

# Lassa Fever in Travelers from West Africa, 1969–2016

## Appendix

**Appendix Table 1.** Demographic and travel-related characteristics of imported Lassa fever (LF) cases, 1969–2016

Case no.	Year	Origin country	Destination country	Age, y	Sex	Suspected route of exposure
1 (1–5)	1969	Nigeria	United States (NY)	52	F	Nurse in Nigeria caring for LF patients
2 (6)	1971	Sierra Leone	United Kingdom	?	F	Nurse in Nigeria caring for LF patients
3 (6)	1971	Sierra Leone	United Kingdom	?	M	Doctor in Sierra Leone likely caring for LF patients
4 (7)	1972	Sierra Leone	United Kingdom	35	F	Nurse in Sierra Leone, needle-stick from patient with unknown illness who later died
5 (8–10)	1974	Nigeria	Germany	?	M	Doctor in Nigeria caring for physician with LF
6 (11,12)	1975	Nigeria	United Kingdom	39	M	Doctor in Nigeria
7 (13–17)	1976	Sierra Leone	United States (DC)	42	F	Lived in Sierra Leone in house with rodents
8 (18)	1976	Nigeria	United Kingdom	33	M	Working in Nigeria
9 (19–22)	1980	Burkina Faso	Netherlands	34	M	Working in Burkina Faso, manure seen near house
10 (23–25)	1981	Nigeria	United Kingdom	18	F	Lived/worked in Nigeria
11 (26)	1982	Nigeria	United Kingdom	21	F	Lived in Nigeria
12 (27,28)	1984	Sierra Leone	United Kingdom	47	M	Rodent exposure while camping in Sierra Leone
13 (29–31)	1985	Sierra Leone	United Kingdom	27	F	Midwife in Sierra Leone caring for LF patients
14 (32)	1987	Sierra Leone, Liberia	Israel	47	M	Travel to rural Sierra Leone and Liberia
15 (33)	1987	Sierra Leone	Japan	48	M	Worked in Sierra Leone
16 (34)	1989	Nigeria	Canada	38	M	Worked in Nigeria in agriculture
17 (35,36)	1989	Nigeria	United States (IL)	43	M	Attended funeral of relative in Nigeria who died from febrile illness diagnosed as malaria
18 (37–41)	2000	Cote d'Ivoire, Burkina Faso, Ghana	Germany	22	F	Travel to Cote d'Ivoire, Burkina Faso, Ghana
19 (37,42–45)	2000	Sierra Leone	United Kingdom	50	M	Aid worker in eastern Sierra Leone
20 (46–49)	2000	Nigeria	Germany	56	M	Unknown
21 (50–55)	2000	Sierra Leone	Netherlands	48	M	Surgeon working at hospital with LF patients
22 (56)	2003	Sierra Leone	United Kingdom	?	?	Work as soldier in rural Sierra Leone
23 (57)	2004	Sierra Leone, Liberia	United States (NJ)	38	M	Travel to farms in Sierra Leone and Liberia
24 (58,59)	2006	Sierra Leone	Germany	68	M	Travel to Sierra Leone
25 (60)	2007	Nigeria	South Africa	46	?	Public health physician from Nigeria
26 (61)	2009	Nigeria	United Kingdom	66	M	Travel to Nigeria
27 (62)	2009	Mali	United Kingdom	20s	M	Worked in rural Mali
28 (63)	2010	Liberia	United States (PA)	47	M	Travel to Liberia, sleeping in dwelling infested by living and dead rats
29 (64,65)	2014	Liberia	United States (MN)	46	M	Travel to Liberia
30 (66–68)	2015	Liberia	United States (NJ)	55	M	Work in Liberia, contact with rodents/excreta
31 (69)	2016	Togo	Germany	40s	M	Nurse in Togo
32 (70)	2016	Togo	United States (GA)	33	M	Nurse in Togo, cared for patient with LF
33 (71,72)	2016	Liberia	Sweden	72	F	Travel to rural Liberia, possible exposure to rodent excreta and acquaintances with LF

