National Endowment for Science, Technology and the Arts), the UK, resulted in more than a dozen innovator teams getting engaged to develop a highly specific and sensitive diagnostic also identifying the specific pathogen. We have today innovators who have successfully completed the Phase I and received Booster grant. Partnerships with Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator (CARB-X) and Wellcome Trust have also given a number of innovators a wonderful platform to develop innovative diagnostics.

Government of India, with the WHO Country office, has prepared a country specific Priority Pathogen list. A special AMR Repository has been established at the DBT autonomous institute National Centre for Cell Science (NCCS), at Pune, which has the largest collection of AMR strains from different hospital and state networks.

Focused investment in high risk research for new antibiotic development has also been made specially to some very active industry and startup groups and academic researchers to take forward the research to product development. Early research supported for new antibiotic development to a startup in collaboration with academia has been very successful and has now moved into clinical trials and has attracted a large quantum of global funding. A strong pipeline of vaccines are also under development with nearly 8 different vaccines targeting the critical priority pathogens of AMR. The 15 valent Pneumococcal conjugate vaccine is now in Phase 3 trials.

A major partnership between the Bill and Melinda Gates Foundation and BIRAC for the Grand Challenges focussed on a global AMR challenge, I has given some very encouraging results on surveillance solutions, infection prevention and control and removal of antibiotics from effluents.

Does AMR need more innovative solutions than what is already available? Can startups contribute more in this regard?

There is a major global effort on drugs for AMR by a number of groups across the world. There is a strong global antibacterials pipeline at preclinical stage which has a vast portfolio of directly targetting small molecules, antibodies and vaccines, phages and microbiota and also includes a number of other repurposed drugs, immunomodulators and anti

virulence approaches. The effort in this direction has to be accelerated. The collaborations and urgent time bound action we saw in response to the COVID-19 crisis is what is needed to address the AMR issues. Data sharing, coordinated research efforts, global sharing of resources and access to shared infrastructure are some of the urgent needs. In response to COVID-19 there have been some interesting developments of novel technologies and platforms, these can now be leveraged for new vaccine and drug development for AMR. The global clinical trials, and the accelerated regulatory processes which we built for COVID-19 will also be very helpful to take forward AMR research.

We have seen a huge response from our robust and vibrant startup ecosystem during COVID-19 —from diagnostics, to vaccines to sanitisers, masks, PPEs— they delivered a large number of innovative solutions. India achieved a record feat of becoming fully self-reliant in our COVID-19 diagnostic kits in less than 60 days, meeting the largest daily demand of testing. We also executed the largest vaccination programme, with over 2.5 billion COVID-19 vaccine doses delivered. Indigenously developed and manufactured vaccines across different novel platforms including the world's first DNA vaccine and thermostable mRNA vaccine. This large network of innovators and innovation ecosystem will now be an important asset that we should work with, to build our AMR network and urgently deliver innovative solutions for India and the world.

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