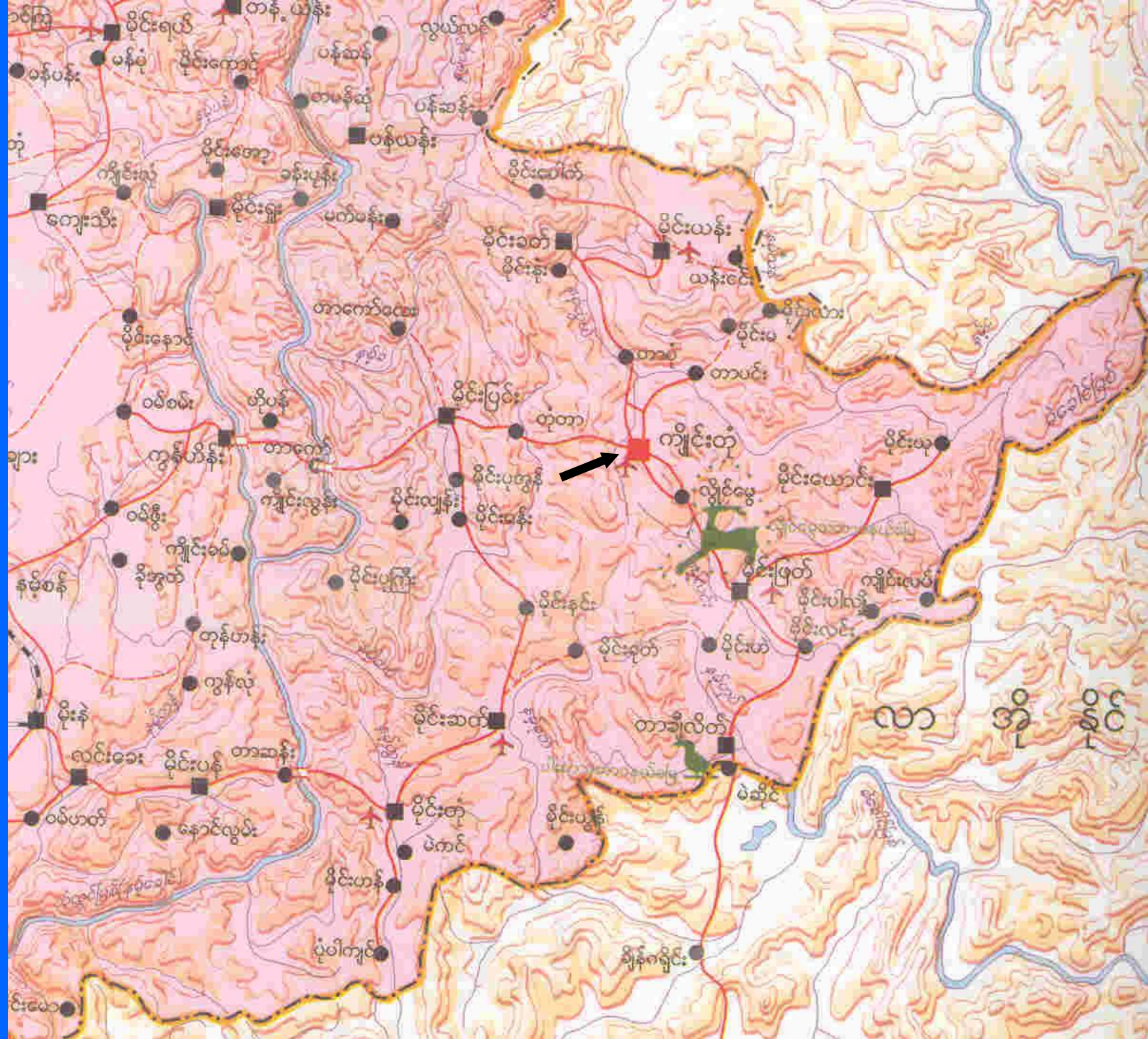


# *Investigation of an Event with Unusual Presentation*

*Prof Dr. Soe Lwin Nyein  
Public Health Expert & Senior Advisor  
MOHS*





# Discussion at Triangle Command HQ



## Area of outbreak

- ~ Kyaingtone Township, Eastern Shan State
- Family quarters of a Military Training School
- Wanyan Village (Ah Kha village near the Military Training School)

## Cases

- Sixteen cases admitted to No. 3 Military Hospital in Kyaingtone ( 4 expired)
- Four domicillary cases in Wanyan Village of which one case was later admitted to Eastern Shan State General hospital



# A typical Ah Kha House in Wanyan Village





# Family Quarters of Military Training School



# Human health

- Any other  
Informations????????????????????  
??

# Animal Health History

- Any other informations  
????????????????????



