AETC AIDS Education & Training Center Program Southeast

2022 Monkeypox Outbreak
Information for Healthcare Teams

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SOUTHEAST STD/HIV PREVENTION TRAINING CENTER
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Disclosures

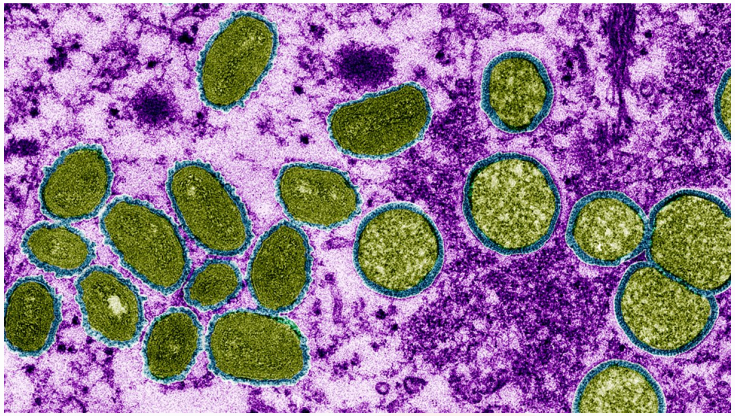
- Serve as Co-Medical Director Southeast STD/HIV Prevention Training Center
- Serve as Co-Primary Investigator AL AETC
- Contributions of many to development of slides
  - Candice McNeil

Outline

- The virus and its history
- Transmission
- Clinical Manifestations
- Mimics
- Diagnosis
- Treatment and prevention

Monkeypox-The Virus

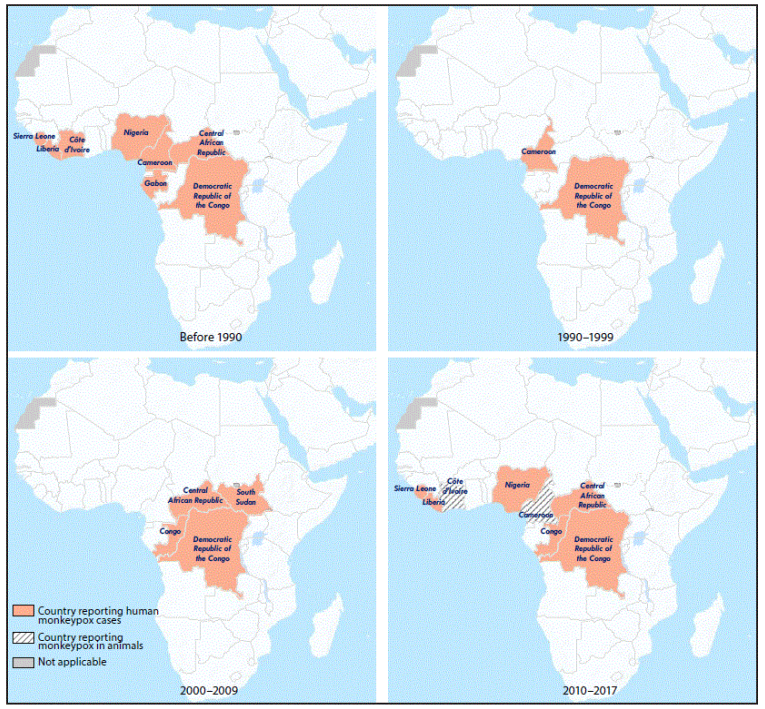
- Orthopox virus
  - Variola virus: causes smallpox
  - Vaccinia virus = used to create the smallpox vaccine
  - Molluscum contagiosum
  - Cowpox virus
- Discovered in 1958
  - Pox-like disease outbreaks in monkeys kept for research
- Source of virus is unknown
  - African rodents and non-human primates may harbor and infect humans
- First human case reported in 1970



Colored Electron Micrograph
https://www.science.org/content/article/monkeypox-outbreak-questions-intensify-cases-soar

