



ANRS | MIE Scientific Days in Vietnam

Towards ending epidemics

15th to 16th of November, 2023

Mpox vaccination: knowledge gap

Dr. Lương Nguyễn Liêm Bình (MD, PhD)

Hôpital Cochin Port Royal, Paris



Outline

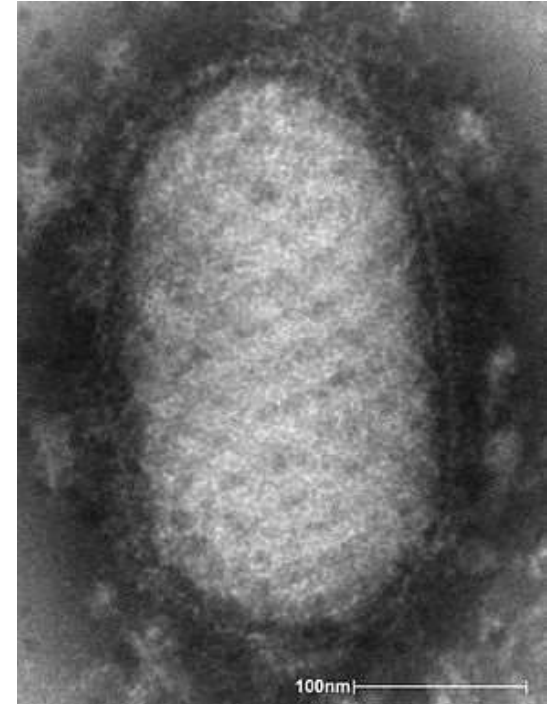
- What we knew
- What happened
- What we learned
- What we still do not know

Outline

- What we knew
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Monkey pox (Mpox)

- ***Poxviridae***, identified in 1970
- Zoonosis
- **Little data** (Petersen, 2019, IDNA):
 - Incubation : 5 to 21 days
 - Mortality: 1 to 10% (children)
- **Few imported cases**
 - 71 cases in the US (2003)
 - 7 cases in UK (2019-2021)



- **Small Pox vaccine to prevent Monkey pox (mpox)**

- 3 generations : Dryvax → ACAM 2000 → Jynneos[®] / Imvanex[®]

→ Little evidence

Pre-exposure

- Zaire (DRC), 1981-1986
- ACAM-2000 (2nd gen)
- 3% probability of being infected

Post-exposure

- Historical study on smallpox, use of delphi (Massousi, 2003, JID)
- Animal challenge

Human monkeypox: secondary attack rates

Z. JEŽEK,¹ B. GRAB,¹ M. V. SZCZENIOWSKI,² K. M. PALUKU,² & M. MUTOMBO²

Bulletin of the World Health Organization, 66 (4): 465–470 (1988)

Outline

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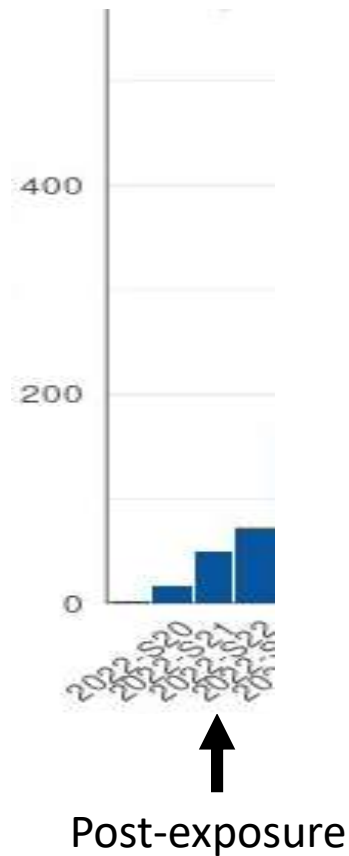
An unprecedented outbreak

