

Monkeypox Research : Clinical characteristics of monkeypox - DRC experience



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Clinical Characterization of MPX (2007-2011)- Sankuru

Clinical characterization of human monkeypox infection: 2008 – 2011



Patients followed for 3 weeks post enrollment:

- Daily evolution of Clinical signs, symptoms and skin lesions
- Daily evolution of lab parameters :
 - Hematology
 - Blood biochemistry
 - Urine analysis
 - Viral load (throat swab, lesion and blood)
 - Cytokine profile
 - Lymphocyte profile

- 1 Clinical characterization of human monkeypox infections in
- 2 the Democratic Republic of the Congo



Demographics and exposure history

Characteristic	Age Group			Total
	< 5 (N = 31)	5-11 (N = 67)	≥ 12 (N = 118)	
Age at Admission (years), Mean (SD)	2 (1.3)	8 (2.1)	21 (8.4)	14 (9.9)
Gender, n (%)				
Female	19 (61.3%)	20 (29.9%)	39 (33.1%)	78 (36.1%)
Male	12 (38.7%)	47 (70.1%)	79 (66.9%)	138 (63.9%)
Marital Status, n (%)				
Married	0 (0.0%)	0 (0.0%)	35 (29.7%)	35 (16.2%)
Single	31 (100.0%)	67 (100.0%)	83 (70.3%)	181 (83.8%)
Family Exposure, n (%)				
Clean/Dressed Consumption Of Wild Game	17 (54.8%)	53 (79.1%)	86 (72.9%)	156 (72.2%)
Handled Uncooked, Freshly Butchered Meat	14 (45.2%)	47 (70.1%)	72 (61.0%)	133 (61.6%)
Ground Squirrel Meat	8 (25.8%)	30 (44.8%)	50 (42.4%)	88 (40.7%)
Initial Close Contact Of Infected Individual (Household)	17 (54.8%)	23 (34.3%)	46 (39.0%)	86 (39.8%)
Monkey Meat	9 (29.0%)	21 (31.3%)	52 (44.1%)	82 (38.0%)
Initial MPX Contact With Blood, Body Fluids, Or Person With Tissue Or Secretions (MPX Compatible Illness)	12 (38.7%)	12 (17.9%)	33 (28.0%)	57 (26.4%)
Dead Animal Contact	3 (9.7%)	17 (25.4%)	27 (22.9%)	47 (21.8%)
Other Wild Game Contact, Not Specified	8 (25.8%)	16 (23.9%)	22 (18.6%)	46 (21.3%)
Meat Of Gambian Rat Or Other Rodent	1 (3.2%)	5 (7.5%)	5 (4.2%)	11 (5.1%)
Multiple Exposures (≥ 2)	24 (77.4%)	67 (100.0%)	114 (96.6%)	205 (94.9%)