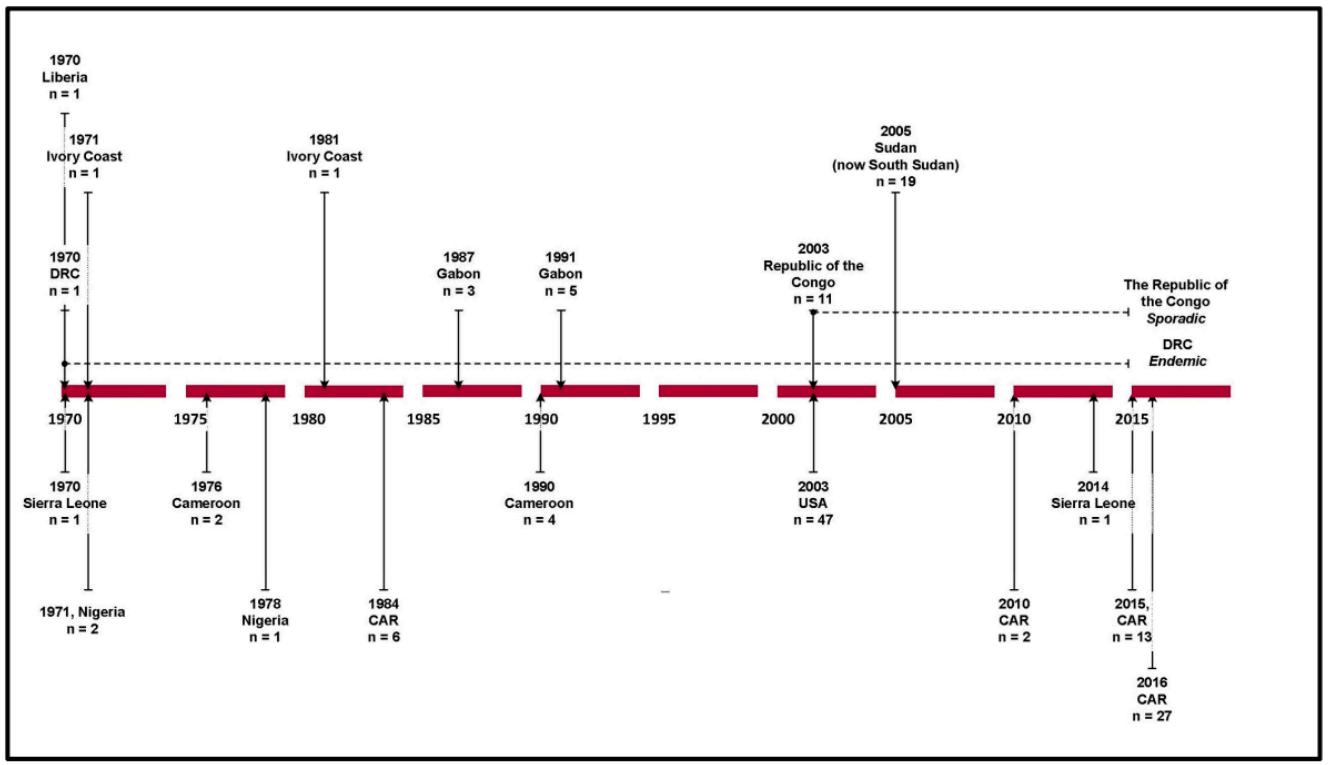
Monkeypox-The Virus

- Endemic in the tropical rainforest regions of Central and West Africa
  - Cameroon
  - Central African Republic
  - Cote d'Ivoire
  - Democratic Republic of the Congo
  - Gabon
  - Liberia
  - Nigeria
  - Republic of the Congo
  - Sierra Leon
  - South Sudan



