



COMMUNIQUE

Young Scientist Symposium: “One-Health: A focus on Infectious Diseases in Africa” 27 to 29 May 2019, Durban, South Africa

Infectious diseases disproportionately afflict Africa perpetuating a cycle of poverty and inequality. This is compounded by the fact that various sectors, departments or ministries often work in “silos”, resulting in an inability to communicate, collaborate and co-ordinate effectively. This has major repercussions at national, regional and international level due to the failure to detect, contain and respond to disease outbreaks in real-time. Moreover, in the wake of the changing epidemiology of diseases and the emergence or resurgence of new ones, it has become clear that efforts need to be more concerted through a multi-sectoral and trans-disciplinary approach in the interest of a “healthier Africa”.

The World Academy of Sciences (TWAS) -TWAS Young Affiliate Network (TYAN), the Academy of Science of South Africa (ASSAf), the South African Young Academy of Science (SAYAS) in partnership with the Sub-Saharan African Network for TB/HIV Research Excellence (SANTHE) and the South African Medical Research Council (SAMRC), collaborated to organise a symposium entitled “ONE HEALTH: A focus on Infectious Diseases in Africa”. The symposium was held in Durban on the 27-28 May 2019 and aimed to provide a platform for early career researchers (ECRs) from different institutions in African to exchange data, expertise, and experience, on surveillance, prevention, intervention and management of infectious diseases of major importance for Africa. The meeting was convened in line with the UN Sustainable Development Goal 3 (Target 3.3) to speak to the issue of infectious diseases in Africa and to respond to the need for a more collective sense of responsibility, ultimately for a more proactive public health regime. The scope of the meeting was very broad and addressed anthroponotic diseases such as HIV, TB and meningococcal meningitis, zoonoses such as brucellosis, listeriosis and Rift Valley fever and vector-borne infections such as malaria, Zika or schistosomiasis amongst others. The conference spanned two days with a packed agenda comprising of a keynote address as well as guest lectures and technical talks divided in one of five principal thematic areas: (i) antimicrobial resistance, (ii) zoonoses, (iii) current status of HIV, (iv) disease management, (v) emerging technologies of well established, emerging or re-emerging threats as well as translational science, policy making and implementation.





Antimicrobial resistance (AMR)

For most microbial diseases, a positive therapeutic outcome is dependent on the *in-vitro* susceptibility of the causal agent to antibiotics. Conversely, antimicrobial resistance (AMR) leads to poor disease prognosis. In Africa, AMR particularly affects the treatment outcome of community-acquired infections such as tuberculosis, sexually transmitted diseases such as gonorrhoea and diarrheal diseases such as gastroenteritis. Presentations by ECRs highlighted the ubiquity of antimicrobial-resistant agents such as entero-pathogenic *Escherichia coli*, *Listeria monocytogenes* and *Mycobacterium tuberculosis* in livestock animals, toxigenic *Vibrio cholerae* O1 in aquaculture farms and *Acinetobacter baumannii* in healthcare settings. It is clear that there is a need for coordinated active surveillance systems of antimicrobial resistant-strains at the human-animal-environment interface to best understand the epidemiology of AMR. It also calls for a more structured framework for data (including “big data”) management, analysis and reporting at the national and regional level. This could be achieved through the setting-up of a network of laboratories exchanging data on AMR and disseminating to important stakeholders.

Emerging and re-emerging zoonotic diseases

With the majority of rural Africans living in close proximity with livestock and wildlife, the risk of contracting zoonotic infections and diseases is higher than in the rest of the world. These zoonoses range from common endemic zoonoses such as salmonellosis, brucellosis and leptospirosis to less well-known, emerging or resurgent zoonoses such as anthrax, Rift Valley fever, Ebola and Zika. Recent events, such as the Rift Valley Fever epidemic in Uganda, or the anthrax outbreak in Selena Ward in Tanzania, have highlighted the role of research in elucidating the “when, how, and where” these pathogens have emerged, their pathogenesis and progression, diagnostics and treatment, and strategies for their prevention and control. However, with the emergence of new zoonotic threats or the spread of known zoonoses on a pandemic scale, it is clear that a One-Health approach that is transdisciplinary and multi-sectoral will be much needed in the future for efficient surveillance, preparedness and response. Moreover, policies, action plans and guidelines should be pre-emptively formulated by relevant governmental stakeholders to guide the detection of zoonotic agents in the animal population and containment of any disease in the human population.