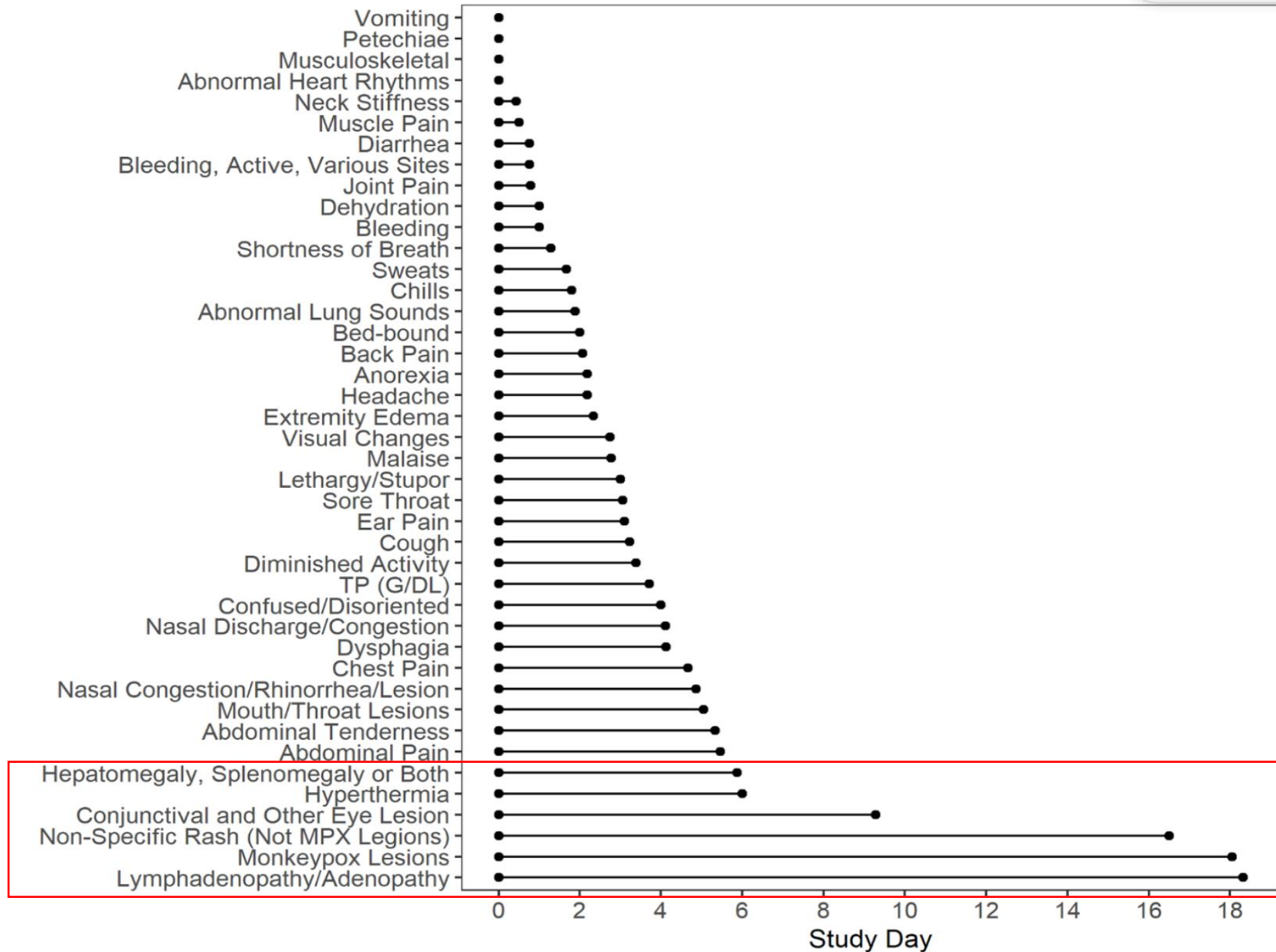
Clinical symptoms

- Rash (96.8%)
- Malaise (85.2%)
- Sore throat (78.2%),
- Lymphadenopathy (57.4%)
- Anorexia (50.0%)

