

# Monkeypox: características gerais da doença

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# Conflito de interesse

- Nada a declarar

# Cenário histórico → atual

## Antes de 2022

Table 2. Number of Cases per Clade<sup>1</sup>.

Decade	Central African Clade (N)	West African Clade (N)	Total Cases
1970–1979	38	9	47
1980–1989	355	1	356
1990–1999	520	0	520
2000–2009	92 confirmed 10,027 suspected <sup>2</sup>	47	139 10,027
2009–2019	85 confirmed 18,788 suspected <sup>2</sup>	195	280 18,788



Fig 6. Number of confirmed, probable, and/or possible monkeypox cases between 2010–2019. [7,8,15,18,29,30,32,33,35,47–49,55–57,59–67,72–74] \* Number reflects suspected cases, since as of the year 2000, the number of suspected cases was primarily reported by the DRC. (base layer of the map: <https://datawrapper.dwcdn.net/UU3bg/1/>).

# Cenário histórico → atual

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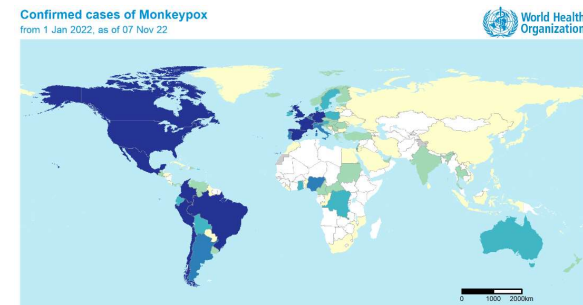
## Cenário atual

Total Monkeypox cases, by WHO region

From 1 Jan 2022. Data as of 07 Nov 2022

	Total Confirmed Cases	Total Probable Cases	Total Deaths
Region of the Americas	52,004	3,703	21
European Region	25,348	0	4
African Region	958	0	14
Western Pacific Region	215	0	0
Eastern Mediterranean Region	72	0	1
South-East Asia Region	31	0	1
Total	78,628	3,703	41

<sup>1</sup> Using most recently complete international standard week (Monday - Sunday)



# Forma de transmissão

## Forma endêmica

- Período de incubação: 5 a 21 dias
- Forma de transmissão:
  - Animal → humano: contato direto, arranhões, mordedura, respiratório (?), contato com mucosas, alimentos???
  - Humano → humano (contato domiciliar): contato com lesões, fluidos corporais, gotícula
  - Fômites (ambiental)
- Período de transmissão: fase prodrômica (?) até desaparecimento das lesões

# Forma de transmissão

## Forma atual

- Período de incubação: 5 a 21 dias
- Forma de transmissão:
  - Humano → humano (contato íntimo)

> Lancet Infect Dis. 2022 Sep 29;S1473-3099(22)00586-2. doi: 10.1016/S1473-3099(22)00586-2. Online ahead of print.

## Viral loads in clinical samples of men with monkeypox virus infection: a French case series

Romain Palich <sup>1</sup>, Sonia Burrel <sup>2</sup>, Gentiane Monsel <sup>3</sup>, Agathe Nouchi <sup>3</sup>, Alexandre Bleibtreu <sup>4</sup>,

