



Afrique One-REACH

Research Excellence for African Challenges in Health

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Advances in One Health Governance, Research and Capacity in Africa

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Presentation of Afrique One

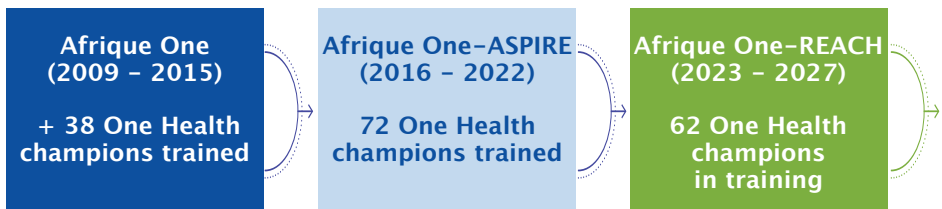


Afrique One is a research consortium focused on the prevention and control of infectious diseases in Africa, using the One Health approach.

Afrique One aims to strengthen research capacity in the areas of animal, human and environmental health in Africa, focusing on potentially zoonotic diseases, i.e. those that can be transmitted between animals and humans.

Afrique One brings together researchers, universities and research institutions from different African countries, as well as international partners. It promotes collaboration between these entities to conduct transdisciplinary research and share the knowledge and resources needed to combat infectious diseases.

Afrique One has built a critical mass of One Health researchers and practitioners in Africa.



Afrique One-REACH objectives

Afrique One-REACH is the third phase of the activities of the Afrique One research consortium. Afrique One-REACH is addressing the lack of sufficient capacity and data in Africa to develop and implement transdisciplinary approaches to combatting some of the world's most urgent and challenging health threats arising from interactions among people, animals and the environment,

including Endemic and Emerging Zoonoses, Neglected Tropical Diseases (NTD) and nutritional and Non-Communicable Diseases.

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Foreword



The 8th World One Health Congress (WOHC2024) in Cape Town, South Africa is giving Afrique One the opportunity to discuss major One Health operational challenges, to mutually share experiences and operational research outcomes as well as identify capacity and institutional needs and perspectives. Afrique One has been involved in operational research and researchers', practitioners' and decision makers' capacity strengthening in One Health since 2009 with the support of diverse funders (Wellcome, Sciences For Africa Foundation). In the last 15 years, the training, capacity developed and research conducted, contributed to demonstrate the socio-ecological links that lead to health risks, the scenarios for diseases control as well as the potential impacts and estimated societal added value of One Health in public health. Since 2009, most of our 150 trainees across Africa (Masters, PhDs, Postdocs) are working in local and regional African institutions, bringing One Health expertise and shaping the health system transition. The way we combine research and practice in a transdisciplinary approach allows us to get a large overview of some health challenges in Africa, issues we need to consider but also deepen for successful One Health operationalizations. Our operational research spans from endemic and emerging infectious diseases to Neglected Tropical Diseases and recently added Non Communicable Diseases.

Out of our 62 fellow's cohort (2023–2027), 20 have submitted abstracts that are accepted for oral and poster communications and will be presented at the WOHC. They will highlight some key issues in One Health: health system tools and methods, health promotion, collective action for behaviour change, modelling the added value, capacity strengthening and legal and economic aspects that enable One Health governance within multiscale institutions. Considering One Health as the integration of academic and non-academic knowledge from disciplines, sectors, institutions, communities, nations that adds societal value (public health, animal health and environmental health), the communications will discuss the contribution of social sciences, modelling and new technologies in the operationalization of One Health in Africa.

We expect to further work on One Health governance, capacity strengthening, game theory on decision and resources allocation, and collaboration such as transparent and equitable partnerships, comparative advantages of One Health initiatives. We also plan to bring three major issues for thoughts: (i) transparent collaboration between researchers, policymakers, and funders to link the regional and national levels; (ii) curricula adaptation along the evolving One Health training supply (Masters, PhD programs, MOOCs...); (iii) health promotion and disease surveillance-response systems with community and public engagement.

**Prof. Bassirou Bonfoh,
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Governance and Capacity building

Approach in Co-designing a Regional One Health Governance and Strategy in West Africa

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Background: The One Health (OH) approach mobilises collaboration of sectors, disciplines, and communities to foster well-being and tackle health, livelihoods and ecosystem threats. The complex interplay between multiple stakeholders and multiscale institutions requires leadership and governance systems to coordinate collaborative operations. The high level of complexity that comes along with the coordination and communication of different disciplines, sectors, the implementation of One Health policies and strategies encounter regional challenges if not picked up by appropriate governance structures. However, while many governance systems for OH coordination mechanisms emerged at global and national levels, the medium level of regional OH coordination mechanisms needs attention.

Methodology: Showcasing the ECOWAS region from August 2022 to February 2023, a qualitative analysis of online interviews and surveys of 42 national, regional and international informants from the multiscale public-, animal-, and environmental health sectors was conducted to develop a governance structure for a regional OH coordination mechanism. Information on regional OH understandings, setups,

expectations, governance structures, working procedures, and an OH Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis were collected. The findings on governance structures were validated at three regional meetings and consolidated in the ECOWAS regional OH governance document.

Results: This work highlights the power of regional OH coordination governance and the importance of transparent and equitable partnerships between researchers, policymakers, and OH funders to link the regional and national levels. The endorsement of the governance and strategy documents will enhance effective regional One Health operationalisation.

Conclusion: This work highlights the power of regional OH coordination governance and the importance of transparent and equitable partnerships between researchers, policymakers, and OH funders to link the regional and national levels. The endorsement of the governance and strategy documents will enhance effective regional One Health operationalisation.

Keywords: One Health, Governance, strategy, West Africa, Coordination

One Health Operationalization in Kenya, Uganda and Ethiopia; what helps and what hinders?

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Background: It is widely recognized that One Health approaches bring incremental benefits through enhanced collaboration between human, animal, environmental health and other related sectors. Many countries have therefore established national One Health platforms to support collaboration across ministries, disciplines and responsibilities. In addition, some countries currently extend their One Health operationalization to district and community levels. Most of these initiatives have only emerged in the last 5–10 years. As a result, there is still little evidence on how they work. This presentation explores factors that limit or support successful One Health operationalization at different levels in Kenya, Uganda and Ethiopia.