- *What are the most important I/V & M steps and urgent challenges  
????????????????*

- **WHAT** concrete, short-term steps can you take to begin to resolve each of the top challenges you just identified?
- **WHO** will take responsibility for these steps? Who will be accountable for making sure the actions have been taken and the problems are being satisfactorily resolved?
- **WHEN** will these actions be completed, and when will progress be reassessed?



# Surveillance and Information Sharing

*Objective:* *Assure appropriate surveillance (animal and human) and information sharing.*

# Disease Prevention and Control Measures

**Objective: Identify appropriate measures to minimize morbidity and mortality through effective prevention and control of disease transmission – national and international.**



## ☀ Epidemiological investigations

- were performed by the clinicians, microbiologists, pathologists and epidemiologists wearing personnel protective equipment (PPE), followed by correct disposal and proper hand washing

☀ Clinical examination and care

☀ Collection of clinical samples

☀ Laboratory investigations.

## ☀ Epidemiological Investigations

- Family quarters of Military Training School
- Nearby three villages
- Primary School

## ☀ Control Measures

- Home quarantine
- Cleaning and disinfection
- Temporary closure of primary school

## ☀ Health Education

- Responsible State, District and Township level officials
- Kyaintone Township government personnel
- Household members of family quarters of Military Training School and villages



# **Epidemiological Investigation**

- influenza-like illnesses started to occur in many children in the Wanyan Village since the first two weeks of October 2005
- children from the military family quarters and Wanyan Village children attend the same primary school
- it was deduced that the illness spread from village children to children from the military family quarters within this school
- estimated minimum incubation period 3-4 days  
estimated median incubation period 5-6 days.

# **ATTACK RATES**

**The age specific attack rates were :**

- **Under 5 years** **25%**
- **5 – 11 years** **65%**
- **12 years and above** **10%**

**The female/male ratio was 3:1**

# Laboratory Investigations

## ☀ On-site Near Patients Tests

- Malaria Paracheck Test
- Dengue IgM and IgG PanBio ICT
- Directigen Flu A (B-D)
- Rapid Latex Agglutination Test for Bacterial Meningitis (Mureuix)

## ☀ Autopsy

- Done on two expired cases



# Directigen Flu A®

Negative



*Influenza A*

Negative



*Influenza A*

Positive



*Influenza A*

Positive  
Control



*Influenza A*

# Specimen Collections

## From cases

- Blood samples from 13 recovered cases and from two fatal cases
- Nasopharyngeal swabs from 9 cases showing respiratory signs
- Cerebrospinal fluid from a case showing neurological symptoms

## From animals

- Blood samples from 5 pigs in the area of outbreak





## Tests at Central Laboratory

- Japanese encephalitis IgM EIA
- Japanese encephalitis haemagglutination inhibition test (for pig sera only)
- Influenza A (H1, H3, H5) immunofluorescent test
- Influenza A (H5) RT-PCR test

## Confirmatory Tests at WHO National Influenza Centre

- RT- PCR for Influenza A (H1, H3 and H5)



# FATAL CASES

## Four cases expired:

- ☀ Three cases expired before the arrival of investigation team
  - Blood sample obtained from one case – negative for JE IgM antibody
  - Autopsy showed marked cerebral oedema with normal meninges



## One case expired after arrival of the investigation team

- Blood sample was negative for dengue, malaria and JE IgM antibody
- Nasopharyngeal swab
  - positive for influenza A (Directigen Flu A),
  - negative for influenza A (H1, H3 and H5) by indirect immunofluorescent test
  - negative for influenza A (H5) by RT-PCR at DMR(LM)
  - positive for influenza A (H1N1) by RT-PCR at WHO NIC
- Autopsy showed massive cerebral oedema with normal meninges

# RECOVERED CASES

**Thirteen cases admitted to No. 3 Military Hospital and four children from Wanyan Village fully recovered with no sequelae**

☀ Blood samples from 13 cases admitted to No. 3 MH and one Wanyan Village child were

■ negative for dengue, malaria and JE IgM

☀ Cerebrospinal fluid from one case admitted to No. 3 MH was

■ negative for *H. influenza b*, *Streptococcus pneumoniae*, *Nisei meningitides a*, *b* and *c*

■ cytology and biochemical parameters were within normal limits

**☀ Nasopharyngeal swabs from four cases admitted No. 3 MH and four Wanyan Village children with respiratory symptoms**

- three were positive for influenza A (Directigen Flu A)
- all were negative for influenza A (H1, H3 and H5) by indirect immunofluorescent test
- all were negative for influenza A (H5) by RT-PCR at DMR(LM)
- three were positive for influenza A (H1, H3 and H5) by RT-PCR at WHO NIC



# ANIMAL SERA

- ☀ Sera from 5 pigs were negative for JE IgM but two sera were positive for JE Haemagglutination Inhibition Antibody

# Communications/Risk communication

**Objective: Identify communications priorities for the general public, healthcare workers and partner agencies (national and international).**