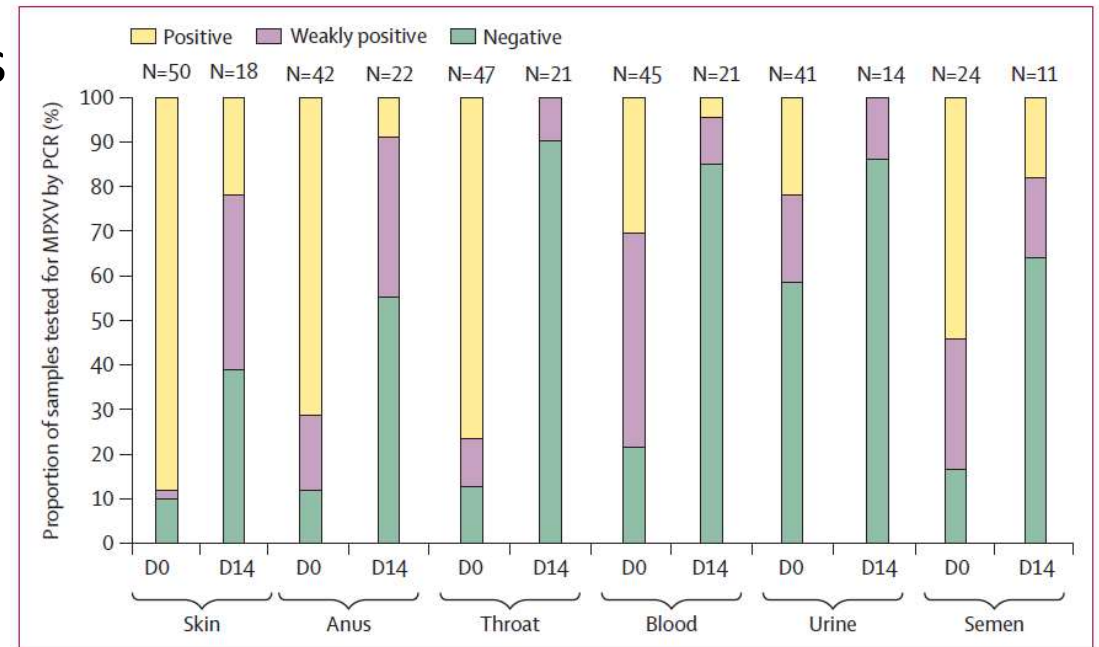


Figure 1: Proportion of clinical samples found to be positive, weakly positive, and negative for MPXV at diagnosis, by use of PCR

D0=day 0. D14=day 14. MPXV=monkeypox virus.

# Forma de transmissão

## Forma atual

- Período de incubação: 5 a 21 dias

> Lancet Infect Dis. 2022 Sep 29;S1473-3099(22)00639-9. doi: 10.1016/S1473-3099(22)00639-9. Online ahead of print.

## Monkeypox virus in human body sites and fluids: evidence for transmission

Francesca Colavita <sup>1</sup>, Andrea Antinori <sup>2</sup>, Emanuele Nicastrì <sup>2</sup>, Daniele Focosi <sup>3</sup>, Enrico Girardi <sup>4</sup>, Francesco Vaia <sup>5</sup>, Fabrizio Maggi <sup>6</sup>

	Participants	HIV-positive	Skin*		Anogenital		Nasopharynx		Plasma		Urine		Semen		Saliva		Fecal matter	
			MPXV DNA prevalence	Median Ct	MPXV DNA prevalence	Median Ct	MPXV DNA prevalence	Median Ct	MPXV DNA prevalence	Median Ct	MPXV DNA prevalence	Median Ct	MPXV DNA prevalence	Median Ct	MPXV DNA prevalence	Median Ct	MPXV DNA prevalence	Median Ct
France (Palich et al, 2022) <sup>1</sup>	50	22/50 (44%)	44/50 (88%)	20	30/42 (71%)	21	36/47 (77%)	27	13/45 (29%)	33	9/41 (22%)	31	13/24 (54%)	28	NA	NA	NA	NA
Spain (Peiró-Mestres et al, 2022) <sup>2</sup>	12	4/12 (33%)	12/12 (100%)	20	11/12 (92%)	23	10/12 (83%)	31	NA	NA	9/12 (75%)	35	7/9 (78%)	32	12/12 (100%)	29	8/12 (67%)	24
16 countries (Thornhill et al, 2022) <sup>†‡</sup>	528	218/528 (41%)	512/528‡	..	..	..	138/528 (26%)	NA	35/528 (7%)	NA	14/528 (3%)	NA	29/32 (91%)	NA	NA	NA	NA	NA
France (Mailhe et al, 2022) <sup>4</sup>	264	73/256 (29%)	252/258 (98%)	23	NA	NA	150/197 (76%)	32	8/26 (31%)	36	NA	NA	NA	NA	NA	NA	NA	NA
Spain (Tarín-Vicente et al, 2022) <sup>5</sup>	181	72/181 (40%)	178/180 (99%)	23	43/55 (78%)	27	82/117 (70%)	32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Italy (Raccagni et al, 2022) <sup>6</sup>	36	15/36 (42%)	36/36§ (100%)	..	..	..	..	..	24/36 (67%)	34	8/36 (22%)	NA	22/36 (61%)	34	NA	NA	NA	NA

Data are n/N (%) unless otherwise specified. Ct=cycle threshold. MPXV=monkeypox virus. NA=not available. \*Includes perianal skin. †Argentina, Australia, Belgium, Canada, Denmark, France, Germany, Israel, Italy, Mexico, Portugal, Spain, Switzerland, The Netherlands, UK, and USA. ‡Refers to skin or anogenital samples combined. §Refers to either skin, anogenital, or oropharyngeal samples combined.

