

MONKEYPOX

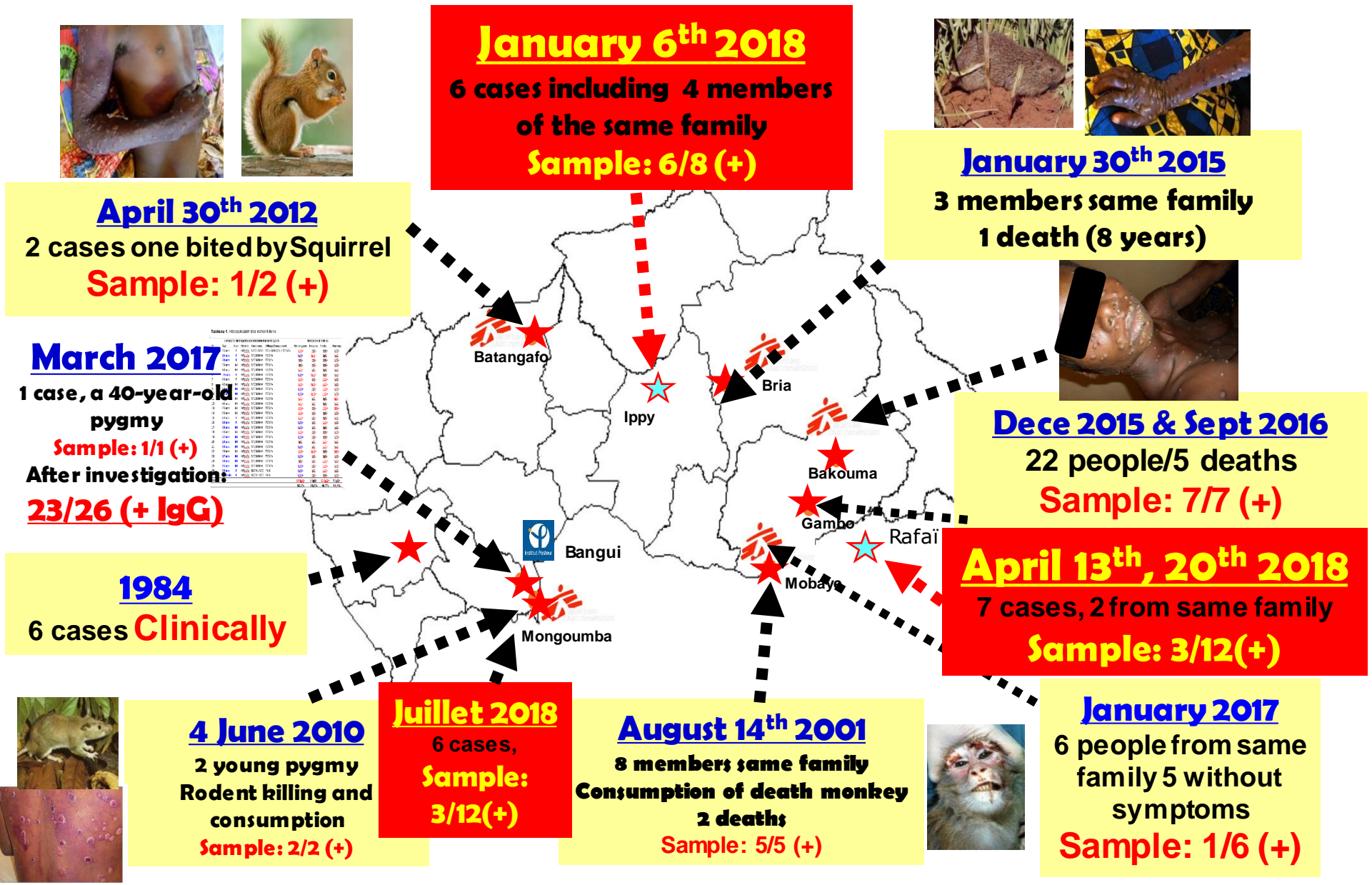
Central African Republic

**Epidemiology, surveillance and laboratory capacities:
what else is needed?**

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Monkeypox in the CAR 2001-2021



Monkeypox : the national surveillance



MINISTÈRE DE LA SANTÉ ET DE LA POPULATION *****		REPUBLIQUE CENTRAFRICAINE Unité - Dignité - Travail *****
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FORMULAIRE D'INVESTIGATION DE CAS DE MONKEY-POX OU VARIOLE DE SINGE