# Crisis Management

**Objective: To identify effective strategies to sustain essential health services and supplies and mitigate the impact of the pandemic.**

# OUTCOME OF CONTROL MEASURES

## ☀ Control Measures comprising of

- Home quarantine
- Cleaning and disinfection
- Temporary closure of primary school

## ☀ Resulted in the containment of the outbreak with no new cases



# DISCUSSION

- Influenza infections can mimic neurological infections
- Influenza encephalopathy probably not due to direct infection of the nervous system but through chemical mediators of inflammation
- On-site, near patient test provided a rapid diagnosis
- Prompt and appropriate control measures initiated preventing further spread
- Fluorescent antibody tests require intact respiratory cells and samples have to be processed within a few hours

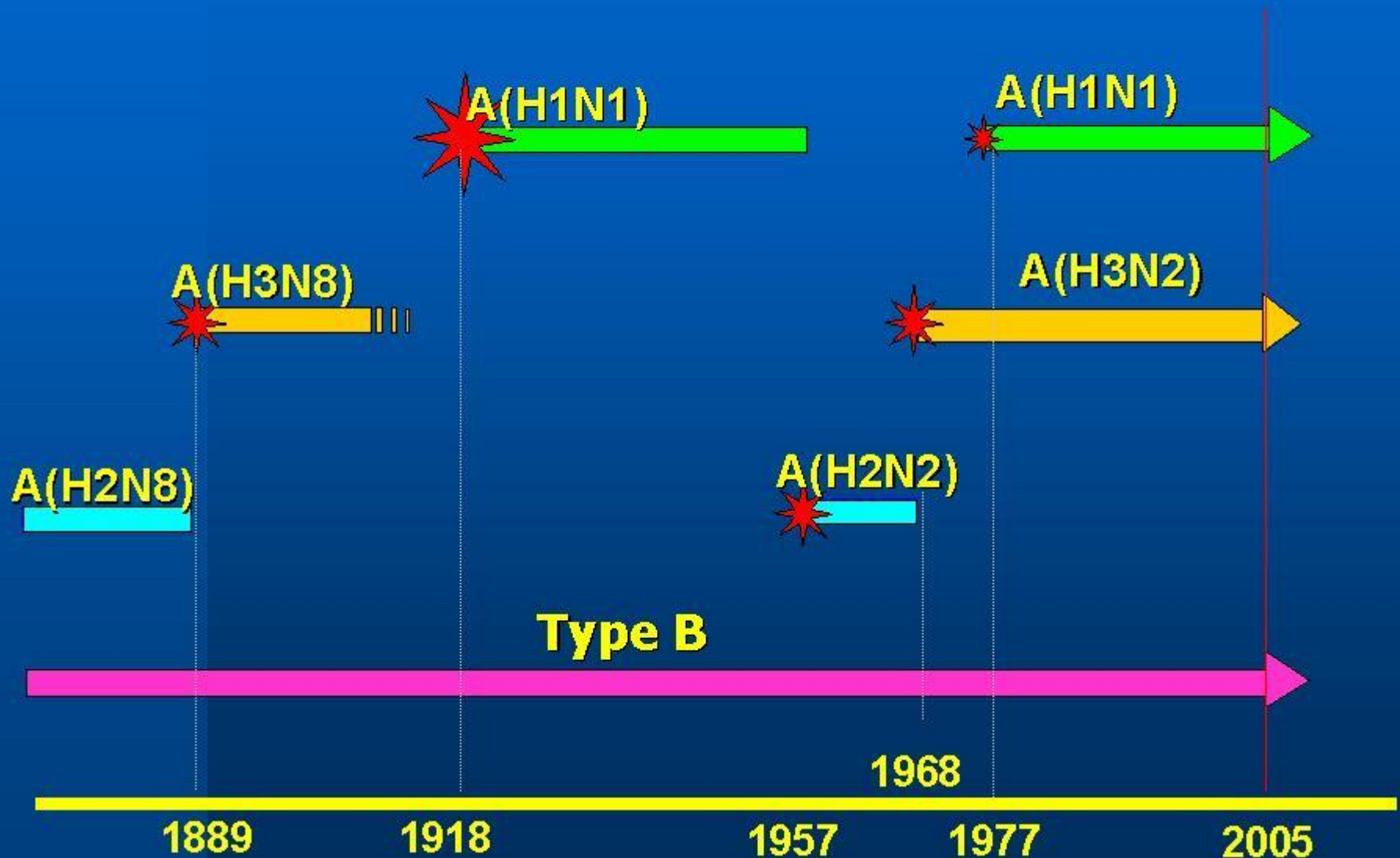
# Electron micrograph of Influenza Virus



# Characteristics of Influenza

- ✱ Occurs worldwide
- ✱ Repeated infections throughout life
- ✱ Outbreaks every year
  - regular epidemics
  - occasional pandemics
- ✱ Usually seasonal winter illness in temperate climates, less seasonal in tropics

