

Laboratory Aspect of VPD Surveillance and Outbreak Investigation

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NHL

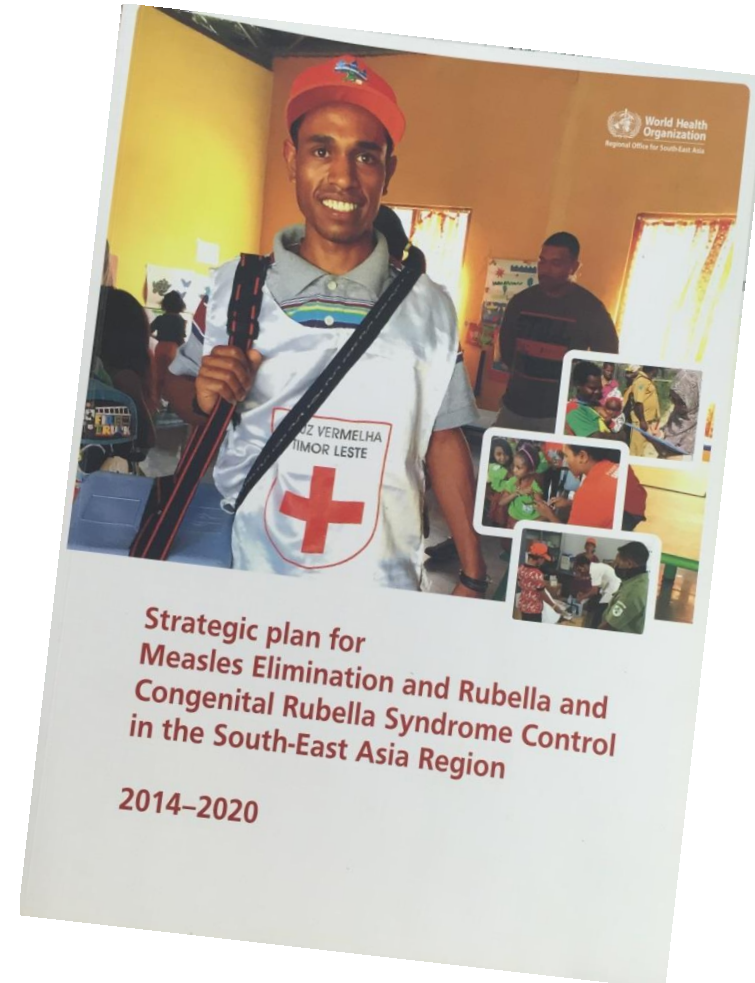
Fever with Rash Surveillance

Measles and Rubella

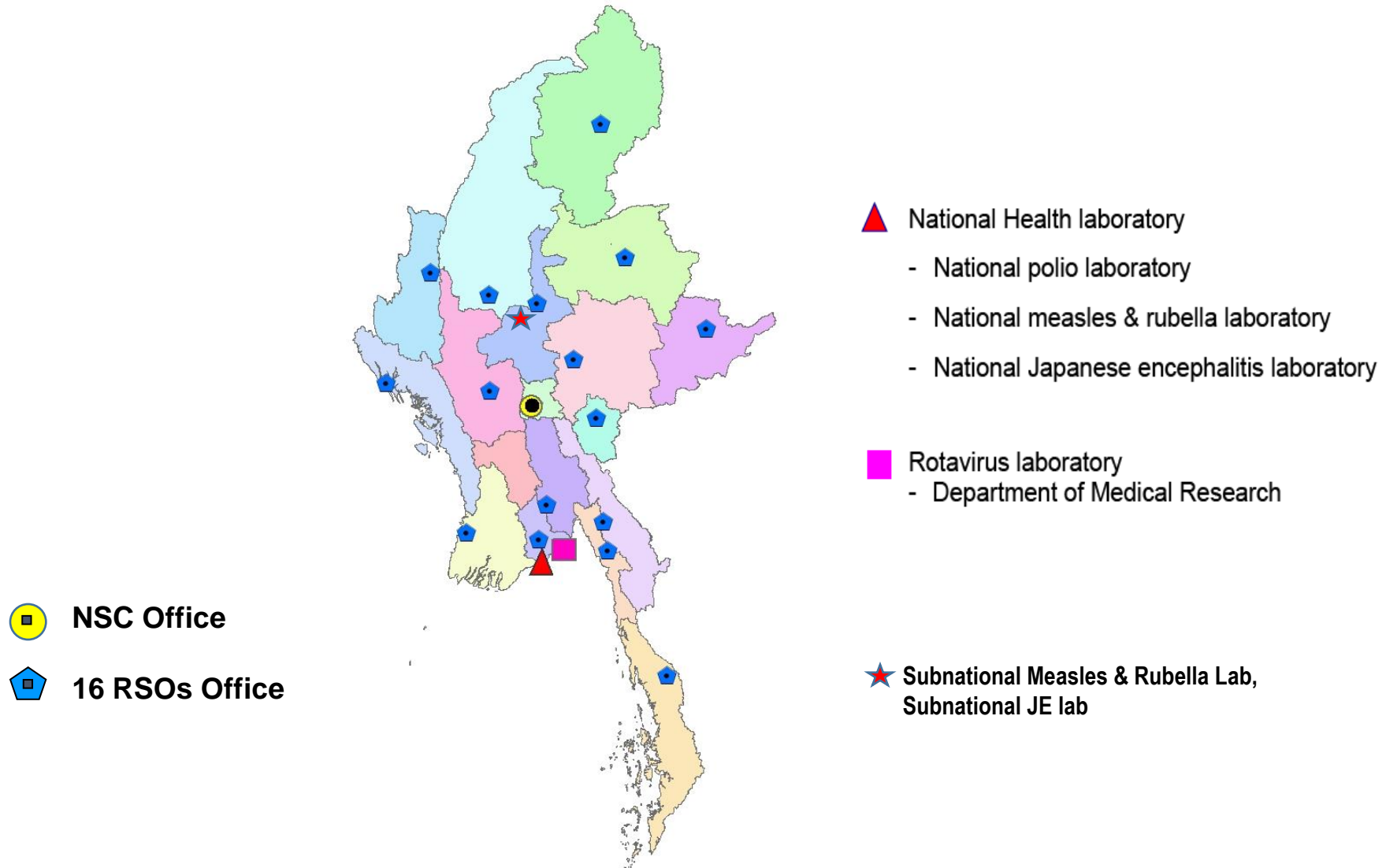
Achieving elimination of measles and control of rubella/CRS by 2020 – Regional Strategic Plan

Key Strategies:

1. Immunization
2. Surveillance
3. Laboratory network
4. Support & Linkages



Network of Regional surveillance officers (RSO) and Laboratories



National Measles/Rubella Lab (NHL, Yangon)

- Surveillance began in 2003
- From 2005 onwards, case-based diagnosis was done
- Measles virus isolation was done since 2006
- PCR since 2016

Sub-National Measles/Rubella Lab (PHL, Mandalay)

- Training 29.8.16 to 2.9.16
- Testing since Nov 2016
- Accredited in Oct 2017

Measles Serology Data

	Measles Test Done	Measles IgM Positive	Measles IgM Negative	Measles IgM Equivocal
2011	1766	1245	452	69
2012	1420	1182	193	45
2013	328	110	212	6
2014	282	24	254	4
2015	244	6	235	3
2016	531	181	334	16
2017	1589	1023	503	62

Rubella Serology Data

	Rubella Test Done	Rubella IgM Positive	Rubella IgM Negative	Rubella IgM Equivocal
2011	425	96	308	21
2012	195	20	166	9
2013	211	23	185	3
2014	257	29	224	4
2015	243	34	196	13
2016	535	12	511	12
2017	965	8	948	9

Measles Genotypes circulating in Myanmar

1. Isolation in VERO h SLAM cell line
2. Positive culture shows syncytia formation
3. Isolated MeV or sample by PCR
4. Positive PCR product is sent to RRL for sequencing
5. Sequence analysis for measles genotyping is done in NML and submit the result in MeaNS, which serves as the Global Measles Sequence Database for the WHO LabNet
6. Myanmar MeV
 1. 2006 - D5,
 2. 2009/2010/2011/2012 - D9
 3. 2016 – D8 (Naga Outbreak), H1 (Ygn outbreak)
 4. 2017 – H1

