EUROPEAN UNION
REFERENCE LABORATORY
FOR RIFT VALLEY FEVER

Funded by the
European Union

IZS TERAMO

SUMMARY RVF MORNING SESSION: 16 OCTOBER 2024

Introduction and welcome address (G. Savini)
The director of the EURL for RVF warmly welcomed the participants. A brief discussion followed regarding the rules of procedure and the agenda of the meeting.

Overview of EURL RVF activities 2024 (G. Savini)
After providing a brief overview of the activities planned for 2024, Dr. Savini detailed the various undertakings of the EURL that have been completed, are currently in progress, or remain to be initiated. Among the concluded projects, he highlighted the promising results of an ELISA IgM kit for camels, developed by IDVet and validated by the EURL using sera kindly provided by ONARDEP of Mauritania. In the context of diagnostics, he also discussed the development and findings associated with the MinION technique applied to positive RVF samples. This innovative device facilitates field testing of animals suspected of RVF virus infection, and once again, the results presented were encouraging.
Dr. Savini proceeded to outline the tests conducted to confirm the effectiveness of the inactivation process developed by Jansen van Vuren et al. (2009). This process enables the safe handling of serum samples without the risk of viral exposure while preserving immunoglobulin M, which can be affected through prolonged exposure to high temperatures. Finally, he addressed the last topic of his presentation, which involved the isolation of various RVFV strains from samples sent by colleagues from Mauritania. He expressed the intention to genetically characterize these strains to gain further insights into the origins of the RVF outbreaks that occurred in Mauritania in 2022.

Integrated management of RVF: the case of Mayotte (C. Cetre-Sossah)
Dr Cetre-Sossah, head of WOAH Reference Laboratory for RVF presented an insightful discussion on the integrated approach needed to control zoonotic and vector-borne infectious diseases, focusing on RVF. She explored the disease's epidemiology and transmission dynamics, highlighting the interplay between the virus, hosts (humans, domestic animals, wildlife), and vectors, primarily mosquitoes. Environmental factors influence RVF's distribution, as conditions favoring vector habitats impact disease emergence and spread.
Dr. Cêtre Sossah explained the cyclical nature of RVF outbreaks, which alternate between pre-epidemic and epidemic phases, driven by factors like virus presence, ecological conditions, and susceptible hosts. A key theme was the One Health approach, promoting collaboration across public health, animal health, and environmental management for effective disease control.
She referenced case studies from Kenya and Mayotte, noting significant advancements in understanding RVF through seroprevalence surveys and rapid diagnostic tools. While

environmental factors like rainfall contribute to outbreaks, anthropogenic influences such as trade and animal movement play a larger role.
The presentation also stressed the importance of studying vector dynamics, particularly mosquito diversity and behavior, to develop targeted control measures. Dr. Cêtre Sossah emphasized the need for collaboration among stakeholders, including farmers and health professionals, to enhance early detection, surveillance, and knowledge sharing.
In summary, she advocated for an integrated approach to managing RVF, acknowledging the complex relationships among ecological factors, zoonotic diseases, and human health in our interconnected world.

Updates on the FLI research regarding RVF (M. Eiden)
Martin Eiden provided an update on the research conducted by the RVF German National Reference Laboratory. He stated that the laboratory, located at the Friedrich-Loeffler-Institut, is equipped with several biosafety level (BSL) labs and animal facilities. It serves as Germany's primary contact for the diagnostics and control of Rift Valley Fever Virus (RVFV) in animals, collaborating with various national and European authorities. The lab is responsible for providing diagnostic protocols and conducting comparative tests, with a focus on serological methods, molecular detection, and immunohistochemistry. Eiden further explained that current diagnostic methods include indirect immunofluorescence assays (IIFA), ELISA, virus neutralization tests, and quantitative RT-PCR. The laboratory employs both monoclonal and polyclonal antibodies for immunoassays, as well as advanced technologies such as multiplex serological testing using Luminex technology to enhance high-throughput capabilities. Additionally, the laboratory has developed a lateral flow assay (LFA) for the rapid field detection of RVFV across various species. Ongoing research encompasses the epidemiology and transmission dynamics of RVFV, vaccine development, and the investigation of potential reservoir hosts, including black rats and fruit bats. The laboratory is actively engaged in multiple projects aimed at improving diagnostics and biosafety measures, strengthening regional laboratory collaborations, and monitoring the transmission cycles of RVFV and other arboviruses.