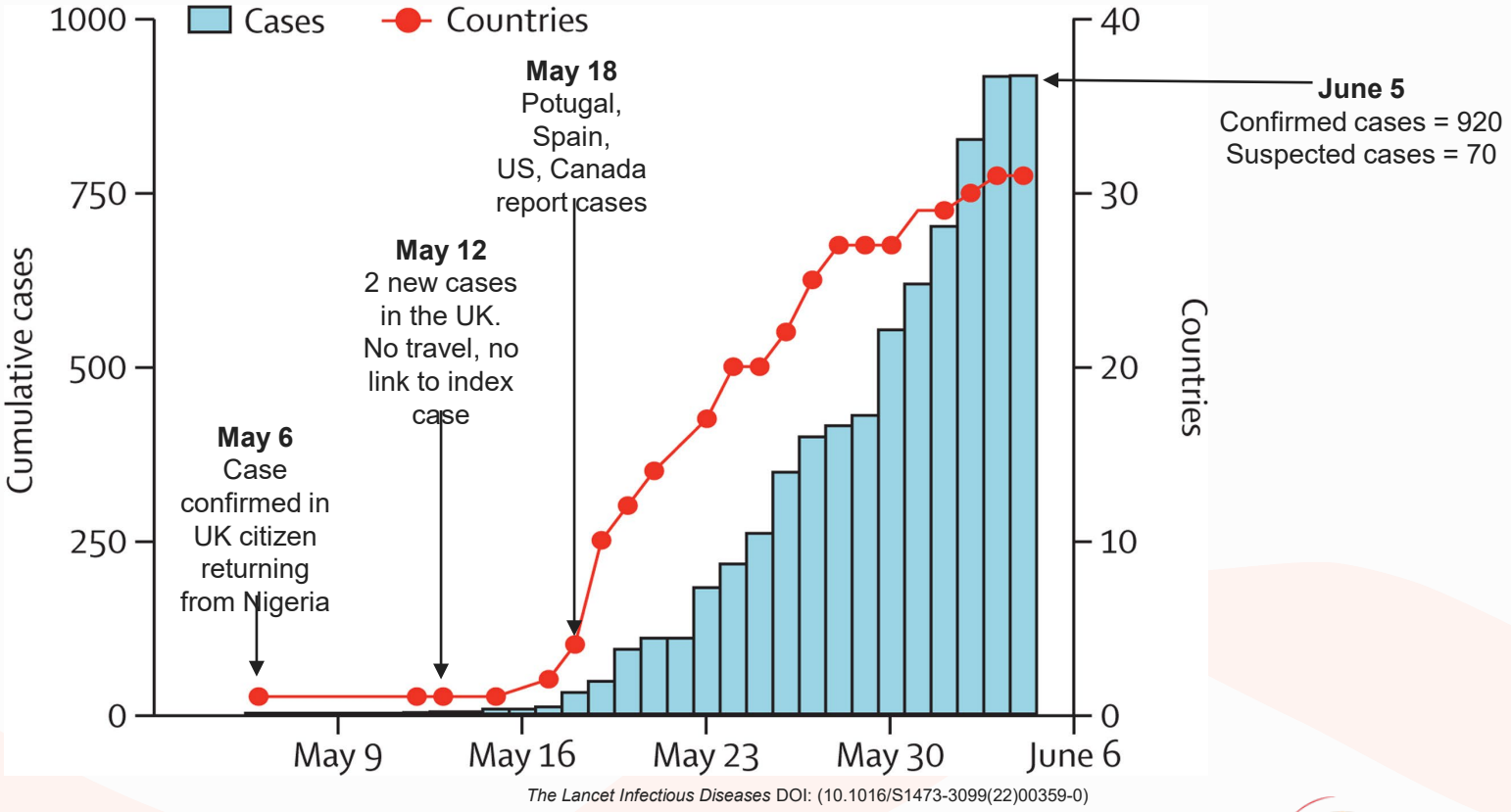
Durski KN, McCollum AM, Nakazawa Y, et al. Emergence of Monkeypox — West and Central Africa, 1970–2017. MMWR Morb Mortal Wkly Rep 2018;67:306–310. DOI: http://dx.doi.org/10.15585/mmwr.mm6710a5external icon

Timeline of Monkeypox outbreaks (1970-2016)