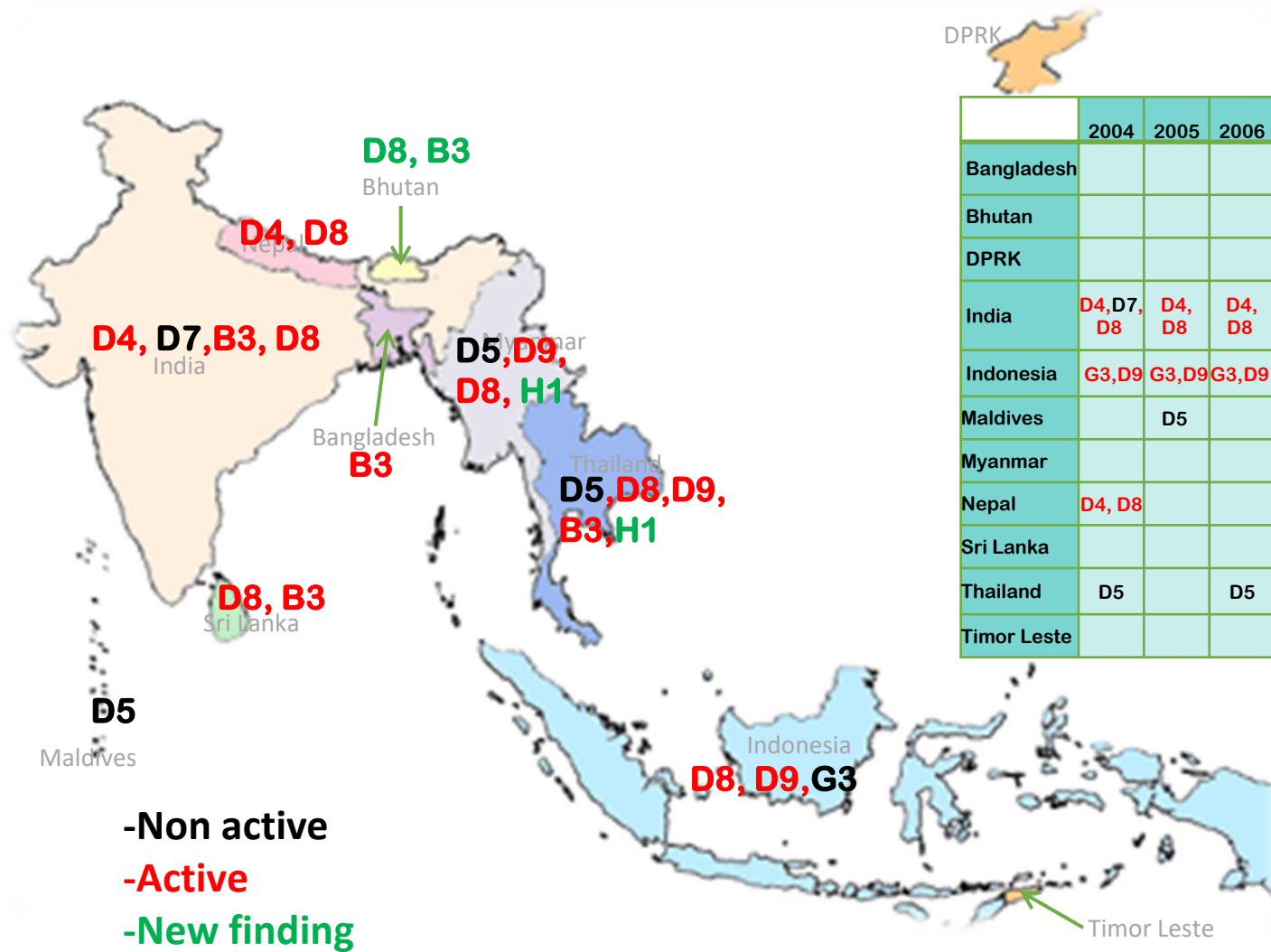
Measles Genotyping data (2009 - 2016)

Year	Total Urine Samples Received	Total Positive from Urine Samples	Total Throat Swab Samples Received	Total Positive from Throat swab Samples	Total Nasal Swab Samples Received	Total Positive from Nasal swab Samples	Total Positive Cases and detected Genotype
2009	48	0	30	2	0	0	2(D9)
2010	49	6	8	0	0	0	6(D9)
2011	255	16	10	1	10	1	18(D9)
2012	130	5	1	0	0	0	5(D9)
2013	1	0	0	0	0	0	0
2014	2	0	0	0	0	0	0
2015	0	0	0	0	0	0	0
2016	12	6 (4 -D8, 2-H1)	7	4 (D8)	0	0	8 (D8), 2 (H1)

Measles Genotypes 2017 Jan - Dec

	Total No. of Samples Received	Total Positive Samples	Genotype
Urine samples by PCR	137	103	H1
Viral isolates from Urine samples	137	5	H1
Throat Swab samples by PCR	5	3	H1
Nasopharyngeal Swab samples by PCR	2	0	
Total	144	106	H1

Measles genotypes circulating in SEAR between 2004 and 2016*



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bangladesh											B3	B3	
Bhutan												D8, B3	D8
DPRK													
India	D4, D7, D8	D4, D8	D4, D8	D4, D8, D7	D4, D8	D4, D8	D4, D8	D4, D8	B3, D4, D8	D4, D8	B3, D4, D8	B3, D4, D8	B3, D4, D8
Indonesia	G3, D9	G3, D9	G3, D9	G3, D8, D9	D9		D9	D9, G3	D8, D9	D8, D9	D8, D9	D8, D9	D8, D9
Maldives		D5											
Myanmar				D5			D9	D9	D9				D8, H1
Nepal	D4, D8				D4	D8	D4, D8	D4, D8	D8			D4, D8	D8
Sri Lanka							D8	D8			B3		B3
Thailand	D5		D5	D5	D5, D9	D9		D8, D9	D8, D9	D8, D9	B3	H1	H1, B3, D8
Timor Leste													

* Data as of 12 Aug 2016

CRS surveillance

- Started since 2016 Nov
- Surveillance sites: YCH, YKCH, NOGH, 550 bedded MCH, 300 bedded MCH

	Rubella Test Done	Rubella IgM Positive	Rubella IgM Negative	Rubella IgM Equivocal
2016 Nov-Dec	4	0	4	0
2017 Jan- Dec	47	0	47	0

AES surveillance

JE

National JE Laboratory (NHL, Yangon)

- JE IgM detection in serum/CSF by ELISA
- Acute encephalitis syndrome(AES) surveillance since 2007

Sub National JE Laboratory (PHL, Mandalay)

- Acute encephalitis syndrome(AES) surveillance since 2016 Nov

Japanese Encephalitis Annual Reports

Year	JE sera tested	JE sera IgM positive	JE CSF tested	JE CSF IgM positive
2009	37	0	5	0
2010	216	19	10	0
2011	181	18	28	4
2012	153	14	20	2
2013	185	17	19	3
2014	228	50	42	16
2015	400	113	309	50
2016(NHL+PHL)	1559+71=1630	388+6=394	792+32=824	129+7=136
2017 Jan-Dec (NHL+PHL)	1369+135=1504	321+52=373	908+64=972	110+16=126

JE Positive Townships (2010)

States/Regions	Townships	No.of Cases
Yangon	Dawbon, Twante, Mingaladon	3
Ayeyarwaddy	Daadeye,	1
Shan East	Tachileik	2
Shan South	Pekon	1
Kayin	Kawkareik	2
Kayah	Loikaw	1
Rakhine	Sittwe	3
Bago East	Waw, Bago	3
Magway	Aunglan	1
Total JE IgM Positive		17

JE Positive Townships (2011)

States/Regions	Townships	No. of Cases
Yangon	Mayangone, Dagon, North Okkalapa, Kyimyindine, New Dagon South, Dawbon	9
Ayeyarwaddy	Pantanaw	1
Mandalay	Naypyitaw	1
Mon	Paung	1
Tannintharyi	Myeik	2
Bago East	Daik U	1
Bago West	Pyay, Paukkhaung	2
Rakhine	Sittwe	2
Magway	Yenanchaung	1
Total JE IgM Positive		20

JE Positive Townships (2012)

States/Regions	Townships	No. of Cases
Yangon	Mingala Taung Nyunt, Hlaingthayar, New Dagon North, Kayan, Kyauktan, Thanlyin	7
Tanintharyi	Myeik, Kyun Su	5
Rakhine	Gwa	1
Mon	Bilin	1
Total JE IgM Positive		14

JE Positive Townships (2013)

States/Regions	Townships	No. of Cases
Yangon	New Dagon South, Hlegu, Dagon Seikkan, Mayangone, Thongwa, Thanlyin, Hlaing, New Dagon North	8
Kachin	Bhamaw, Momauk	4
Rakhine	Rathedaung	1
Ayeyarwaddy	Kyaunggone	1
Mon	Bilin	2
Unknown		1
Total JE IgM Positive		17

JE Positive Townships (2014)