Serology and virology Proficiency Test results (C. Pinoni)
Dr. Chiara Pinoni presented the findings from the proficiency test (PT) organized by the RVF EURL. The 2024 PT involved 26 laboratories, including 21 National Reference Laboratories (NRLs) from the European Union (EU), 2 from other European nations, and 3 from outside Europe.

Senegal field and laboratory experience (O. NDaye)
Dr. Oumar Ndiaye's from the Institut Pasteur de Dakar (IPD) in its presentation emphasized the IPD rich history and expertise in public health, particularly regarding Rift Valley Fever (RVF) in Senegal. Established in 1924, the IPD aims to prevent

infectious and chronic diseases through research, education, and vaccine production. As a Collaborating Center for the World Health Organization (WHO), the IPD is specialized in arboviruses and viral hemorrhagic fevers.
Its core activities include virological testing, disease surveillance, and clinical evaluations for diseases like Yellow Fever, Dengue, Zika, and RVF. Dr. Ndiaye highlighted that RVF remains a significant challenge in Senegal, with significant outbreaks recorded particularly linked to environmental factors. Recent investigations in the Matam region have revealed a high prevalence of RVF antibodies among both livestock and humans, indicating the active circulation of the virus. Specific mosquito species thriving in wet conditions have been identified as the primary vectors for the disease.
Despite the ongoing threat of RVF, Dr. Ndiaye pointed out that effective diagnosis remain a challenge due to logistical issues related to cold chain management and high costs of molecular testing. In this context, serological testing may offer a promising alternative for RVF diagnosis, with current efforts aimed at developing more sensitive assays. He concluded by stressing that RVF presents a growing health threat in Senegal, necessitating improved diagnostic strategies to aid outbreak management and surveillance efforts.

<u>RVF in Western and Southern African countries (J. Paweska)</u>
Dr. Paweska gave a broad and comprehensive overview of the disease, with a particular focus on the South African context, and addressed key aspects of RVF epidemiology, ecology, diagnostics and prevention. In the beginning of his presentation, Dr. Janusz Pawęska addressed the urgent issue of Rift Valley Fever (RVF) through a compelling case study. He detailed the plight of a 68-year-old South African farmer who became infected after slaughtering a potentially infected warthog during an outbreak. Initial blood tests were negative, but further analysis confirmed the presence of the virus, leading to severe symptoms including fever, renal failure, and hemorrhaging. Dr. Pawęska then traced RVF's history back to the 1930s, especially its economic and public health impacts in Kenya, and remarked significant South African outbreaks in the early 1950s, the 1970s, and from 2010-2011, with a particularly alarming resurgence affecting thousands of animals.
The presentation also examined RVF epidemiology, emphasizing its link to flooding and the role of Aedes mosquitoes as primary vectors. Heavy rainfall catalyzes these outbreaks, leading to high mortality in livestock, particularly among younger and pregnant animals, while human cases can present with severe complications. Effective management strategies highlighted the need for livestock vaccination, vigilant outbreak surveillance, and mosquito monitoring. Reliable diagnostics like RT-PCR and serological tests are essential for confirming RVF.
Looking ahead, Dr. Pawęska mentioned ongoing research into safer vaccines and improved diagnostics, advocating for a "One Health" approach that integrates human, animal, and environmental health. He warned of the potential for RVF to spread to new

regions due to emerging genetic variants and climate change, stressing the importance of coordinated efforts in surveillance, vaccination, and research to mitigate health impacts and economic losses in agriculture. He urged continued vigilance to anticipate and address future outbreaks globally.