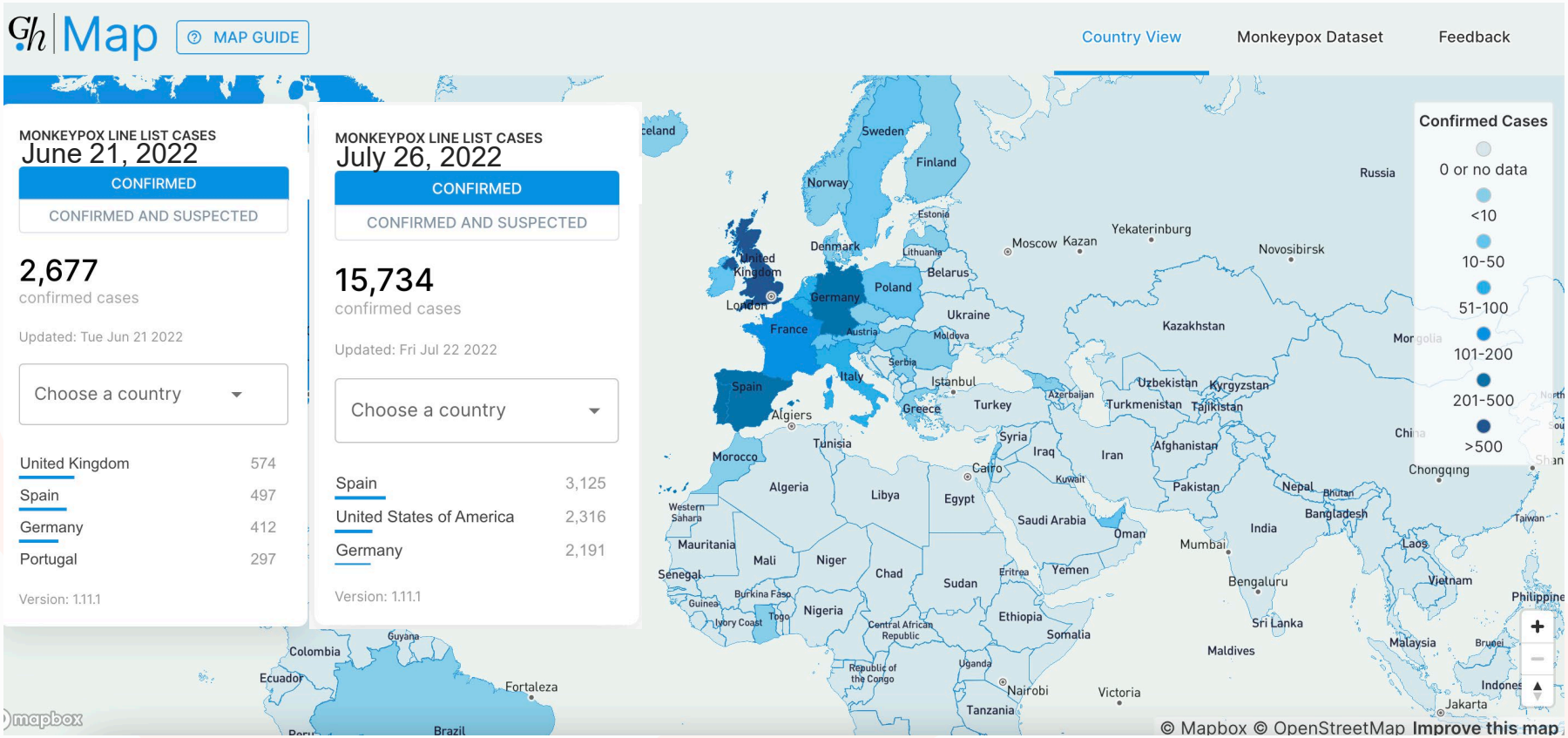
Brown, K.; Leggat, P.A. Human Monkeypox: Current State of Knowledge and Implications for the Future. *Trop. Med. Infect. Dis.* **2016**, *1*, 8. https://doi.org/10.3390/tropicalmed1010008

2022 Monkeypox Outbreak-The Beginning



The Lancet Infectious Diseases DOI: (10.1016/S1473-3099(22)00359-0)