States/Regions	Townships	No. of Cases
Yangon	Hlaingthayar, New Dagon South, Kyauktan, Kayan, North Okkalapa	5
Kachin	Mohnyin, Waingmaw, Tanai, Myitkyina, Mogaung	15
Rakhine	Minbya, Pauktaw, Rathedaung, Sittwe, Kyauktaw, Myauk Oo, Myebon	23
Bago East	Shwegyin, Kyaukkyi	3
Bago West	Pyay, Paungde, Monyo,	3
Mandalay	Pyigyitagun	2
Magway	Magway	1
Ayeyarwaddy	Pathein, Pantanaw, Wakema, Bogale	4
Unknown Regions		2
Total JE IgM Positive		58

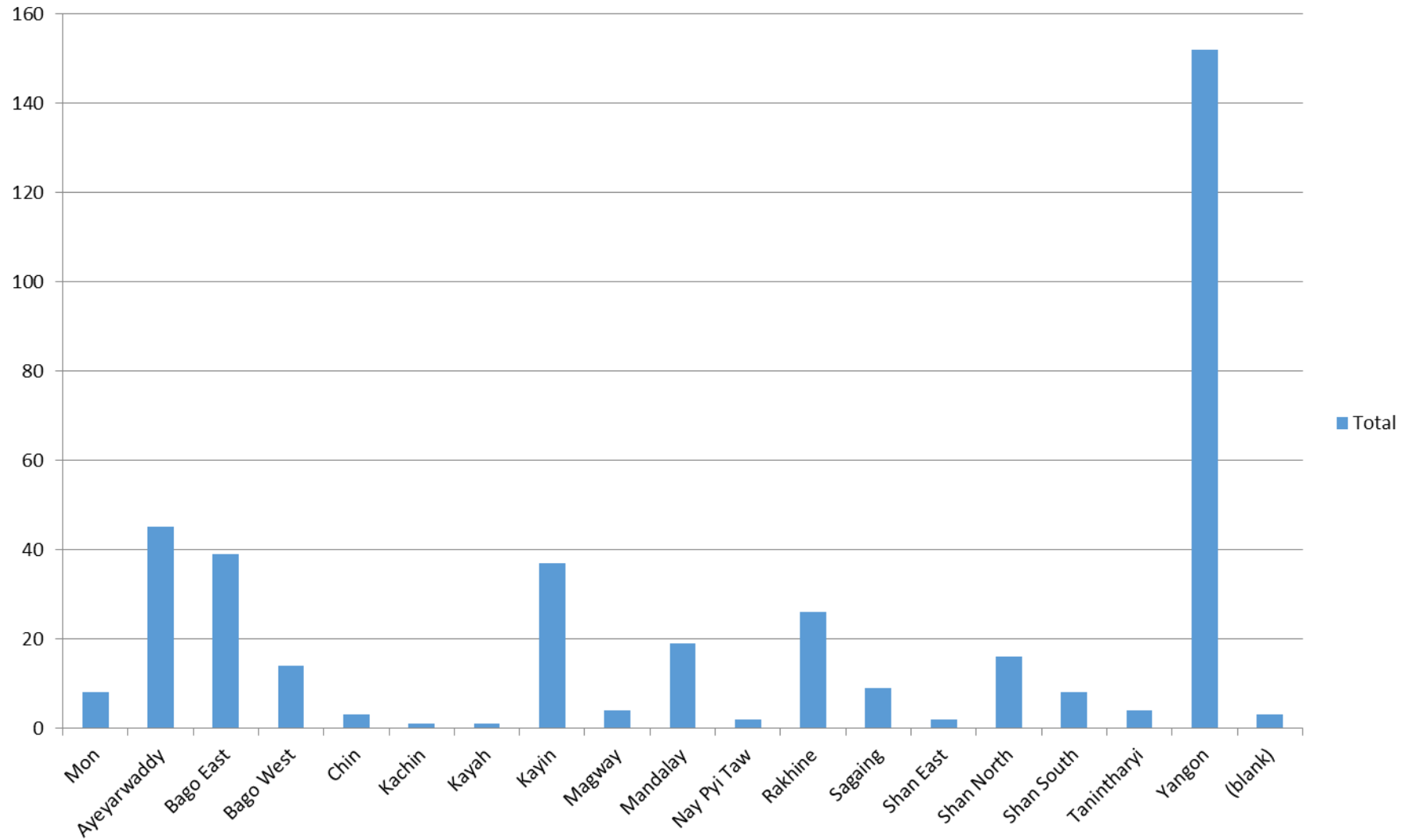
States/Regions	JE Positive Townships (2015)	No. of Cases
Yangon	Mingala Taung Nyunt, Insein, New Dagon South, New Dagon East, Kayan, Thaketa, Thongwa, Hlegu, Thingangyun, Hlaingtharyar, Hmawbi, Kawmhu, Shwepyithar	34
Kachin	Mogaung, Waingmaw, Myitkyina, Mohnyin	6
Rakhine	Minbya, Sittwe, Pauktaw, Myebon, Myauk Oo, Kyauktaw, Ponnagyun	48
Bago East	Pyu, Waw, Kawa, Kyauktaga, Bago, Shwegyin, Taungoo	10
Bago West	Tharawady, Nattalin, Gyobingauk, Pyay, Monyo, Zigone	16
Kayin	Hpa-an, Hlaingbwe	2
Magway	Aunglan, Minbu, Taungdwingyi	3
Ayeyarwaddy	Pathein, Wakema, Pantanaw, Yegyi, Pyapon, Henzada, Mawkyun, Kyaiklat, Nyaungdon, Myaungmya	23
Mon	Mawlamyine, Chaungzon, Paung, Bilin	5
Thanintaryi	Dawei, Thayetchaung	3
Shan North	Tangyan	1
Sagaing	Kalemyo	1
Chin	Paletwa	1
Unknown Regions		3
Total JE IgM Positive		391

S/R	JE Positive Townships (2016) NHL	No. of Cases
Yangon	Ahlon, Dagon Seikkan, Dallah, Dawbon, Hlaingthayar, Hlegu, Hmawbi, Htantabin, Insein, Kamayut, Kawa, Kawhmu, Kayan, Kungyangone, Kyauktada, Kyauktan, Latha, Mayangone, Mingaladon, N.Okkalapa, New Dagon East, New Dagon North, New Dagon South, Pabedan, S. Okkalapa, Shwe Pyi Thar, Taikkyi, Tamwe, Thaketa, Thanlyin, Thingangyun, Thongwa. Twante, Yankin	152
Kachin	Mohnyin	1
Kayah	Loikaw	1
Rakhine	Kyauktaw, Manaung, Minbya, Myauk-Oo, Myebon, Pauktaw, Ponnagyun, Ramree, Sittwe	26
Mandalay	Chan Aye Thar Zan, Kyaukse, Madaya, Maha Aung Mye, Myingyan, Patheingyi, Pyin Oo Lwin, Thazi, Wundwin	19
Naypyitaw	Pyinmana, Zabu Thiri	2
Bago East	Bago, Daik-U, Kawa, Kyauktaga, Pyu, Shwegyin, Thanatpin, Waw	37
Bago West	Letpadan, Minhla, Nattalin, Paukhaung, Paungde, Pyay, Shwedaung, Tharawady, Zigone	14
Kayin	Hlaingbwe, Hpa-an, Kawkareik	37
Magway	Aunglan, Pauk, Saw, Taungdwingyi	4
Ayeyarwaddy	Bogale, Danubyu, Dedaye, Kyaiklat, Kyangin, Kyaunggone, Kyonpyaw, Maubin, Mawkyun, Myaungmya, Nyaungdon, Pantanaw, Pyapon, Thabaung, Wakema, Yegyi	45
Mon	Kyaikto, Mawlamyine, Thanbyuzayat, Thaton	8
Thanintaryi	Launglon, Myeik	4
Shan East	Kengtung	2
Shan North	Hsipaw, Konegyan (Laukkaing), Kunglong, Kutkai, Kyaukme, Lashio, Tangyan	16
Shan South	Hopone, Hsiseng, Pekon, Taunggyi, Tsi Seng	8
Sagaing	Budalin, Kanbalu, Kani, Khin-U, Monywa, Salingyi, Wetley, Yay-U	9
Chin	Paletwa, Tiddim	3
Unknown Regions		3
Total JE IgM Positive		391