Affect mostly MSM



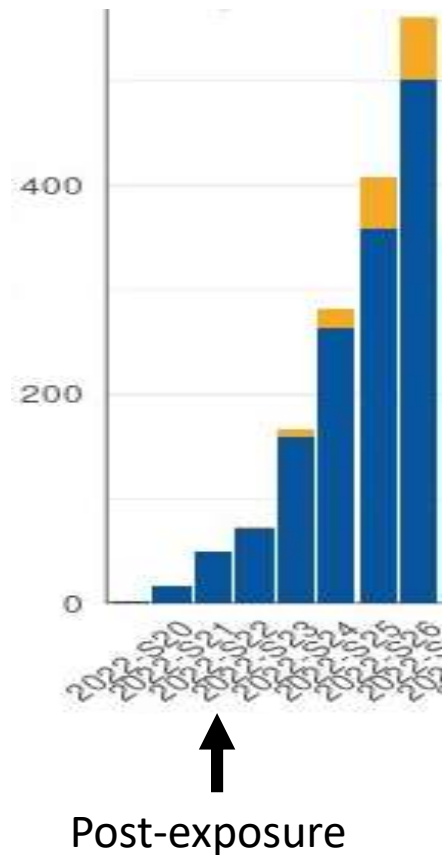
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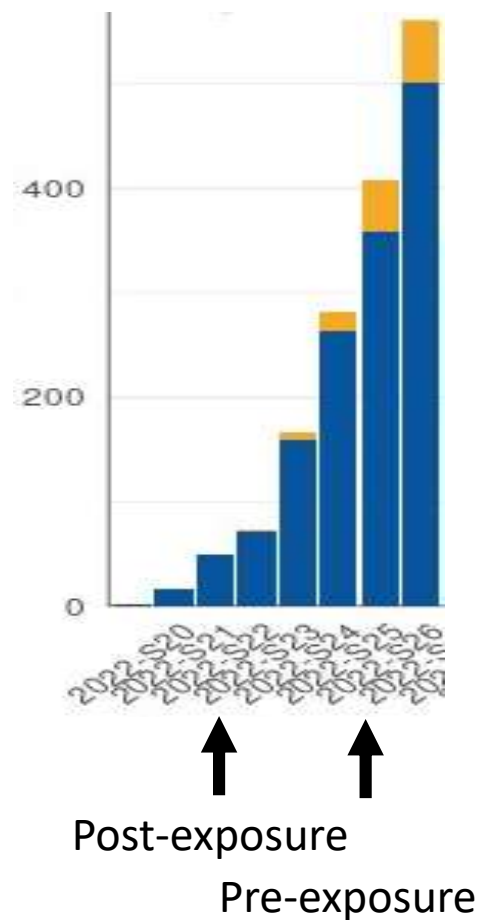
An unprecedented outbreak

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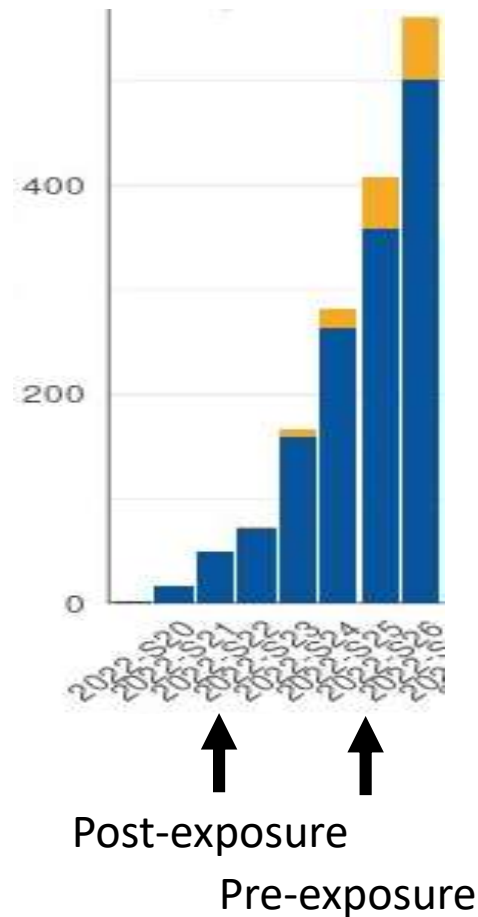


