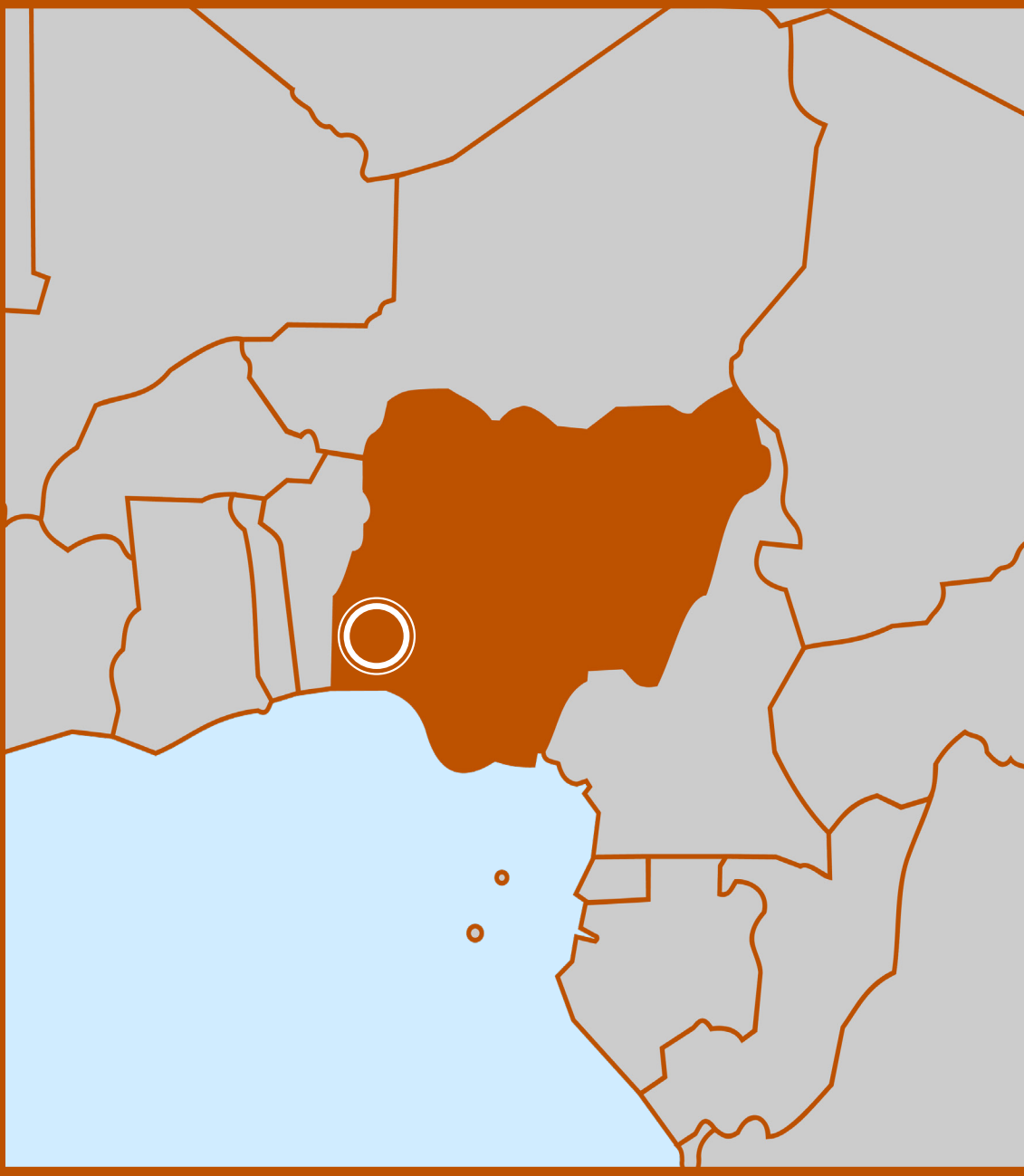
The Pan African Medical Journal

From known to the unknown: investigating an unusual outbreak of viral exanthema in a secondary school in Abeokuta, Nigeria, 2015

