



-- REPORT --

ANTI-MICROBIAL RESISTANCE IN THE INDIAN CONTEXT:

POINT OF CARE DIAGNOSTICS AND SUSCEPTIBILITY
MEASUREMENTS

-- Friday, 30th June 2017 --

Organized by



Supported by



Rapporteur: Aishwarya Nair

Support team: Monish Deshmukh, Pramod Bhurji, Shubham Singh
BIRAC Social Innovators, Social Innovation Immersion Program.

Contact point

Dr. Mugdha Lele,
Manager – Social Innovations, Venture Center, Pune
Email: siip@venturecenter.co.in
<http://www.venturecenter.co.in/campaigns/amr/>

A campaign on Anti-Microbial resistance was carried out by Bio incubator, Venture Center, Pune on Friday, 30th June 2017. The workshop brought together social innovators, NGOs, industry professionals, impact investors, medical doctors with an interest in or working in AMR. The objectives were to get an overview of key issues and challenges and emerging opportunities for developing Point-of-Care (PoC) diagnostics in the Indian context and to introduce funding calls in this domain like the Discovery awards & Longitude Prize. This workshop was supported by the Social Innovation Immersion Program at Venture Center, Pune and Nesta, UK.

Key sessions in this workshop were planned as follows:

- Introduction to Discovery awards & Longitude Prize
- Talks on existing PoC diagnostics & susceptibility measurements in India
- Panel discussions on effectively leveraging discovery awards by previous awardees and prospective applicants
- Networking sessions



INTRODUCTION

Antimicrobial resistance (AMR) is a growing and severe problem which threatens to reverse many of the achievements of modern medicine. Infections with resistant organisms are difficult to treat, and when treatable often requiring costly and sometimes toxic alternatives. It is an increasingly serious threat to global public health that requires action across all government sectors and society. New resistance mechanisms are emerging and spreading globally. There is a growing need for diagnostics to identify anti-microbial resistance and measure susceptibility.



To tackle this menace, the Longitude Prize, a challenge with a £10 million prize fund to reward a diagnostic test that helps solve the problem of global antibiotic resistance has been launched. It is being run by Nesta and supported by Innovate UK as funding partner. In addition to this, the Discovery Awards which are small seed grants to help teams and individuals further develop their ideas for the Longitude Prize have been initiated. The aim is to help teams move their ideas forward, as well as enabling new innovators to enter the race to the Longitude Prize. This latest round of seed funding is provided by BIRAC (a public sector company of the Government of India, Department of Biotechnology) and is open exclusively to teams based in India.

In this background, Venture Center has an on-going campaign on Anti-Microbial Resistance (AMR), which aims to network all stakeholders to help initiate useful projects, start-ups etc related to AMR. The focus is on development of point-of-care diagnostics and susceptibility measurements in context to the Indian situation. The idea is to nucleate and nurture AMR related startups in the Pune region. The event is aligned intentionally with the announcement of the Discovery awards on 5th of June 2017, so as to help facilitate startup creation and to make the participants aware about upcoming funding schemes related to AMR.

The workshop aimed to:

- Introduce Discovery awards 2017 & Longitude Prize
- Outline the key issues/ challenges and emerging opportunities for developing PoC diagnostics in the Indian context
- Explore potential industry-academia/research/medical fraternity partnerships in technology development and advancement to develop diagnostics & susceptibility measurements pertaining to AMR in India
- Networking between innovators, enthusiasts and experts in AMR in the Pune region