Déclaration

1. Date de la déclaration ____/____/____
2. Cas signalé par (cocher toutes les cases correspondantes et préciser)
☐ Équipe mobile, n° _____
☐ Centre de santé _____
☐ Hôpital _____
Autre à préciser : _____

3. Fiche remplie par (nom et prénom) _____

4. Informations transmises par (nom et prénom) _____

5. Lien avec le patient

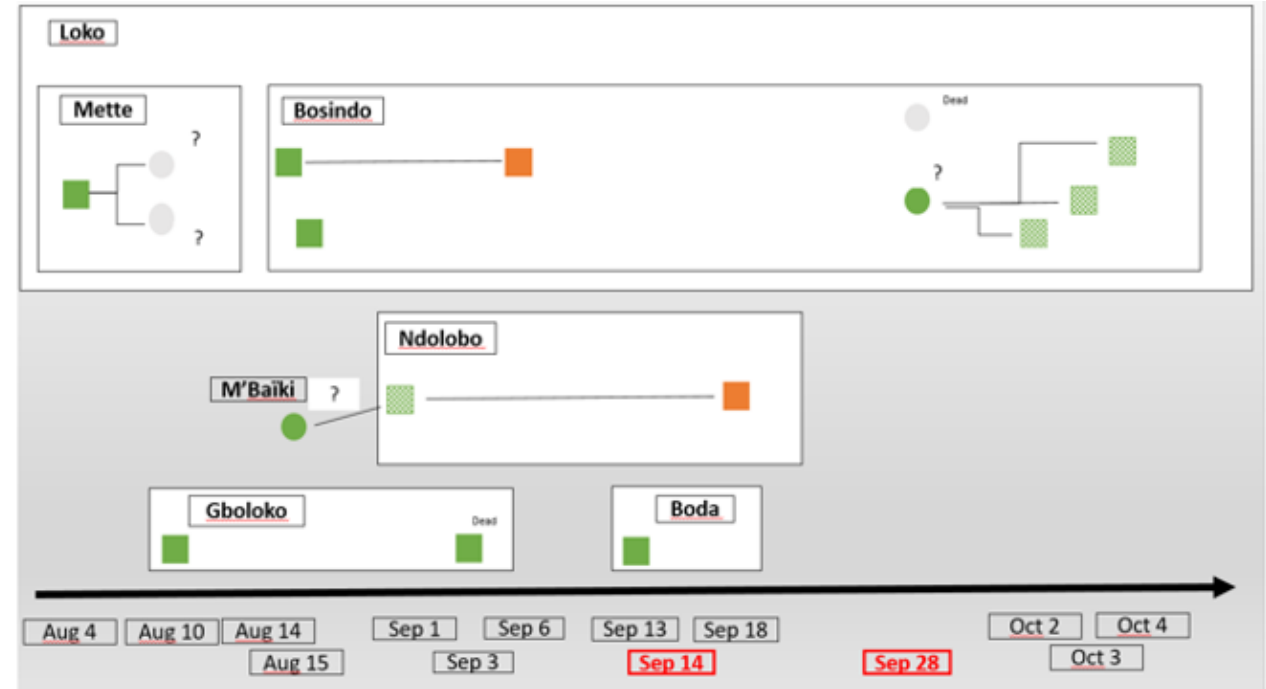
Identité du patient

6. Nom _____ Prénom _____
7. Pour les enfants, nom du père/Mère/Tuteur _____
8. Date de naissance ____/____/____
9. Âge (ans) _____
10. Sexe ☐ M ☐ F
11. Village/Quartier de résidence durant les 12 derniers mois _____

12. Quartier/Village _____
13. Nom du chef _____
14. District Santé ou zone _____
15. Nationalité _____
16. Profession du patient (cocher toutes les cases correspondantes)
☐ Enfant non scolarisé
☐ Elève/Étudiant
☐ Marchand de gibiers
☐ Marchand (autre)
☐ Chasseur
☐ Employé de maison
☐ Planteur/Fermier
☐ Mineur



Monkeypox : Outbreak investigation



Pattern of monkeypox virus transmission hypothesized to have occurred during these outbreaks