**Table:** Large case series reporting prevalence of MPXV DNA and median Ct of positive samples at PCR in at least two different bodily fluids



# Manifestação clínica

## Pré-2022

- Pródromo: febre, astenia, mialgia, calafrios, cefaleia (2-3 dias) → adenomegalia de qualquer cadeia, uni ou bilateral
- Lesão cutânea: distribuição centrífuga, mácula → pápula → vesícula → pústula → crosta (14-24d)
- Evolução uniforme



*Petersen et al. Infect Dis Clin N Am 2019*



# Manifestação clínica

## Quadro atual

Summary of symptoms  
As of November 09 2022

	All	Male	Female
Any rash	27,857 (85.4%)	26,537 (85.8%)	718 (72.4%)
Systemic rash	19,400 (59.5%)	18,590 (60.1%)	641 (64.6%)
Fever	18,958 (58.1%)	18,076 (58.4%)	515 (51.9%)
Genital rash	14,980 (45.9%)	14,299 (46.2%)	231 (23.3%)
Headache	10,268 (31.5%)	9,606 (31.0%)	414 (41.7%)
Any lymphadenopathy	9,688 (29.7%)	9,495 (30.7%)	178 (17.9%)
Fatigue	9,532 (29.2%)	8,875 (28.7%)	315 (31.8%)
Muscle ache	9,134 (28.0%)	8,570 (27.7%)	325 (32.8%)
General lymphadenopathy	7,205 (22.1%)	7,074 (22.9%)	127 (12.8%)
Local lymphadenopathy	6,473 (19.8%)	6,349 (20.5%)	112 (11.3%)
Sore throat	4,499 (13.8%)	4,164 (13.5%)	165 (16.6%)
Rash, unknown location	3,313 (10.2%)	3,291 (10.6%)	20 (2.0%)
Oral rash	2,875 (8.8%)	2,381 (7.7%)	59 (5.9%)
Chills	2,760 (8.5%)	2,364 (7.6%)	92 (9.3%)

- Pródromo infrequente
- Lesão cutânea precede manifestação sistêmica
- Às vezes sem lesão cutânea
- Localizações atípicas
- Evolução pleomórfica

# Manifestação clínica

**15** MINISTÉRIO DA SAÚDE  
Secretaria de Vigilância em Saúde

**BOLETIM EPIDEMIOLÓGICO ESPECIAL**  
**Monkeypox**

Boletim Semanal | Centro de Operações de Emergências (COE) 25/9/2022 a 8/10/2022

Quanto ao local de surgimento das lesões (Figura 19), considerando as notificações com o preenchimento da informação (n = 7.129), observou-se maior frequência na região **genital (n = 4.071; 57,1%)**, seguida do tronco (n = 3.007, 42,2%), dos membros superiores (n = 2.953; 41,4%) e da face (n = 2.343; 32,9%).

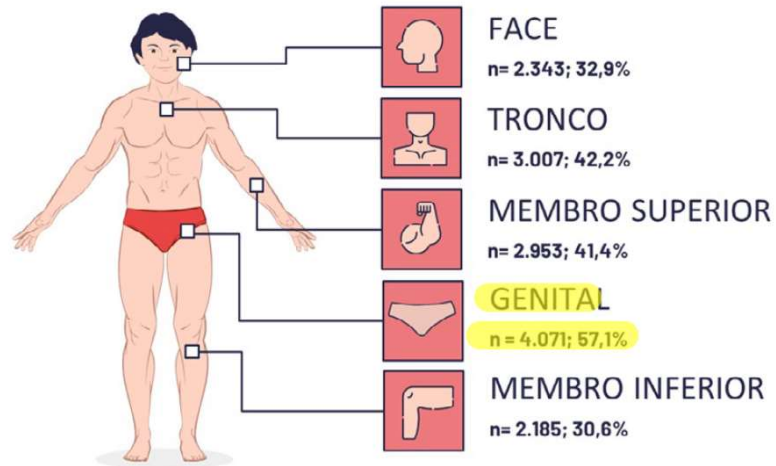


FIGURA 19 Casos confirmados e prováveis de monkeypox, segundo local de surgimento das lesões, até 8 de outubro de 2022, Brasil (N = 7.129)