Methods: To explore current challenges and lessons learned from One Health operationalization, we conducted systematic mapping of the existing evidence on One Health operationalization in Africa (Savilaakso et al., 2024), and held expert consultations with One Health practitioners. Based on existing categories of the International Health Regulations and Performances of Veterinary Services, as well as environmental aspects, we developed score cards that enabled experts to

rank One Health implementations and further needs for operationalization at different levels in Kenya, Uganda, and Ethiopia.

Results: Our results show implementation progress but also the need to improve multi-sectoral actions at different levels within a country or region to further facilitate this approach. Lack of sustainable cross-sectoral collaboration due to dependence on partner funding is a major concern as is the perception that One Health creates extra work that is not part of standard tasks for many stakeholders. Establishment of high-level leadership, resource allocation within state budgets, legal frameworks, joint prioritization and curricula development are some aspects mentioned in both the literature studies and expert consultations. Experts thought that One Health in Kenya, Uganda and Ethiopia was well implemented in areas of human and animal health and AMR, but that environmental health issues such as chemical events, natural disasters, or biodiversity loss were only poorly addressed. They recommended that new initiatives should concentrate on further integrating collaborative actions into the daily business of animal, human and environmental services

and job descriptions. Most studies continue to emphasize the need for One Health rather than detailing the results of operationalization of this approach.

Conclusion: One Health requires a scaled approach from community to district (subnational), province and national levels. Special attention should be given to address current implementation challenges at the subnational level and across borders. Furthermore, One Health will have to be institutionalized and fully owned by the different services involved to make existing initiatives sustainable. More practical evidence is needed on how

One Health can be operationalized at the interface of different ministries and levels, and to understand context-specific outcomes of One Health approaches for different health areas in the three countries.

Keywords: One Health Operationalization, Uganda, Kenya, Ethiopia

Social Media text: One Health requires a scaled approach from community to district and national levels. In addition, more practical evidence is needed to understand the context-specific benefits of One Health for different sectors in Kenya, Uganda and Ethiopia.

One Health in Human–Environment Systems: Linking Health and the Sustainable use of Natural Resources

Poster

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Background: Social–ecological system (SES) approaches have been used for strategic analyses of sustainable use of natural resources like rangelands, fishing grounds, livestock or forests. Elinor Ostrom's concept of "governing the commons" contradicts the so called "tragedy of the commons" that assumes that common pool resources are inevitably overused and irreversibly destroyed.

Methods: We expand the SES to One Health in Social–Ecological Systems (OHSES) by including humans as a resource system that contributes to the human capital of a nation's gross domestic product (GDP). Ill health leads to a reduction of health and wellbeing benefits through premature death, disability or temporary reduction of work capacity. The OHSES analysis framework uses game theory and mathematical modelling for strategy

evaluation and comparison. It enables us to analyse the system's current situation and find possible Nash equilibria, Pareto–optimal solutions, and best resource management strategies while maintaining sustainable ecosystem services.

Results: A first example on the elimination of dog rabies in Africa shows that when compared to human post–exposure vaccination, coordinated mass dog vaccination is the best strategy for all countries, leading to human capital benefits of ten billion USD over a period of 30 years with the possible elimination of the disease. Inaction and all other strategies have lower welfare benefits and could not lead to the elimination of dog rabies. Further case studies relating human and animal health and sustainable natural resource use are proposed.

Conclusion: Epistemological assumptions and ethical issues of a OHSES approach are discussed in the light of pressing needs to combine human and animal health with the sustainable use of natural resources to address the broader impact of the contemporary threats such as

antimicrobial resistance, biodiversity loss and climate change.

Social media: First game theoretical approach to One Health in Social-Ecological Systems shows profitability of rabies elimination in Africa.

Enhancing One Health capacities and capabilities in strengthening Resilient Health Systems to address emergencies in Africa

Poster

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Background: The implementation of One Health approach in Member States of the WHO African region is challenging in a context of weak health infrastructure, weak surveillance system in both human and animal sectors, particularly for effective emerging and re-emerging infectious diseases (EIDs) detection, control, and prevention. However, substantial progress has been made to implement operational One Health platforms and to improve collaboration between human, animal and environmental health sectors in countries in the frame of One Health platforms. Implementing an integrated One Health approach operational in the African region at the human-animal-environmental interfaces has several challenges including social, economic, political and environmental drivers. Despite these challenges, the WHO in collaboration with regional and international technical partners including academia and research institutions remain committed to develop evidence-based One Health operationalization and monitoring its principles in the African Region.

Methodology: The WHO/AFRO has engaged closely with the Afrique One – REACH (African Science Partnership for Intervention Research Excellence) and

other Regional and countries One Health Networks and partners to develop the One Health Scorecard Platform for capacity building in One Health science using the transdisciplinary ecosystem approach.

Expected Results: This platform will provide learning materials on how to implement intervention One Health sciences and how to measure performance indicators using metric such as Scorecard methods. The platform's ultimate value would be to serve as a database of One Health research and capacity building networks for people to learn from other projects and connect to other researchers for collaboration or advice in the framework of the One Health platforms.

Conclusion: The overall objective of the initiative will be to lay out the One Health roadmap to strengthen the capacity and capabilities of national One Health platforms researchers and practitioners for better preparedness and prevention in the context of health systems strengthening in the African Region.

Keywords: One Health, Africa, Scorecard, Research, Capacity

Transversal aspects (Social sciences, Modelling, Surveillance, Technology)

Barriers to developing interventions through mathematical modeling for pandemic preparedness in the context of One Health in Africa: The experience of the Afrique One consortium

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Background: Mathematical and statistical modeling have emerged as cutting-edge tools in both understanding and preventing the emergence and spread of infectious diseases. The recent COVID-19 pandemic serves as a prime example of how modeling has proven invaluable to containing the spread of SARS-CoV-2. However, many African countries especially francophones lack the required expertise to benefit from applications of infectious disease modeling to their epidemiological challenges. The reasons are manifold and some of them include: (i) data trustworthiness and effective data collection techniques, (ii) shortage of skilled experts in modeling to efficiently monitor, analyze and interpret One Health data to inform policy and decision-making, (iii) lack of collaboration between decision-makers, researchers, and practitioners undermining the credibility of modeling outcomes. This work aims to assess the needs and challenges of modeling in the One Health context in Africa, and propose strategies to improve preparedness and response efforts in Africa.

Methods: The Afrique One-REACH (Research Excellence for African Challenges in Health) consortium, with a component dedicated to Data Science, Statistics, and Modeling (DSSM), aims to build critical mass of One Health

researchers and practitioners in Africa. Now in its third phase, 61 fellows were recruited (Postdoc, Ph.D, and Master) to conduct One Health research across Africa. During the inception meeting in Arusha, Tanzania (February 2024), we conducted content analyses of their research proposals to ascertain whether they will be employing modeling analysis or if they could potentially benefit from including modeling concepts in their studies, and assess their need for training in modeling topics.