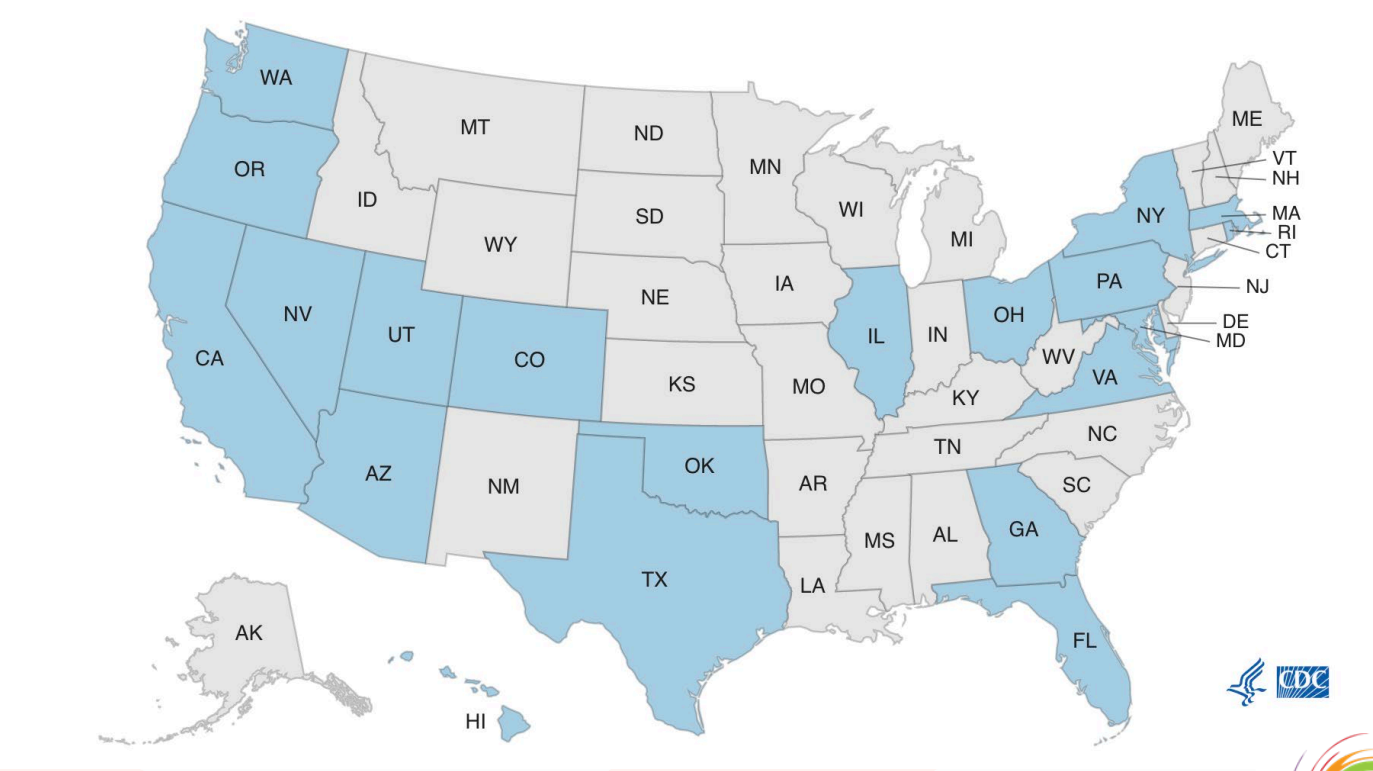
2022 Monkeypox Outbreak-Worldwide



https://map.monkeypox.global.health/country

2022 Monkeypox Outbreak-U.S. (n = 113)

June 17, 2022