Fonte: COE Monkeypox Nacional, até 8/10/2022

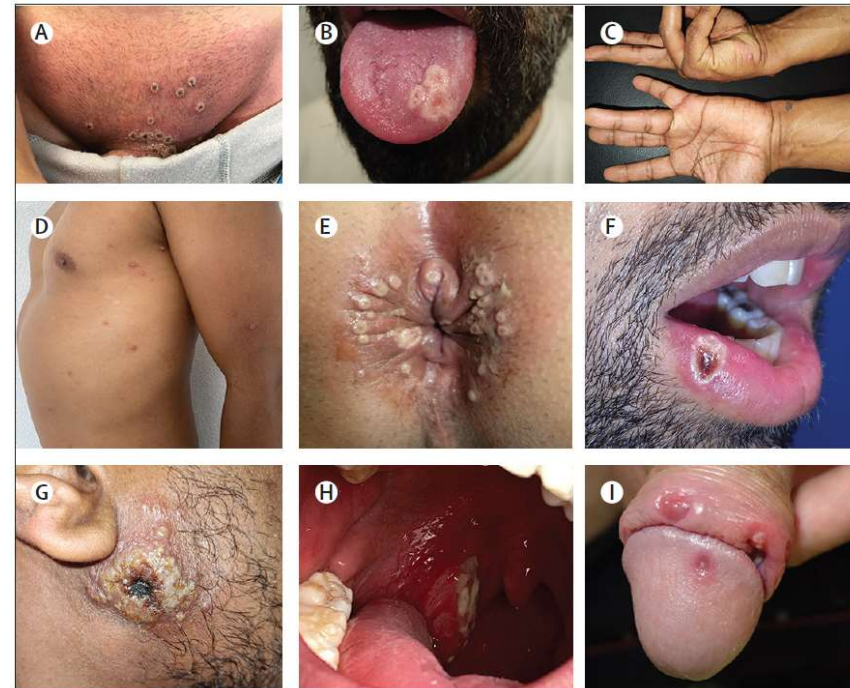


Figure 1: Clinical presentation of monkeypox

## Clinical presentation and virological assessment of confirmed human monkeypox virus cases in Spain: a prospective observational cohort study

Eloy José Tarín-Vicente, Andrea Alemany, Manuel Agud-Dios, Maria Ubals, Clara Suñer, Andrés Antón, Maider Arando, Jorge Arroyo-Andrés, Lorena Calderón-Lozano, Cristina Casan, José Miguel Cabrera, Pep Coll, Vicente Descalzo, María Dolores Folqueira, Jorge N García-Pérez, Elena Gil-Cruz, Borja González-Rodríguez, Christian Gutiérrez-Callar, Águeda Hernández-Rodríguez, Paula López-Roa, María de los Ángeles Meléndez, Julia Montero-Menárguez, Irene Muñoz-Gallego, Sara Isabel Palencia-Pérez, Roger Paredes, Alfredo Pérez-Rivilla, María Pitiñana, Nuria Prat, Aida Ramirez, Ángel Rivero, Carmen Alejandra Rubio-Muniz, Martí Vall, Kevin Stephen Acosta-Velásquez, An Wang, Cristina Galván-Casas\*, Michael Marks\*, Pablo L Ortiz-Romero\*, Oriol Mirjà\*



# Manifestação clínica

## Grupos de risco - Países endêmicos

- Infecção mais frequente em < 45 anos
- Gestantes
- Crianças (menores de 4 anos)
- Imunodeprimidos

Case Reports > J Infect Dis. 2017 Oct 17;216(7):824-828. doi: 10.1093/infdis/jix260.

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

Placide K Mbala <sup>1, 2</sup>, John W Huggins <sup>3</sup>, Therese Riu-Rovira <sup>4</sup>, Steve M Ahuka <sup>1</sup>, Prime Mulembakani <sup>2</sup>, Anne W Rimoin <sup>5</sup>, James W Martin <sup>6</sup>, Jean-Jacques T Muyembe <sup>1</sup>

Affiliations + expand

PMID: 29029147 DOI: 10.1093/infdis/jix260

**Table 1. Clinical Characteristics of Pregnancy Outcomes for Participating Pregnant Women**

Variable	Case 1 (Patient ID 55)	Case 2 (Patient ID 221)	Case 3 (Patient ID 241)	Case 4 (Patient ID 76)
WHO severity score	Moderate	Severe	Mild	Moderate
Age, y	20	25	29	22
Time of gestation, wk	6	6–7	14	18
Malaria status	Negative	Negative	Negative	Positive
Maximum lesion count, no.	76	1335	16	113
MPXV load, genome copies/mL <sup>a</sup>				
Maximum	$3.5 \times 10^3$	$7.9 \times 10^5$	$2.3 \times 10^5$	$8.9 \times 10^5$
In placental tissue	—	—	—	$2.4 \times 10^7$
In fetal tissue	—	—	—	$1.6 \times 10^3$
Time to qPCR negativity, d after fever onset <sup>b</sup>	26	>17	2	>27
Minimum albumin level, g/dL	2.6	2.4	2.4	1.8
Event	Miscarriage	Miscarriage	Live birth	Fetal death
Time from disease onset to event <sup>c</sup>	24	14	9 <sup>d</sup>	21

# Manifestação clínica

## Grupos de risco - Países endêmicos

- Gestantes
- Crianças (menores de 4 anos)