An unprecedented outbreak

Affect mostly MSM



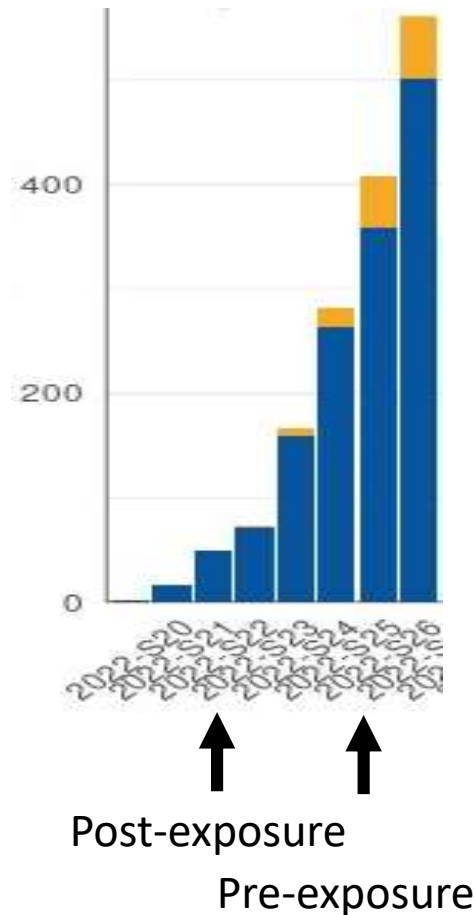
An unprecedented outbreak



Affect mostly MSM



An unprecedented outbreak



nature medicine

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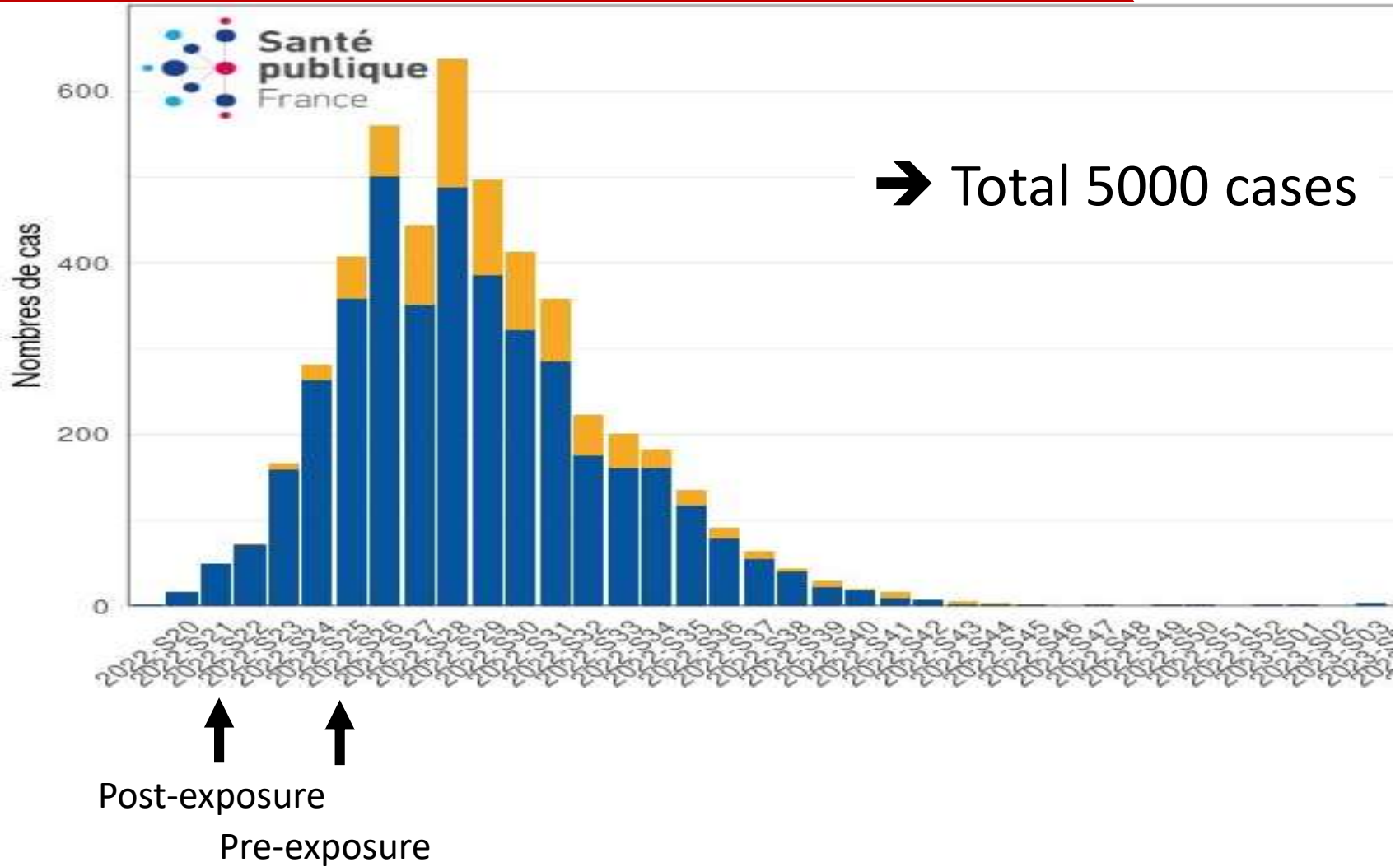
[nature](#) > [nature medicine](#) > [correspondence](#) > article