Results: The results showed that both the perceived and actual needs were high when addressing complex health threats with One Health, with 63% of fellows expressing a need for modeling. About 90% of the proposals referenced the need to evaluate intervention scenarios and estimate their effectiveness, calling for modeling to deliver optimal solutions at maximum value. Training in a variety of modeling techniques including structural equation modeling, generalized linear models, cost-effectiveness models, ecological and epidemiological dynamic models would clearly be helpful. However, only a few fellows (17%) explicitly mentioned the type of models that could help the analyses of their data.

Conclusion: Building effective partnerships, data and knowledge

exchange among actors are needed to enhance modeling in a One Health context in African countries for better preventive intervention for pandemic preparedness. Planning complex decision under uncertainty will require collaborative engagement to detect, train and keep skilled researchers

in the field of data modeling. This involves also updating training curricula to include modeling modules from undergraduate level upwards.

Keywords: Modeling, epidemic prevention, human and animal health, cost-effectiveness, Africa.

Situational analysis of wildlife surveillance in preventing zoonotic diseases in a developing country

Poster

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Background: The role of wildlife in public health is coming to attention because of the wildlife-borne disease outbreaks the world is experiencing. Wildlife disease surveillance with the One Health approach is essential for detecting and preventing zoonotic disease emergence and spillover. Given that the approach is relatively new and requires sectoral collaboration and proper resource sharing, the capacity for developing countries to implement these activities poses complex challenges. To inform appropriate management and mitigation mechanisms for controlling diseases originating from wildlife, it is necessary to assess knowledge and the extent of problem. This study aims to analyse the status, gaps, and perspectives for a better contribution of wildlife management to the health security system in Côte d'Ivoire.

Methods: A systematic review of scientific studies carried out in the wildlife sector in Côte d'Ivoire between 2012 and 2022 was assessed together with a SWOT analysis of existing surveillance mechanisms at regional and national levels. Semi-structured interviews were conducted among eight local government officers from

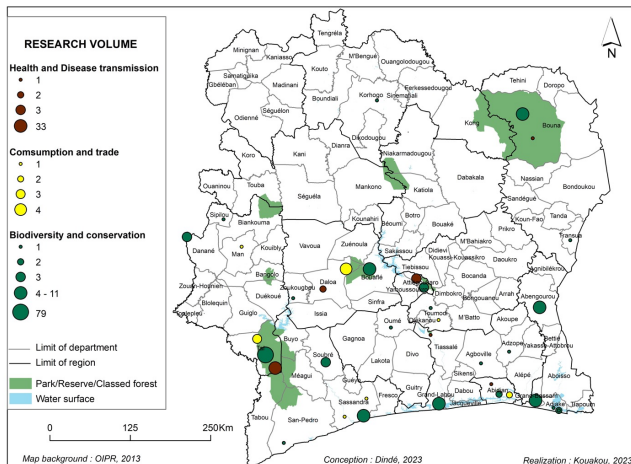
institutions responsible for wildlife, veterinary services, and public health. Then, a stakeholder seminar with 23 participants was organized in December 2023 and gathered the national One Health platform (NOHP), and stakeholders from governmental, non-governmental and research institutions to share findings and discuss the joint One Health surveillance system.

Results: Interest in wildlife research is growing but mainly focused on conservation accounting for 69% of publications. Health and zoonoses represented 22% and wildlife disease surveillance accounted for only 5% of health actions reported. From the government perspective, wildlife disease surveillance is still in its infancy and documented attempts are implemented on an ad hoc basis by researchers. Current wildlife monitoring is limited to ecological monitoring by park rangers, who count species and observe animal behaviour and deaths. Veterinary services are updating their disease reporting tool to include events evolving wildlife. Wildlife regulations are ineffective and identified as a huge weakness limiting health surveillance in the wildlife sector. The current legal framework does not promote public

health monitoring in the wild meat value chain, which remains a hotspot of pathogens spillover. Furthermore, the public health surveillance system is characterized by sectoral implementation, disparities in capacity between sectors, and significant gaps in collaboration between institutions regarding data and information sharing. Efforts made by the NOHP to coordinate sectoral actions through a technical working group on surveillance are still insufficient and do not integrate contributions from research.

Conclusion: Wildlife disease surveillance in Côte d'Ivoire has not been considered a priority by the public health system. The lack of integrated human-wildlife interface management, and legal frameworks regarding wild meat consumption hinder disease surveillance and control. The One Health platform is a great opportunity for pushing wildlife surveillance in the health system.

Keywords: Wildlife, Zoonosis, Surveillance, One Health, Research, Côte d'Ivoire



Map of Côte d'Ivoire showing height of wildlife studies conducted across the country

Advancing Rabies Control in Côte d'Ivoire: Insights from implementing the BlockRabies App: A Blockchain-Secured One Health Solution

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Abstract Context: Rabies, a zoonotic virus of great public health concern, remains endemic in Côte d'Ivoire. Despite a national strategic plan, barriers such as under-reporting, lack of inter-sectorial communication and inaccessibility of vaccines hinders the progress towards the goal of zero dog-mediated rabies by 2030. Our novel blockchain-secured One Health digital application called the "BlockRabies App" attempts to address these challenges in a coordinated manner. In September 2023, the implementation phase of the project began at the two pilot sites: Bouaké and San Pedro, when all users from the designated partner institutions, including physicians, nurses, veterinarians, pharmacists, and laboratory technicians have been adopting this digital tool in their workflow alongside the routine paper-based reporting system. The objective is to assess the adoption pathways of the BlockRabies application amongst all actors.

Methods: After the BlockRabies App co-development, three trainings have been held for partner actors in San Pedro and Bouaké with a transdisciplinary approach. This includes a blend of participatory meetings, workshops, focus group discussions, observation, open and closed questionnaires, personal and technical support, and application monitoring.

Preliminary Results: 17 rabies actors from San Pedro and Bouaké's public health institutions, and San Pedro's veterinary service participated in the third training. 10 had never used the application outside of the workshops, and one did not know they already had access. 8 experts had a positive view of the application but 5 could not list a clear benefit. An inventory scan of 300 rabies vaccines took less than five minutes with the BlockRabies scanning App, which saves a full day of manual vaccine serial numbers recording. The identified challenges for the current adoption is an unstable internet connection, worries from the public health sector about patient confidentiality, and the request for a simplified interface to improve navigation ease.