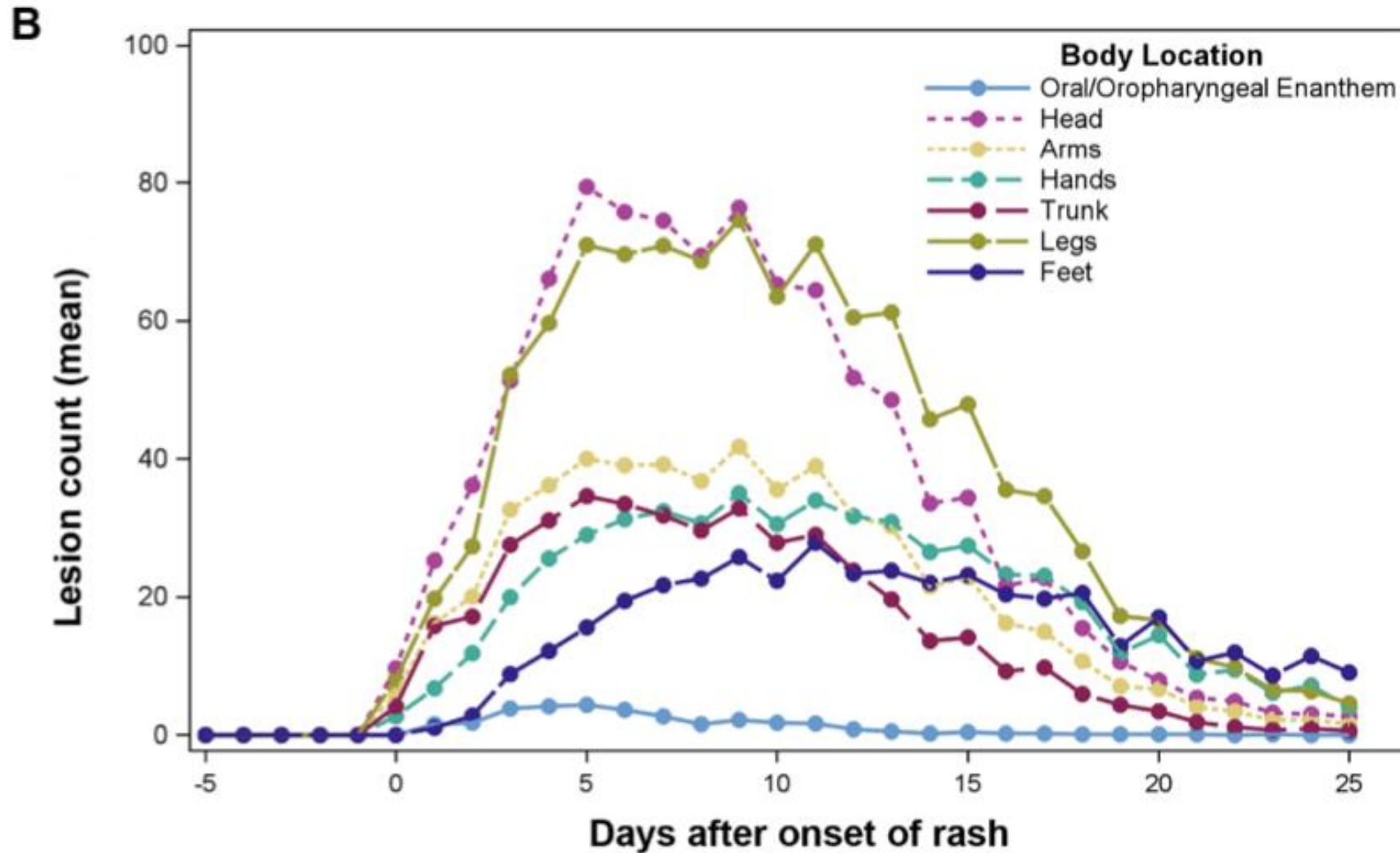
Physical examination findings or signs

- Skin lesions (99.5%)
- Lymphadenopathy (adenopathy) (98.6%).
- MPXV mouth/throat lesions (28.7%)
- Abnormal lung sounds (10.6%)
- Hepatomegaly, splenomegaly or both (7.9%)
- Bleeding (2.3%)

