ONE HEALTH PLATFORM

ONE HEALTH AGENDA

OHS
ONE HEALTH SCIENCE

AMR
ANTIMICROBIAL AGENTS AND RESISTANCE

SPI
SCIENCE POLICY INTERFACE

One Health Science

SCIENTIFIC AGENDA

1. **Determinants of inter-species (including zoonotic) transmissibility of animal infectious agents**
   - Environmental and ecological drivers (natural and human induced)
   - Host determinants (e.g. receptor distribution, immunology and evolution...)
   - Pathogen determinants (e.g. receptor binding domain adaptation, escape from immunity...)
   - Vector determinants: entomology, pathogen -(intermediate) host/vector interaction/ vector spread /climatic variabilities
2. **Determinants of intra-species transmissibility of infectious agents that have crossed the species barrier**
   - Environmental and ecological drivers (natural and human induced)
   - Host determinants (pathogenesis and replication/shedding sites) and evolution
   - Pathogen determinants
   - Reservoir studies: bats, rodents, migratory birds
   - Arthropod vectors (mosquitoes, ticks,....): entomology, pathogen -(intermediate) host/ vector interaction/vector spread
3. **Syndromic surveillance of infectious diseases in humans & animals**
4. **Pathogen discovery/identification platforms for humans & animals**
   - Genomics/proteomics
   - In vitro platforms
   - Animal models (BSL -2/3/4)
5. **Development of diagnostic assays for emerging infectious agents**
6. **Epidemiology of newly emerging infections in original host and newly invaded species (classical, molecular and GIS aided...)/ Especially Dangerous Pathogens**
7. **Pathogenesis of newly emerging infections in original host and newly invaded species (virulence and transmissibility...) / Especially Dangerous Pathogens/sustainable biosafety and biosecurity**
8. **Mathematical modeling and scenario evaluation for risk assessment and economic/ disease burden impact**
9. **Intervention strategies in original host and in newly invaded species:**
   - Isolation, quarantine, stamping out methods based on diagnostic/epidemiological data
   - Vaccine development and testing platforms
   - Antimicrobial drug discovery, development and testing platforms
   - Biological response modifier platforms (genomics, proteomics, NGS...)
   - Animal models
   - Mathematical modeling
10. **Biological threat reduction including naturally occurring, accidentally or deliberately developed animal and zoonotic pathogens/control of biological agents**
11. **Advances in vaccine technologies and their impact in underprivileged communities / populations**
12. **Utilization of big data to mitigate biological threats and gathering epidemic intelligence**
13. **Cost-effectiveness of operational programmes of One Health**

The One Health Science Agenda is reflected in the topics of the World One Health Congresses (biennial)

Antimicrobial Resistance

AMR
ANTIMICROBIAL AGENTS AND RESISTANCE

SCIENTIFIC AGENDA

1. **Prevalence and surveillance of resistance**
   - Prevalence of carbapenem resistant enterobacteriaceae (CRE) and vancomycin resistant enterococcus (VRE) in human, animal, environment/food/water
   - Treatment of CRE and VRE
   - Surveillance of antibiotic resistance (including resistant genes in nature)
   - Genomic surveillance (genetic relationships between resistant microbes)
   - Prevalence of colistin-resistance

2. **Genomic epidemiology/evolution of transmission**
   - Evolution of AMR genes (human/animal/environment)/AMR whole genome sequencing in hospitals and on farms/genome sequencing of bacteria from the environment
   - Metagenomic reviews (including the evolution of soil microbial communities)
   - Gene mobilization factors (includes waste management)
   - Systems epidemiology of transmission (ecological compartments/patient and animal migration/network analysis/bacterial spread/horizontal gene transfer/bacteriophages)

3. **Surveillance of antibiotic use (incl. the environment)**
   - Challenges in sharing big data (humans/livestock/developing countries)

4. **Use of antibiotics in human and animals, in food and agriculture and the environmental impact**
   - Role of antibiotics (including food safety)
   - Antimicrobial stewardship along the lifecycle of antimicrobial treatments in human and animals
   - Stewardship in resource-limited settings
   - Impact of measures to foster appropriate use/cost-effective measures (including on behavioural change of meds/vets/farmers)/cultural differences in practice of medicine (underlying reasons)
   - Infection prevention and control
   - Access to existing and new antimicrobial medicines/vaccines and diagnostic tools (including need differences between developed and developing world countries)

5. **Novel strategies for AMR interventions/preparedness**

6. **Challenges in drug development**
   - Design and implementation of efficient clinical trials for novel antibiotics
   - Development of new antimicrobial medicines/diagnostic tools/vaccines
   - Molecular basis of the bacterial cell wall permeability
   - Best practices for future antibacterial drug discovery efforts
   - Development of potential antibiotics against Gram negative bacteria/New antibiotics to treat Gram negative infections

7. **Alternative approaches to tackling resistant infections**
   - Antibiotic alternatives (including bacteriophages) in clinical practice, food safety, food security
   - Non-traditional approaches for humans and animals
   - Genome editing techniques
   - Nano techniques

8. **Role of vaccines in AMR strategies and vaccine acceptance**

9. **New economic models**
   - Incentives to invest while reconciling the need to use antibiotics wisely/economic models for antibiotic innovation

10. **Risk assessment**

11. **Impact of AMR on global trade**

12. **Impact of AMR on food safety (Codex Alimentarius)**

13. **AMR and an integrated One Health approach**

14. **Emergence and spread of AMR as a significant challenge to global health and animal production with high economic consequences**

15. **Societal impacts from AMR**

Science Policy Interface

AGENDA

1. **The impact of zoonotic diseases: why should One Health be of importance to policy makers? - lessons learnt from One Health crises**
2. **Health emergencies: preparedness and management**
   - surveillance and outbreak response
   - health crises and disasters
3. **Addressing zoonotic diseases at the animal-human-ecosystem interface: what are the threats? / drivers of emerging zoonotic diseases**
4. **Resistance to antibiotics and antivirals: challenges for policy makers and scientists**
5. **Operationalizing One Health (based on the pillars of ownership, alignment, harmonization, managing for results and mutual accountability)**
6. **Inter-sectoral collaboration at global level as a key to prevention, preparedness and response strategies**
7. **Strengthening One Health Science and the Health Security Interface / global perspectives on health and security**
8. **Strengthening national and regional epidemiological surveillance systems/ development, assessment and deployment of new tools and mechanisms for early warning and surveillance systems**
9. **Biological Threat Reduction in practice: strengthening global biological security through collaborations and a better understanding of zoonotic origins**
10. **How can the public and private sectors take action and address disaster risk reduction?/ global health security/role of the private sector and public private partnerships (PPP)**
11. **Civil society participation / risk communications**
12. **Community-driven development (CDD) projects and One Health**
13. **The role of vaccines in biological threat reduction**
14. **Establishment of long-term research collaborations (including scientists in low-resource environments)/what is needed?**
15. **New initiatives to identify unknown viruses on a global scale, advances in vaccine technologies and their impact on underprivileged communities**
16. **The global importance of pandemics for economic development**
17. **The economic benefits of a One Health approach / Economics of One Health**
18. **Multilateral initiatives/multisectoral approaches with the aim to build and strengthen sustainable capacities in the One Health arena**
19. **Bio threat scanning / scanning zoonotic diseases that could have the potential for misuse**

The Science Policy Interface Agenda is reflected in the topics of the World One Health Congresses. The Governments Group of the One Health Platform is a major contributor to the development of the programme, as is the Bio Threats Scanning Group.