Conclusion: The pioneering and innovative BlockRabies App is the epitome of One Health in practice, and the first to provide a platform combining real-time information on dog rabies diagnostics and surveillance status, patient management, and the vaccine supply chain. The application primarily promotes the efficiency of inter-sectorial communication, increases transparency and traceability, and prevents the wastage of life-saving vaccines in a resource poor context. The digitalization of joint Veterinary and Public Health records presents a challenging transition. Nevertheless, if

technical conditions are enhanced and actors are trained and empowered to use this digital tool confidently in their workflow, promising outcomes could follow. Until the end of the year, we will assess the adoption rate estimate, motivation, incentives, confidence and

perceived benefit of the application to help facilitate its full implementation.

Keywords: Côte d'Ivoire, rabies, one health, digitalization, adoption, communication, blockchain



Training session at the Veterinary Services Directorate in Bouaké in April 2024 (Photo credits: Rose Delima N'Guessan)

Ethics and socio-cultural determinants of the use of an integrated blockchain-secured information management system in rabies control in West Africa

Poster

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Background: Rabies is a threat to public health in Africa and identified as a priority disease for elimination with the zero case by 2030 strategy. One of the challenges in rabies control is lack of surveillance and inadequate communication between the human and animal health sectors, leading to vaccine waste and shortages, and consequent human mortality. To address this, an interdisciplinary research team (rabies control stakeholders and partners) in One Health approach have pooled their

knowledge and resources to develop a Blockchain-secured digital tool BlockRabies App to connect different sectors and facilitate information sharing to optimize surveillance and patient monitoring. However, ethical issues, the socio-cultural, institutional, and economic contexts challenge its adoption and appropriation by the health system. This study analyses a transdisciplinary process and ethical issues in co-designing and operationalizing the One Health App.

Methods: The study took place in Côte d'Ivoire and Mali, where the «BlockRabies App» is being implemented. Qualitative methods, including interviews and participants observation, were used to collect data on factors enabling and hindering the implementation and the adoption process. A thematic content analysis was conducted, assisted by NVivo 14 software, and focusing on trust, security, costs, confidentiality, ethics, social and added value.

Results: The results on the technology readiness process show that App users were actively involved in the design, and participated in various stages of testing, correcting, and validating the App through on-the-job trainings. Several iterations and negotiations between academic, non-academic and community actors for co-creating a common understanding of the App took place. Specific sectoral needs were addressed and discussed in the network and towards adaptation and co-construction of the information system flow as well as responsibilities. The results show that the following aspects were critical points in the cross-sectoral App co-creation and implementation: a strong consensual definition of governance, fostering

transparency and trust, ethical and safety considerations, data access and storage location, App's hosting site protection, authorization and informed consent forms for the use of vaccines by patients and the use of human rabies biological samples. However, access to public health data for the vets was not compliant with the existing data-sharing protocols and actors raised the need for a user manual and the app operating procedures.

Conclusion: Users' initial hesitation about ethics in implementation process have been overcome. The App enabled (i) timely provision of intradermal vaccines, which avoids vaccine shortages and promotes high levels of compliance among exposed patients, (ii) rapid exchange of results of rapid diagnostic tests performed on suspected animals to rapidly inform the therapeutic decision of the exposed patients, (iii) introduction of the vaccine scanning QR code for large quantities of quick serial numbers registrations, which will help to reduce working time.

Keywords: Blockchain, Innovation adoption, West Africa, Rabies, Ethics

Assessing the contribution of social science perspective in One Health research: The case study of African Science Partnership for Intervention Research Excellence (Afrique One-ASPIRE) program

Poster

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One Health (OH), focusing on the interconnectedness of human, animal, and environmental health, primarily draws from natural and health sciences, with limited integration of social sciences perspectives. Despite some initiatives to involve economics and behavioural sciences in epidemic preparedness and response strategies, there is a paucity of social science perspectives within the One Health conversation and research. However, social sciences propose a dual service offer to the OH agenda: a cognitive offer (knowledge) and an operational offer (processes). Therefore, they can enrich the understanding of the emergence of OH, and the point of view of the actors involved in the promotion of OH. Incorporating insights from social sciences, particularly economics and anthropology, can enrich the dialogue and contribute to a more comprehensive and effective approach to addressing the intricate connections among humans, animals, and ecosystems in One Health practices.

As the integration of social sciences into OH realm remains inadequate, fragmented and under-funded, this paper questions the conceptualization of OH approach in social sciences and knowledge production, taking a pan-African research programme on capacity building in One Health as case study. It aims to assess the contribution of integrative and transformative knowledge production and operationalisation to inform collective action and accompany

behavioural change. The study consisted of analyzing concepts and outputs produced by social sciences fellows affiliated to Afrique One-ASPIRE research program. This consisted of conducting a retrospective cross-sectional analysis by carefully scrutinizing: 1) research protocols of fellows enrolled in the program; 2) defended Master and PhD dissertations in social sciences and economics and; 3) published articles from all scientific publications with a strong social sciences component. This aimed to assess how the One Health approach has been conceptualized and operationalized in social science studies.

The study revealed an increased involvement of social sciences (sociology, anthropology, and economics) in One Health research across the continent, despite the slow pace. However, OH is more often used in scientific outputs as a buzzword and rarely with a consistent integrative content. Most social science research findings are related to knowledge, attitudes, and practices of peoples regarding diseases; aetiologies and sociocultural causes of diseases; or cost of healthcare. The part of social sciences related to health management has often been restricted to social perceptions and accountability of impacts and benefits. One Health being a call to collective action, engagement strategies of communities (scientific and non-scientific) into dialogue for disease prevention and improved

health security is still limited. Further efforts to bring social research into One Health will consist in developing and testing of new theories about One Health and social dynamics; examining Indigenous conceptualizations of One Health; and developing strategies to engage various communities in

collective actions for behavioural change.

Keywords: Afique One-ASPIRE, Collective action, One Health, Social sciences, Africa

Approaches for Early Warning Systems: Experience from the integration of animal health surveillance in Tanzania

Poster

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Background: Growing global health threats necessitate the urgency of advanced early warning systems for humans and animals. Tanzania, like many other countries, is making a significant transition from reactive to proactive multi-data source surveillance systems. However, the pace is still slow due to complex, interconnected challenges that demand integrative solutions. A study conducted in Tanzania explored integrative approaches for enhancing early warning capabilities with a specific focus on animal health surveillance.