**Appendix Table 2.** Clinical and epidemiologic characteristics of imported Lassa fever cases, 1969–2016\*

Case no.	Year	Initial clinical symptoms	Physical exam/basic lab findings	Positive LASV PCR test within 1-2 days of admission (N/A = not available)	Treatment (s)	Outcome	High-risk contacts/total contacts (% high-risk/total)†	Secondary cases
1 (1–5)	1969	Fever, sore throat, malaise, headache, nausea	Oropharyngeal ulcer, epigastric tenderness, lymphadenopathy, tremor, nystagmus, dizziness, scalp hair loss, muscle tenderness; leukopenia (neutrophil-predominant), anemia, elevated ESR, proteinuria	N/A	Hydroxychloroquine, procaine and crystalline penicillin, supportive treatment	Survived	Unknown	0
2 (6)	1971	Fever, iridocyclitis, nausea/vomiting, anorexia	Abdominal tenderness	N/A	Chloramphenicol, ampicillin, hydrocortisone, prednisone, cloxacillin	Survived	Unknown	0
3 (6)	1971	Fever, malaise, anorexia, headache, joint pains, pleuritic and shoulder pain	Leukocytosis; mild thrombocytopenia, elevated ESR	N/A	None	Survived	Unknown	0
4 (7)	1972	Fever, headache, prostration, nausea/vomiting, limb and back pain	Hypotension; anemia, elevated ESR, microscopic hematuria	N/A	Chloroquine	Survived	Unknown	0
5 (8–10)	1974	Fever, malaise, pharyngitis, nausea/vomiting, subconjunctival hemorrhage, myalgias	Pharyngitis, soft palate ulceration, cervical adenopathy	N/A	Chloroquine, ampicillin, chloramphenicol, convalescent serum	Survived	3	0
6 (11,12)	1975	Fever, joint pains	Unknown	N/A	Unknown	Died	361	0
7 (13–17)	1976	Headache, vomiting, diarrhea, neck/back pain, headache, vertigo	Leukopenia	N/A	Unknown	Survived	29/552 (5%)	0
8 (18)	1976	Unknown	Unknown	N/A	Unknown	Survived	300	0
9 (19–22)	1980	Abdominal pressure, poor appetite, fever, rash, face and feet swelling	Conjunctival erythema, skin peeling at fingertips; elevated ESR	N/A	Chloroquine	Survived	Unknown	0
10 (23–25)	1981	Fever, abdominal pain, bilious vomiting, retro-orbital pain, facial edema, urinary frequency	Abdominal tenderness; leukocytosis, hyponatremia, microscopic hematuria and proteinuria, transaminitis, thrombocytopenia, coagulation abnormalities	N/A	Chloramphenicol, convalescent serum, supportive treatment	Survived	5/173 (3%)	0
11 (26)	1982	Fever, headache, fatigue	Leukocytosis, elevated bilirubin	N/A	Chloroquine, quinine, sulfadoxine/pyrimethamine	Survived	Unknown	0
12 (27,28)	1984	Fever	Unknown	N/A	Unknown	Survived	Unknown	0
13 (29–31)	1985	Fever, diarrhea, exudative pharyngitis,	Unknown	N/A	Chloroquine, quinine, chloramphenicol, oral ribavirin,	Survived	20/50 (40%)	0