Participant Guide



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From known to the unknown: investigating an unusual outbreak of viral exanthema in a secondary school in Abeokuta, Nigeria, 2015

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Abstract

Investigating an outbreak of disease requires mastery of a set of skills and collaboration among different cadres of health workers. Although you want to focus on a specific disease, you need to keep your mind open to possibilities. This case study is based on investigation of an outbreak of rashes suspected to be measles but which proved to be otherwise. It reinforces the knowledge of the steps in outbreak investigation which should have been covered in classroom lecture or background reading. This case study is best suited for basic level of training in field epidemiology and can be completed within 2-3 hours.

How to Use the Case Study

General instructions: This case study is to be used in a classroom setting for 12-20 participants.

Audience: Residents at the basic/frontline level in Field Epidemiology and Laboratory Training Programmes, trainees in the epidemiology course in the general public health training programmes, medical officers of health of the local government area and state surveillance officers and other health workers involved in outbreak investigations.

Prerequisites: Participants should have prior lectures in outbreak investigation. Participants should also have basic knowledge of rates, ratio and frequencies.

Materials needed: Laptops with Microsoft Excel (or graph paper, and pencil), white board or flip charts with markers.

Level of training and associated public health activity: Novice – outbreak investigation

Time required: 2-3 hours

Language: English

Participant Guide

Goal of Case Study: To understand and apply the processes of outbreak investigation, including the role of the laboratory in outbreak investigation.

Learning Objectives: After completion of this case study, the participants should be able to:

1. Recognize an outbreak
2. Identify and select potential members of an outbreak investigation team
3. List the steps in an outbreak investigation
4. Construct a working case definition
5. Construct a line list of cases
6. Draw an epidemic curve and interpret the findings
7. Suggest an appropriate public health response to an outbreak

Introduction

Abeokuta is a cosmopolitan city in Southwest Nigeria. Inhabitants pride themselves on their rich history of autonomy and education. To date, numerous students from the rest of southwest Nigeria enroll in its many secondary schools. Thus, a health event within a boarding school in the city may likely spread to other parts of the Southwest as the students return to their place of origin at the end of the school session.

Figure 1. Map of Abeokuta in Ogun, Nigeria [World Atlas]

Grace Secondary School is a privately-owned coeducational institution with boarding facilities for males and females. The school was served by two school nurses who managed the school clinic.

Beginning 27th January 2015, the attending nurse received students in the sick bay who all had similar symptoms – low grade fever, body pains, and conjunctivitis, followed by body rashes by the third day. The students' state of health continued to deteriorate, prompting her to request referral of the students to the retainer clinic. Many more students, particularly fellow classmates or bunk mates, presented at the school sick bay on subsequent days. By 6th February 2015, twenty-three students with similar symptoms had been seen in the sick bay.

Part 1

Referral services were provided by Cornerstone Infirmary, a private health facility managed by a family physician. He took further history and found that none of the students had a previous history of contact with someone with similar symptoms outside the school. The immunization history of the students could not be ascertained. He observed that some of the students were coughing, and a few others had developed conjunctivitis. He made a provisional diagnosis of measles infection based on the symptoms. He requested a full blood count, and commenced intravenous fluids, high dose Vitamin A (100,000 units) and antibiotics. He also filled out a notification form for dispatch to the local government medical officer of health. The medical officer of health immediately forwarded the report of suspected measles outbreak to the Epidemiology Unit of the State Ministry of Health in Abeokuta for the next action.

Question 1. What is an outbreak of a disease?

Question 2. In case there were no defined thresholds to determine an outbreak at the level of the health facility or the Local Government Area, how else can an outbreak be recognized?

Question 3. Does this constitute an outbreak of measles? Give reasons for your answer.

Part 2

On 8th February 2015, the State Director of Public Health was presented with the report of the outbreak at Grace Secondary school and the actions taken so far. He decided to constitute a State Rapid Response Team (RRT) to investigate and control the outbreak. The first task of the team was to plan an investigation of the outbreak.

