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Commentary

Things Change, Priority Shifts Happen: Rabies in the Age of the Pandemic

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Rabies, one of the major classical neglected tropical diseases (NTD), is an acute progressive viral encephalitis, appreciably older than even historical narratives [1]. More than 17 different, highly neurotropic lyssavirus species are responsible for broad continental distribution (apart from Antarctica), and other putative viral relatives are described regularly [2]. No mammals evade susceptibility, with representative reservoirs among diverse bats and mesocarnivores [3]. Importantly, this zoonosis has the highest case fatality of any infectious disease, primarily due to direct transmission via the bites of rabid dogs, providing easy portal access to the peripheral nervous system for replication in the brain. While estimates vary, arguably tens of millions of exposures and tens of thousands of human deaths occur annually. Besides the obvious public health consequences, rabies impacts upon domestic animals and wildlife have major ramifications for global agriculture, veterinary medicine and conservation biology.

Using laboratory-based surveillance, domestic animal vaccination, and postexposure prophylaxis (PEP) to bitten persons, all developed countries eliminated dog-to-dog circulation of rabies virus and associated human mortalities. Increasingly, lesser developed countries (LDC) repeated this model. Based upon the foundation of mass vaccination of dogs and human PEP, a vision arose for the global elimination of human rabies caused by dogs (GEHRD) by the year 2030 (AKA 'zero by 30' or ZBT), in large measure built upon the successful regional Pan American Health Organization's program enacted throughout the Americas [4]. Ideally, this entails an introspective scoping exercise now, a highly focused enactment over the following ~ 5 years, and at least 2 years of enhanced surveillance to confirm the self-determined 'rabies-free' status, to meet the ZBT goal. Support by the Vaccine Alliance (GAVI), subject to availability of funding for the 2021 - 2025 strategic period, could augment human PEP within eligible countries (https://www.gavi.org/our-alliance/strategy/vaccine-investment-strategy).

The emergence of the COVID-19 pandemic from 2019 to date impacted all NTD, including rabies, otherwise serving as a preparedness model for emerging pathogen detection and successful One Health responses [5]. Within the Americas, even before the pandemic, enzootic canine rabies in Bolivia affected neighboring countries, requiring a regional focus [6]. During the pandemic, conditions worsened. Human movement restrictions, shelter-in-place directives and supply chain disruptions affected health education, surveillance activities, dog vaccination campaigns and the delivery of PEP. The broader translocation and spillover to other neighboring countries were predictable, such as in Peru [7]. Elsewhere, within the Caribbean, optimism for ZBT reigned in Haiti, the poorest country in the region, but arising pandemic realities were only exacerbated anew by political strife and natural disasters [8]. While more than 65 LDC were most affected, highly developed countries were not spared. Faced with the threat of additional cases from abroad, recently the U.S. CDC imposed a suspension on the importation of dogs from high-risk countries (https://www.cdc.gov/importation/bringing-an-animal-into-the-united-states/high-risk-dog-ban-frn.html).

Although the global health situation is dire, emerging infectious diseases are a reality for which modern systems need to plan, yet always re-focus upon enzootic pathogens, particularly those of high consequence with a disproportionate impact upon poor communities [9]. Pandemics will flow, and ebb, including the current one. However, NTD will continue for ages to come, without the necessary evidence for eradication based upon acquired herd immunity, but in contrast will perpetuate as quintessential diseases of nature, requiring transdisciplinary One Health attention. As to rabies, one could always benefit from new tools that are considered faster, more effective, and less expensive. However, waiting for tomorrow's improvements is simply a convenient excuse and has a cost. In reality, the field today does not really require an improved understanding as to its essential epizootiology, more sensitive and specific diagnostic tests or safer and more efficacious biologics - these have existed since the 20th century [10]. Goals and timelines are useful but highly conditional as priorities. At a minimum, the GEHRD program needs to remain resilient and stay the course with dedicated local champions, a determined political will and the collective international spirit of perseverance to continue on this basic road of surveillance, prevention, and control (particularly within Africa and Asia), regardless of a ticking ZBT clock, as in essence all time is relative, in comparison to this ancient malady [11,12].

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