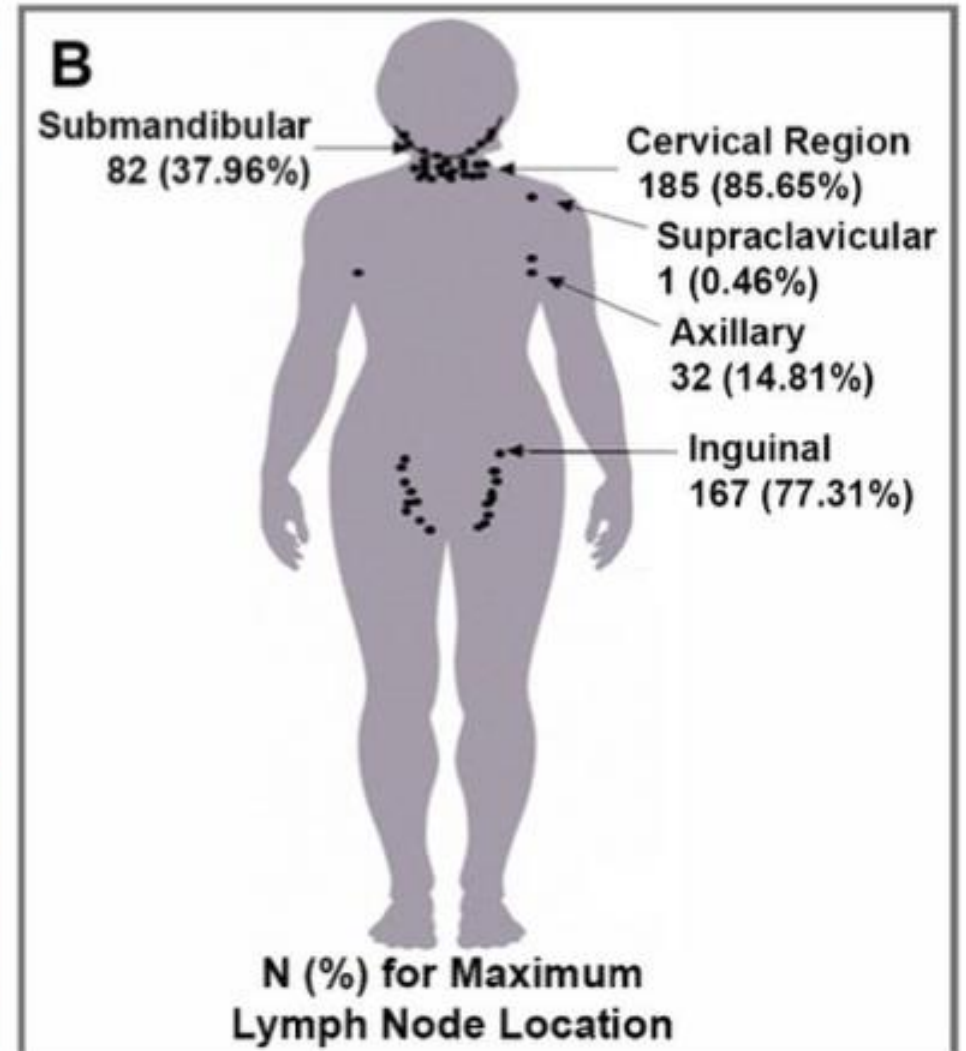
The duration of clinical symptoms and signs : average 3 – 5 days



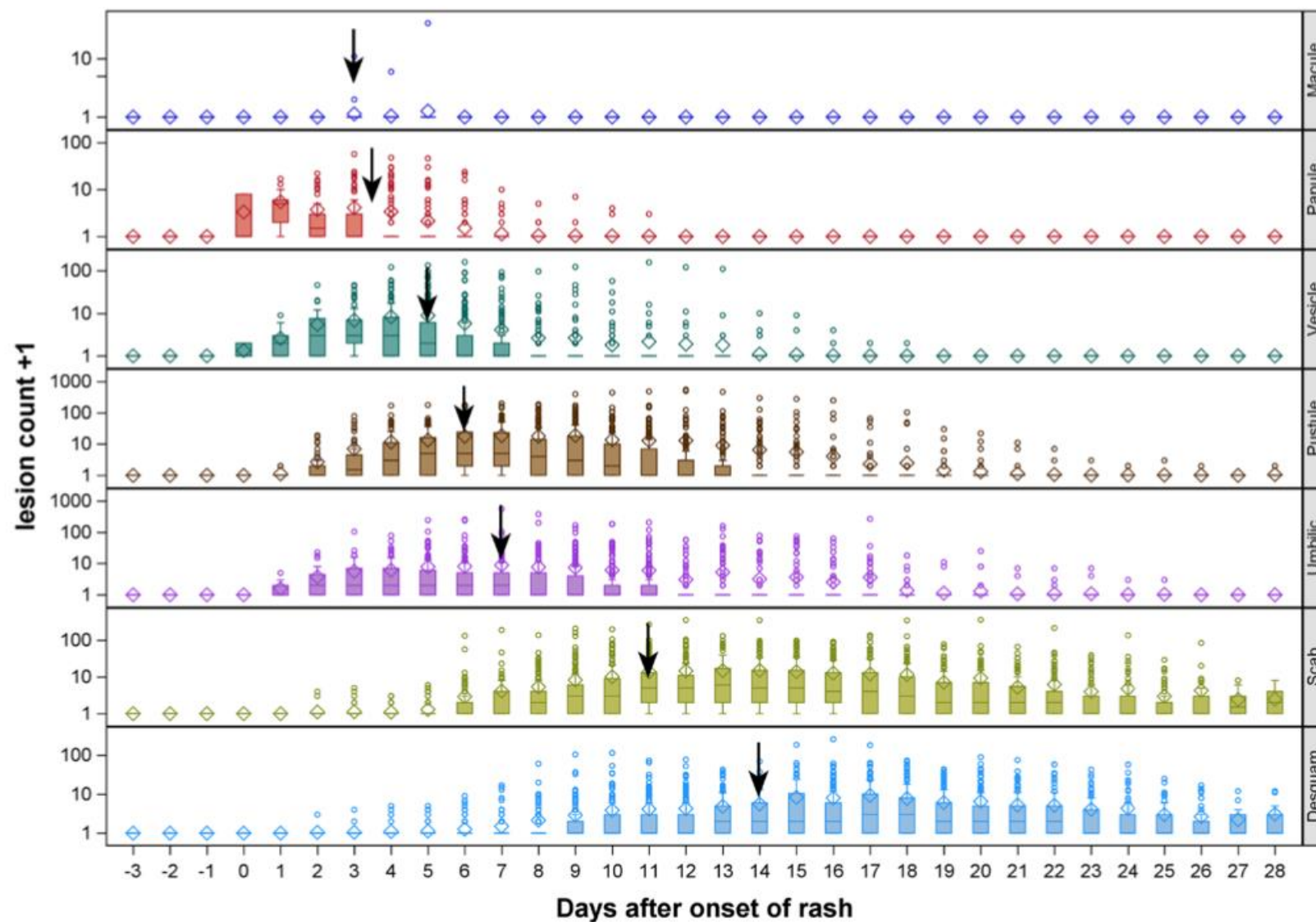
Change in total lesion count or lesion count by body location over time



