

Strategies to Prevent (STOP) Spillover

Best practices for animal value chain interventions to reduce zoonotic disease spillover risks at markets and farms – the USAID STOP Spillover approach



Jonathon D Gass^{1,2}, Felicia B Nutter², Nadia Rimi³, Elizabeth Gold⁴, Mustafizur Rahman³, Nguyen T. Le Quyen⁵, Jeffrey Mariner², Ratana Chhan⁶, Tristan Burgess⁷, Edward Magbity⁶, Arlette Dinde Olaby⁷, Sreytouch Vong⁴, Sok Dou⁶, Hellen Janetrix Amuguni²

¹Tufts University School of Medicine, ²Tufts University Cummings School of Veterinary Medicine, ³icddr,b, ⁴JSI Inc., ⁵VOHUN, ⁶TetraTech, ⁷Center for Wildlife Studies

Background

Strategies to Prevent Spillover (or STOP Spillover) is a USAID funded program developing interventions to reduce risks associated with viral zoonotic disease threats. STOP Spillover enhances global understanding of the complex causes of the spread of a selected group of known zoonotic viruses from animals to humans. The project builds government and stakeholder capacity in priority Asian and African countries to identify, assess, and monitor risks associated with these viruses and develop proven risk reduction measures. **“Spillover”** refers to an event in which an emerging zoonotic virus is transferred from a non-human animal host species (livestock or wildlife) to another, or to humans.

Participatory epidemiological approaches in five countries – **Sierra Leone, Cambodia, Vietnam, Cote D’Ivoire, and Bangladesh** - identified **animal value chains**, including those involving **wild meat hunting, butchery, and sale; live-bird markets (LBMs); and wildlife farming as target locations for interventions** to reduce risks of zoonotic spillover from wild and domesticated animals to humans.

Here, we highlight best practices for the design, implementation, and evaluation of animal value chain interventions at market and farm interfaces.

Methods

Routine monitoring and evaluation (M&E) protocols were developed and implemented during intervention activities at animal markets and wildlife farms, including data collection on intervention milestones, activity adaptation, and global Key Performance Indicators (KPIs).

M&E data were managed via a centralized database, the Global Electronic Network of Monitoring and Evaluation (GENOME) and accessible to country teams and global staff for monitoring implementation and data/file storage, facilitating improvement and adaptation.

To identify best practices, data were extracted from GENOME, systematically reviewed, and context-related data were logged via informal interviews with country teams. Data were thematically analyzed to determine cross-cutting best practices.

Results

M&E data revealed **six global best practices for animal value chain interventions to reduce risk of zoonotic spillover.**

① **Multi-level, multi-sectoral stakeholder engagement** ensures that design and implementation of interventions retains support, incentivizes participation, and creates opportunities for sustainability. In Vietnam, multi-level government engagement enhanced community involvement, promoting localized solutions on wildlife farms.

② **Evidence-based biosafety practices** (including using personal protective equipment (PPE) and protocols facilitating proper use) were easily adopted as long as issues around access were addressed. In Sierra Leone, among 47 wild meat market butchers, consistent donning of PPE (aprons, nitrile gloves, and dedicated PPE clothing) ranged from 79-99%.

③ **Intervention evaluation paired with sampling and surveillance** helps to identify practices that reduce pathogen prevalence. In Bangladesh, pre-post sampling and control market comparisons highlighted the biosafety practices most associated with pathogen risk reduction during an LBM intervention.

④ **Public-private partnerships can facilitate economically sustainable risk reductions.** In Bangladesh, STOP Spillover facilitated agreements where poultry industry partners funded biosafety-focused infrastructure improvements of LBMs, in exchange for the opportunity to sell their processed poultry products in the markets.

⑤ **Participatory methods such as community dialogues and Trials of Improved Practices (TIPs)** ensured that new biosafety practices were acceptable and feasible. Intentional and purposeful inclusion of community voices and perspectives in intervention design and data interpretation was key.

⑥ **Data sharing with research subjects and local stakeholders** throughout implementation reinforces sustained adoption of risk reducing behaviors. Community subjects participating in animal value chain interventions should be considered as the primary audience for data sharing – first, because their data should be integrated into lasting change driven by community endeavors; second, because interventions that take data and do not give back will not succeed or be sustainable.

Discussion

Six best practices were highlighted through a qualitative data extraction of M&E data which occurred throughout activity implementation. Several themes emerged which can help to inform future animal value chain interventions aimed at reducing risks associated with zoonotic disease spillover. We encourage future interventions to consider engaging stakeholders at national, sub-national, and community levels, using evidence-based biosafety measures (i.e. PPE) in a harm reduction approach, conducting sampling and pathogen characterization to identify presence of zoonotic threats, establishing partnerships between industry and government to enact economically-sound change, engaging in participatory methods to make community voices an integral part of the research, and sharing data with research subjects to inspire individual behavior change.



(L) Alligator for sale, wild meat market, Cote D’Ivoire. (R) Butcher donning PPE, Sierra Leone. STOP Spillover, 2023.

Conclusions

STOP Spillover’s approach to identifying, characterizing, and evaluating zoonotic risks along the animal value chain has elucidated best practices associated with intervention success. Best practices may be applied by future stakeholders interested in developing methods to reduce risk of zoonotic spillover at animal markets and wildlife farms. We encourage researchers to consider these lessons and incorporate them into the design and implementation of future projects.

Acknowledgements

This work was made possible by the generous support of the American people through USAID. STOP Spillover acknowledges all the stakeholders involved in animal value chain activities for their commitment to the project. We also thank Consortium staff, incl. Meghan Stanley, Christine Curran, and Michaela Randall for supporting the development of this poster.