Question 4. Who are necessary members of this outbreak investigation team? Justify your response.

Question 5. What are the steps in an outbreak investigation?

Question 6. List the components of an outbreak investigation plan.

Question 7. What should be the objectives of this outbreak investigation?

Question 8. Provide the standard suspected, probable, and confirmed case definitions for measles.

Question 9. What criteria are used in developing a working case definition during an outbreak?

Question 10. Develop a working case definition for this outbreak.

Part 3

The response team arrived at the secondary school on 9th February 2015. The team decided to search for other cases of the disease and carry out further investigations. All bunk, dormitory, and class mates of the affected students were interviewed for history of fever and rashes (within the last two weeks). History of vaccination against measles was elicited, but responses were deemed unreliable because vaccination cards were not available for confirmation and parents were not available to provide the information. The students were examined for rashes and signs of respiratory infection and conjunctivitis. Those with clinical symptoms were referred for observation in the community hospital. In order to verify the diagnosis, 5 mls of venous blood samples were collected from those with positive history of fever and rashes. The investigators developed a line list from the case notification forms and the records of suspected cases. Cases of the rash were found among the students until the 28th of February, 2015.

Question 11. What is a line list?

Question 12. What information would you want to include in a line list of this outbreak?

Question 13. Excerpts from the case report forms are provided in Appendix 1. Using these case report forms, develop a template line list of the case in this outbreak.

Question 14. Using the line list provided in Appendix 2 draw an epidemic curve for this outbreak. Interpret your findings.

Question 15. What other descriptive analysis can you perform with this information?

The investigators tabulated the distribution of the cases by grade and sex in the secondary school. The information is provided in Table 1.

Table 1: Distribution of cases by cases by grade and sex, February 2015

Descriptive variable		No. of cases	Population of the grade	Attack rate (%)
Grade	Junior Secondary School 1	14	92	
	Junior Secondary School 2	4	66	
	Junior Secondary School 3	19	59	
	Senior Secondary School 1	8	73	
	Senior Secondary School 2	6	50	
	Senior Secondary School 3	6	57	
Sex	Male	41	229	
	Female	16	168	

Question 16. Determine the attack rate of the outbreak by grade and sex. Which grade was the most affected?

The students are accommodated in six blocks of hostels, of which block A1 is the largest. The investigators also analyzed the cases by the blocks of residence to find the source of the outbreak. The results are presented in the table below.

Table 2: Distribution of cases by block of hostel, February 2015

Hostel	Cases	Population	Attack rate
A1	20	115	17.4
A2	8	57	14.0
B1	12	85	14.1
B2	6	55	10.9
C1	9	29	31.0
C2	2	56	3.6
Total	**57**	**397**	**14.4**

Question 17. From the results of the descriptive study, in which hostel did the exposure most likely occur?

Question 18. In order to find out the risk factors associated with this outbreak, what further action would you recommend to the team of investigators?

Part 4

While awaiting the results of the laboratory investigation, the state director of public health instructed the State Immunization Officer to conduct a mop–up immunization of all the students below the age of 15 years within the school and the community in which the school is located. However, at the end the immunization, the laboratory result of the students who had history of fever and rashes revealed that none of the students had positive measles immunoglobulin M.

Question 19. What possibly went wrong in this outbreak investigation? What is the implication of this finding for future investigations?

Question 20. What other diseases that present as viral exanthema should the investigation team consider as a possible cause of this outbreak?

The director of laboratory services requested that the samples be taken to the national reference laboratory for further analysis for other viral exanthems. Eleven of the samples yielded a positive test for rubella immunoglobulin. The outbreak investigation team wrote their report with suggestions for future outbreak investigation and public health services in the state.

Question 21. What are the possible sections of this outbreak investigation report?

Question 22. What recommendation should the state director of public health include in the report?