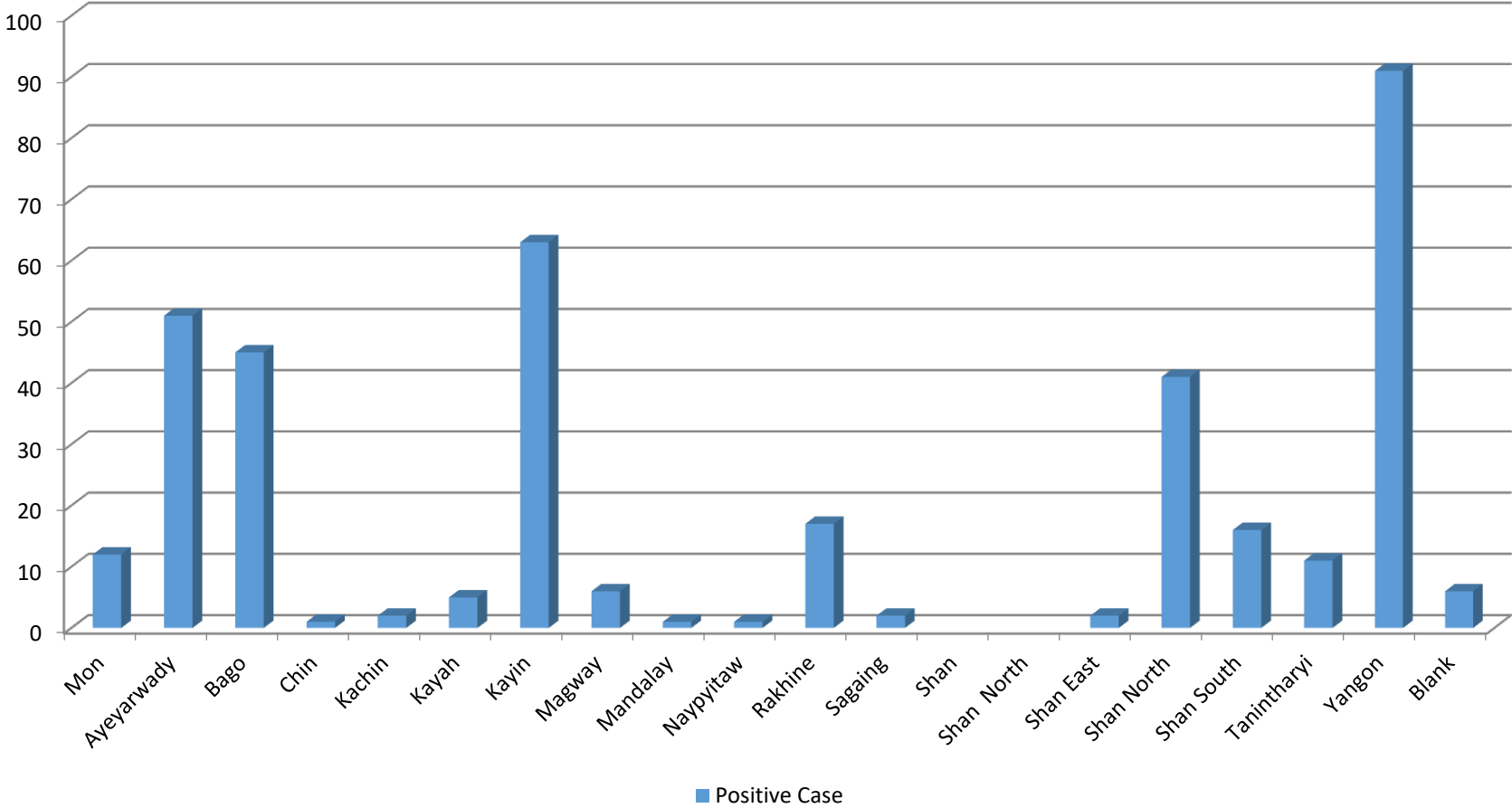
S/R	JE Positive Townships (2017) NHL	No. of Cases
Yangon	Ahlon, Dagon Myothit (North),Dagon Seikkan, Dagon Myothit(South),Dallah,Hlaing, Dawbon, Hlaingthayar, Hlegu, Hmawbi, Htantabin, Insein, Kamayut,Kawhmu, Kayan, Kungyangone,Kyauktan, Kyeemyindaing,Latha, Maubin,Mayangone, Mingaladon,Mingalartaungnyunt, N.Okkalapa, Sanchaung, Shwepyithar,S. Okkalapa, Taikkyi, Tamwe, Thaketa, Thanlyin, Thingangyun, Thongwa. Twante,Pabetan	92
Kachin	Myitkyina	2
Kayah	Bawlakae,Demoso,Loikaw	5
Kayin	Hliangbwe,Hpa-an,Hpapon,Kawkayeik,Kyainseikkyi	62
Rakhine	Gwa,Kyaukphyu,Kyauktaw, Myauk-Oo, Myebon, Pauktaw, Ponnagyun, Sittwe, Thandwe	17
Mandalay	Patheingyi	1
Naypyitaw	Zayyar Thiri	1
Bago	Bago, Daik-U, Gyopinkaut, Kawa, Kyauktaga,Latpantan,Minhla,Nyaunglebin,Oakpho,Padaung,Paukkaung,Pyay, Pyu, Taungoo,Thanatpin,Tharyawaddy, Waw,Zigone	45
Magway	Aunglan,Magway,Myothit, Taungdwingyi, Thayet	6
Ayeyarwaddy	Bogale, Danubyu, Dedaye, Eainme,Hninthada,Ingapu,Kangyidaunt,Kyaiklat, Kyonpyaw, Lemyatna,Maubin, Mawkyun, Myaungmya, Nyaungdon, Pantanaw,Pathein, Pyapon, Thabaung, Wakema, Zalun	51
Mon	Kyikelat,Kyaikto, Mawlamyine, Mudon,Thaton, Yay	12
Thanintaryi	Bokepyin,Dawei,Kawthoung,Kyunsu,Myeik,Pulaw,Tanintharyi	11
Shan East	Kengtung,Kyinton	2
Shan North	Hopang,Hsipaw, Kunglong, Kutkai, Kyaukme, Lashio,Laukkaing,Maingye,Mongyai,Namhsam,Namtu,Nanlan, Tangyan,Thantlang	41
Shan South	Loilen,Mongnai,Nangsan, Pekon, Pinlaung,Taunggyi, Tangyan	16
Sagaing	Budalin, Tabayin	2
Chin	Paletwa	1
Unknown Regions		6
Total JE IgM Positive		373

Lab confirmed JE Positive Cases, 2016 as of December NHL

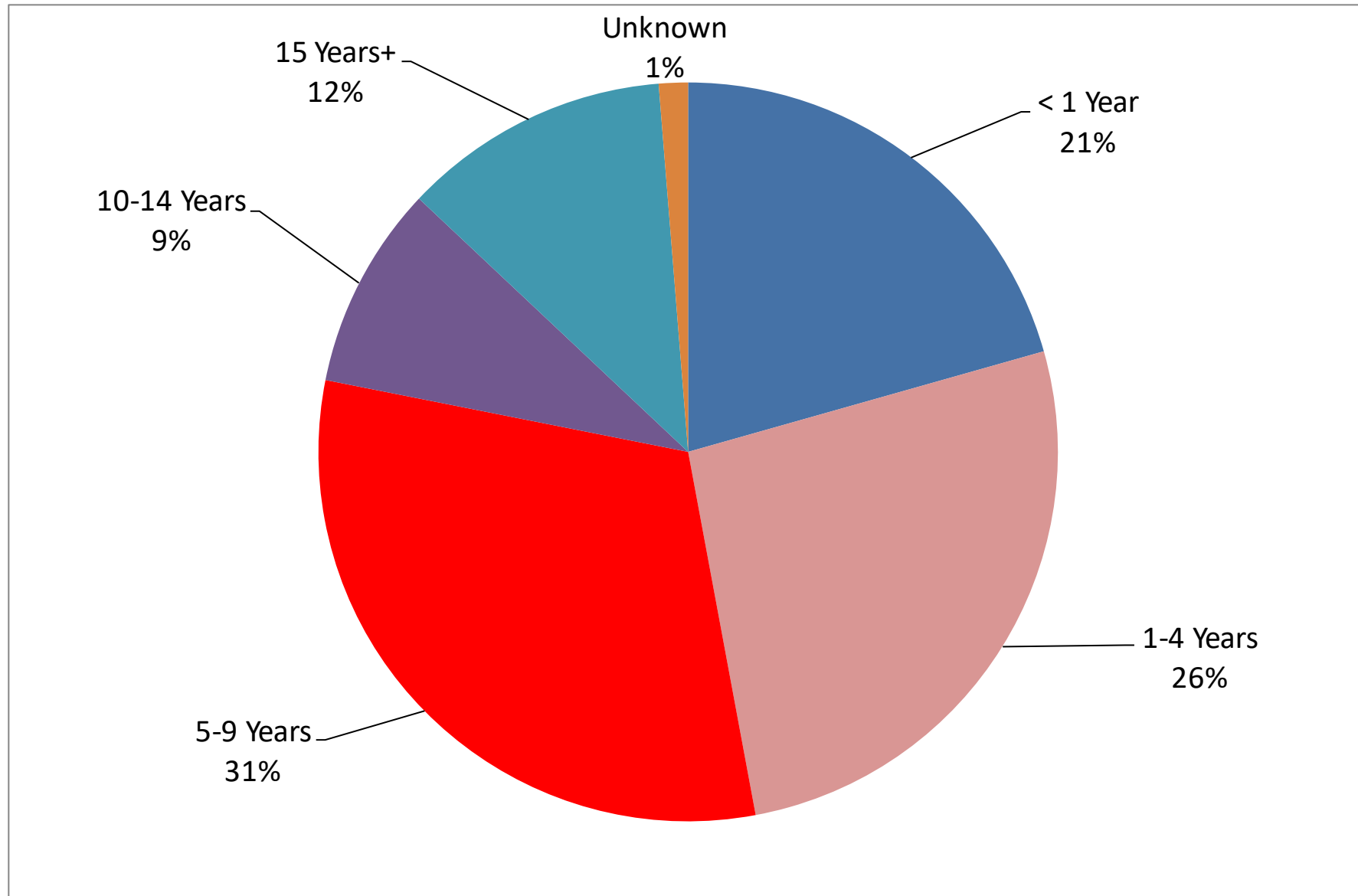
(States and Regions)