CORRESPONDENCE | 13 July 2022

A prospective national cohort evaluating ring MVA vaccination as post-exposure prophylaxis for monkeypox

[Liem Binh Luong Nguyen](#) , [Jade Ghosn](#), [Christine Durier](#), [Carla Tachot](#), [Eric Tartour](#), [Amel Touati](#), [Tabassome Simon](#), [Brigitte Autran](#), [Inmaculata Ortega Perez](#), [Erica Telford](#), [Jeremy K Ward](#), [David Michels](#), [Laurence Meyer](#), [Alexandra Rousseau](#), [Laurence Berard](#), [Xavier de Lamballerie](#) & [Odile Launay](#)

An unprecedented outbreak



Outline

- What we knew
- What happened
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Clinical presentation

- **Different clinical presentation**
 - Localized
 - Lesions located around genitals + throat
- **Mortality less severe < 1%**



Mailhe, CMI, 2022

Clinical presentation

- **Different clinical presentation**
 - Localized
 - Lesions located around genitals + throat
- **Mortality less severe < 1%**
- **Except**



Mailhe, CMI, 2022

Clinical presentation

Mpox in people with advanced HIV infection: a global case series

Oriol Mitjà, Andrea Alemany*, Michael Marks*, Jezer I Lezama Mora, Juan Carlos Rodríguez-Aldama, Mayara Secco Torres Silva, Ever Arturo Corral Herrera, Brenda Crabtree-Ramirez, José Luis Blanco, Nicolo Girometti, Valentina Mazzotta, Aniruddha Hazra, Macarena Silva, Juan José Montenegro-Idrogo, Kelly Gebo, Jade Ghosn, María Fernanda Peña Vázquez, Eduardo Matos Prado, Uche Unigwe, Judit Villar-García, Noah Wald-Dickler, Jason Zucker, Roger Paredes, Alexandra Calmy, Laura Waters, Cristina Galvan-Casas, Sharon Walmsley, Chloe M Orkin, on behalf of SHARE-NET writing group*