Case no.	Year	Initial clinical symptoms	Physical exam/basic lab findings	Positive LASV PCR test within 1-2 days of admission (N/A = not available)	Treatment (s)	Outcome	High-risk contacts/total contacts (% high-risk/total)†	Secondary cases
		conjunctivitis, generalized tender lymphadenopathy			IV ribavirin, prostacyclin analogue, plasma, dexamethasone, mannitol			
14 (32)	1987	Fever, headaches	Exudative pharyngitis, hypotension, neurological signs/myelitis; leukopenia, thrombocytopenia, transaminitis	N/A	Supportive treatment	Survived	Unknown	0
15 (33)	1987	Fever, sore throat, malaise, diarrhea, epigastric pain	Facial edema, pharyngitis, axillary lymphadenopathy, papular rash on neck and chest, distended abdomen with ascites, hepatomegaly; transaminitis, proteinuria, ketonuria, elevated LDH, CPK, ESR, CRP	N/A	Supportive treatment	Survived	Unknown	0
16 (34)	1989	Fever, headache, malaise, nausea, chills, sore throat, dry cough, pleuritic chest pain	Inflamed conjunctiva and pharynx; leukopenia, albuminuria, elevated AST	N/A	Chloroquine, sulfadoxine/pyrimethamine, trimethoprim/sulfamethoxazole, chloramphenicol	Survived	Unknown	0
17 (35,36)	1989	Fever, shaking chills, sore throat, myalgia, persistent severe headaches	Transaminitis	N/A	Penicillin VK, cefaclor; ribavirin requested but not received prior to patient dying	Died	7/102 (7%)	0
18 (37-41)	2000	Fever, flu-like symptoms, tonsillitis	Pharyngitis, ulcerative tonsillitis; transaminitis, renal failure, thrombocytopenia, elevated LDH	Yes	Artesunate, ciprofloxacin, IV ribavirin	Died	Unknown	0
19 (37,42-45)	2000	Fever, malaise, diarrhea	Unknown	Yes	Unknown	Died	125	0
20 (46-49)	2000	Fever, diarrhea, one episode of generalized seizures	Transaminitis, elevated CSF protein, decreased glucose	Yes	Unknown	Died	18/232 (8%)	1
21 (50-55)	2000	Fever, malaise, nausea, diarrhea, myalgias, arthralgias	Rash on trunk; thrombocytosis, transaminitis, renal injury	No (diagnosis considered on day 6, PCR returned positive day 8)	Artesunate, cefmandol, netilmicin, doxycycline, IV ribavirin	Died	132	0
22 (56)	2003	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	0
23 (57)	2004	Fever, chills, severe sore throat, diarrhea, back pain	Unknown	No	Antimalarial, antibiotic therapy; IV ribavirin requested but not received prior to patient dying	Died	5/188 (3%)	0
24 (58,59)	2006	Fever, worsening of pre-existing neurological symptoms	Unknown	No (first sample was sent on day 10 and tested positive)	Unknown	Unknown	Unknown	0
25 (60)	2007	Unknown	Unknown	Yes	Unknown	Died	Unknown	0
26 (61)	2009	Fever, malaise, loss of appetite, abdominal	Unknown	Yes	IV ribavirin requested but not received prior to patient dying	Died	0/328 (0%)	0

Case no.	Year	Initial clinical symptoms	Physical exam/basic lab findings	Positive LASV PCR test within 1-2 days of admission (N/A = not available)	Treatment (s)	Outcome	High-risk contacts/total contacts (% high-risk/total)†	Secondary cases
		pain, confusion, lethargy, mild diarrhea						
27 (62)	2009	Unknown	Unknown	Yes	Antimalarial therapy	Died	7/125 (6%)	0
28 (63)	2010	Fever, chills, knee/ankle pain, anorexia, sore throat, skin tenderness, shortness of breath	Parotid enlargement, tonsillar exudates, posterior cervical lymphadenopathy, splenomegaly; leukopenia, thrombocytopenia, transaminitis	No (diagnosis considered on day 3, first sample was sent on day 5 and tested positive)	None	Survived	0/140 (0%)	0
29 (64,65)	2014	Fever, nausea, vomiting, diarrhea	Confusion, generalized abdominal pain, proteinuria	Yes	Dialysis, methylprednisolone	Survived	6/255	0
30 (66–68)	2015	Fever, chills, myalgias, sore throat	Pharyngeal erythema and exudates, tender cervical lymphadenopathy; transaminitis, renal injury	Yes	Broad-spectrum antibiotics; IV ribavirin requested but not received prior to patient dying	Died	15/177 (8%)	0
31 (69)	2016	Fever, malaise, sore throat	Unknown	No (diagnosed postmortem)	Anti-malarials, broad-spectrum antibiotics	Died	33/55 (60%)	1
32 (70)	2016	Fevers, sore throat, retro-orbital headache, diminished hearing, diarrhea, malaise, weakness	Conjunctival pallor, oral thrush, systolic murmur, bladder distention with suprapubic tenderness; leukopenia, thrombocytopenia, renal injury, transaminitis	Yes	IV ribavirin, oral favipiravir	Survived	Unknown	0
33 (71,72)	2016	Fever, nausea, arthralgia, loose stools, headache	Atrial fibrillation; elevated CRP, renal injury, transaminitis, proteinuria	No (diagnosis considered on day 22, first sample was sent on day 24 of sample from day 15 which tested positive)	None	Survived	122	0

\*AST, aspartate aminotransferase; IV, intravenous; CPK, creatine phosphokinase; CRP, C-reactive protein ; CSF, cerebrospinal fluid; ESR, erythrocyte sedimentation rate; LASV, Lassa virus LDH, lactate dehydrogenase; N/A, not available.

†For those investigations that did not specify number of high-risk contacts, number refers to total contacts.

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