# Eras of Human Influenza Viruses





# Influenza Encephalopathy

- ✱ mostly reported from Japan
- ✱ occurs in young children during an influenza epidemic though sporadic cases have been reported
- ✱ a sudden onset of high fever, severe convulsions, rapidly progressive coma, and death within 2 or 3 days
- ✱ a few reports from Europe and North America

# CONCLUSIONS

- Influenza A infections can exhibit unusual presentations like encephalopathy
- On-site, near-patient tests provide rapid diagnosis facilitating prompt and appropriate control measures
- Conventional non-pharmaceutical control measures (without vaccines or antivirals) can prevent further spread of an outbreak
- For infection control and protection of the outbreak investigation team, health care workers and laboratory personnel, imperative to wear personnel protective equipment followed by correct disposal and proper hand washing

# Surveillance system design

- *Data---collection , analysis, interpretation*
- *For-----Appropriate public health action*
- *Disrupt health system –EWARS,Sur:sys----crucial,*
- *Key issues*
- *(1)-public health importance of the disease*
- *(2)objectives(SMART)..trends and detect changes intervention,hypothesis*
- *(3)case definition-suspect,probable,confirmed*

- ***(4)Data indicators required  
(data.set,sources,collection)  
active,passive,sentinel***
- ***surveillance, confidentiality,flow,distribution***
- ***(5)Action as an outcome of the system***
- ***Intervention,research,survey,legislation***
- ***(6)Feedback-motivation,communication***
- ***(7)Evaluation-system useful/achieve  
obj:***



# Prioritization of surveillance

(1) *Present burden of the disease-----* ( $<1=1$ )  
( $1-9=2$ ), ( $10-99=3$ ) ( $100-999=4$ ) ( $>1000=5$ ) *PER*  
*100,000 POPULATION*

(2) *Severity—CFR %-* ( $<1=1$ ), ( $1-4=2$ ), ( $5-9=3$ ),  
( $10-19=4$ ), ( $>20=5$ )

(3) *Epidemic potential-(Never spread=1)*  
(*Rare=2*)(*Localized=3*)(*National=4*)  
(*International=5*)

*(4) Potential threat/emergence/changing  
pattern(absent=1)(small=2)  
(medium=3)*