Monkeypox outbreaks in the CAR 2001-2021

Monkeypox national surveillance database 2001 – 2021

95 suspected outbreaks

32 chickenpox outbreaks

n=59 participants
chickenpox confirmed cases : 48
suspected cases: 8
contacts : 3

23 monkeypox suspected outbreaks

n=82 participants
suspected cases: 40
contacts : 42

40 monkeypox outbreaks

n= 327 participants

Monkeypox confirmed cases : 99

Two co-infection chickenpox-monkeypox

Monkeypox suspected cases : 61

Contacts of monkeypox cases : 167

Median = 1 - Range : 1 to 13 by outbreak

Median = 0 - Range : 0 to 15 by outbreak

Median = 0 - Range : 0 to 32 by outbreak

Outbreak size :
from 1 to 13 confirmed cases

25 suspected and confirmed cases maximum

Zoonotic or inter-human transmission?

Zoonotic transmission

16/40 outbreaks with suspected zoonotic sources without animal reservoir determination

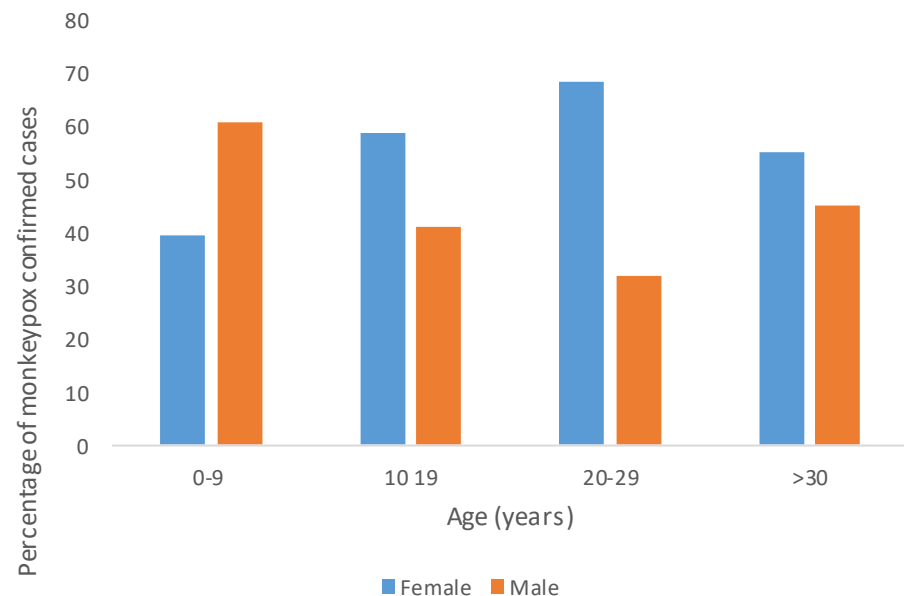
Probable underestimation of wildlife/human contacts



Interhuman transmission

65,7 % described a contact with a human cases
95,2% of interhuman contacts are intra-household

Epidemiological characteristics



Mean age : 15.5 years

Female : 53,1 %



Table 1: Characteristics of the participants investigated during monkeypox outbreaks in the CAR, 2001-2021 (n=327)