The pattern of distribution of Monkeypox associated lymph node



Change in lesion count on hands with time



Comparison of lesion count by location **on day of admission** among illness severity categories

Body Location	Level 1	Level 2	Level 3	Level 4 (Death)	Adjusted P value	Raw P value
	(N = 99)	(N = 74)	(N =40)	(N = 3)		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
Oral/Oropharyngeal Enanthem	1 (2.0)	4 (10.0)	6 (10.6)	29 (35.9)	<.0001	<.0001
Head	32 (44.3)	87 (113.1)	96 (117.6)	191 (102.2)	<.0001	<.0001
Arms	35 (54.0)	89 (100.6)	118 (181.0)	259 (89.8)	<.0001	<.0001
Hands	15 (32.7)	32 (43.5)	49 (101.7)	73 (58.2)	<.0001	<.0001
Trunk	27 (43.0)	77 (89.8)	95 (138.0)	313 (157.1)	<.0001	<.0001
Legs	62 (111.1)	154 (204.4)	217 (372.7)	374 (343.5)	<.0001	<.0001
Feet	12 (42.4)	17 (28.8)	22 (43.9)	49 (70.7)	0.0110	0.0110
Total Body	184 (300.9)	459 (547.1)	602 (885.8)	1288 (763.7)	<.0001	<.0001

Comparison of **Maximum lesion count** by location among illness severity categories

