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NEWS RELEASE

Field Projects International Leads Specialist Group Proposing Large-scale, Decentralized Biosurveillance to Protect Global Health

*Wildlife Disease Screening can be Deployed Widely Using Newly Affordable
Technology, Reducing Spillover Risks while also Advancing Conservation Goals*

Writing in the journal *Science* this month, a group of authors including FPI leadership and researchers from the USA, Germany, the UK, and Australia advocate for large-scale, proactive wildlife pathogen screening. The importance of such expanded biosurveillance efforts has been highlighted by the current COVID-19 pandemic, which like Ebola, H1N1, SARS, HIV, and a great many others before it, “spilled over” from animal hosts into humans. In fact, more than half of all emerging infectious diseases (EIDs) are zoonotic, meaning that they arrive in human populations via such spillover events. Among these, 70% originate in wildlife, which underscores the urgency of establishing routine monitoring at high-risk locations around the world.

Of particular concern are the human-wildlife interfaces where people commonly come into direct contact with wildlife. This may occur when animals are hunted for sustenance, but the risk is amplified at places such as wildlife markets, where many different species are often kept in close proximity with poor biosecurity and limited health and safety standards.

Presently, most wildlife disease testing is done reactively after an outbreak, and often the advanced laboratories used for molecular analysis exist far from where spillovers are most likely to occur. The authors note that the overwhelming majority of existing reference labs for animal pathogens do not exist at zoonotic hotspots where EID risk is greatest, such as Southeast Asia, Africa, and Central and South America.

However, this no longer needs to be the case, as the technologies used for detecting pathogens via genome sequencing have become affordable and practical for use in even remote locations. Furthermore, it has been demonstrated in a previous FPI publication¹ that in situ training programs for field lab protocols can rapidly produce competent technicians, opening avenues for local control over public health and research priorities.

“Portable sequencing technology with low power requirements and small footprints have become affordable today, unlike ten years ago right after the H1N1 pandemic,” said Mrinalini Watsa, senior scientist at Field Projects International. “We have demonstrated in prior projects that this technology can be utilized in tropical rainforest requirements, and training provided to competent local scientists, of which there is no scarcity. Simply providing access to technology reduces inequity and increases participation in biosurveillance methods.”

A decentralized approach to biosurveillance not only allows for a greater volume of data to be collected, but it is also resistant to the shifting socio-political climates that affect funding priorities for more expensive centralized efforts. The authors give examples including PREDICT, an intermittently funded federal program that partially financed the study of bat coronaviruses, as well as the U.S. National Institutes of Health’s withdrawal of support for the EcoHealth Alliance and the US’s withdrawal from the World Health Organization.

“We are not implying that our model is better than what others have been doing up to this time. COVID-19 has made it clear where the gaps are, and our vision for global biosurveillance can address those gaps, namely, that the majority of the world, and especially locals in zoonotic hotspots, do not have the resources to participate in spillover surveillance,” commented Gideon Erkenwick, co-Founder of FPI and Post Doctoral Researcher in the Infectious Diseases Division of the Washington University in St. Louis School of Medicine. “Anyone can be trained to collect sequence data that is shared and analyzed instantaneously in the ‘cloud’”. This will allow all stakeholders to be in the loop, from the grassroots and up.

There would still be an important role for more advanced regional research laboratories to provide targeted pathogen screening, to generate new reference genomes, and to maintain biobanks, but the broader pathogen surveillance effort

¹ Watsa, M., Erkenwick, G.A., Pomerantz, A. and Prost, S., 2020. [Portable sequencing as a teaching tool in conservation and biodiversity research](#). PLoS Biology, 18(4), p.e3000667

becomes more proactive, democratized, and adaptable to local needs and conditions. Furthermore, to compliment a strategy of decentralized field laboratories, the authors emphasize the importance of a publicly accessible, centralized, and curated database. Only by sharing high-quality data can genomes be compared and classified, mutation rates be characterized and monitored, the prevalence of diseases be linked to geographic distributions, and other potential indicators of EID risk become known.

“Beyond looking for new viruses, data on disease diversity within natural wildlife populations, and the extent of disease sharing between species is a giant black hole in many parts of the world, and along much of the human-wildlife interface,” says Erkenwick. “This task is too large and too important for only one or two countries to take on, decentralizing the effort is the best option to keep scale with increasing EID risks.”

In addition, the authors recommend that international biosecurity standards for managing wildlife trade also be established based on taxa-specific disease risks. However, they emphasize that this must be implemented carefully to avoid stigmatizing certain animals and triggering fearful human behaviors that threaten species welfare and survival. One of the goals of increased pathogen screening for wildlife (along with complimentary human testing programs) is to inform conservation efforts by detecting threats to nonhuman populations as well.

Fundamentally, the authors advocate for a strategy of wildlife disease surveillance that is in line with the “One Health” concept focusing on interactions and equilibrium among human and natural systems. Public health is inextricable from animal health and ecological function, necessitating a multidisciplinary approach to manage risks to each. The proposed disease monitoring network also depends on the enhanced agency and participation of under-resourced localities that are most at-risk, underscoring a necessary social justice component to this framework.

About Field Projects International (FPI)

We are a 501(c)(3) organization focused on research, education, and conservation. We began in 2009 while investigating tamarin reproductive biology in the Peruvian Amazon, and have since expanded to include studies related to primate communication, habitat use, social behavior, and population growth. Along the way, we have developed and published best-practice protocols for callitrichid mark-recapture programs, and developed custom technology to affordably monitor wildlife movements. Beyond our work with primates, we have also conducted research into the disease ecology of

wildlife communities including bats, small mammals, and birds. In addition, FPI has assisted with the establishment of field-based conservation genomics laboratories on three continents, and have operated research training programs in field biology, as well as courses in tropical biology, for more than a decade. To date, we have trained 313 research scientists, and have provided an average of 2 scholarships per field course.