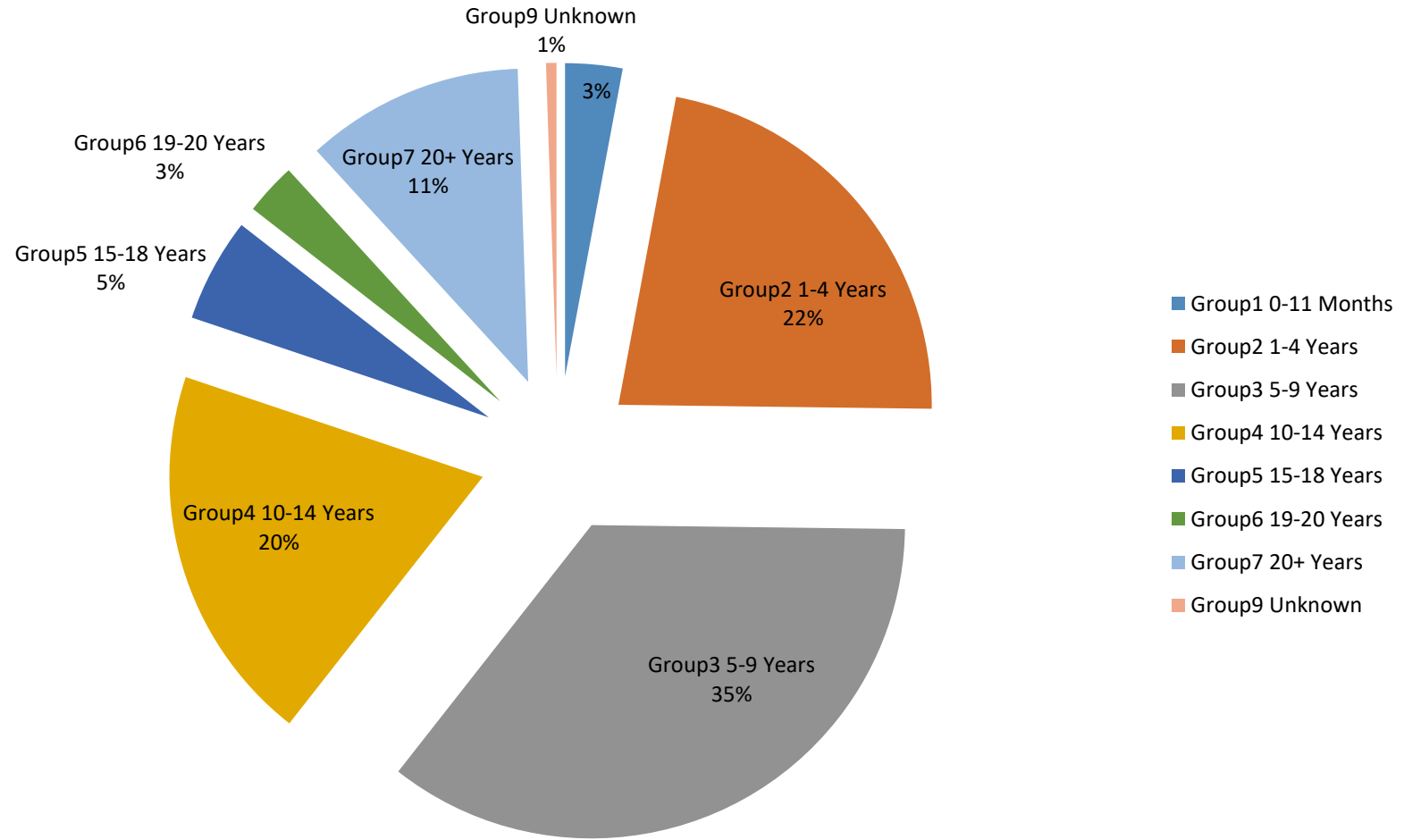
Lab confirmed JE Positive Cases, 2017 as of Dec by States&Regions



Lab confirmed JE Positive Cases, 2016 as of December (NHL)



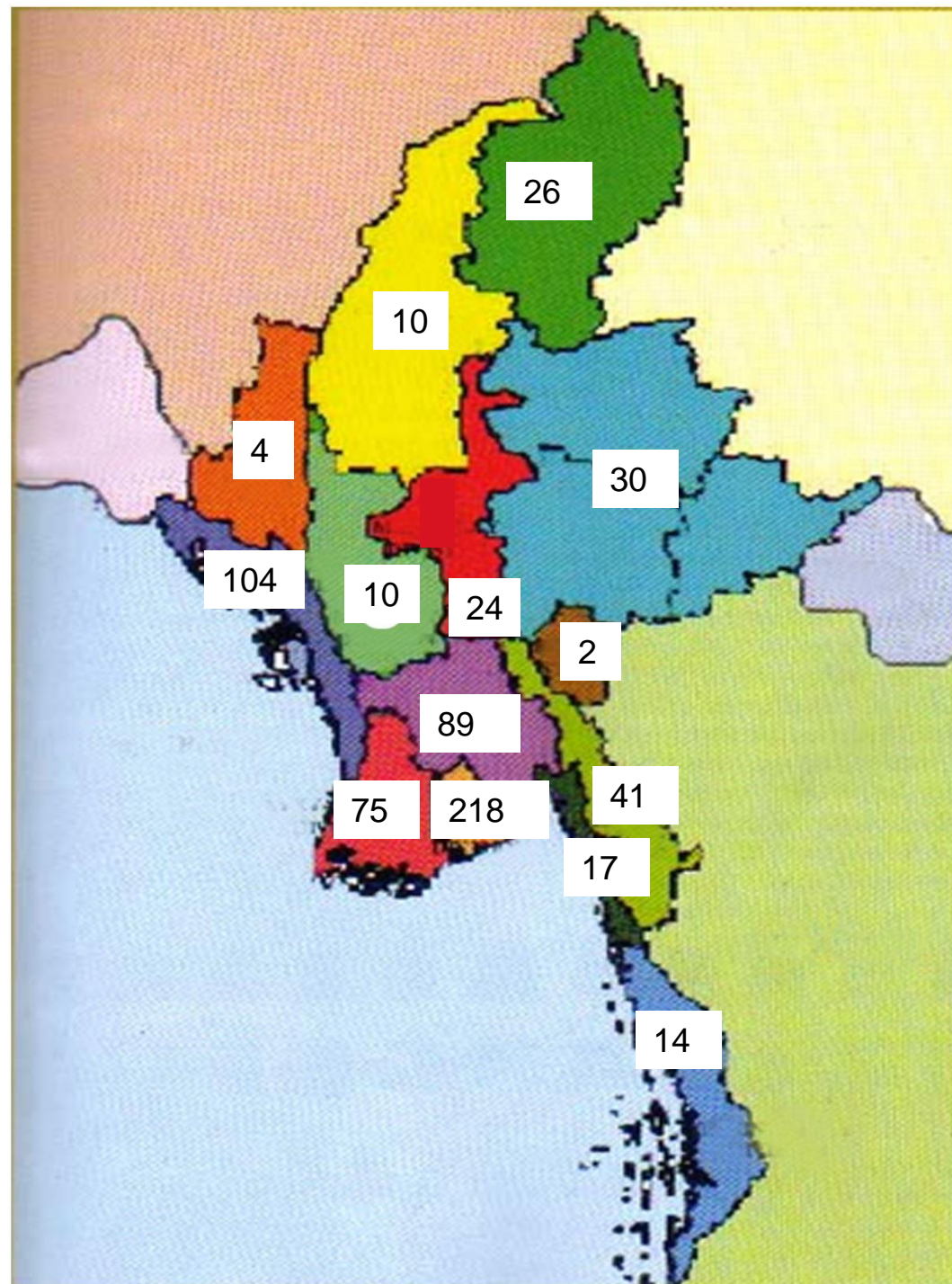
Lab confirmed JE Positive Cases,2017 as of Dec by States&Regions