*(High=4)(almost certain=5)*

*(5) Health gain opportunity through PH  
activities*

*(DHF=1, Polio=5)*

*(6) IHR(Eradication, Elimination)*

*(7) SE impact*

*(8) Public concern and perception*

# *Outbreak Investigation and Response*

- *How the disease outbreak recognized????*

# *(1)Field Operation preparedness*

- *TECHNICAL (K A P)*
- *LOGISTICS*
- *COORDINATION*



# Logistics and Communication Challenges

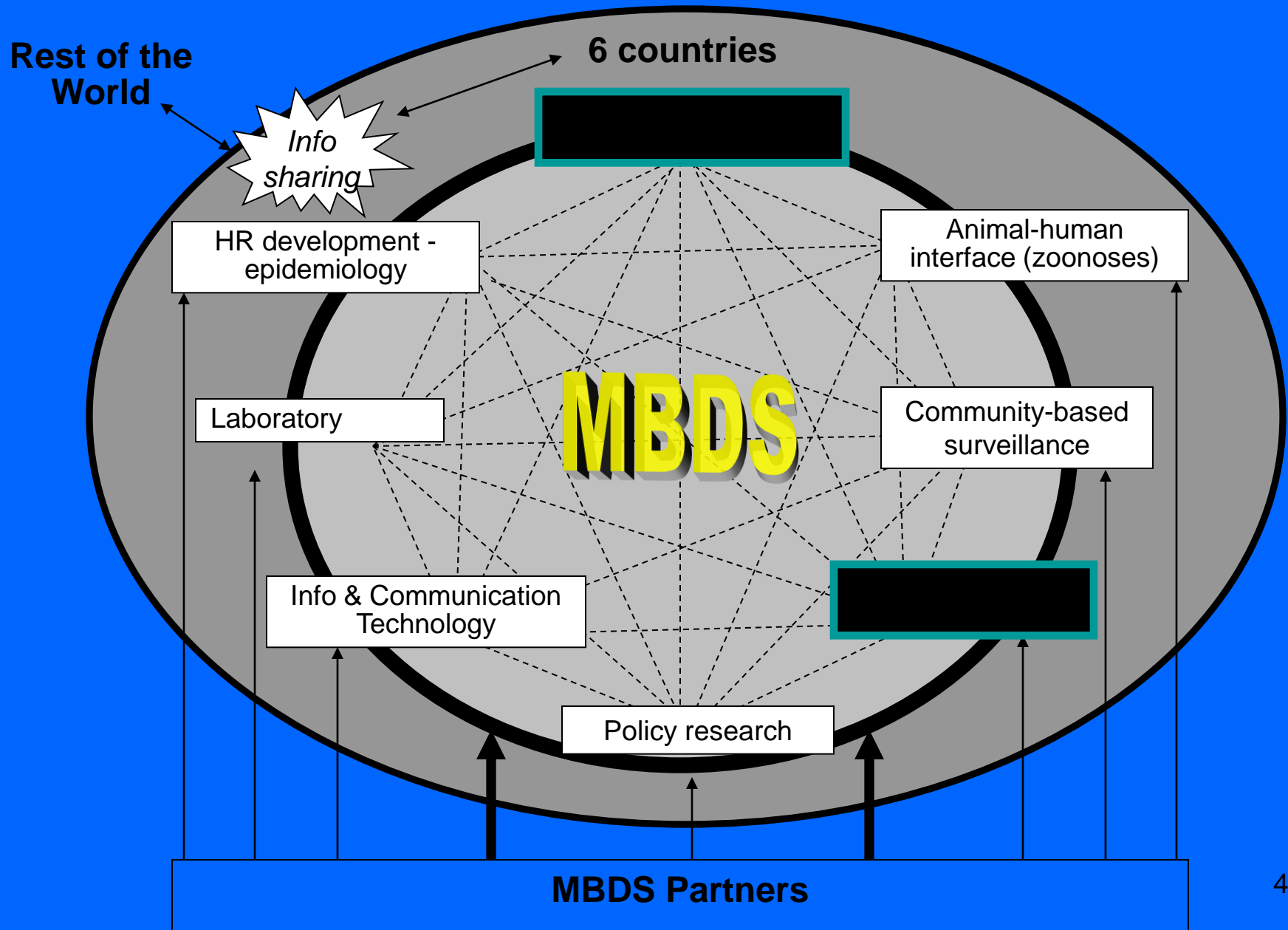




# *Rapid Response Team*

- *Team composition???*
- *TOR ???*
- *Field preparation???*
  - *Objective , Strategy, Command system,*