Methods: The study focused on three components: identifying data sources, stakeholder mapping for collaboration and developing a prototype of an integrated animal health surveillance system. A mixed-method study design was used to identify data sources, which were assessed in content, spatial coverage, accuracy, cost, accessibility and frequency using pre-defined criteria. A consultative workshop was used for stakeholder mapping guided by the USAID stakeholder mapping tool. The prototype of an interoperable system named Wanyama heAlth SuRveillance (WARN) was developed was developed using Hypertext Preprocessor (PHP) version 7.4 (Laravel framework), Python version 3.8.0 and MySQL database. Three animal health

information systems in Tanzania were linked through Application Programming Interfaces (APIs). The practical application of the prototype was demonstrated by simulating it with sample records and dummy data pulled from SILAB and AfyaData repositories, visualising its output on the unified interactive dashboard.

Results: A total of 13 data sources were identified and assessed. Most surveillance data came from livestock farmers, slaughter facilities, and livestock markets. Electronic surveillance tools like AfyaData and Event Mobile Application (EMA-i) and information systems such as the Tanzania National Livestock Identification and Traceability System (TANLITS) and Agricultural Routine Data System (ARDS) showed the potential to generate relevant surveillance data. Few data sources were actively used for surveillance due to limited integration, coordination and poor quality. Sub-national stakeholders such as community members, religious and political leaders and the private sector were found to have high resource and non-resource-based influence that can improve data flow from the community level. The initial simulation of the WARN using dummy data and archived records has demonstrated that an integrated animal health surveillance

system in Tanzania could improve the sensitivity of the system in disease detection.

Conclusion: A study established criteria for assessing data sources for health surveillance and proposed better ways of using them for enhancing early warning. The mapping exercise showed the system could benefit from diverse stakeholder interaction for resource mobilisation and expanding the horizon of data sources. WARN is unique in its interoperability and flexibility to integrate more data for monitoring health threats and risk drivers. The proposed solutions have been adopted by Tanzania's Ministry

of Livestock and Fisheries, with support from the Food and Agriculture Organization of the United Nations (FAO), to develop integrated syndromic surveillance systems for animal health.

Keywords: Integrative approaches, early warning, integration, animal health surveillance, Tanzania

Social media: As we move towards global health security, integrative approaches may enhance the early warning capabilities of our surveillance systems. Tanzania's experience in integrating an animal health surveillance system is a good example.

General insights on obstacles to dog vaccination in Chad on community and institutional level

Poster

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Domestic dogs are responsible for 95% of all human rabies cases worldwide and continue to be the main reservoir for this fatal virus in African and Asian countries. Chad has been recognized as a rabies-endemic country since 1961, but no national control strategy is in place to date and dog vaccination coverage is very low. This study aimed to analyze the barriers to dog vaccination from a socio-anthropological point of view to guide strategies to facilitate access to dog vaccination for rabies control in Chad. The study was conducted from August to September 2018 in four regions of Chad. Data collection was undertaken through interviews and focus group discussions among veterinarians, animal health authorities and dog owners. Identified barriers to dog vaccination access were grouped into three main aspects: economic, socio-cultural and institutional level. Economic constraints encountered related to the cost of the vaccine itself and the expenses for transporting the dogs to the vaccination site.

The cultural belief that the vaccine has an impact on the therapeutic properties of dog meat for consumers was a socio-cultural obstacle. In addition, dogs are considered impure animals in Muslim faith, which prohibits handling of dogs. At the institutional level, unavailability of vaccines in veterinary services, lack of communication about the law on dog vaccination, absence of rabies in the training curricula of veterinary agents, and the lack of intersectoral collaboration limit vaccination coverage. To improve rabies vaccination coverage in Chad, communication strategies that are adapted to the context and take cultural obstacles into account must be put in place in synergy of interdisciplinary action. In addition, factors such as affordability, geographical access and availability of vaccines needs to be addressed throughout the country.

Key words: Rabies, cultural context, veterinary services, dog vaccination, Chad

“When the dog bite someone”: community and service provider dynamics influencing access to integrated bite case management in Chad

Poster

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This study aims to identify factors on the community, the human health and the animal health provider level that determine access to Post Exposure Prophylaxis (PEP) and animal rabies diagnosis in the light of a future integrated bite case management (IBCM) approach for rabies control in Chad. The study was embedded in an overall project conducted from 2016 to 2018, to determine rabies burden and vaccine demand in West and Central Africa. Data collection took place during the projects closing workshops with stakeholders organized between August and September 2018 in the three study zones in Chad covering Logone Occidental and Ouaddai province and parts of Hadjer Lamis and Chari Baguirmi province. A qualitative approach based on focus group discussion and in-depth interviews was used to get insights on access to care and animal investigation after suspected rabies exposure. A total of 96 participants, including 39 from the community (bite victims, dog owners) and 57 human and animal health providers (health center managers, chief veterinary officers, chief district medical officers, chiefs of livestock sectors) contributed to the study. Based on an existing conceptual framework of access to health care, several points

of dissatisfaction were identified, in particular the unaffordability of human rabies vaccine for PEP (affordability) and the distance to travel to a health facility in case of a bite (accessibility). In addition, there are unfavorable attitudes observed highlighted by the importance given to traditional or local rabies care practices to the detriment of PEP (acceptability) and a low level of knowledge among Chadian communities regarding bite prevention, coupled with a very inadequate information and awareness system regarding the disease (adequacy). As for human and veterinary health services, both sectors suffers from insufficient resources for PEP on the human health and rabies diagnosis on the veterinary side impacting negatively on availability and accessibility of both these services. Action to improving provision of rabies health services and increasing knowledge about risk and prevention of the disease among the population need to be undertaken to implement IBCM, improve access to PEP and achieve the goal of eliminating dog mediated human rabies by 2030 in Chad.

Keywords: rabies, Chad, One Health, PEP access, integrated bite case management (or alternatively IBCM)

Integrated One Health approach to NTDs: implementation of chronic wounds management model in Côte d'Ivoire

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Abstract Context: Chronic wounds are a public health concern, yet often neglected in low- and middle-income countries (LMICs). It thus represents a major cause of morbidity, suffering and disabilities. In Côte d'Ivoire, chronic wounds patient's treatment pathway is threatened by the interaction between the trust traditional healers and the accessibility to modern health system. Most often the lack of wound etiology and treatment history result in poor health outcomes. In this context, chronic wound management has been considered mainly from the biomedical perspective with poor contribution from other disciplines. Thus sociologists, economists, nutritionist, and epidemiologists, have rarely been involved in the wound treatment pathways.