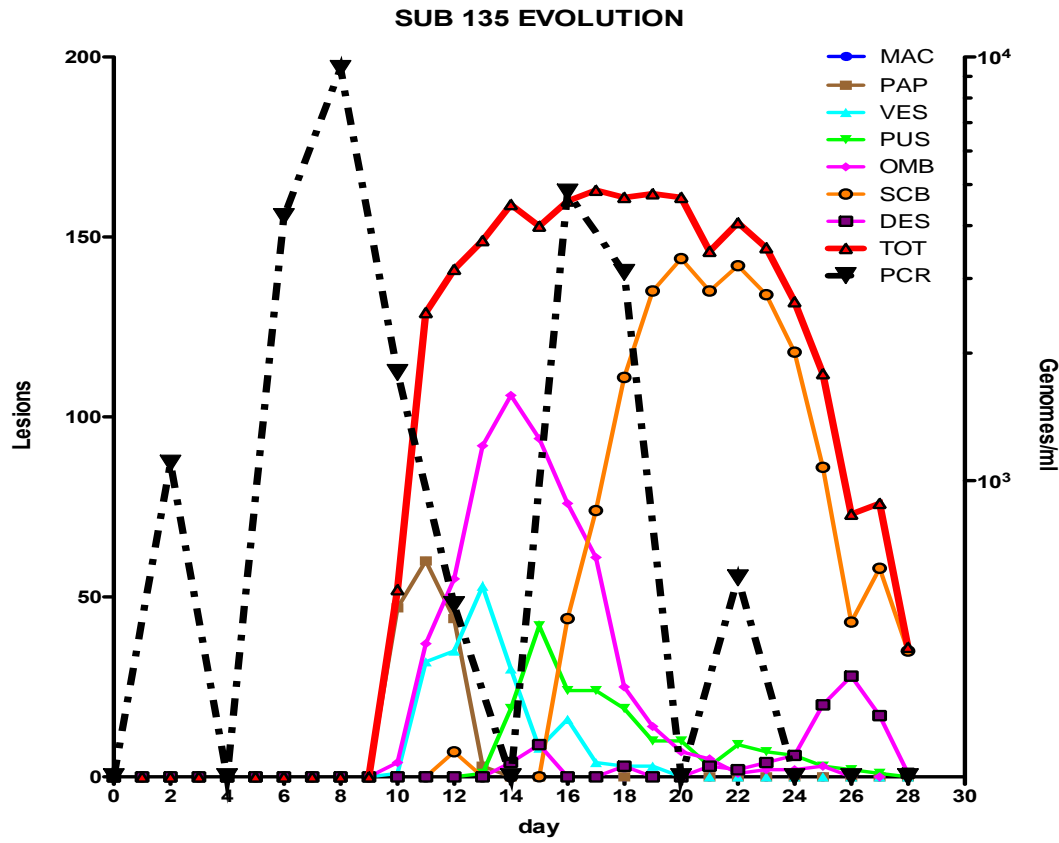
Body Location	Level 1	Level 2	Level 3	Level 4 (Death)	Adjusted P value	Raw P value
	(N = 99)	(N = 74)	(N =40)	(N = 3)		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
Oral/Oropharyngeal Lesions	0 (1.1)	2 (3.5)	7 (12.6)	29 (35.9)	<.0001	<.0001
Head	38 (47.7)	106 (122.3)	147 (153.5)	527 (546.0)	<.0001	<.0001
Arms	42 (65.4)	102 (105.1)	149 (200.9)	771 (896.0)	<.0001	<.0001
Hands	19 (41.7)	38 (42.7)	75 (129.8)	222 (264.5)	<.0001	<.0001
Trunk	30 (45.7)	84 (91.9)	125 (190.5)	904 (924.2)	<.0001	<.0001
Legs	77 (128.7)	180 (208.0)	296 (438.3)	1284 (1431.2)	<.0001	<.0001
Feet	17 (65.6)	25 (35.9)	44 (67.1)	142 (133.1)	<.0001	<.0001
Total Body	223 (352.7)	537 (567.5)	843 (1098.6)	3879 (4210.2)	<.0001	<.0001

Clinical laboratory findings

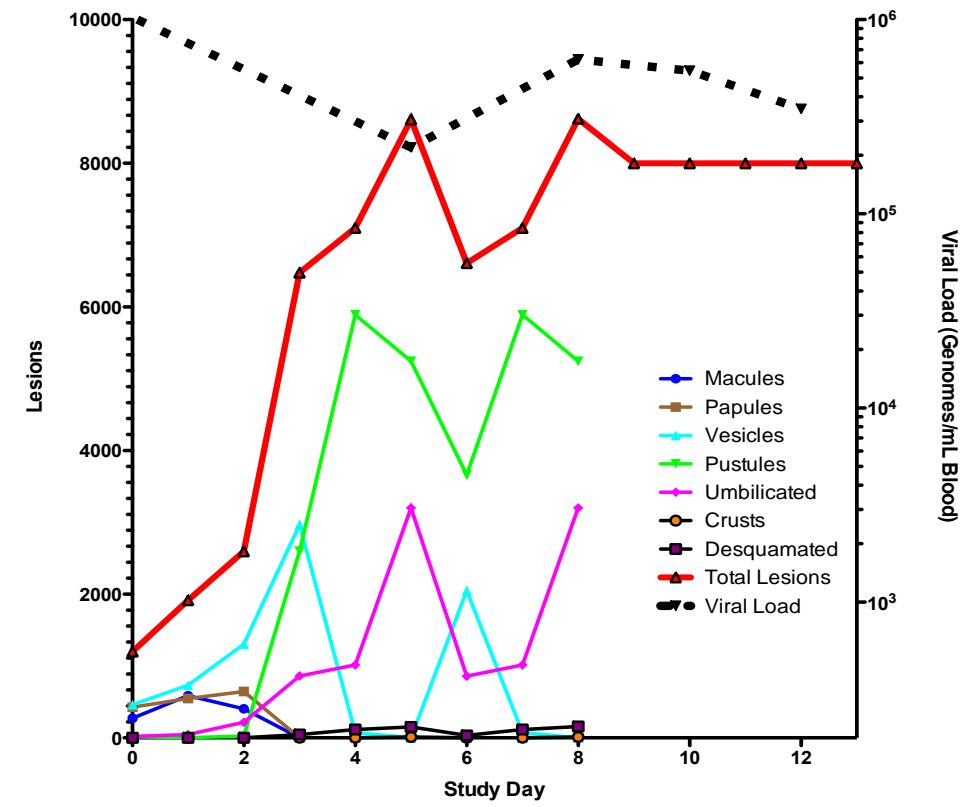
survivors (levels 1-3) vs. level 4 (death)