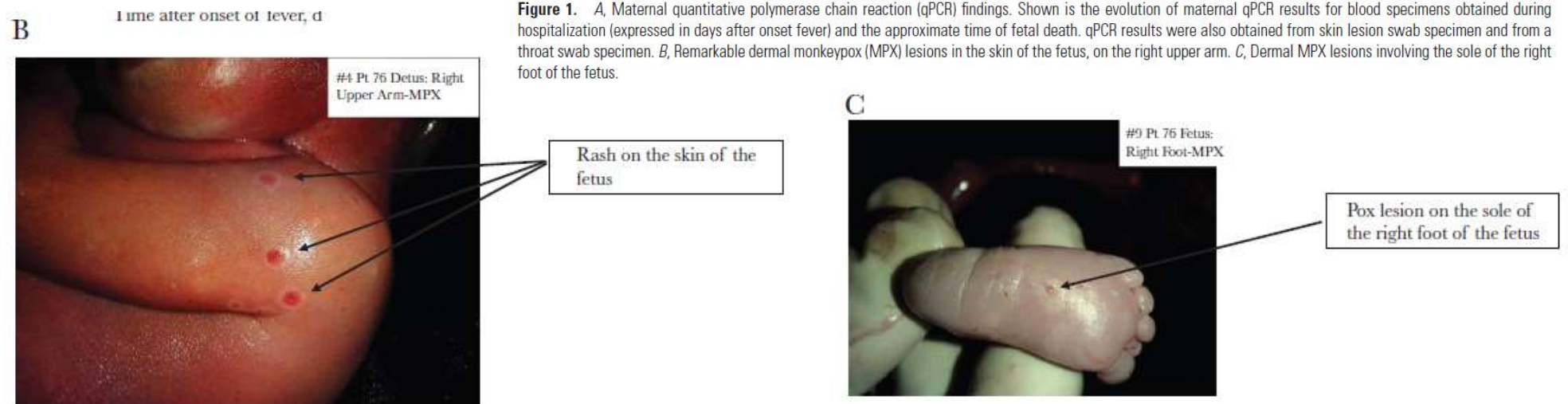
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Affiliations + expand

PMID: 29029147 DOI: 10.1093/infdis/jix260



# Manifestação clínica

TABELA 5 Casos confirmados e prováveis de monkeypox, segundo sexo de nascimento e raça/cor, até 8 de outubro de 2022, Brasil (N = 8.464)

Variáveis sociodemográficas	n (%)
<b>Sexo de nascimento</b>	
Masculino	7.745 (91,5)
Feminino	699 (8,3)
Sem informação	20 (0,2)

TABELA 7 Casos confirmados e prováveis de monkeypox, segundo a orientação e o comportamento sexual por sexo ao nascimento, até 8 de outubro de 2022, Brasil (N = 8464)

Variáveis	Masculino n (%)	Feminino n (%)	Total n (%)
<b>Comportamento sexual</b>			
Relação sexual com homens	4.177 (53,9)	360 (51,5)	4.543 (53,7)
Relação sexual com mulheres	727 (9,4)	16 (2,3)	743 (8,8)
Relação sexual com homens e mulheres	508 (6,6)	15 (2,1)	524 (6,2)
Não informado	2.333 (30,1)	308 (44,1)	2.654 (31,4)

Fonte: COE Monkeypox, 8/10/2022

## Grupos de risco – situação atual

- HSH
- Imunodeprimido (infecção pelo HIV/aids)

Considerando as notificações com o preenchimento da informação (n = 7.134), observou-se 41,0% (n = 2.926) dos casos confirmados ou prováveis de monkeypox declararam viver com o vírus da imunodeficiência humana (HIV) e 891 (10,5%) afirmaram possuir uma infecção sexualmente transmissível ativa (IST), descritas na Tabela 9.

# Manifestação clínica

TABLE 1. Demographic and clinical characteristics abstracted from intake forms of patients with Monkeypox virus infection who received tecovirimat (Tpoxx) under the Food and Drug Administration-regulated Expanded Access Investigational New Drug protocol (N = 549) — United States, May–August 2022