Conclusion

The outbreak investigation team concluded that the outbreak of exanthema in the secondary school at Abeokuta was due to rubella and not measles infection. A review of the literature indicated that rubella is associated with over 100,000 cases of congenital rubella syndrome worldwide [Lambert et al, 2015]. Annual cases of congenital rubella syndrome are estimated to be about 116 (95% CI: 56–235) per 100,000 live births in Africa [Vynnycky et al, 2016]. Sero-prevalence of rubella IgG in Nigeria is 38.8% [Olajide et al, 2015]. Despite the risk of congenital malformation that may arise from pregnant women infected with rubella, vaccination against rubella is not part of the routine national immunization schedule in any part of Nigeria. In addition, laboratories within the states are in general not equipped to diagnose rubella infection. The team therefore recommended that routine immunization against rubella should be included in the routine immunization regime and the guidelines for outbreak investigation should be reviewed to include protocols for its recognition and investigation.

Background Reading

Centre for Disease Control and Prevention. Principles of Epidemiology in Public Health Practice: Public Health Surveillance. 3rd Edition. U.S. Department of Health and Human Services (CDC). Office of Workforce and Career Development. Atlanta, GA. Updated 2012. Chapter 6-8

Federal Ministry of Health. National Technical Guidelines for Integrated Disease Surveillance and Response (2006). Epidemiology Division. Federal Ministry of Health. Abuja, Nigeria

Heyman DL. Control of Communicable Diseases Manual. Washington. Measles. American Public Health Association. 2008. 19th Edition. 402-408

Heyman DL. Control of Communicable Diseases Manual. Washington. Measles. American Public Health Association. 2008. 19th Edition. 529-534

Teutsch SM. Considerations in Planning a Surveillance System. Principles & Practice of Public Health Surveillance. Lee LM, Teutsch SM, Thacker SB, St. Louis ME, eds. Third Edition. Oxford University Press. 2010. Chapter 2:18-31

Carneiro CSC, Coelho S, Cestari T, Allen SH, e-Silva MR. Viral exanthems in the tropics. Clinics in Dermatology. 2007. Volume 25, Issue 2, 212 - 220

Competing Interests

No competing interests declared.

Author's Contributions

Oluwaseun Oladeinde (OEO) and Akinyode Bamiselu (AB) did the outbreak investigation, data collection, and analysis, and were supervised by Patrick Nguku (PN) and Dairo M.D (MDD). Dairo M.D, Joseph

Frimpong (JP) and Meeyoung Park (MP) wrote the manuscript. All authors approved of the manuscript before publication.

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References

1. World Atlas: Map of Abeokuta in Ogun, Nigeria www.worldatlas.com/img/locator/city/083/14983-abeokuta-locator-map.jpg
2. Centre for Disease Control and Prevention. Principles of Epidemiology in Public Health Practice: Public Health Surveillance. 3rd Edition. U.S. Department of Health and Human Services. (CDC). Office of Workforce and Career Development. Atlanta, GA. Updated 2012.
3. Federal Ministry of Health. National Technical Guidelines for Integrated Disease Surveillance and Response (2006). Epidemiology Division. Federal Ministry of Health. Abuja, Nigeria
4. Heyman DL. Control of communicable Diseases Manual. Washington. Measles. American Public Health Association. 2008. 19th Edition. 402-408
5. Heyman DL. Control of Communicable Diseases Manual. Washington. Measles. American Public Health Association. 2008. 19th Edition. 529-534
6. Jennifer M. Best. Rubella. Seminars in Fetal & Neonatal Medicine (2007) 12 (3), 182-192
7. Lambert N, Strebel P, Orenstein W, Icenogle J, Poland GA. Rubella. *Lancet (London, England)*. 2015; 385 (9984):2297-2307. doi:10.1016/S0140-6736(14)60539-0.
8. Olajide OM, Aminu M, Randawa AJ, Adejo DS. Seroprevalence of rubella-specific IgM and IgG antibodies among pregnant women seen in a tertiary hospital in Nigeria. *International Journal of Women's Health*. 2015; 7:75-83. doi:10.2147/IJWH.S68667.
9. Carneiro CSC, Coelho S, Cestari T, Allen SH, e-Silva MR. Viral exanthems in the tropics. Clinics in Dermatology. 2007. Volume 25, Issue 2, 212 - 220
10. Vynnycky E, Adams EJ, Cutts FT, et al. Using Seroprevalence and Immunisation Coverage Data to Estimate the Global Burden of Congenital Rubella Syndrome, 1996-2010: A Systematic Review. Trotter CL, ed. *PLoS ONE*. 2016; 11(3):e0149160. doi:10.1371/journal.pone.0149160.