SESSION 1: INTERACTIVE INTRODUCTION TO LONGITUDE PRIZE AND DISCOVERY AWARDS

The first session of the workshop was an interactive introduction to Longitude Prize and Discovery Awards by Dr. Daniel Berman (Lead, Longitude Prize, Challenge Prize Centre, NESTA, London). The session started with Dr. Berman highlighting the importance of antibiotics in the current health & medicine scenario, evolution of resistance over the years due to the misuse and overuse of antibiotics, the individual and societal consequences of growing antibiotic resistance. Then he went on to introduce the Longitude Prize, a £10 million prize fund that will reward a transformative, rapid, accurate, and affordable point-of-care diagnostic test that can significantly reduce antibiotic misuse or overuse, anywhere in the world. He emphasized why a diagnostic would be crucial and how it could effectively perform functions like discriminating between pathogens & detect antibiotic sensitivity of infecting pathogen etc. He explained what kind of test would be eligible to win the prize with stepwise detail on the application and selection process. Technologies in use in this sector were briefly discussed and

then he went on to explain the current status of the Discovery awards and Longitude Prize. He discussed a couple of teams from India which won the Discovery awards 2016 and the technologies that were submitted for review. He talked about Superbugs, a mobile game to fight bacteria using antibiotics which has gained a lot of popularity and generated awareness about rising anti-microbial resistance. He concluded the session with an overview of why this specific problem is being looked into and the importance of solutions in the sector; encouraging new applicants for the Longitude Prize. For further details a reference was made to the website: www.longitudeprize.org



SESSION 2: TECHNICAL SESSION

The first talk of the technical session was by Dr. Ramesh Paranjape (Former Director of the National AIDS Research Institute, Pune) on : “Point of Care (PoC) diagnostics for microbial infections and PoC susceptibility measurements: The need in Indian context”. He started out with the evolution of PoC kits in India, the applications, advantages, the ideal characteristics of a point-of-care test in resource limited settings. He pointed out the important features that differentiate between PoC tests in hospital based and field based settings. The challenges for developing PoC facilities due to unmet needs in developing countries like India were enlisted by Dr.Paranjape. He briefly spoke about the 90-90-90 objectives of UNAIDS by 2020 and how we could go about trying to achieve them. He evaluated a couple of novel PoC kits based in India such as HIV serology PoCs (Calypse Aware HIV1/2, OraQuick Rapid HIV1/2, Oracheck HIV), the True Nat rapid diagnosis kit developed by Bigtec Labs and the need for many more innovations in this area. He concluded by enumerating the challenges in the acceptability of PoCs as compared to the laboratory based assays due to lower sensitivity, quality assurance issues, higher cost, validation & field testing requirements etc.



The second talk in this session was by Dr. Sambudhha Ghosh, founding Director of AbGenics LifeSciences Private Ltd and ABEL Biosolutions Private Ltd, Pune, India. The talk was focused on : Point of Care diagnostics for reducing antibiotic misuse in the context of animal health. He addressed the issue of antibiotic usage in animals and its contribution to AMR. He began by tracing the increase of antibiotic resistance over the years. He then moved on to point out the

reasons why antibiotics are being used in animals – therapeutically and non-therapeutically (as growth promoters, for weight gain, improving feed efficiency etc). He focused on concepts like animal drug withdrawal time, food borne pathogens and genetic basis of antibiotic resistance. The spread of antibiotic resistance through food was talked about with examples of MDR Salmonella. The mechanisms of antibiotic resistance such as enzymatic modification, decreased accumulation of the antibiotic, alteration of the drug target were discussed. He gave examples of antibiotic resistant bacteria discovered in meat and fish. He concluded by emphasizing that the routine prophylactic use of antimicrobials should never be a substitute for good animal health management.



Dr. Prakash Doke (Ex.Director of Health Services, Government of Maharashtra and currently Professor at Department of Community Medicine, Bharati Vidyapeeth Medical College, Pune) briefly gave the community health perspective on AMR and susceptibility measurements. He spoke about the general causes and implications of antimicrobial resistance. He focused on top ten causes of mortality in India, pathogens of high community concerns, strategies to reduce transmission and came to point of care diagnostics as the need of the day. He gave an example of Genexpert as a good rapid diagnostic test. He came to the conclusion that an ideal test must consider the qualifications, experience and working conditions of healthcare manpower.



