

Anticipating the Next Pandemic Threat At the Human-Animal Interface in Sarawak, Malaysia

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BASS CONNECTIONS



Duke One Health



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Project Summary: Expanding on data collected by the 2017-2018 Bass Connections team, continued bioaerosol sampling was performed in several new high-priority settings in an effort to increase surveillance for novel zoonotic respiratory viruses in Sarawak, Malaysia.

Understanding the problem

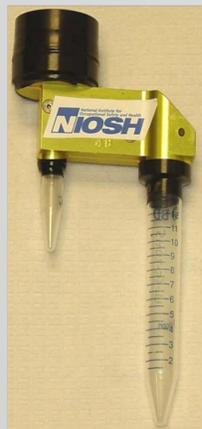
- Around 75% of emerging infectious diseases are zoonotic in origin
- In settings where humans and animals interact, viral host transfer can produce epidemics

Project Goals

- Refine surveillance efforts for emerging respiratory viruses in Malaysia at priority sites: swine abattoirs, poultry farms, and kindergarten settings
- Leverage a One Health approach to understand the epidemiology of respiratory viruses in Sarawak
- Build the surveillance and diagnostic capacity of local collaborators

Surveillance Methods

- Utilized NIOSH two-stage cyclone samplers to collect air samples
- Collected observational environmental surveys in each setting
- Performed real time-PCR to identify prevalence of respiratory viruses: *adenovirus*, *coronavirus*, *enterovirus*, *influenza viruses A/B/C/D*, *porcine reproductive and respiratory syndrome virus* and *porcine circoviruses 2/3*



NIOSH Bioaerosol Sampler

Bioaerosol Sampling Work Flow



Conclusions

- Bioaerosol sampling appears to be an effective for detecting respiratory viruses in field settings
- Swine abattoirs, poultry farms, and kindergarten settings differ in the prevalence and type of viruses detected
- Virus detections were few in the kindergarten settings
- Currently we are validating field work with repeated molecular analyses at Duke
- Collaborations are to continue with local partners on future surveillance of emerging pathogens

Initial Viral Detection Results

| Site Type | Flu A | Flu B | Flu C | Flu D | Entero | Adeno | Corona | PCV2 | PCV3 | PRRSV |
|----------------------|----------------------|-------------------|------------------|-------------------|-------------------|------------------|------------------|-------------------|------------------|-------------------|
| Poultry Farm | Site 1 (n=8) | 2 | 0 | 0 | 1 | 0 | | | | |
| | Site 2 (n=8) | 4 | 2 | 0 | 1 | 0 | | | | |
| | Site 3 (n=4) | 0 | 0 | 0 | 0 | 0 | | | | |
| | Site 4 (n=4) | 0 | 0 | 0 | 3 | 0 | | | | |
| | Site 5 (n=4) | 0 | 0 | 0 | 0 | 0 | | | | |
| | Total (n= 28) | 6/28 (21%) | 2/28 (7%) | 0/28 (0%) | 5/28 (18%) | 0/28 (0%) | | | | |
| Swine Abattoir | Session 1 (n=4) | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 1 | 0 |
| | Session 2 (n=4) | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | Session 3 (n=4) | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| | Session 4 (n=4) | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 2 |
| | Session 5 (n=4) | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| | Session 6 (n=4) | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| Total (n= 24) | 3/24 (13%) | 2/24 (8%) | 0/24 (0%) | 9/24 (38%) | 0/24 (0%) | 1/24 (4%) | 0/24 (0%) | 4/24 (16%) | 1/24 (4%) | 3/24 (13%) |
| Kindergarten | Site 1 (n=4) | 0 | 0 | 0 | 1 | 0 | 0 | | | |
| | Site 2 (n=4) | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | Site 3 (n=4) | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | Site 4 (n=8) | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | Site 5 (n=8) | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | Site 6 (n=3) | 0 | 0 | 0 | 0 | 0 | - | 0 | | |
| | Site 7 (n=4) | 0 | 0 | 0 | 0 | 0 | - | 0 | | |
| Total (n= 35) | 0/35 (0%) | 0/35 (0%) | 0/35 (0%) | 1/35 (3%) | 0/35 (0%) | 0/35 (0%) | 0/35 (0%) | | | |

Summary of positive and negative viral detection from each site/sampling session



Duke Team with Sibuh Hospital Clinical Research Center

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