Distribution of JE
positive cases in
States/Regions of
Myanmar

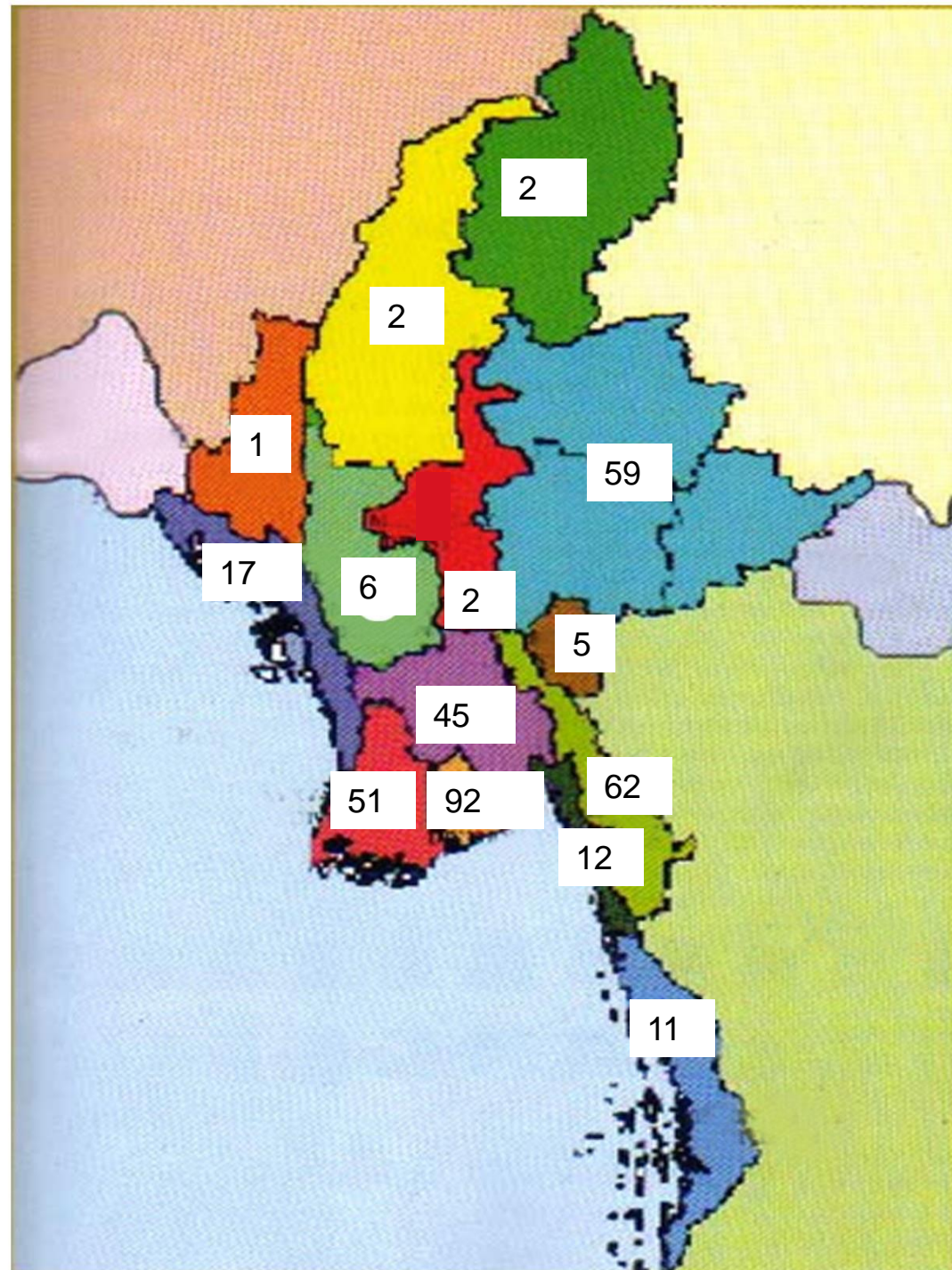
(2010- 2016), NHL

**Total JE IgM Positive
Cases (2010-2016) are
671 including
unknown Regions – 7**



Distribution of JE positive cases in States/Regions of Myanmar (2017), NHL

Total JE IgM Positive Cases (2017) are 373 including unknown Regions – 6



ILI/SARI surveillance

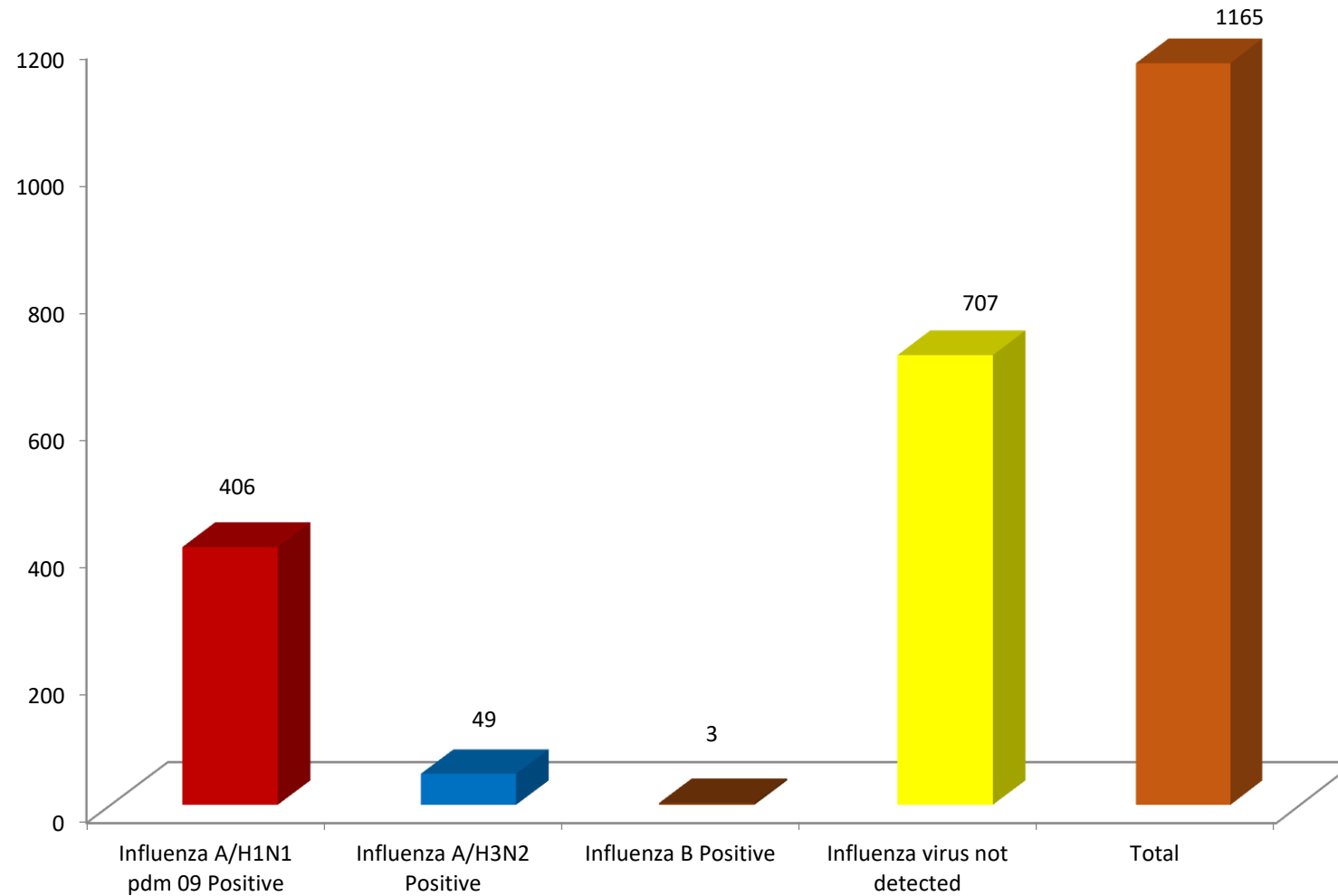
NIC Surveillance data since 2005 based on TSGH and Pyinmana General Hospital