https://www.cdc.gov/poxvirus/monkeypox/response/2022/us-map.html

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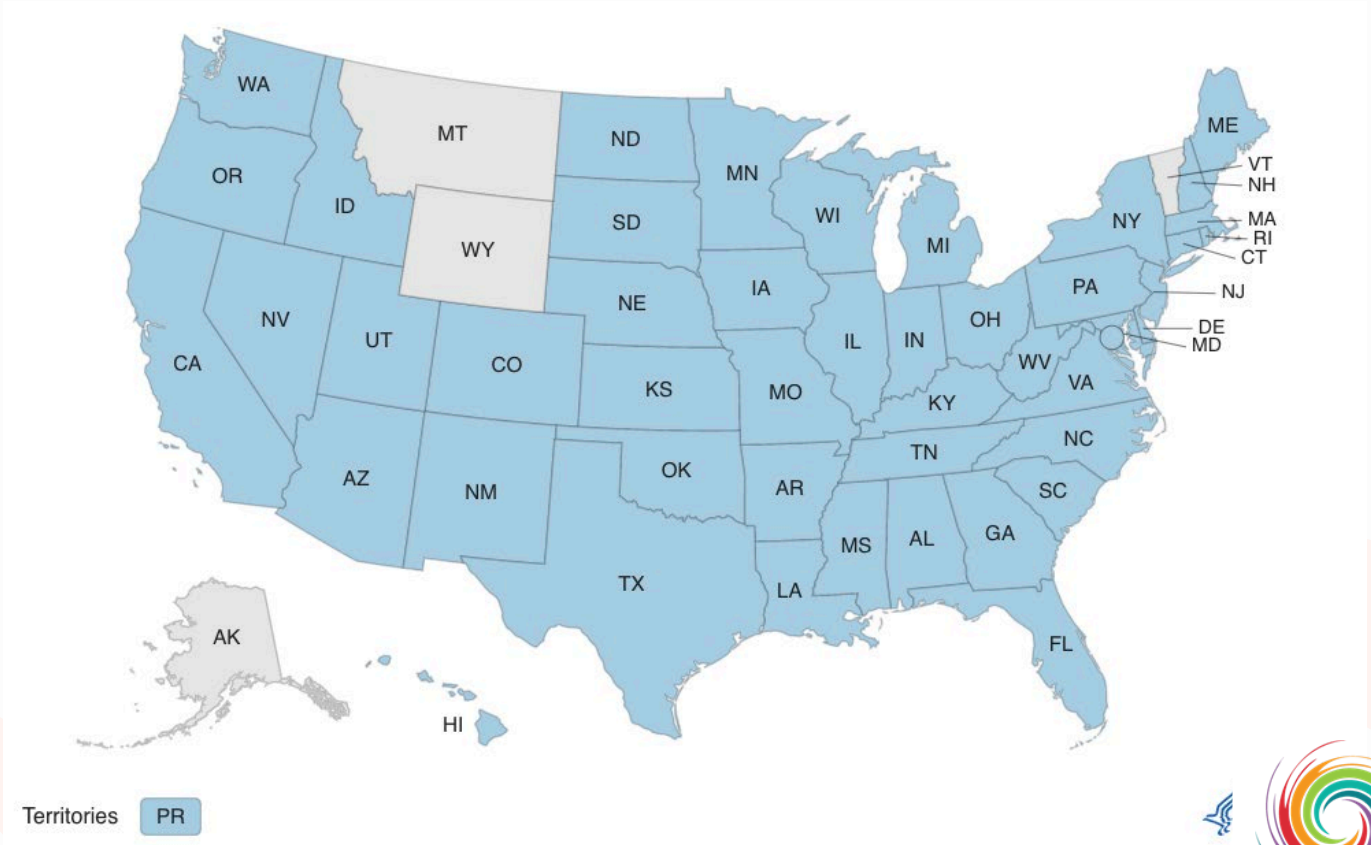
2022 Monkeypox Outbreak-U.S. (n = 3,591)