Characteristic (no. missing, unknown, or not specified)	No. (%)
<b>Sex* (22)</b>	
Male	515 (97.7)
Female	12 (2.3)
<b>Age group, yrs (22)</b>	
0–18	5 (0.9)
19–64	518 (98.3)
≥65	4 (0.8)
Median (IQR)	36.5 (31.4–43.9)
<b>Race and ethnicity (85)</b>	
White, non-Hispanic	180 (38.8)
Hispanic or Latino	161 (34.7)
Black or African American, non-Hispanic	83 (17.9)
Asian, non-Hispanic	13 (2.8)
Other, non-Hispanic	11 (2.4)
Unknown race, non-Hispanic	10 (2.2)
Multiple races, non-Hispanic	6 (1.3)
<b>HHS region†</b>	
2	141 (25.7)
3	68 (12.4)
4	88 (16.0)
5	36 (6.6)
9	153 (27.9)
Other regions	63 (11.5)
<b>Lifetime history of vaccination against monkeypox or smallpox</b>	
No monkeypox or smallpox vaccination documented	488 (88.9)
JYNNEOS	52 (9.5)
Previous monkeypox or smallpox vaccination reported, but vaccine product unknown	8 (1.5)
ACAM2000	1 (0.2)
<b>Percentage of body affected (190)</b>	
<10	232 (64.6)
10–24	60 (16.7)
25–49	28 (7.8)
50–74	22 (6.1)
75–100	17 (4.7)
Median (IQR)	5 (1–10)
<b>No. of lesions at start of treatment (20)</b>	
<10	210 (39.7)
10–100	299 (56.5)
>100	20 (3.8)
<b>Clinical indication for treatment‡ (not mutually exclusive) (309)</b>	
Lesions in anatomic areas that might result in serious sequelae**	191 (79.6)
At risk for severe disease	74 (30.8)
Pain	121 (50.4)
<b>Signs and symptoms documented at start of treatment (not mutually exclusive)</b>	
Rash	460 (83.8)
Fever	194 (35.3)
Rectal pain	108 (19.7)
Lymphadenopathy	74 (13.5)
Headache	46 (8.4)
Malaise	35 (6.4)
<b>Immune status</b>	
HIV-positive	254 (46.3)
Other immunocompromising condition††	7 (1.3)
No immunocompromising condition reported	288 (52.5)

See table footnotes on the next page.

HIV-positive 254 (46.3)

## Grupos de risco – situação atual

- HSH
- Imunodeprimido (infecção pelo HIV/aids)

Morbidity and Mortality Weekly Report

## Clinical Use of Tecovirimat (Tpoxx) for Treatment of Monkeypox Under an Investigational New Drug Protocol — United States, May–August 2022

Kevin O’Laughlin, MD<sup>1,\*</sup>; Farrell A. Tobolowsky, DO<sup>1,\*</sup>; Riad Elmor, MS<sup>2</sup>; Rahsaan Overton, MPH<sup>1</sup>; Siobhán M. O’Connor, MD<sup>1</sup>; Inger K. Damon, MD, PhD<sup>1</sup>; Brett W. Petersen, MD<sup>1</sup>; Agam K. Rao, MD<sup>1</sup>; Kevin Chatham-Stephens, MD<sup>1</sup>; Patricia Yu, MPH<sup>1,†</sup>; Yon Yu, PharmD<sup>1,‡</sup>; CDC Monkeypox Tecovirimat Data Abstraction Team

# Manifestação clínica

## Complicações – países endêmicos

- Rara
  - Infecção secundária
  - Encefalite
  - Pneumonite
- Hospitalização – 5 a 10%
- Letalidade
  - Clado I – 10 – 15%
  - Clado II - <1%

Review > [N Engl J Med. 2022 Nov 10;387\(19\):1783-1793. doi: 10.1056/NEJMra2208860.](#)  
Epub 2022 Oct 26.

## Monkeypox

[Antoine Gessain](#)<sup>1</sup>, [Emmanuel Nakoune](#)<sup>1</sup>, [Yazdan Yazdanpanah](#)<sup>1</sup>

# Manifestação clínica

## Complicações – cenário atual

- Rara
  - Uveíte/ ceratite
  - Lesões extensas e prolongadas
  - Edema peniano/ proctite
  - Infecção secundária
  - Miopericardite
  - Pneumonite
- Hospitalização – 5 a 10%
- Letalidade
  - Clado IIb - <0,05%



# Manifestação clínica

> MMWR Morb Mortal Wkly Rep. 2022 Oct 21;71(42):1343-1347. doi: 10.15585/mmwr.mm7142e1.