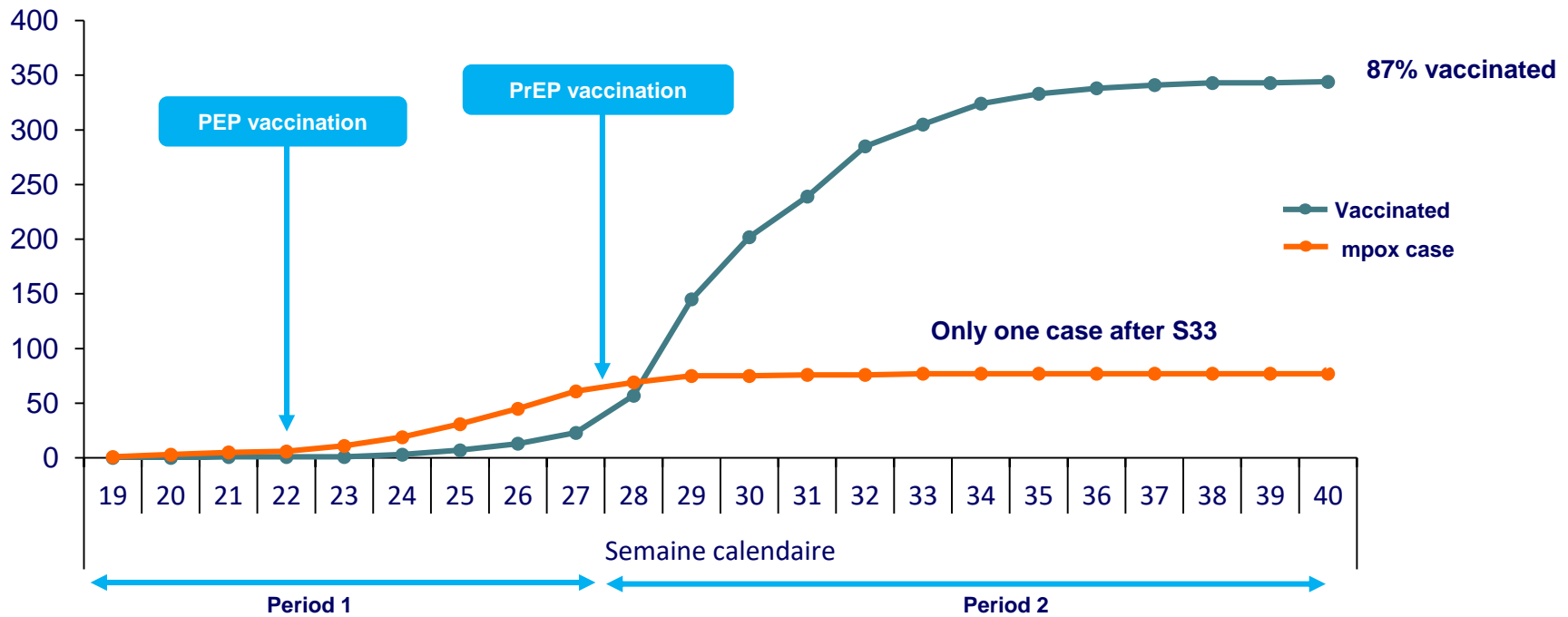
Lancet, 2023

- Severe lesions if CD4 <200 /mm³
- Necrotizing if CD4 <100 /mm³
- 25% death



Is vaccine effective?

- ANRS 174 Doxyvac trial : High risk HSH cohort study

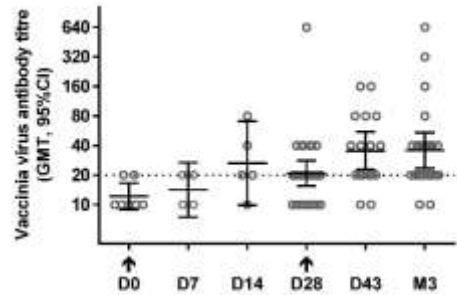


IRR : 64%

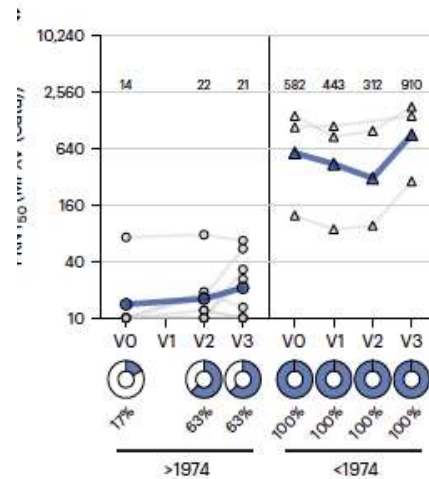
Courtesy of Pr. Jade Ghosn

Is vaccine effective?

Immunogenicity



Luong Nguyen,
ECCMID, 2023



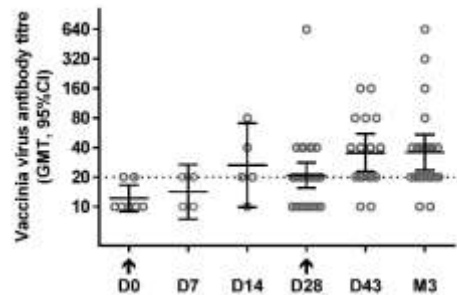
Zaack, Nature Med, 2022

➔ But only humoral !