Appendices

1. Excerpts from the viral exanthema investigation form
2. Line list of cases

APPENDIX 1

EXERPTS FROM THE VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM

EXANTHEM OUTBREAK INVESTIGATION FORM #01

	Case Identifier / Serial No.	1
	Sex	F
	Age	10
	Class	1
	Date of onset of rash	9 Feb
	Nature of the rash	Body
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #02

	Case Identifier / Serial No.	2
	Sex	M
	Age	10
	Class	1
	Date of onset of rash	9 Feb
	Nature of the rash	Left hand
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #03

	Case Identifier / Serial No.	3
	Sex	M
	Age	9
	Class	1
	Date of onset of rash	9 Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #04

	Case Identifier / Serial No.	4
	Sex	M
	Age	11
	Class	1
	Date of onset of rash	11 Feb
	Nature of the rash	Itchy rash
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #05

	Case Identifier / Serial No.	5
	Sex	M
	Age	11
	Class	1
	Date of onset of rash	11 Feb
	Nature of the rash	Armpit
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #06

	Case Identifier / Serial No.	6
	Sex	M
	Age	10
	Class	1
	Date of onset of rash	28 Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #07

	Case Identifier / Serial No.	7
	Sex	M
	Age	10
	Class	1
	Date of onset of rash	2nd Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #08

	Case Identifier / Serial No.	8
	Sex	M
	Age	11
	Class	1
	Date of onset of rash	9 Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #09

	Case Identifier /serial No	9
	Sex	M
	Age	11
	Class	1
	Date of onset of rash	6th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #10

	Case Identifier / Serial No.	10
	Sex	M
	Age	9
	Class	1
	Date of onset of rash	4th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #11

	Case Identifier / Serial No.	11
	Sex	M
	Age	11
	Class	1
	Date of onset of rash	27th Jan
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #12

	Case Identifier /serial No	12
	Sex	M
	Age	11
	Class	1
	Date of onset of rash	9th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #13

	Case Identifier / Serial No.	13
	Sex	M
	Age	12
	Class	1
	Date of onset of rash	19th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #14

	Case Identifier / Serial No	14
	Sex	M
	Age	11
	Class	1
	Date of onset of rash	11th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #15

	Case Identifier / Serial No.	15
	Sex	F
	Age	12
	Class	2
	Date of onset of rash	8th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #16

	Case Identifier / Serial No.	16
	Sex	M
	Age	11
	Class	2
	Date of onset of rash	5th Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #17

	Case Identifier / Serial No.	17
	Sex	M
	Age	12
	Class	2
	Date of onset of rash	2nd Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #18

	Case Identifier / Serial No.	18
	Sex	F
	Age	11
	Class	2
	Date of onset of rash	9th Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #19

	Case Identifier / Serial No.	19
	Sex	M
	Age	13
	Class	3
	Date of onset of rash	9th Jan
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #20

	Case Identifier / Serial No.	20
	Sex	F
	Age	13
	Class	3
	Date of onset of rash	4th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #21

	Case Identifier / Serial No.	21
	Sex	F
	Age	12
	Class	3
	Date of onset of rash	5th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #22

	Case Identifier / Serial No.	22
	Sex	M
	Age	13
	Class	3
	Date of onset of rash	4th Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #23

	Case Identifier / Serial No.	23
	Sex	F
	Age	12
	Class	3
	Date of onset of rash	7th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #24