## Complicações – cenário atual

Ocular Monkeypox – United States, July–September 2022

FIGURE 2. Left eye in a patient\* with HIV-associated immunocompromise and ocular monkeypox, with conjunctivitis and conjunctival lesion earlier in the course of monkeypox illness (A), and with conjunctival ulcer and peripheral keratitis later in the course of monkeypox illness (B) — United States, August–September 2022

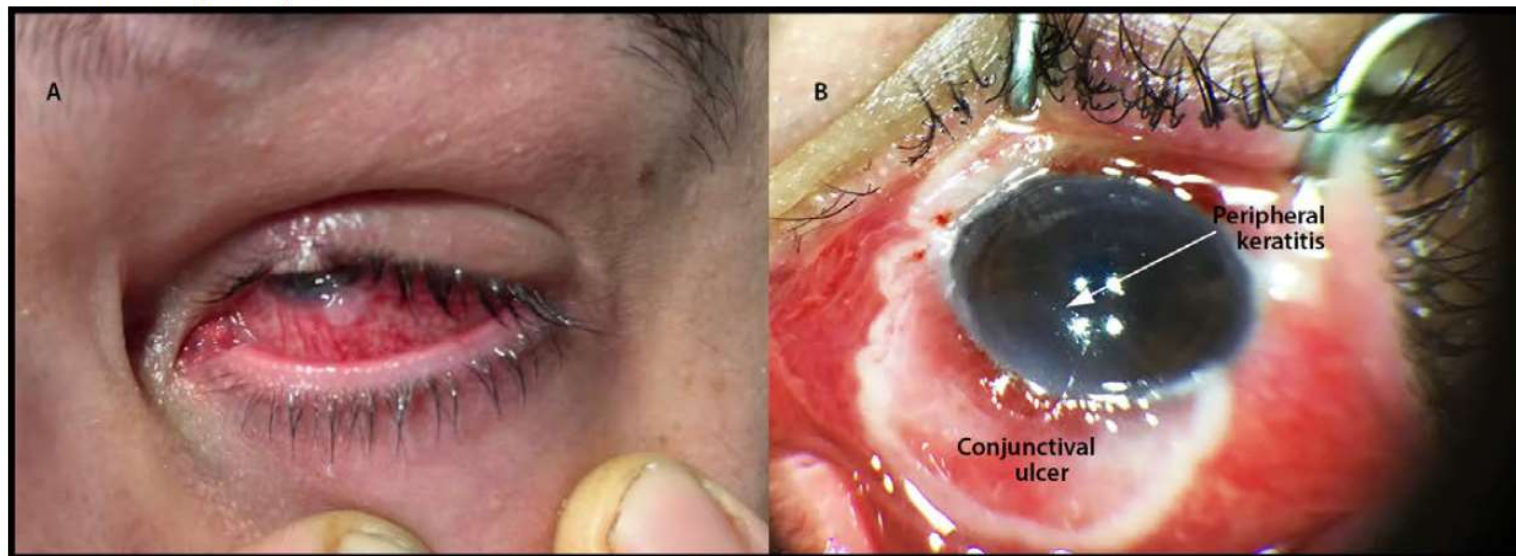


Photo A/Nathanael Adjei-Kyeremeh

Photo B/Dharmendra R. Patel

\* Patient has consented to the publication of these photographs.

# Manifestação clínica

## Complicações – cenário atual

> Clin Gastroenterol Hepatol. 2022 Sep 26;S1542-3565(22)00922-3. doi: 10.1016/j.cgh.2022.09.024.  
Online ahead of print.

### Esophageal Monkeypox lesion

Sharmistha Mishra <sup>1</sup>, Rishad Khan <sup>2</sup>, Adriana Krizova <sup>3</sup>, Samir C Grover <sup>4</sup>