# MBDS Core Strategies

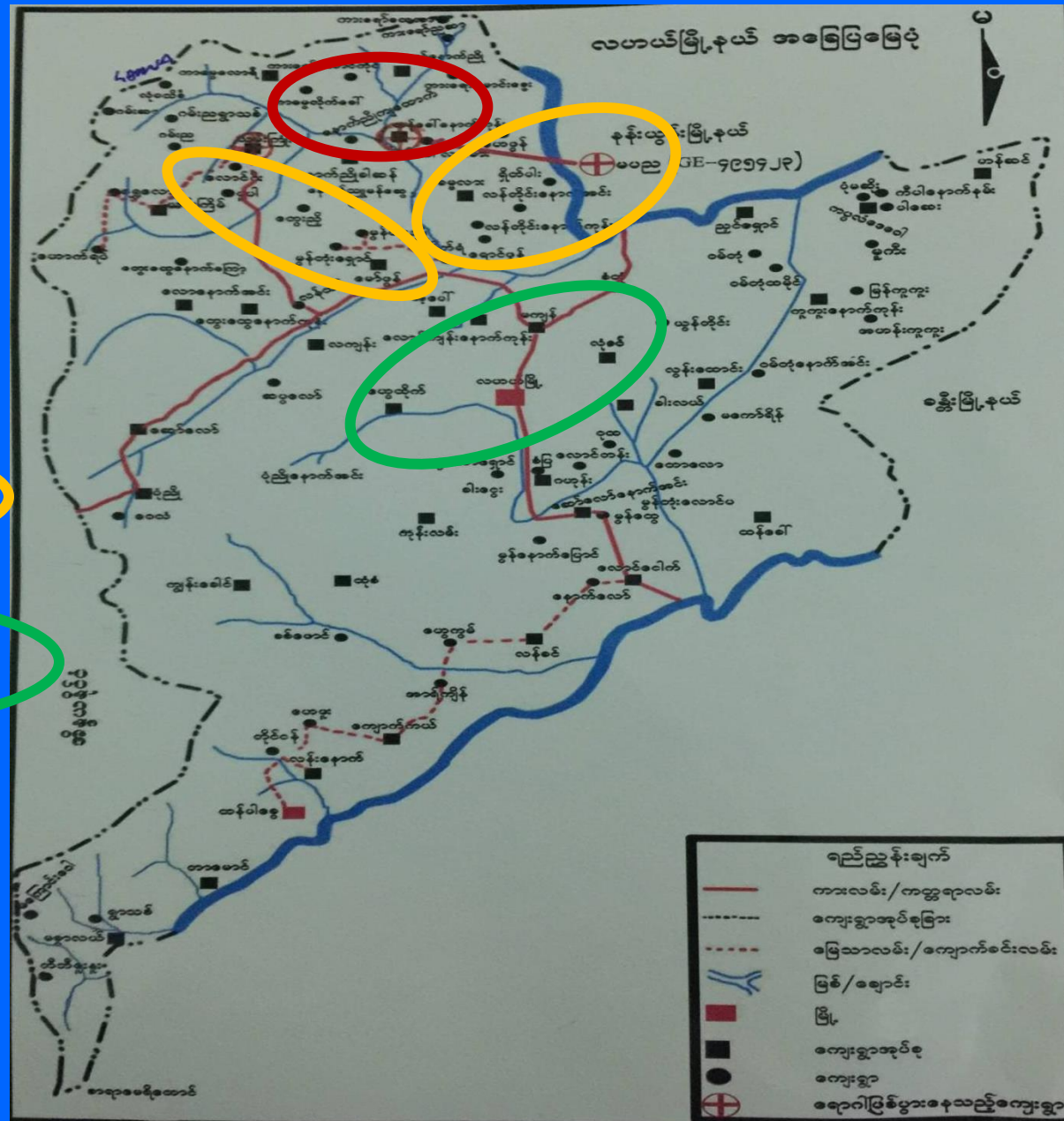


# Control Strategies for Measles Outbreak

Containment Zone

High Risk Zone

Immunization and Health Assessment Zone



## *Other steps for operation*

- *Confirm/ verify the outbreak*
- *Case definition and case finding*
- *Data collection and Analysis ( identification, Demographic , Clinical details ,risk factors )*

*Descriptive analysis- person, place ,time*

*Reviewing causal factors and  
generating a testable hypothesis*

*Analytical studies to test Hypothesis  
(RR,OR)*



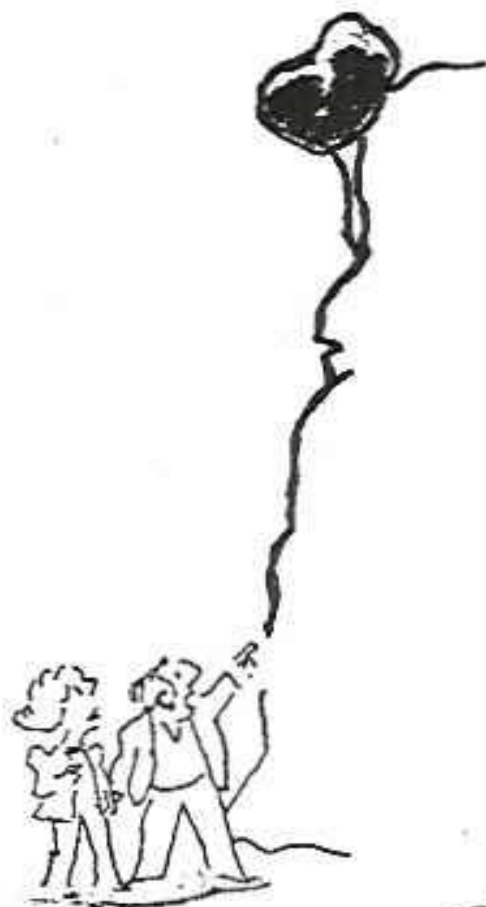
## ***Contn:***

- ***Environmental and Laboratory confirmation***
- ***Other studies-Entomological studies***
- ***Communicate conclusions and recommend control measures***
- ***Implement control measures***
- ***Follow up the implementation of control measures***