Method: We integrated advanced knowledge from medical sciences, surgery, sociology, epidemiology, economy, and nutrition sciences to co-develop with communities and health practitioners, chronic wounds management model in the Taabo health and demographic surveillance site (HDSS) from 2019 to 2021 in partnership with the National Buruli Ulcer Control Program (PNLUB). The project builds on the inter- and transdisciplinary approach and integrated intersectoral wound management model «Prevent, identify and treat early» to reduce the burden

of chronic wounds and associated sequelae, as well as the social and economic costs. The model is based on the core competence of community health workers (CHWs) derived WHO protocol. They were trained to recognize and treat wounds, refer complicated wounds to higher levels of care and raise community awareness of wound care and prevention. The project estimated the wound prevalence, the socioeconomic burden, the referral of patients according to the severity and the nutritional effect on wound healing time as the main perceived limitation to care.

Results: The study recruited 690 wounds from 2019–2020 in the Taabo HDSS. Wound prevalence was 11%. Most chronic wounds lasted from 3 months to 30 years. Children under 15 and male adults were the more affected. Wounds etiologies were traumatic (79%), Buruli ulcer (10%). Chronic wound status leads to patient social isolation or exclusion from the community of the One Health platforms. Nutritional supplement average cost of 113 € per patient reduces treatment duration by 2.5 months and dressing cost by 50 € for each patient. This inductive One Health highlights the need for better communication between medical and non-medical actor through the CHW in addressing the care need by the patients.

Keywords: chronic wounds, one Côte d'Ivoire, transdisciplinary health, wound management,

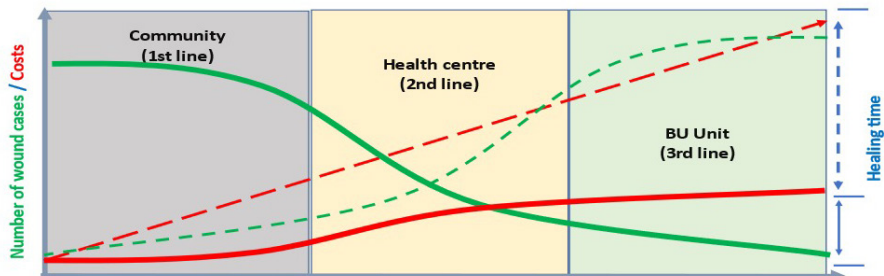


Figure 1. Project theory of change to fight against wound in the Taabo Health and Demographic Surveillance Site Côte d'Ivoire

Community based NTDs management model in rural setting, Côte d'Ivoire: social and psychological added value of a One health approach to wounds management

Poster

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Background: Wounds are part of the neglected tropical diseases and a complex health problem at the ecological, social, and public health interface. In Côte d'Ivoire, the wounds management approach within the health system is medical-centred while patient's adherence to treatment often depends on other factors such as social, economic, psychosocial that shape the early access of services in rural area. To address this complexity, an innovative community based wound care intervention has been developed in the Taabo Health Demographic Surveillance System (HDSS), a high endemic area for skin diseases in Côte d'Ivoire. The intervention was designed in a transdisciplinary and co-productive manner with community health workers (CHWs) locally selected

to identify and treat wound early in the households. The objective of this study was to assess from the communities' perspectives, the effectiveness of this coproduced model and how the mental health issues are addressed with the duration of care.

Methods: We conducted a mix cross-sectional study using questionnaires, individual and Focus Group Discussion guides in Taabo-HDSS where the Community Based Wound Management model (CBWM) is being implemented. Quantitative data was collected from 191 heads of households and 101 patients with wounds. An additional qualitative data was gathered from former and recovered patients, village authorities, health staff, adolescents, adults, women and men. Variables

assessed were related to the process of care with CHWs, satisfaction with the treatment model, perceived effectiveness of the model and anxiety and depression rate among patients. Quantitative data were analysed with R while qualitative data were analysed manually and with MAXQDA.

Results: Among households, 97% of those who experienced wound care within the model in community were

satisfied with the service. The main drivers of satisfaction were the healing effectiveness (40%), the availability of CHWs (32%), the sociability of the CHWs (13%) and the speed of care delivery (5%). The perceived benefit of the model were the reduction of severe case (61%), the early recourse to care (59%), the confidence in the adapted modern care (38%) and the well-being.

Integrated One Health approach to Brucellosis Diagnosis and management: Toward implementation of national policy in Tanzania

Poster

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Abstract Context: Brucellosis is listed as a priority zoonosis with formulated policy and strategic plans for concerted, One Health, multi-sectoral management and prevention in Tanzania since 2015. However, the national standard treatment guidelines and essential list of medications released in 2021 had no specific guidance on brucellosis. This presented a critical gap in the implementation of formulated policy in the routine diagnosis and management of brucellosis at healthcare facilities. This study aimed to synthesize evidence needed to support the development of national guidelines for diagnosis and management of brucellosis in

Tanzania, drawing on local, evidence-based studies and international guidelines.

Methods: A systemized search was conducted on local, peer-reviewed and grey literature on field-based epidemiological studies on brucellosis conducted in Tanzania between 2010 and 2022. Advocacy meetings were held between September 2021 and October 2023 with multiple stakeholder communities. Representatives were included from various stakeholder levels such as health practitioners, brucellosis and infectious disease researchers as well as representatives of national and international zoonotic

disease control programs. Mixed method approaches to multi-level, stakeholder engagement processes were used to synthesize and customize relevant evidence on brucellosis control. Prioritized themes for development of guidelines that included screening and diagnosis, case definitions, chemotherapy, and prevention were discussed and draft guidelines co-produced with key stakeholders. The initial draft of proposed guidelines was presented before the national committee responsible for the standardization of management and treatment guidelines in Tanzania. A final draft was submitted to national-level, policy stakeholders for inclusion into the standard treatment guidelines.

Results: A synopsis prepared from eighteen reviewed publications was synthesized. Data analysis and contextualization was achieved by consensus through stakeholder iterative processes. Drafted guidelines for the diagnosis and management of brucellosis in healthcare facilities

were further reviewed during a series of three sub-national level policy meetings, then submitted to national level policy makers. Finally, a thematic section on brucellosis was re-introduced into the Tanzania standard guidelines for the treatment and management of diseases and ratified for inclusion in November 2023.