SESSION 3 : PANEL DISCUSSION

The third session of the AMR workshop was a panel discussion amongst previous awardees and prospective applicants of the Longitude Prize. Dr. Radha Rangarajan joined over skype and started the discussion by talking about her idea that was submitted to the Discovery Awards, 2016, which was a rapid molecular assay to test for bacterial pathogens in patient samples. She gave pointers on what criteria is most important in winning the Longitude Prize. Dr. Daniel Berman also contributed to the discussion by enlisting criteria that a winning test must fulfill. He spoke about the Challenge Prize which contributes towards solving long term societal

challenges and why anti-microbial resistance was chosen as the topic for the Longitude Prize in 2017. Following this, Dr. Sudeshna Adak (Director and CEO, OmiX labs, Bangalore) spoke about the AMR signature assays for predicting susceptibility to existing and re-purposed drugs which had won them the Discovery Awards, 2016 and the current gaps in the market of PoC diagnostics that needs to be worked at. Dr. Milind Choudhari (Founder and CEO of WeInnovate Biosolutions Pvt. Ltd) spoke about the rapid detection kit being developed and how it fulfills the Longitude prize criteria. There were a lot of comments from Dr Daniel and previous applicants on the finer aspects of diagnostics as required in the prize. Dr Sandeep Kadam (Consultant Pediatrician and Neonatologist at KEM Hospital and Research Center, Pune) being the only medical doctor on the panel talked about how infections are being treated by reckless misuse and overuse of antibiotics. He focused on the importance of not prescribing antibiotics unless absolutely necessary and the need for susceptibility measurement tests to be able to prescribe the right antibiotic. Dr. Kavita Parekh (Assistant Professor at Dept of Microbiology at Modern College, Pune) who has worked extensively in the area of molecular diagnostics and antibiotic resistance also gave valuable inputs to the discussion. Dr Premnath (Director of Venture Center) who moderated this entire discussion and encouraged participants from Pune to work on their models of PoC tests for the next step of Longitude Prize application and also focused on the importance of scalability and sustainability in these models.



NETWORKING SESSION

During the high tea, all the panelists, speakers and AMR enthusiasts in the audience got a chance to interact and discuss their ideas on the topic of point-of-care diagnostics in the field anti-microbial resistance. The current applicants of Longitude Prize also got the opportunity to extensively interact with Dr Daniel Berman which gave them new insights on what is expected of them by the deciding committee and how to modify or fine tune their applications or better their products in the short time leading upto the final deadline of 1st September 2017. For the newbies, it was an exposure to the market niche for products to detect antibiotic resistance so that it can be effectively tackled. It also brought into perspective the multiple factors that add up in contributing towards the rise of antibiotic resistance over the years.



Key take homes

- The Longitude Prize, a £10 million prize fund that will reward a transformative, rapid, accurate, and affordable point-of-care diagnostic test that can significantly reduce antibiotic misuse or overuse, anywhere in the world.
- Checklist for developing the test:
 - ☒ Needed
 - ☒ Affordable
 - ☒ Easy-to-use
 - ☒ Safe
 - ☒ Accurate
 - ☒ Rapid
 - ☒ Scalable
 - ☒ Connected
- PoC diagnostic test with high sensitivity, good quality, low in cost and which has fulfilled validation and testing requirements is needed
- Routine prophylactic use of antimicrobials should never be a substitute for good animal health management and hence the need for developing Point of Care diagnostics for reducing antibiotic misuse in animals.
- An ideal PoC test must consider the qualifications, experience and working conditions of healthcare manpower in the public health sector to be of maximum use.
- There is a need for developing susceptibility measurement tests to enable prescription of the right antibiotic in the clinical settings.
- Need to keep in mind the scalability and sustainability of the solutions developed while addressing the issue of Anti-Microbial Resistance in the Indian settings.