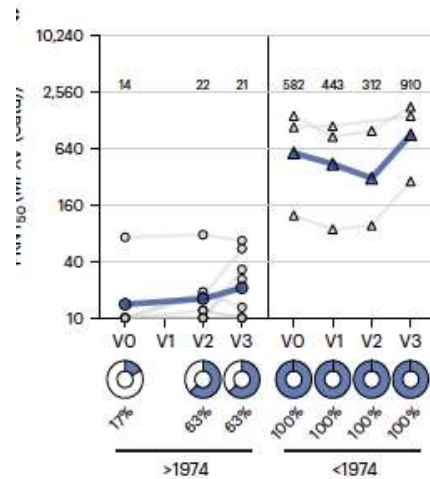
Is vaccine effective?

Immunogenicity

VS



Luong Nguyen,
ECCMID, 2023



Zaack, Nature Med, 2022

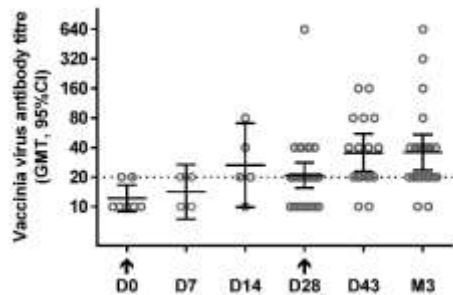
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Is vaccine effective?

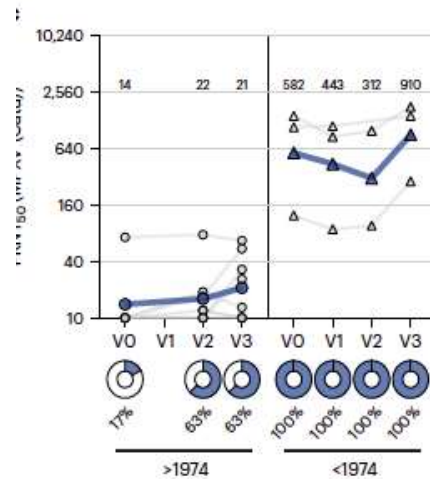
Immunogenicity

VS

Epidemiology



Luong Nguyen,
ECCMID, 2023



Zaack, Nature Med, 2022

➔ But only humoral !

Morbidity and Mortality Weekly Report

Demographic and Clinical Characteristics of Mpox in Persons Who Had Previously Received 1 Dose of JYNNEOS Vaccine and in Unvaccinated Persons — 29 U.S. Jurisdictions, May 22–September 3, 2022

Jennifer L. Paine, MPH¹; Nathaniel M. Lewis, PhD²; Kennedy Hoadick, MPH¹; Michelle Canning, MPH¹; Amy Furbush, PhD^{1,2}; Amanda B. Payne, PhD³; Adam L. Cohen, MD⁴; Joshua Varon, MPH, MEd^{4,5}; Rodrigo Bessot, MPH⁶; Erin Younglin, MPH⁷; Raley Gierke, MS^{8,9}; Axel Mangia, PhD¹⁰; Nikko Kapferrman, MS¹¹; Katherine Tomich, DNP^{12,13}; Christine Moss, MPH¹⁴; Dawn Niese, MPH¹⁵; Susan Adya, MPH¹⁶; Brandon Brown, MPH¹⁷; Tiffany Henderson, MS¹⁸; Lindy Banerjee, MPH¹⁹; Rosalynn Wiza, MPH²⁰; Rachael Han, MPH^{21,22}; Anna M. Szadkowska, PhD²³; Meghan Abzug, MPH²⁴; Megan McLafferty, MPH²⁵; Michael G. Eberhart, MPH²⁶; Michael Paronowski, MPH²⁷; Sandra Miranda De Lencastre, MPH²⁸; Emma Craggs, MPH²⁹; Abdoulaye Dioubou, MD, PhD³⁰; Caleb Wiedeman, MPH³¹; Jade Murray-Thompson, MPH³²; Elizabeth McCarty, MPH³³; Jessica Muzickowski, PhD³⁴; Anna Kucharski, MSc³⁵; Elizabeth A. Tarrance, Vaccinated Person