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Samples received	975	307	1,250	1,417	533	694	444	580	343	642	61	725
Rapid test Flu A	136	35	124	327	529	474	376	170	206	239	7	128
Rapid test Flu B	98	0	160	133	0	220	26	351	0	166	2	272
PCR A(H3N2)	1	0	63	134	350	17	165	0	72	56	1	119
PCR A(H1N1) Pdm 09	0	0	0	0	16	232	0	29	1	167	3	9
PCR Flu B	20	0	129	102	0	114	10	109	1	125	2	272
Total no. of isolates	32	0	192	302	487	363	175	138	74	348	0	204

Influenza surveillance

- Regarding Influenza surveillance in Thinginyun Sanpya General Hospital and Pyinmana 200 bedded hospital, collaborative study with Niigata University, Japan since 2003 but the data is not representing the whole country
- **May 15th-16th 2017** - Meeting for ILI/SARI surveillance at NHL. Medical Superintendent , Physicians, Pediatricians from States and Regional Hospitals attended
- **May 17th-18th 2017** – Training workshop on proper sample collection, storage and transportation from AI, ILI and SARI cases at NHL. Laboratory Personnel from States and Regional Hospitals and SDCU teams from States and Regions attended
- With support of WHO, need to strengthen influenza surveillance system together with CEU (**8 Influenza surveillance sites – YGH, TSGH, Mandalay General Hospital, NPT 1000 bedded hospital, Sittway, Muse, Myitkyina, Myawaddy**)

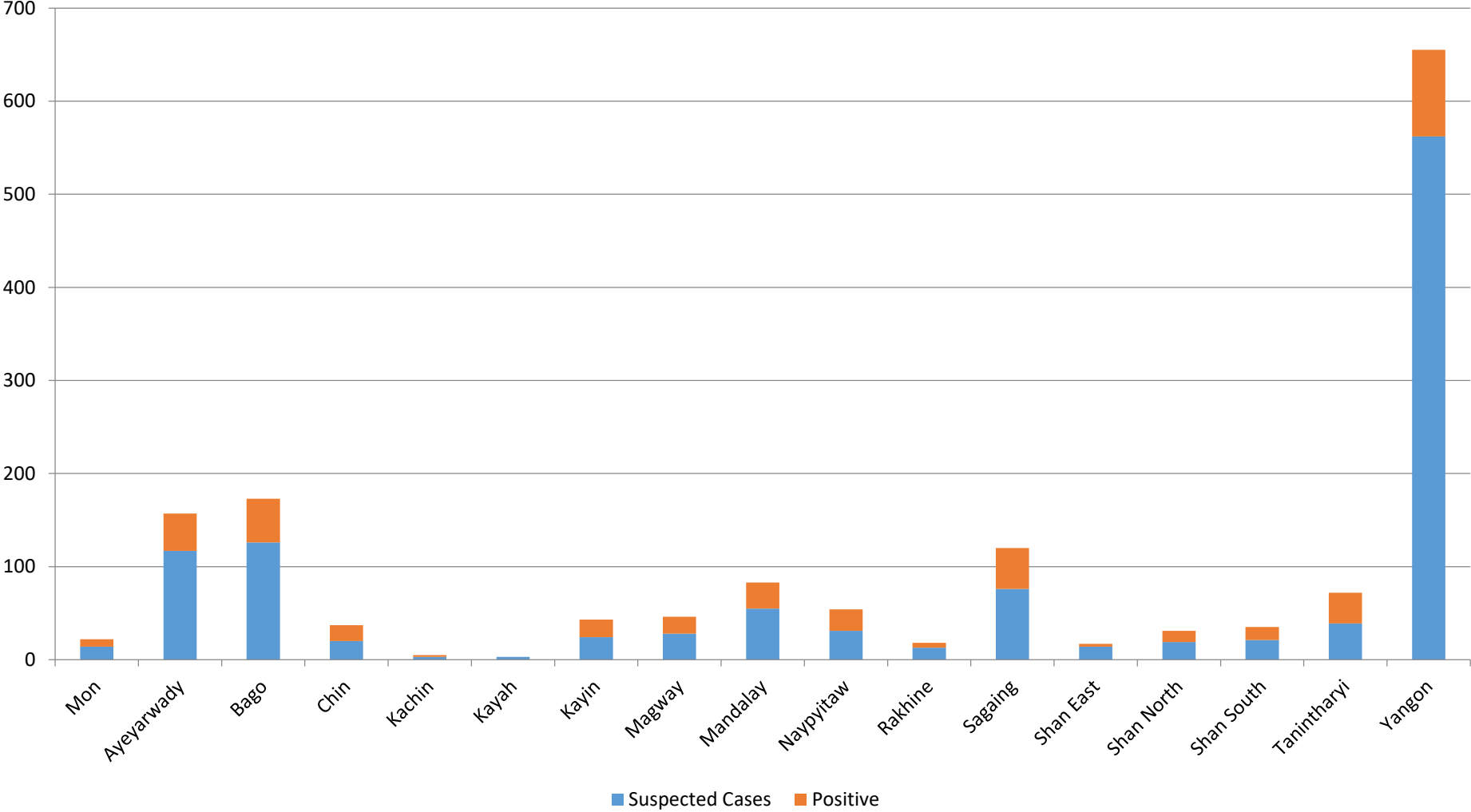
Influenza Data (As of 31.12.17)



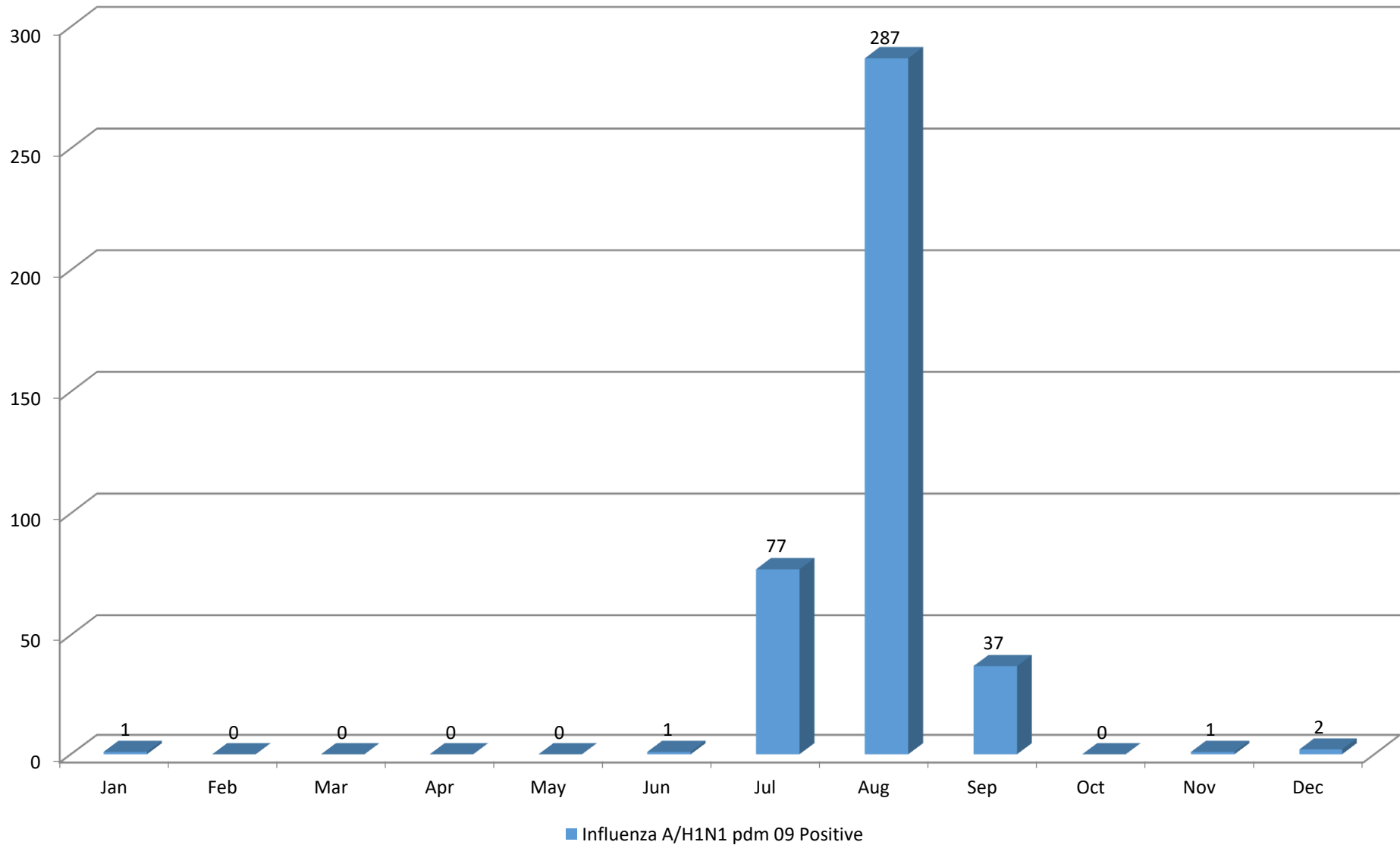
Influenza Data (Regional Distribution) (As of 31.12.17)