RISK  
PERCEPTION

RISK  
ASSESSMENT

RISK  
MANAGEMENT



J. WATTS



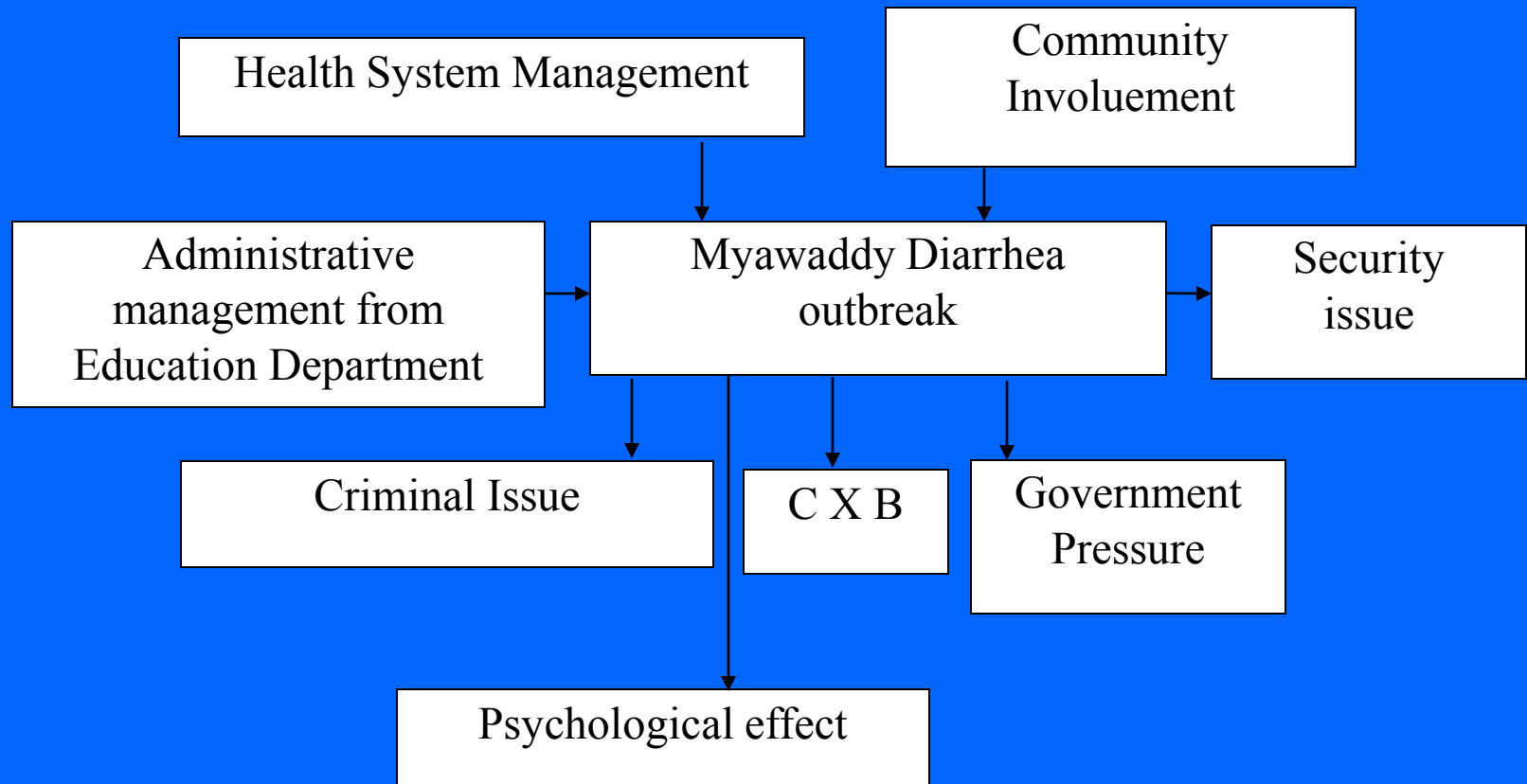






# Important Consideration for Outbreak Management Related Issues

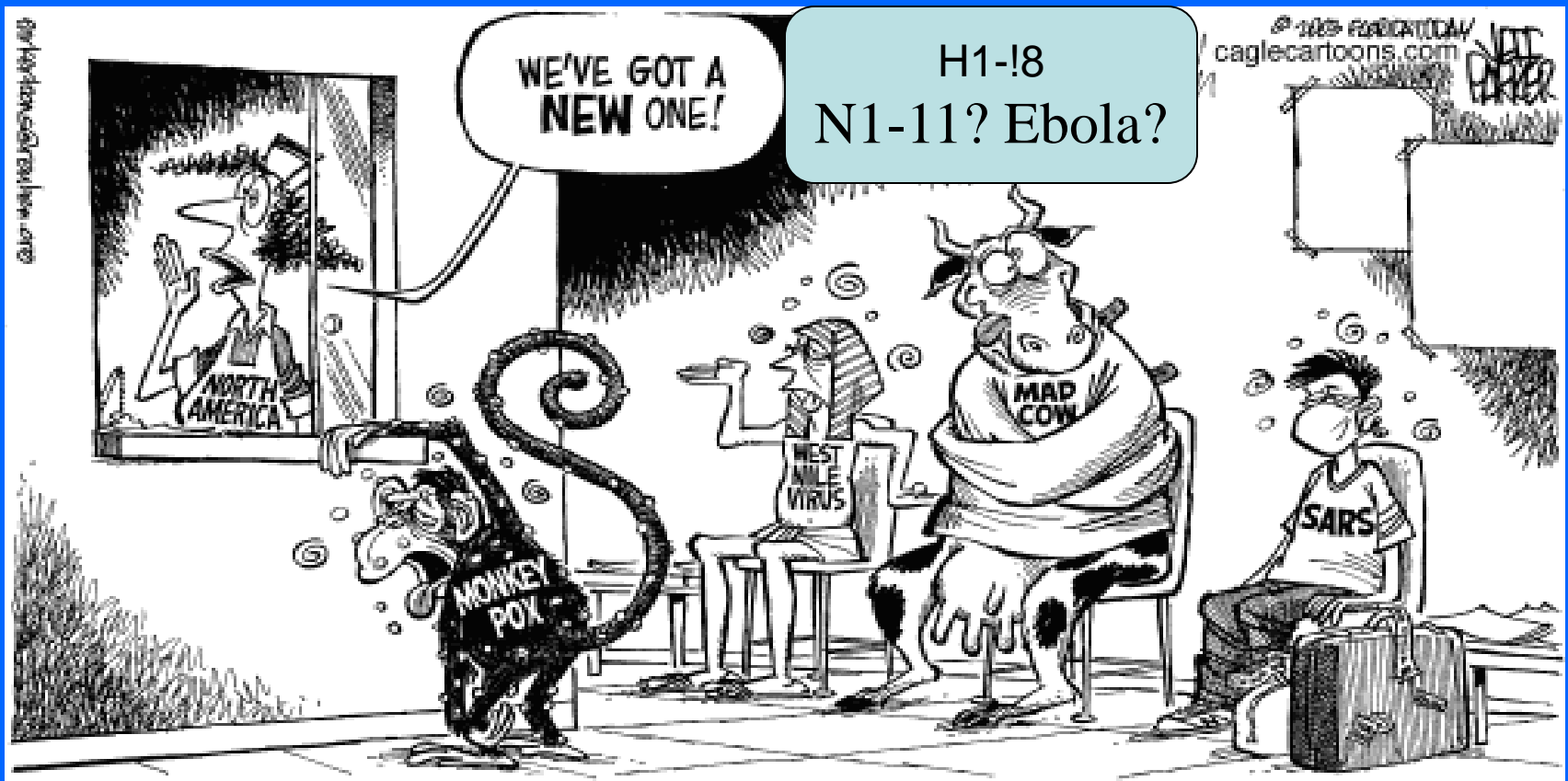




# *Report Writing*

- *Abstract*
- *Back ground*
- *Objective*
- *strategy*
- *Method of investigation*
- *Observation/result*
- *Conclusions, action taken*
- *Recommendations*

*Be prepared, New will come!*  
*THANK YOU*



# **ACKNOWLEDGEMENT**

We would like to extend our gratitude to all those who provided assistance towards the successful completion of this operation.

# Table 1. Case summaries of fatal cases

Name	Age / Sex	Symptoms	Outcome	Laboratory Investigations							
				Directigen Flu A	Malaria Paracheck	Dengue ICT	JE IgM ELISA	H5N1 RT-PCR	IFA test	H1,H3, H5 PCR*	Autopsy
EEK	5 F	afebrile/ tonic-clonic convulsions	Expired within 24 hr of admission	ND	ND	ND	ND	ND	ND	ND	ND
TTA	6 F	fever/ tonic-clonic convulsions	Expired within 24 hr of admission	ND	ND	ND	ND	ND	ND	ND	ND
SSM	3 F	fever/ generalized convulsions	Expired after 30 hrs of admission	ND	ND	ND	Neg	ND	ND	ND	Marked cerebral oedema
SMN	7 F	fever & vomiting	Expired after going into coma	Pos	Neg	Neg	Neg	Neg	Neg	H1N1	Marked cerebral oedema

**ND = not done    Pos = positive    Neg = negative    \* done at WHO NIC**

## Table 2. Case summaries of recovered cases

Name	Age/ Sex	Symptoms	Outcome	Laboratory Investigations						