	Case Identifier / Serial No.	24
	Sex	F
	Age	12
	Class	3
	Date of onset of rash	6th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #25

	Case Identifier / Serial No.	25
	Sex	M
	Age	13
	Class	3
	Date of onset of rash	4th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #26

	Case Identifier / Serial No.	26
	Sex	M
	Age	12
	Class	3
	Date of onset of rash	8th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #27

	Case Identifier / Serial No.	27
	Sex	M
	Age	13
	Class	3
	Date of onset of rash	9th Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #28

	Case Identifier / Serial No.	28
	Sex	M
	Age	13
	Class	3
	Date of onset of rash	28th Jan
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #29

	Case Identifier / Serial No.	29
	Sex	M
	Age	14
	Class	3
	Date of onset of rash	29th Jan
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #30

	Case Identifier / Serial No.	30
	Sex	F
	Age	12
	Class	3
	Date of onset of rash	8th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #31

	Case Identifier / Serial No.	31
	Sex	F
	Age	12
	Class	3
	Date of onset of rash	8th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #32

	Case Identifier / Serial No>	32
	Sex	M
	Age	13
	Class	3
	Date of onset of rash	2nd Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #33

	Case Identifier / Serial No.	33
	Sex	F
	Age	12
	Class	3
	Date of onset of rash	5th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #34

	Case Identifier / Serial No.	34
	Sex	F
	Age	12
	Class	3
	Date of onset of rash	7th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #35

	Case Identifier / Serial No.	35
	Sex	M
	Age	13
	Class	3
	Date of onset of rash	6th Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #36

	Case Identifier / Serial No.	36
	Sex	M
	Age	11
	Class	3
	Date of onset of rash	09 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #37

	Case Identifier / Serial No.	37
	Sex	M
	Age	12
	Class	3
	Date of onset of rash	05 Feb
	Nature of the rash	Face
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #38

	Case Identifier / Serial No.	38
	Sex	M
	Age	13
	Class	4
	Date of onset of rash	09 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #39

	Case Identifier / Serial No.	39
	Sex	M
	Age	14
	Class	4
	Date of onset of rash	07 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #40

	Case Identifier / Serial No.	40
	Sex	M
	Age	14
	Class	4
	Date of onset of rash	07 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #41

	Case Identifier / Serial No.	41
	Sex	M
	Age	14
	Class	4
	Date of onset of rash	08 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #42

	Case Identifier /serial No	42
	Sex	M
	Age	13
	Class	4
	Date of onset of rash	06 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #43

	Case Identifier /serial No	43
	Sex	M
	Age	14
	Class	4
	Date of onset of rash	05 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #44

	Case Identifier / Serial No.	44
	Sex	F
	Age	14
	Class	4
	Date of onset of rash	09 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #45

	Case Identifier / Serial No.	45
	Sex	M
	Age	14
	Class	4
	Date of onset of rash	08 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #46

	Case Identifier / Serial No.	46
	Sex	M
	Age	14
	Class	5
	Date of onset of rash	06 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #47

	Case Identifier /serial No	47
	Sex	M
	Age	15
	Class	5
	Date of onset of rash	06 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #48

	Case Identifier / Serial No.	48
	Sex	M
	Age	14
	Class	5
	Date of onset of rash	05 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #49

	Case Identifier / Serial No.	49
	Sex	M
	Age	14
	Class	5
	Date of onset of rash	05 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #50

	Case Identifier / Serial No.	50
	Sex	F
	Age	13
	Class	5
	Date of onset of rash	11 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #51

	Case Identifier / Serial No.	51
	Sex	F
	Age	13
	Class	5
	Date of onset of rash	10 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #52

	Case Identifier / Serial No.	52
	Sex	M
	Age	14
	Class	6
	Date of onset of rash	05 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #53

	Case Identifier / Serial No.	53
	Sex	M
	Age	15
	Class	6
	Date of onset of rash	06 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #54

	Case Identifier / Serial No.	54
	Sex	M
	Age	15
	Class	6
	Date of onset of rash	05 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #55