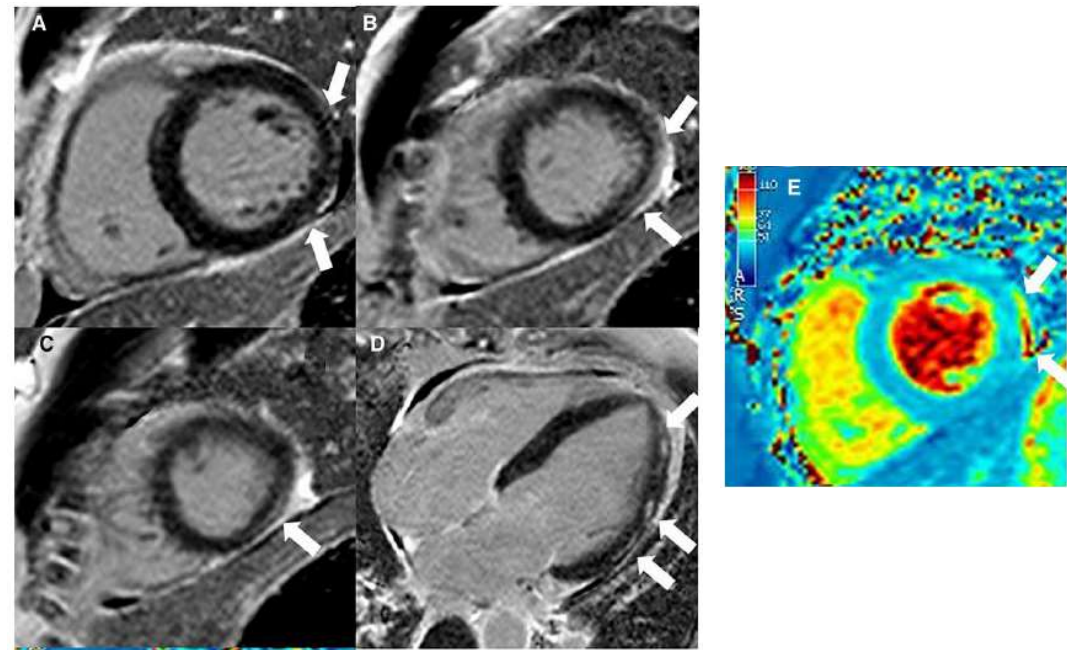
# Manifestação clínica

## Complicações – cenário atual

> Open Forum Infect Dis. 2022 Aug 3;9(8):ofac394. doi: 10.1093/ofid/ofac394. eCollection 2022 Aug.

### Atypical Clinical Presentation of Monkeypox Complicated by Myopericarditis

Darrell H S Tan <sup>1 2 3</sup>, Shelby Jaeranny <sup>4</sup>, Maggie Li <sup>5</sup>, Sharon S Sukhdeo <sup>3</sup>, Juan Carlos Monge <sup>3 6</sup>,



# Manifestação clínica

## Complicações – cenário atual



# Prevenção

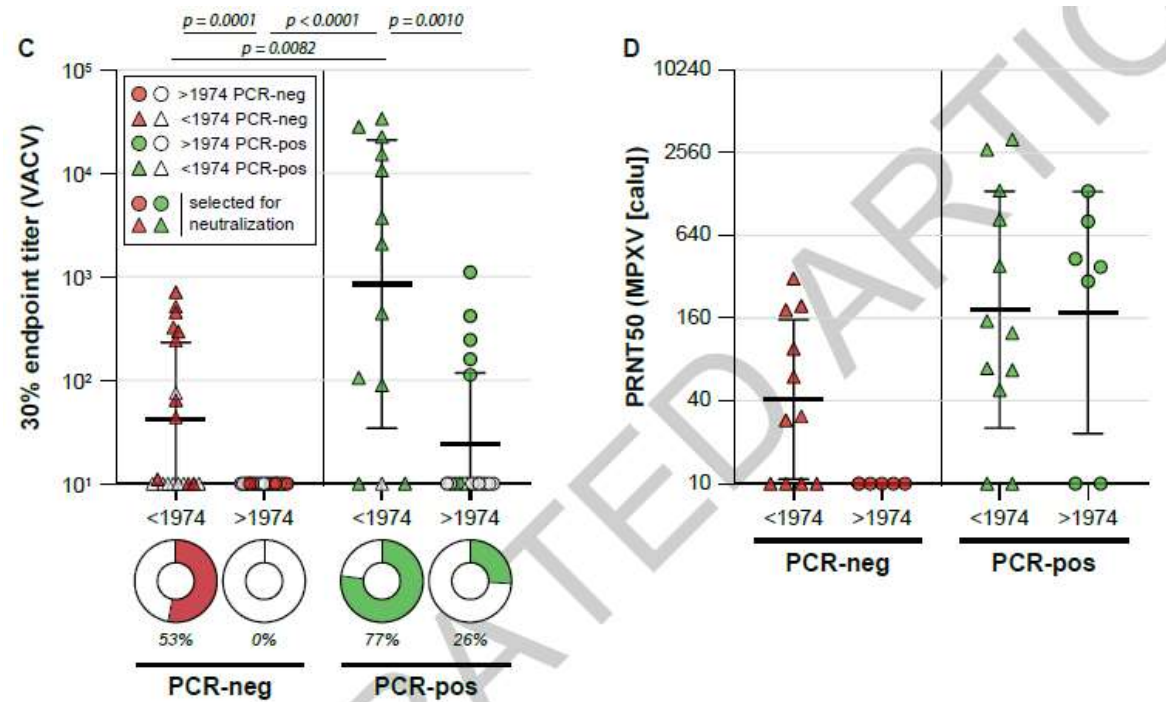
## Vacina?

nature medicine

<https://doi.org/10.1038/s41591-022-02090-w>

Accelerated Article Preview

Low levels of monkeypox virus neutralizing antibodies after MVA-BN vaccination in healthy individuals



# Prevenção

Obrigada!