Moreover, sharing of surveillance data between human and livestock health sectors should be swift to facilitate early warning.

Current HIV situation in Africa

As per UNAIDS 2018, there are approximately 37,9 million people who are infected with HIV/AIDS worldwide and two-third of them live in sub-Saharan Africa. Moreover, 90% of HIV-positive children in the world are concentrated in Africa. AIDS-related illnesses are believed to be responsible for an annual death toll of more than a million in the African continent alone. This epidemic has adverse impacts on the economy of implicated countries as people suffering from AIDS are unable to be productive members of the society. However, thanks to antiretroviral (ART) drugs, there has been a tremendous decrease in the number of HIV-related deaths and the incidence of new HIV cases. Nevertheless, research presented at the symposium showed evidence of impaired cognitive function of HIV-infected children despite them receiving drug treatment. This is likely due to direct effects of HIV on the brain of the child or exposure to the drug *in utero*. Hence, the need for mental health support of HIV-infected children was emphasised to promote better cognitive outcomes. It is also worth mentioning that with the limited availability of ART drugs, only 1 in every 2 HIV-positive patients in Africa are able to receive treatment. Moreover, the presence of latent HIV reservoirs in infected individuals and an increasing infected aging population also make eradication of the disease even more difficult. Hence, HIV remains a major health concern and elimination of the virus is both challenging and expensive. Genome editing or gene editing, represents a novel and valuable approach for creating precise additions, deletions, and alterations to site-specific locations within the human genome to lower their susceptibility to certain infectious diseases such as HIV/AIDS. Specifically, CRISPR, may be used to edit human host genes as well as the epigenetic mechanisms, associated with HIV disease outcomes. Such technologies have revolutionised the way science is being performed, creating areas and acumen into a novel approach against a broad range of life-threatening infectious diseases. However, a major drawback with CRISPR is the possibility of off-target edits unintentionally made at the wrong place within the genome that can have adverse health consequences in the long term. CRISPR is a nascent technology, which provides a strong foundation for the expansion of future tools in the gene editing field and we are only beginning to see some of its potential.





Concluding remarks

The “ONE HEALTH” symposium represented a real opportunity to exchange knowledge, build capacity and foster a sense of advocacy amongst Africa’s future scientific leaders in response to the number of infectious disease threats on the continent. Moreover, this forum has been a true eye-opener to researchers from academia and governmental institutions to take a greater stand and to “become part of the solution”. There is no doubt that the symposium was also a wake-up call on the need for more concerted efforts from different actors and from different disciplines working on a local, national and global front to attain optimal health for people, animals and the environment. Understanding the current predicament of infectious disease through such a symposium, allows researchers to go beyond the call of duty and come together to engage the right people to bring about a social change for the betterment of the continent.

Ends.

The Symposium was attended by young scientists from the following countries: Benin, Cameroon, Ethiopia, Ghana, Malawi, Mauritius, Namibia, Nigeria, Kenya, South Africa, Sudan, Tanzania, Uganda and Zambia.

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South African Young Academy of Science

SAYAS was launched in September 2011, under the auspices of the Academy of Science of South Africa (ASSAf) in partnership with the Department of Science and Innovation (DSI). SAYAS was established out of the need for young scientists to contribute towards solutions to the important national, regional and global challenges facing society. The young academy represents the voice of young scientists in South Africa on national and international matters and provides a platform for young scientists to influence policy decisions.

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