	Case Identifier /serial No	55
	Sex	F
	Age	16
	Class	6
	Date of onset of rash	06 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #56

	Case Identifier / Serial No.	56
	Sex	F
	Age	16
	Class	6
	Date of onset of rash	09 Feb
	Nature of the rash	Generalized
	Outcome	Alive

VIRAL EXANTHEM OUTBREAK INVESTIGATION FORM #57

	Case Identifier / Serial No.	57
	Sex	F
	Age	15
	Class	6
	Date of onset of rash	09 Feb
	Nature of the rash	Generalized
	Outcome	alive
neralized		
	Outcome	alive

APPENDIX 2

Line list of the outbreak of maculopapular rashes in Abeokuta, March 2015

S/N	Class	Age (years)	Sex	Date of onset of rash	Nature of the rash	Outcome / Result
19	3	13	m	9-Jan	face	alive
11	1	11	m	27-Jan	generalized	alive
28	3	13	m	28-Jan	generalized	alive
29	3	14	m	29-Jan	generalized	alive
5	1	9	m	2-Feb	arm pit	alive
7	1	10	m	2-Feb	face	alive
17	2	12	m	2-Feb	generalized	alive
32	3	13	m	2-Feb	generalized	alive
22	3	13	m	4-Feb	face	alive
20	3	13	f	4-Feb	generalized	alive
25	3	13	m	4-Feb	generalized	alive
10	1	9	m	4-Feb	generalized	alive
21	3	12	f	5-Feb	generalized	alive
33	3	12	f	5-Feb	generalized	alive
16	2	11	m	5-Feb	face	alive
37	3	12	m	5-Feb	face	alive
43	4	14	m	5-Feb	generalized	alive
48	5	14	m	5-Feb	generalized	alive
49	5	14	m	5-Feb	generalized	alive
52	6	14	m	5-Feb	generalized	alive
54	6	15	m	5-Feb	generalized	alive
24	3	12	f	6-Feb	generalized	alive

S/N	Class	Age (years)	Sex	Date of onset of rash	Nature of the rash	Outcome / Result
47	5	15	m	6-Feb	generalized	alive
55	6	16	f	6-Feb	generalized	alive
9	1	11	m	6-Feb	generalized	alive
35	3	13	m	6-Feb	generalized	alive
42	4	13	m	6-Feb	generalized	alive
46	5	14	m	6-Feb	generalized	alive
53	6	15	m	6-Feb	generalized	alive
34	3	12	f	7-Feb	generalized	alive
23	3	13	f	7-Feb	generalized	alive
39	4	14	m	7-Feb	generalized	alive
40	4	14	m	7-Feb	generalized	alive
15	2	12	f	8-Feb	generalized	alive
30	3	12	f	8-Feb	generalized	alive
45	4	14	m	8-Feb	generalized	alive
26	3	12	m	8-Feb	generalized	alive
41	4	14	m	8-Feb	generalized	alive
31	3	12	m	9-Feb	generalized	alive
38	4	13	m	9-Feb	generalized	alive
1	1	10	f	9-Feb	body	alive
3	1	9	m	9-Feb	face	alive
8	1	11	m	9-Feb	face	alive
27	3	13	m	9-Feb	face	alive
12	1	11	m	9-Feb	generalized	alive

S/N	Class	Age (years)	Sex	Date of onset of rash	Nature of the rash	Outcome / Result
2	1	10	m	9-Feb	left hand	alive
18	2	11	f	9-Feb	generalized	alive
36	3	11	m	9-Feb	generalized	alive
44	4	14	f	9-Feb	generalized	alive
56	6	16	f	9-Feb	generalized	alive
57	6	15	f	9-Feb	generalized	alive
51	5	13	f	10-Feb	generalized	alive
4	1	11	m	11-Feb	itching	alive
14	1	11	m	11-Feb	generalized	alive
50	5	13	f	11-Feb	generalized	alive
13	1	12	m	19-Feb	generalized	alive
6	1	10	m	28-Feb	face	alive