Updated July 26, 2022



https://www.cdc.gov/p

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2022 Monkeypox Outbreak-U.S. (n = 3,591)

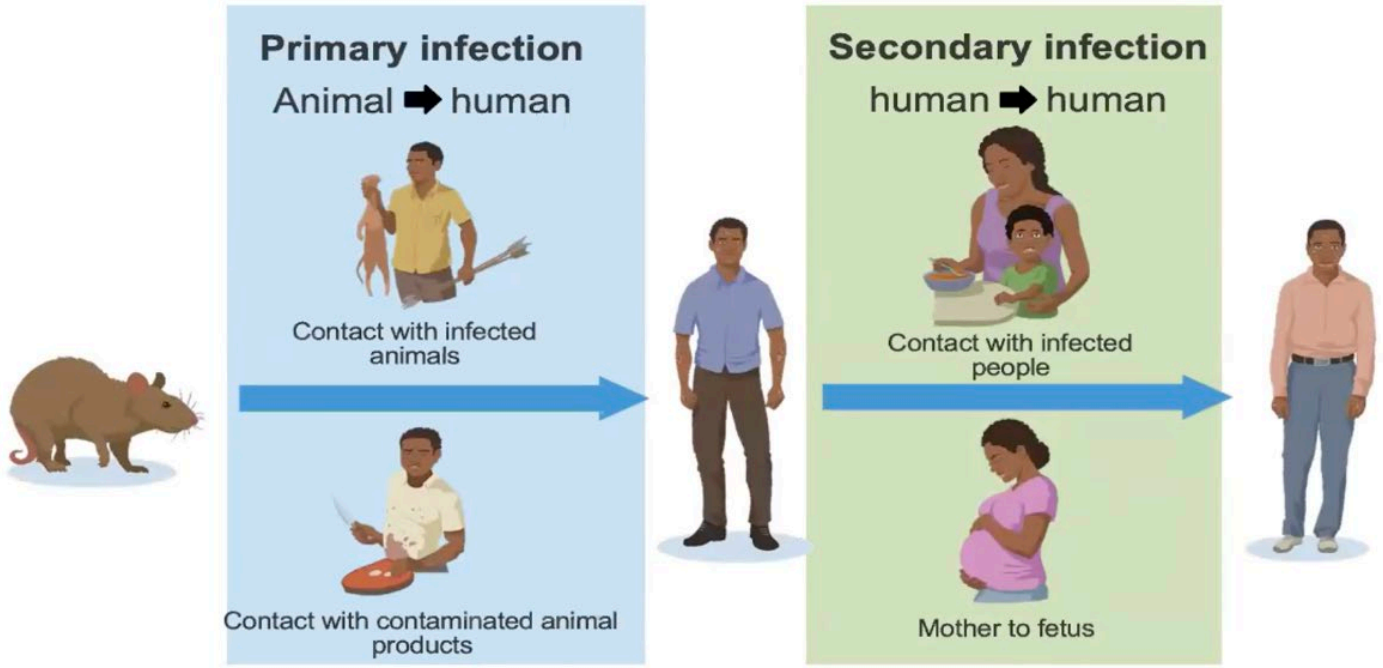
Updated July 26, 2022

Case Count by State of Residence

State	Number of Cases
Alabama	5
Arizona	35
Arkansas	4
California	356
Colorado	53
Connecticut	24
Delaware	3
District Of Columbia	191
Florida	309
Georgia	289
Hawaii	10
Idaho	2
Illinois	350
Indiana	33
Iowa	8
Kansas	1
Kentucky	6
Louisiana	26
Maine	1
Maryland	91
Massachusetts	96
Michigan	24
Minnesota	25
Mississippi	1

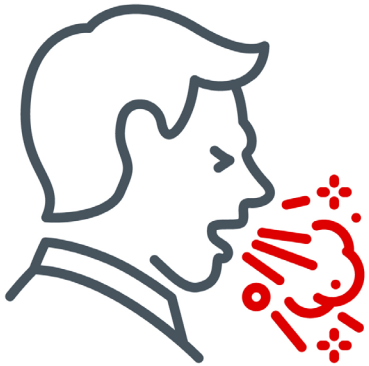
https://www.cdc.gov/poxvirus/monkeypox/response/2022/us-map.html

Monkeypox-Transmission



World Health Organization Training Materials on Monkeypox
https://www.idsociety.org/multimedia/all-videos/monkeypox-in-the-u.s.-an-update/

Monkeypox-Transmission



- Unprotected contact with
  - Respiratory Droplets
  - Skin Lesions
  - Body Fluids
  - Contaminated surfaces and objects (bedding, towels, clothing)

- The virus can enter via
  - Broken Skin
  - Mucous Membranes
  - Respiratory Tract

https://www.idsociety.org/multimedia/all-videos/monkeypox-in-the-u.s.-an-update/

Monkeypox-Transmission

- Intimate Contact
  - Oral, anal, and vaginal sex, or touching the genitals or anus of a person with monkeypox.
  - Hugging, massage, kissing, or talking closely.
  - Touching fabrics, shared surfaces, and objects used by a person with monkeypox
    - Bedding
    - Towels
    - fetish gear
    - sex toys.

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2022 Monkeypox Outbreak-U.S.

- Most cases reported in gay, bisexual and other men who have sex with men.

Information available for vulnerable populations

www.cdc.gov/poxvirus/monkeypox/pdf/MPX_Social_Gatherings_Safer_Sex-508.pdf

June 2022

Social Gatherings, Safer Sex and Monkeypox

Monkeypox is a disease caused by a virus not commonly seen in the United States. While we work to contain the current outbreak and study the virus, we want you to have information so you can make informed choices when you are in spaces or situations where monkeypox could be spread through close, intimate contact or during sex. There is a lot we still need to learn about monkeypox, and we will update this information as we learn more on www.cdc.gov/monkeypox.

What is monkeypox?

Monkeypox is a disease that can make you sick, including a rash, which may look like pimples or blisters, often with an earlier flu-like illness. Monkeypox can spread to anyone through close, personal, often skin-to-skin contact including:

- Direct contact with monkeypox rash, sores, or scabs from a person with monkeypox. We believe this is currently the most common way that monkeypox is spreading in the U.S.
- Contact with objects, fabrics (clothing, bedding, or towels), and surfaces that have been used by someone with monkeypox.
- Contact with respiratory secretions, through kissing and other face-to-face contact.

This contact can happen when you have sex including:

- Oral, anal, and vaginal sex or touching the genitals (penis, testicles, labia, and vagina) or anus (butt) of a person with monkeypox.
- Hugging, massage, and kissing.
- Touching fabrics and objects during sex that were used by a person with monkeypox and that have not been disinfected, such as bedding, towels, fetish gear, and sex toys.

What are the symptoms of monkeypox?

- Monkeypox symptoms usually start within 2 weeks of exposure to the virus.
  - The first symptoms might be like the flu, such as fever, headache, muscle aches and backache, swollen lymph nodes, chills, or exhaustion.
  - Within 1-3 days of these symptoms beginning, people develop a rash or sores.