Conclusion: This study evidences the benefits of integrated and multi-sectoral, One Health approaches in the diagnosis and management of brucellosis. The synthesis of locally conducted studies contextualized to address specific national policy gaps was critical to the uptake of research output. Ratification of the proposed recommendations into Tanzania's national guidelines highlights the significant transition from scientific research to policy. This milestone in Tanzania's approach to brucellosis presents a model for the One Health approach to the control of zoonoses.

Keywords: One Health, Policy, Governance, Brucellosis, Tanzania

Serotype diversity and antibiotic resistance of Non-typhoidal *Salmonella* recovered from food of animal origin and environment in Accra, Ghana

Poster

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Background: Livestock and their products can contribute significantly to the total non-typhoidal *Salmonella* (NTS) infection in humans as well as emergence and spread of antimicrobial resistant *Salmonella* strains. The study determined the occurrence, serotype diversity and antimicrobial resistance of non-typhoidal *Salmonella* from animal sourced foods and their products as well as environmental samples in five districts in the greater Accra Region of Ghana.

Methods: Meat (chicken, beef, pork), eggs, raw cow milk, vegetables and faeces were randomly collected from purposefully selected slaughter slabs, farms and markets. A total of 696 samples were processed. *Salmonella* spp. was isolated using standard microbiological methods and identified by matrix-assisted desorption/ionization-time-of-flight mass spectrometry (MALDITOF). Serotyping of *Salmonella* isolates was done using the Kauffman white classification scheme. Antimicrobial sensitivity testing was done using the Kirby-Bauer disc diffusion method and minimum inhibitory concentration for colistin.

Results: The overall prevalence of NTS was 3.7% (26/696). Pork and raw cow milk recorded the highest prevalence of 73.1% (n/N) and 15.4% (n/N). Seven different serotypes of *Salmonella* were identified with the most predominant and diverse serotype being *S. Typhimurium* (59.1%) isolated from pork and cow milk. Overall, 57.6% of the total number of isolates were resistant to more than one antimicrobial with widespread resistance to Ampicillin (66.6%) while 11.3% were multidrug resistant (MDR) with a higher proportion in milk.

Conclusion: The high prevalence of NTS in pork and cow milk and the occurrence of MDR in *S. Typhimurium* isolates indicates a higher risk of salmonellosis. To ensure food safety and human health, there is the need for surveillance and effective implementation of control programs in animal production, antibiotic use and waste management.

Key words: Non-typhoidal *Salmonella*, Food, serotype, Antimicrobial resistance, Ghana

Livestock disease control challenges in Ghana: leveraging transdisciplinary approaches for effective and sustainable interventions

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Introduction: Livestock represent valuable assets for many households in low- and -middle income countries (LMICs). However, animal diseases are highly prevalent in LMICs due to inadequate disease control measures. Livestock mortality causes major income losses for farmers, and often threatens food security. We investigate effective and cost-effective preventive veterinary interventions, barriers to their utilization, and farmers' willingness to pay, for the effective interventions to protect their livestock assets, and wellbeing.

Methods: We implemented a mixed-method study in three representative districts of the main farming belts in Ghana, which entailed a scoping review, surveys involving 350 livestock farmers and 13 professional veterinary officers (VOs), and seven focus group discussions with 65 farmers. We conducted descriptive and inferential analysis of the quantitative data, and analyzed qualitative data deductively. We used triangulation to achieve convergence across the datasets and analyses.

Results: Our review affirmed vaccination as the most effective and cost-effective strategy for controlling most infectious animal diseases. The farmers and VOs identified foot-and-mouth disease, contagious-bovine-pleuropneumonia (CBPP) and peste-des-petits-ruminants (PPR) as priority diseases affecting livestock production in Ghana, with

an annual average (median) of 10% mortality to diseases (IQR=0 to 23%) reported. The increasing severity of disease-induced herd mortalities is associated with worsening wellbeing for affected farmers. And, despite the availability of effective vaccines for diseases prioritized by livestock owners i.e. CBPP and PPR, only 15% of farmers regularly vaccinated their herds. Farmers relied predominantly on treatments rendered by informal veterinary service providers operating outside the purview of the veterinary authorities. In some cases, farmers administered treatments themselves. The VOs exhibited a limited capacity to control the sale and use of veterinary medicines in the informal sector. Furthermore, treatments applied by farmers in most cases were not useful for the targeted diseases. The main obstacles to vaccination uptake included farmers' limited awareness on the value of vaccines, financial constraints arising from the requirement of farmers to purchase entire vaccine vials regardless of herd size, and inadequate availability and accessibility of VOs when animal health services are required. Upon sensitizing farmers about the benefits of vaccines, we found that on average, farmers were willing to pay vaccination costs exceeding the prevailing prices.

Conclusion: Our research underscores the significant role of livestock vaccination in mitigating the occurrence of diseases and their adverse effects on livestock productivity. This not

only safeguards the livelihoods and wellbeing of farmers, but also enhances public health and food security. To achieve effective and sustainable animal disease control, strategies aimed at improving

vaccination uptake need to prioritize extensive community engagement, alongside reforms in the vaccination policies within the veterinary services.

Evaluating Antimicrobial Resistance in Foodborne Pathogens and microbial Quality in Accra, Ghana

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Background: Foodborne Pathogens (FBPs) are frequently responsible for food poisonings and outbreaks globally, with bacteria ranking second only to viruses in posing public health risks, mainly due to Antimicrobial Resistance (AMR). Despite contaminated food often being linked to diarrheal-related hospitalizations, especially in Ghana during outbreaks, integrated surveillance using the One health approach to confirm this has not been conducted; this study aimed to bridge this gap by involving various sectors in human and environmental health to understand the occurrence of antimicrobial resistance in foodborne bacteria comprehensively.

Methods: Stool samples of diarrheal patients were collected at both Maamobi General Hospital and Kaneshie Polyclinic, alongside administering questionnaires to comprehend the factors contributing to the transmission of diarrhea between January 2019 and October 2020. Additionally, ready-to-eat (RTE) food and water were obtained from food vendors, while palm swabs were taken from the vendors, and their responses regarding potential risk factors for food and water contamination were examined.