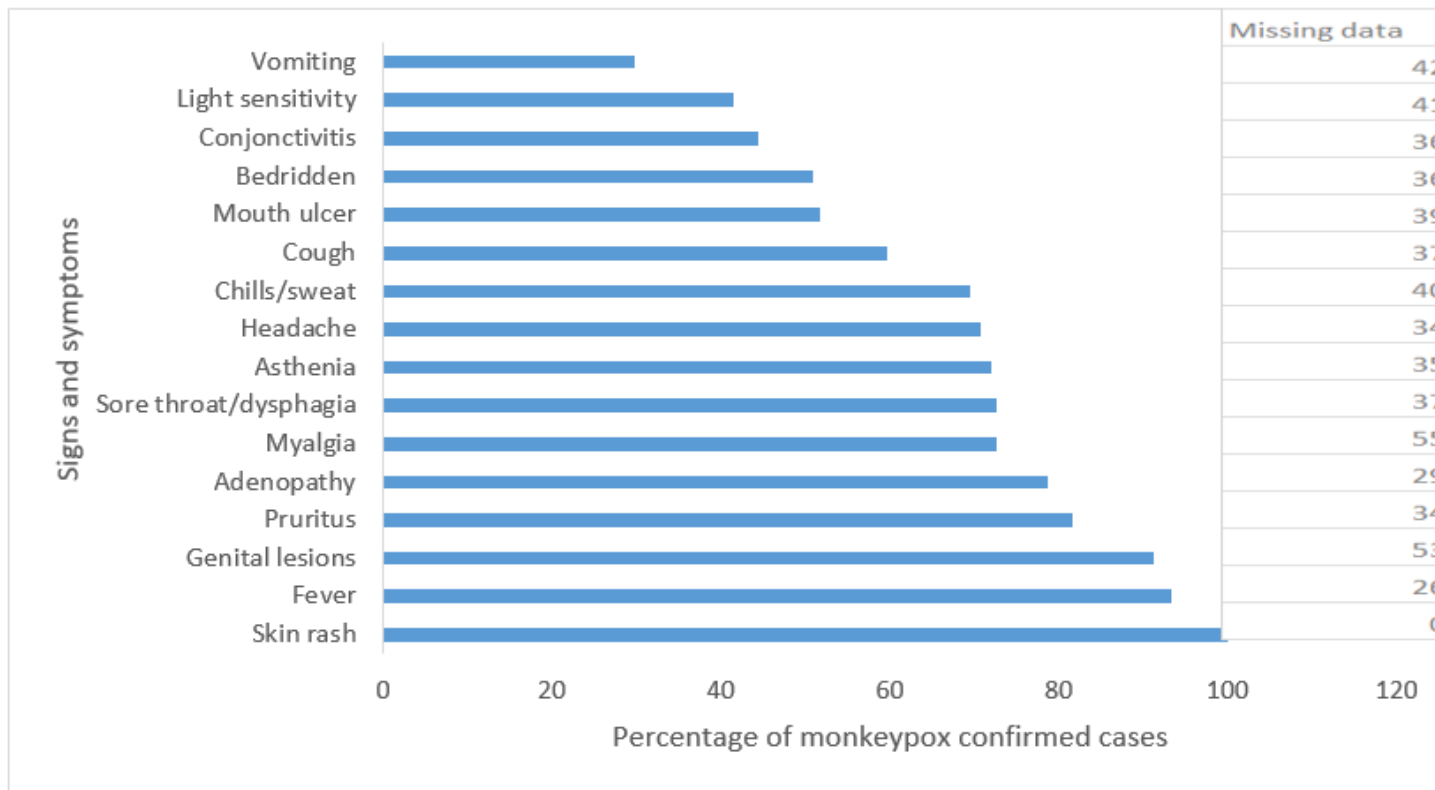
Characteristics	Confirmed cases (n= 99)	Suspected cases (n = 61)	Contacts (n=167)	P value
Gender				P= 0,6
Female	51 (53.1 %)	37 (60.7 %)	90 (53,9 %)	
Male	45 (46.9 %)	24 (39.3 %)	77 (46,1 %)	
Missing data	3	0	0	
Age (years), Median (IQR)	15.5 (5.5-27)	8 (2-23)	27 (14-40)	
Age groups (years)				P< 0,001
0-9	33 (35.9 %)	30 (50.9 %)	23 (17 %)	
10-19	17 (18.5 %)	9 (15.2 %)	18 (13.3 %)	
20-29	22 (23.9 %)	11 (18.6 %)	30 (22.2 %)	
> 30	20 (21.7 %)	9 (15.3 %)	64 (47.4 %)	
Missing data	7	2	32	
Born before 1980*				P<0.001
Yes	3 (3.3 %)	4 (6.8 %)	28 (20.7 %)	
No	89 (96.7 %)	55 (93.2 %)	107 (79.3 %)	
Missing data	7	2	32	

Clinical characteristics

Incubation= 7 days (IQR : 1-13, range : 0 - 17)

Genital lesions : 91,3% (n=42/46 with available information)

Figure 4: Frequency of signs and symptoms in people with confirmed monkeypox virus infection in the CAR, 2001-2021 (n=99)



Disease outcomes and Case Fatality Ratio

Case Fatality Ratio : 7,5 % (12/160)

Children Case Fatality Ratio : 9,6 % (8/83)

Role of co-infection with HIV?
With chickenpox?