ORIGINAL ARTICLES

Vaccine Effectiveness of JYNNEOS against Mpox Disease in the United States

Natasha F. Dewary, PhD, Joseph DeStefano, PhD, Anna H. Chen, PhD, Neil Sandberg, M.S., Cassie L. Mavris, M.FH, Eric Salway, B.S., Alexander F. Rubin, PhD, Cary Sweet, M.S., Amanda E. Cohen, M.D., David S. Lyles, M.D., Adam L. Cohen, M.D., Deborah Sandmeyer, M.P.H., Daniel C. Payne, PhD, Jacqueline L. Gerhart, M.D., and Laura E. Faddesen, PhD

Real-world effectiveness of a single dose of mpox vaccine in males

Journal of the American Medical Association
November 15, 2022
DOI: 10.1001/jama.2022.18888

Author disclosures of potential conflicts of interest and author contributions are found at the end of this article. Address correspondence to Dr. Dewary (natasha.f.dewary@hhs.gov).

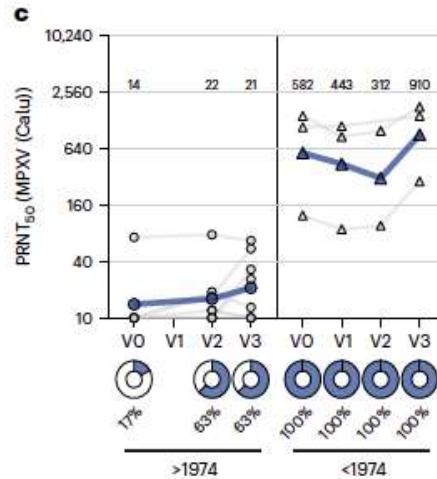
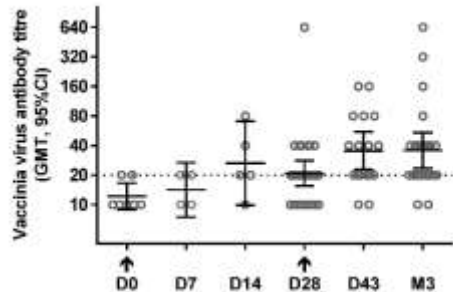
➔ Only observational, case/control

Is vaccine effective?