Results: Frequently encountered pathogens like *E. coli*, *E. cloacae*, and

K. pneumoniae were found in stool and food, while *K. pneumoniae*, *Aeromonas* spp., and *E. cloacae* were identified in samples from food, water, and palms in Maamobi and Kaneshie. Among stool isolates, Enterobacteriaceae constituted 69.7%, with an Extended-spectrum beta Lactamase (ESBL) occurrence of 26.5%, primarily in *E. coli* (13.2%), *K. pneumoniae* (35.7%), and *P. mirabilis* (57.1%). Commonly detected ESBL genes were *blaTEM* (n=14), followed by *blaCTX-M* (n=13) and *blaSHV* (n=4). Additionally, some *E. coli* isolates harbored the heat-labile (Lt) gene associated with Enterotoxigenic *E. coli* (ETEC). Resistance to penicillins and aminoglycosides was observed in Enterobacteriaceae except for *E. coli*. Food items showed common occurrences of various pathogens including *E. cloacae* (16.8%), *Citrobacter* spp (10.1%), *E. faecalis* (7.8%), *Pseudomonas* spp (6.7%) and *K. pneumoniae* (4.0%), with resistance genes and Diarrhoeagenic *E. coli* (DEC) detected in some isolates. Over 50% resistance to penicillins and Rifampicin was observed among Enterobacteriaceae and non-Enterobacteriaceae isolates. Water and palm samples displayed the presence of *K. pneumoniae*, *Aeromonas* spp, and *E. cloacae*, with resistance to multiple antibiotics noted. Stew samples had unsatisfactory Total Plate Counts (TPC), while over 50% of water samples

were considered impure based on TPC and Total Coliform Counts (TCC). Palm swabs showed 100% purity.

Conclusion: The research emphasizes the significance of enhancing hand hygiene practices among street food vendors to mitigate food and water contamination, stressing the necessity for educating vendors and enforcing food safety regulations. Furthermore, the presence of antimicrobial-resistant foodborne pathogens underscores the importance of intensifying surveillance efforts in the food chain, incorporating a comprehensive One Health approach. Ongoing Next Generation Sequencing endeavors

aim to elucidate the interconnections among prevalent pathogens across diverse environmental and clinical samples. the vaccination policies within the veterinary services.

Keywords: Antimicrobial Resistance, Foodborne Pathogens, One health

Tweet: This study addresses the global public health risks posed by food borne pathogens and antimicrobial resistance, on the need for proper surveillance, enhanced hygiene practices among food vendors, and a holistic One Health approach to mitigate contamination.

Exploring zoonotic Transmission Dynamics of Mpox Virus in Central and West Africa using a One Health approach

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Background: The increasing global prevalence of Mpox cases has raised concerns regarding potential animal reservoirs, sources of transmission, and pathways. This research explores the emerging zoonotic risks posed by Mpox virus, associated with the consumption of rodents in Central and West Africa. The study focusses on communities to understand transmission dynamics and address public health concerns.

Methods: In collaboration with partners in the Democratic Republic of Congo (DRC) and Côte d'Ivoire (CI), our research used a mixed-methods approach. In the DRC, qualitative data was collected by focus group discussions, while corresponding quantitative data was collected via

questionnaires at 57 households in four villages to investigate socio-demographics, attitudes, and consumption practices related to rodent hunting and consumption, particularly focusing on cane rats. In CI, data was collected through observation and key-informant interviews during visits to cane-rat breeding programs, markets, and restaurants offering wild meat in Abidjan, CI.

Results: Our study reveals communities seem unaware of the risks associated with consuming rodents in DRC and CI. We found a significant risk of zoonotic pathogen transmission in rural DRC villages, where wild rodents are hunted, prepared, and consumed by all family members, including children. In CI, despite the implementation of a

cane rat breeding program to mitigate risks associated with wild meat consumption, challenges persist.

Conclusion: The research underscores the importance of a One Health approach, integrating epidemiology and social sciences to address the risks of zoonotic pathogen spill-over. Despite government warnings and bans, there is a lack of awareness linking diseases to wild meat consumption which is a deeply entrenched practice in DRC and CI. The limitations of existing programs underscore the necessity for a more holistic approach to effectively tackle these challenges.

The study stresses the vital role of considering human and socio-ecological factors in addressing zoonotic threats. The practical implications call for enhanced surveillance and a deeper understanding of epidemiology. By shedding light on transmission pathways and advocating for targeted strategies, the study contributes to the development of preventive interventions and highlights the significance of collaborative efforts to combat infectious diseases associated with rodent consumption.

Sero prevalence and transmission risk factors of brucellosis in small ruminant breeding farms of Dassa-Zoumè in Benin

Poster

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Background: Brucellosis is a chronic tropical disease of domestic mammals such as cattle and small ruminants. Symptoms are uncharacteristic and typically present as abortions. This can lead to significant economic losses for livestock farmers and of infection to humans. The aim of this study was to determine the seroprevalence and risk factors for brucellosis in the municipality of Dassa-Zoumè, Benin.

Methods: Serum samples were obtained from animals of breeding age on farms where cases of abortion had been reported at least once, and screened for Brucella specific antibodies using the Rose Bengal test. Data collected in the field was used to determine risk factors using Multiple Correspondence Analysis (MCA) and

binomial logistic regression. Overall, 586 samples were collected from 38 farms in the 10 districts of the Dassa-Zoumè municipality.

Results: Majority of farms were run by men, with breeding facilities that allow their animals to be sheltered without the need for quarantine measures. The seroprevalence of Brucella was 31.6% (12/38) at farm level and 10.2% (60/586) among animals. The brucellosis transmission risk factors were associated to breeder experience, sheltering, sex of the animal, breed, pregnancy and abortion record. Breeding experience of less than 15 years (OR=0.182, CI=0.053-0.622, p=0,0266), non-existence of breeding shelters (OR=0.222, CI=0.086-0.573, p=0.00651), goat species (OR=0.119,

CI=0.073-0.192, $p < 2e-16$), females (OR=0.116, CI=0.089-0.154, $p < 2e-16$), pregnancy (OR=0.108, CI=0.081-0.144, $p < 2e-16$) and non-abortion (OR=0.166, CI=0.103-0.267, $p = 1.18e-13$) were the risk factors for brucellosis infection in the commune.

Conclusion: These results show the presence of *Brucella* circulating in the municipality of Dassa-Zoumè which pose both economic and public health risks. Since most breeders have close contact with their animal without any specific protection, the risk of transmission to human needs to be further assessed.

Keywords: *Brucella*, Sheep, Goat, Neglected zoonosis, Public health

Social media: Brucellosis is a zoonotic disease spreading in the most raised livestock (small ruminant) in Benin. The prevalence is about 10.2% and the risk factors are associated to animal sex, specie, pregnancy and abortion statute. This leads to important public health and economic risk.

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