- Statistically significant differences in the **alanine phosphatase (ALT) (90 vs 26 U/L; p = 0.0224, adjusted)** and **aspartate aminotransferase (AST) (415 vs 48 U/L; p = 0.0004, adjusted)**
- For **CBC (complete blood count) variables**, no difference between survivors and fatal cases for any CBC variable.
Neutrophil count show difference among the non-fatal categories
- The **platelet count was $130 \times 10^3/\mu\text{L}$ in the fatal group vs $296 \times 10^3/\mu\text{L}$ among survivors (p = 0.0102, unadjusted)**
- For **urine, elevated protein among illness severity** level 1, 59 mg/dL (SD 65.3), level 2 category 88 mg/dL (SD 87.3), vs level 3 category 114 mg/dL (SD 108.3); p = 0.0147, adjusted (data not shown)

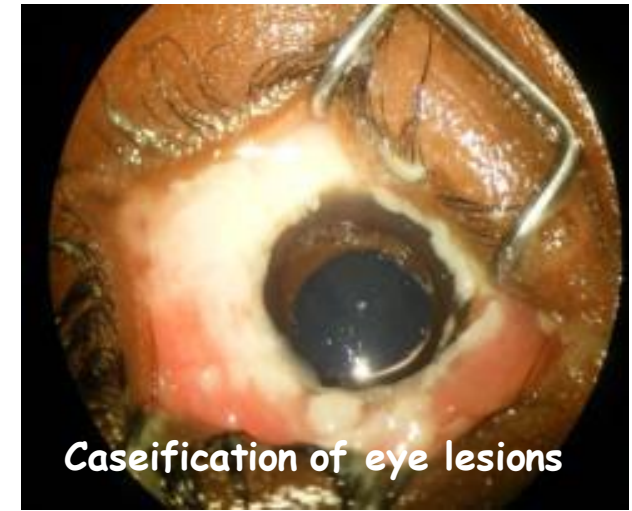
Evolution of lesion for subject 135 who was enrolled as an asymptomatic subject and later developed disease.



Lesion Evolution in one fatal case (Subject 54)



Complications observed in monkeypox patients



Fetal Demise Due to Maternal Monkeypox Infection

The Journal of Infectious Diseases

BRIEF REPORT

Maternal and Fetal Outcomes Among Pregnant Women With Human Monkeypox Infection in the Democratic Republic of Congo

Placide K. Mbala,^{1,2} John W. Huggins,⁴ Therese Riu-Rovira,³ Steve M. Ahuka,¹
Prime Mulembakani,² Anne W. Rimoin,⁵ James W. Martin,⁶ and
Jean-Jacques T. Muyembe¹

4 spontaneous abortion
among the 5 pregnant
women enrolled in the study



Opportunities

- Well characterized clinical cohorts for Long-term sequelae and immunogenicity studies
- Improved diagnostics
- Monkeypox infection in key populations
 - Health Care workers
 - Hunters, Sanctuaries
 - Pregnant/breastfeeding women
- Co-infection (chickenpox, measles, HIV, rubella, etc.)
- Re-infection/Re-activation
- Transmissibility
- Genomic epidemiology of monkeypox
- Ecologic studies to determine host reservoir species
- Expanding active disease surveillance and serosurveys of humans and animals in geographically varied region

Partners

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