				Directigen Flu A	Malaria Paracheck	Dengue ICT	JE IgM ELISA	H5N1 RT-PCR	IFA test	H1,H3, H5 PCR*
HEP	12 F	fever	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
MCS	6 F	fever & cough	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
MKS	10 M	fever & cough	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
SLN	4 M	fever & cough	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
WTH	6 F	fever & cough	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
WPA	1M	fever & cough	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
YNM	3F	fever & cough	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
MKH	9 F	fever & cough	Discharged	Neg	Neg	Neg	Neg	ND	ND	Neg
AAM	10 F	fever	Discharged	ND	Neg	Neg	Neg	ND	ND	ND
KKM	8 F	afebrile severe headache	Discharged	Neg	Neg	Neg	Neg	ND	ND	Neg
TES	7 F	vomiting	Discharged	Neg	Neg	Neg	Neg	ND	ND	Neg
STTH	5 F	fever & cough	Discharged	Pos	Neg	Neg	Neg	Neg	Neg	Neg

**ND = not done    Pos = positive    Neg = negative    \*done at WHO NIC**



## Table 3. Case summaries from Wan Yan Village children

Name	Age/ Sex	Symptoms	Laboratory Investigations				
			Directigen Flu A	H5N1 RT-PCR	IFA test	H1,H3, H5 PCR*	JE IgM ELISA
AY	5 M	fever & cough	Neg	ND	ND	Neg	ND
BG	3 F	fever & cough	<b>Neg</b>	ND	ND	<b>H1N1</b>	ND
AGL	5 M	fever & cough	<b>Pos</b>	Neg	Neg	<b>H1N1</b>	ND
BD	13 F	fever & cough	<b>Pos</b>	Neg	Neg	<b>H1N1</b>	Neg

**ND = not done    Pos = positive    Neg = negative    \* done at WHO NIC**