States and Regions (Patient's address)	Total suspected samples received	A/H1N1pdm09 positive samples
Mon	14	8
Ayeyarwady	117	40
Bago	126	47
Chin	20	17
Kachin	3	2
Kayah	3	0
Kayin	24	19
Magway	28	18
Mandalay	55	28
Naypyitaw	31	23
Rakhine	13	5
Sagaing	76	44
Shan East	14	3
Shan North	19	12
Shan South	21	14
Tanintharyi	39	33
Yangon	562	93
Grand Total	1165	406

Influenza Data (Regional Distribution) (As of 31.12.17)



Influenza A/H1N1 pdm 09 Positive by month as of 31.12.2017



Feedback from National Measles & Rubella Laboratory

- For isolation of measles virus – urine or throat swab specimen (in VTM)- **cold chain** and collect these samples **within 3days** after the onset of rash
- Collect blood sample **within 4 to 28 days** after the onset of rash for Measles IgM Ab
- **Prevent hemolysis** of samples – narrow needle, rapid suction, rapid pushing blood out of syringe, wet container
- Some of the lab forms are not filled completely (Date of onset of rash and patient's address)
- Collect 3-4 ml of blood in a **sterile plain tube** and **one tube** is enough
- Tubes are without label. We cannot do the samples without label. Please apply label, including patient's name, age, sex, date of collection, type of specimen

The Republic of the Union of Myanmar

Date of notification: _____	Name of investigator: _____
Date of investigation: _____	Title: _____
	Office: _____

Patient Identification

Patient's name: _____	Sex(M/F): _____	Date of birth: ___/___/___	Age year: ___ months: ___
Father's name: _____	Mother's name: _____		
Address: State/Region: _____			
Urban: Township: _____	Ward: _____	Group no./name: _____	
House no: _____			
Rural: Township: _____	Village Tract: _____	Village: _____	

Immunization

Measles immunization received through IDI: _____	Measles immunization received through SIS: _____
Total number of measles immunizations: _____	If immunized, was immunization record seen? Yes/No
Total number of measles rubella immunizations: _____	If immunized, was immunization record seen? Yes/No
If Yes, give dates: M/R dose: ___/___/___ Measles 2nd dose: ___/___/___	

Clinical Features

Fever: Yes/No	Rash: Yes/No	If yes, type: _____
Date of onset of rash: ___/___/___ Duration of rash: _____ days		
Date of onset of fever: ___/___/___		
Cough: Yes/No	Running nose: Yes/No	Red eyes: Yes/No
Arthralgia/arthritis: Yes/No	Lymph Node enlargement: Yes/No	
Other symptoms: _____		
Pregnant: Yes/No	If Yes LMP: _____	Due date: _____

Treatment

Did the patient receive care in a hospital/health center/private clinic? _____	Yes/No If yes date: _____
Any complications and comments? _____	

Epidemiological contact information

Was there contact with a suspected measles or rubella case in the month prior to rash onset?	measles	rubella	no	unknown
Was there a confirmed case of measles or rubella in this area in the month prior to rash onset in this case?	_____	_____	_____	_____
Travel of the patient in the month prior to rash onset?	Yes	no	unknown	
If yes, describe where? _____				
Was patient in contact with a pregnant woman since developing symptoms?	Yes	no	unknown	

Laboratory tests (Measles/Rubella)

Date blood collected: _____	Date urine (if any) collected: _____
Date serum sent to National Laboratory: _____	Date urine sent to reference laboratory: _____
Date of laboratory result: _____	
Measles IgM test result: POSITIVE / NEGATIVE / EQUIVOCAL / NOT DONE	
Rubella IgM test result: POSITIVE / NEGATIVE / EQUIVOCAL / NOT DONE	
Other lab test results: _____	
Date results received by investigator: _____	
Date patient informed of results: _____	
Outcome after 30 days of Rash: Alive/ Died / Not Known	If Died: Date and Cause of death: _____

Final classification of case

_____ laboratory-confirmed measles	_____ laboratory-confirmed rubella
_____ epidemiologically-confirmed measles	_____ epidemiologically-confirmed rubella
_____ clinically confirmed measles	_____ Discard
_____ other: _____	

Feedback from National JE Laboratory

- Sending of serum or CSF for Acute Encephalitis Syndrome surveillance
- Collect 3-4 ml of blood in a **sterile plain tube** and **one tube** is enough
- Collect 0.5 ml of CSF in a **sterile plain tube**
- **Serum or CSF requires cold chain**
- Tubes are without label. We cannot do the samples without label. Please apply label, including patient's name, age, sex, date of collection, **type of specimen**
- Proper lab requisition form and need to be completely filled

1. Report/Investigation Information: Name of Investigator(s): _____			
Date Case Reported: ___/___/___		Title/Office: _____	
Date Case Investigated: ___/___/___		Notified by: _____	
2. Case Identification: Patient's Name: _____			
Date of Birth: ___/___/___		Age: years ___ months ___ Sec: ___	
Father's Name: _____		Mother's Name: _____	
Full Permanent Address: State/Region: _____ Township: _____			
Village/Ward: _____		Street No. & House No. _____ Phone No. _____	
3. Hospitalization: Yes/No Date of Hospitalization: ___/___/___			
Name of Hospital: _____		Hospital Registration Number: _____ Clinical	
Diagnosis: _____			
Outcome: Recovered completely / Recovered with disability / Death/Unknown			
4. Immunization History: Vaccinated against JE? Yes / No / Unknown			
Total JE doses received: _____		Date of last JE dose: ___/___/___	
5. Signs and Symptoms: Date of onset of first symptoms: ___/___/___ Rapid Onset: Yes / No / Unknown			
Fever: Yes / No / Unknown Paroxysms: Yes / No / Unknown			
Headache: Yes / No / Unknown Paralysis: Yes / No / Unknown			
Neck Stiffness: Yes / No / Unknown			
Seizures (not simple febrile seizures): Yes / No / Unknown			
Change in mental status: Yes / No / Unknown Any other, specify: _____			
If yes, Confusion/Diorientation/Stupor/Unconsciousness/Inability to talk/ Other: _____			
Travel History (2 weeks before the onset): Yes / No / Unknown			
If yes, where: _____			
6. Serum Specimen Collection:			
Date Collected	Date Sent to Lab	Date of Result	Laboratory Results
Serum 1 ___/___/___	___/___/___	___/___/___	Positive / Negative / Equivocal
Serum 2 ___/___/___	___/___/___	___/___/___	Positive / Negative / Equivocal
7. CSF Specimen Collection:			
Date Collected	Date Sent to Lab	Date of Result	Laboratory Results
CSF 1 ___/___/___	___/___/___	___/___/___	Positive / Negative / Equivocal
CSF 2 ___/___/___	___/___/___	___/___/___	Positive / Negative / Equivocal
8. Case Classification: Lab confirmed/ Probable /AES-other agent/AES-unknown			
9. Signature of responsible person filling the form: _____			
Case Definition of AES: Clinically, a case of Acute Encephalitis Syndrome (AES) is defined as a person of any age, in any geographical region, at any time of year with the acute onset of fever and a change in mental status (including symptoms such as confusion, disorientation, coma, or inability to talk) AND/OR new onset of seizures (excluding simple febrile seizures).			

Feedback from National Polio Laboratory

- On sample collection bottle, please apply label, including patient's name, age, sex, date of collection

Feedback from NIC

- Please use VTM tubes for sample collection
- Please use cold box for sample transportation



H1N1 suspected sample without cold chain



Sample transportation

- Samples especially CSF, serum, stool need cold chain
- They are kept for long period at the highway express gates and so the quality of samples are not good
- The sample collector mix all types of samples in one ice box (eg. Water sample for bacteriological testing, stool for AFP, Blood for JE/Measles, CSF for JE)

NHL

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THANK YOU

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