Immunogenicity

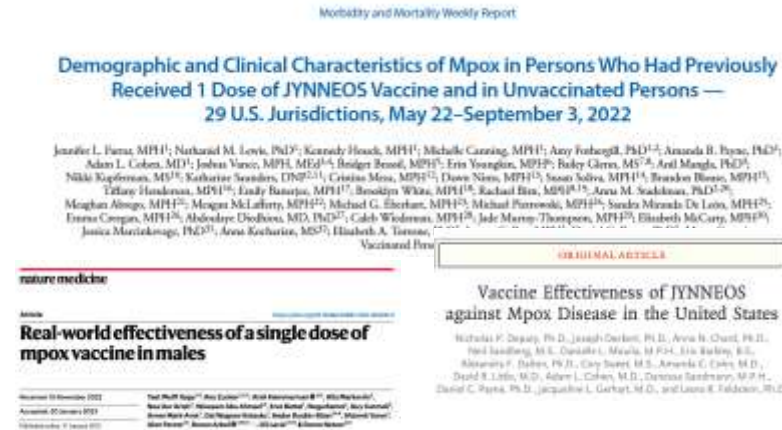
VS

Epidemiology

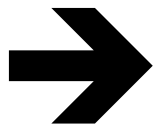


Luong Nguyen,
ECCMID, 2023

Zaack, Nature Med, 2022



Vaccination likely to be effective

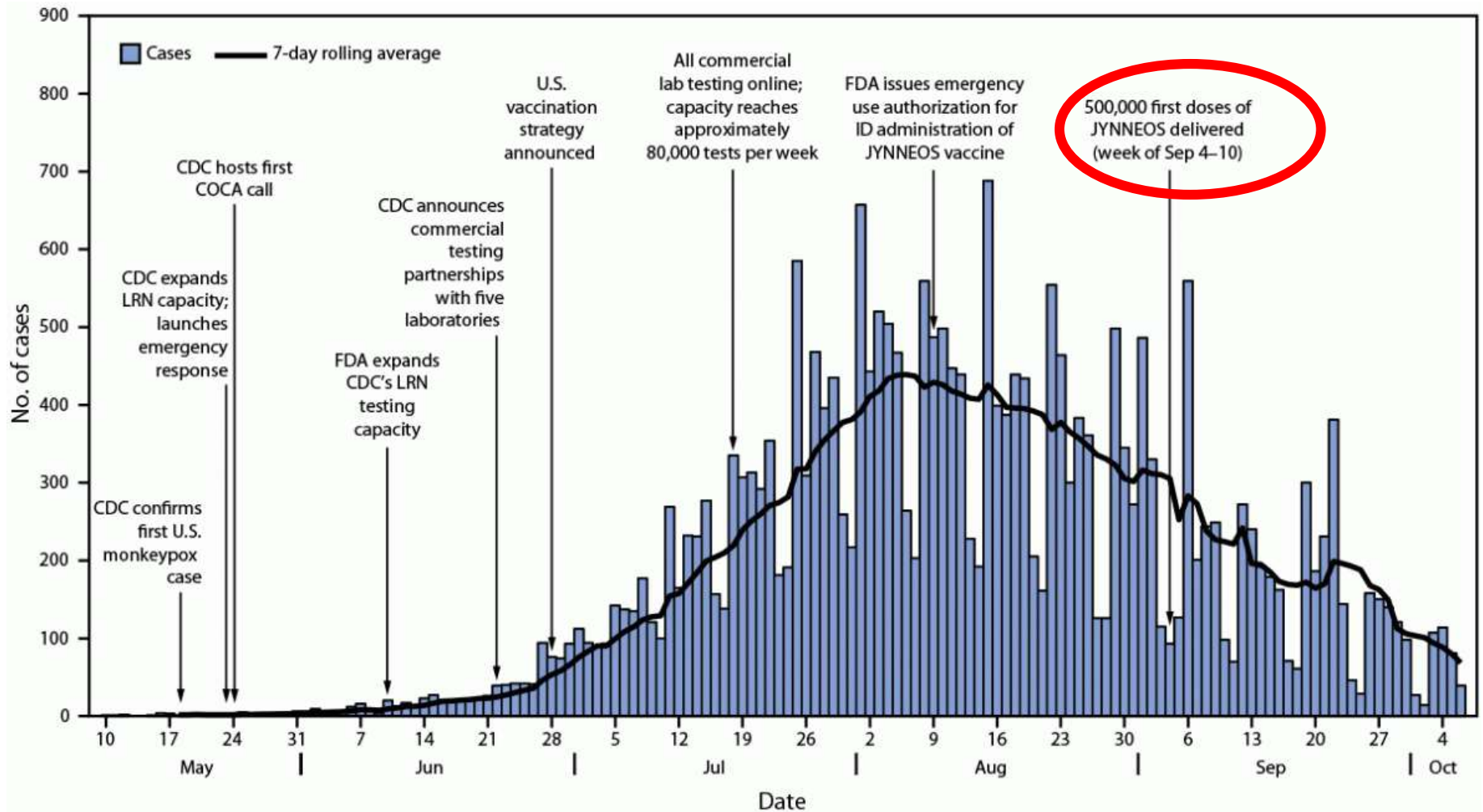


- Less effective than for small pox (60-80%) for infection
- Probably with milder forms
- More effective with previous small pox immunization

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In the end...



Unanswered questions

- **What really reduced cases ?**
 - Vaccination
 - Behavioral change
 - Sexual network saturation

- **What is the effectiveness of the vaccine**
 - On immunocompromised (HIV?)
 - Route of administration
 - Need for booster dose?
 - Articulation with antiviral (teicovirimat)

- ANRS | MIE
 - VAAC
 - HPMU
- **Monkey Vax study team**
 - Funders: ANRS | MIE and MOH
 - Co-investigator: Pr. O. Launay, Pr. J. Ghosn
 - Sponsor : AP-HP
 - Analysis : CESP/SC-10
 - Virology : AMU
 - Immunology : Inserm

Questions? liem.luong@aphp.fr