8 co infection with malaria

-One or several complications (n=11 patients)

Broncho pneumonia (4)

Septicemia (3)

Deshydratation (6)

Superimposed bacterial cutaneous infection (1)

Fistulization of an adenopathy (1)

Corneal ulceration (1)

Cutaneous sequelae (4)



Laboratory capacities

Monkeypox diagnostic tools

Diagnostic method	Reagents and equipment
Real Time PCR Monkeypox typing and sub-typing primers	<ul style="list-style-type: none">-qPCR generic primers-qPCR Congo Basin strains primers-qPCR West African strains primers- qPCR cowpox strain-Equipment: ABI 7500 Fast
Virus isolation New born mice inoculation	<ul style="list-style-type: none">- Intracerebral inoculation (very sensitive)- Equipment: BSL-3+ lab with a BSC level-III
ELISA	<ul style="list-style-type: none">- IgM and IgG detection (but high cross-reactivity, false positives and false negatives)-Equipment: ELISA chain-No multiplexing capability



Viral Isolation

- Preparation of crushed crusts, serum dilution, pus
- Intracerebral inoculation of the suspension to a litter of 9 newborn mice
- Mice visited every day and mortality noted (death between 2 and 4 days)
- Presence of verified on at least one mouse by qPCR

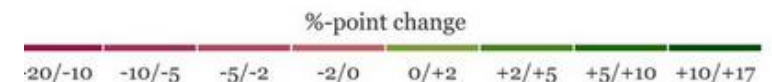
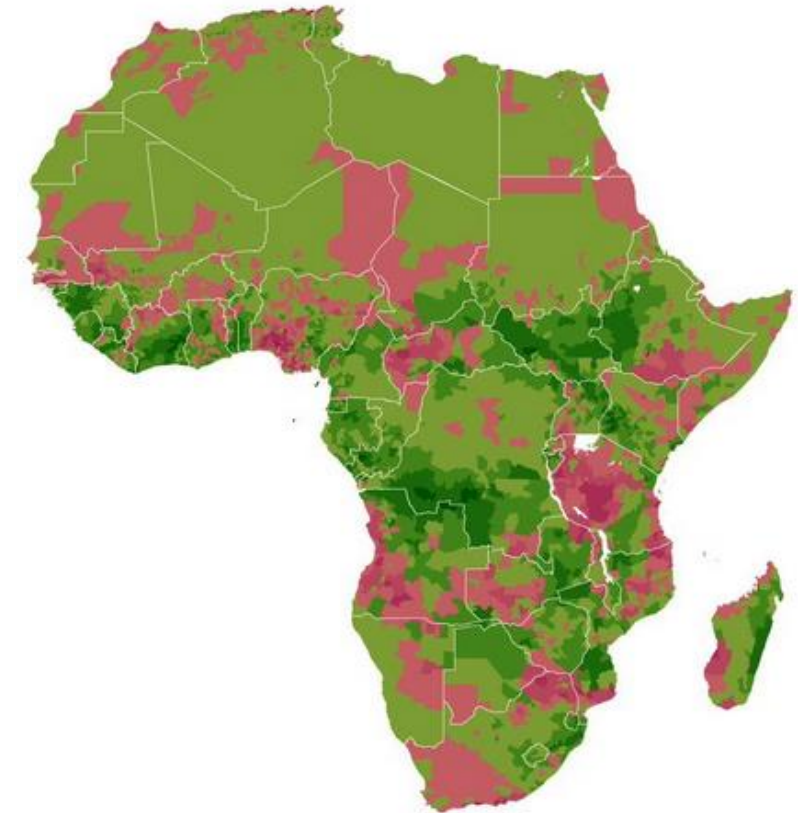


Increase of the monkeypox outbreaks since 2018

- Improved detection and response to disease?
- Population movements due to civil and military unrest or migration ?
- Environmental and ecological disturbance?
- Animal dynamics ?



Tree cover density change
between 2015 & 2019



What else is needed?

- Improvement of local health system capacity and training
- Health care worker protection: delivery of vaccine and Personal Protective Equipment (PPE)
- Protection of local communities : Infection Prevention and Control, medical waste management
- Evaluation of the general population exposition
- Need for transboundary collaboration in the sub region around the understanding of the Congo Basin strain: ecological understanding of the disease
- Improvement of wildlife health surveillance





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