- The rash or sores may be located on or near the genitals or anus but could also be on other areas like the hands, feet, chest, or face.
  - The sores will go through several stages, including scabs, before healing.
  - The sores can look like pimples or blisters and may be painful or itchy.
  - Sores may be inside the body, including the mouth, vagina, or anus.

You may experience all or only a few of these symptoms. Most people with monkeypox will get the rash or sores. Some people have reported developing the rash or sores before (or without) the flu-like symptoms.

Monkeypox can be spread from the time symptoms start until all sores, including scabs, have healed and a fresh layer of skin has formed. This can take several weeks.

What are researchers investigating?

- If the virus can be spread when someone has no symptoms.
- If the virus could be present in semen (cum), vaginal fluids, and fecal matter (poop).

How can a person lower the chance of getting monkeypox at places like raves, parties, clubs, and festivals?

When thinking about what to do, seek out information from trusted sources like the local health department. Second, consider how much close, personal, skin-to-skin contact is likely to occur at the event you plan to attend. If you feel sick or have any rashes or sores, do not attend any gathering, and see a healthcare provider.

- Festivals, events, and concerts where attendees are fully clothed and unlikely to share skin-to-skin contact are safer. However, attendees should be mindful of activities (like kissing) that might spread monkeypox.
- A rave, party, or club where there is minimal clothing and where there is direct, personal, often skin-to-skin contact has some risk. Avoid any rashes or sores you see on others and consider minimizing skin-to-skin contact when possible.
- Enclosed spaces, such as back rooms, saunas, or sex clubs, where there is minimal or no clothing and where intimate sexual contact occurs have a higher likelihood of spreading monkeypox.

How can a person lower their risk during sex?

Talk to your partner about any recent illness and be aware of new or unexplained sores or rashes on your body or your partner's body, including the genitals and anus. If you or your partner have recently been sick, currently feel sick, or have a new or an unexplained rash or sores, do not have sex and see a healthcare provider. This is always a good plan, even if monkeypox isn't in your area.

If you or a partner has monkeypox, the best way to protect yourself and others is to not have sex of any kind (oral, anal, vaginal) and not kiss or touch each other's bodies while you are sick, especially any rash or sores. Do not share things like towels, fetish gear, sex toys, and toothbrushes.

If you or your partner have (or think you might have) monkeypox and you decide to have sex, consider the following to reduce the chance of spreading the virus:

- Have virtual sex with no in-person contact.
- Masturbate together at a distance of at least 6 feet, without touching each other and without touching any rash or sores.
- Consider having sex with your clothes on or covering areas where rash or sores are present, reducing as much skin-to-skin contact as possible.
- Avoid kissing.
- Remember to wash your hands, fetish gear, sex toys and any fabrics (bedding, towels, clothing) after having sex.
- Limit your number of partners to avoid opportunities for monkeypox to spread.

What should a person do if they have a new or unexplained rash, sores, or other symptoms?

- Avoid sex or being intimate with anyone until you have been checked out by a healthcare provider. If you don't have a provider or health insurance, visit a public health clinic near you.
- When you see a healthcare provider, remind them that this virus is circulating in the area.
- Avoid gatherings, especially if they involve close, personal, skin-to-skin contact.
- Think about the people you have had close, personal, or sexual contact within the last 21 days, including people you met through dating apps. You might be asked to share this information if you have received a monkeypox diagnosis, to help stop the spread.

June 2022

Reducing Stigma in Monkeypox Communication and Community Engagement

How CDC is Framing Communication Around Monkeypox

Helping people make the best-informed decisions to protect their health and the health of their community from monkeypox requires a combination of providing key prevention information to the public and working with partners and trusted messengers to ensure information reaches affected communities.

Anyone can get monkeypox, and CDC is carefully monitoring for monkeypox that may be spreading in any population. We are working to provide frontline healthcare providers and public health officials with information about what monkeypox looks like and how to manage the illness.

Based on reports from outbreaks in other countries, many—though not all—of the reported cases have been among gay and bisexual men. The data tell us we need to put added emphasis on channels that will take public health information to gay and bisexual men—across big cities and small towns, across racial and ethnic lines, and among all socioeconomic backgrounds. In addition to broad outreach efforts, we are also raising awareness of the current situation with multiple partners in the LGBTQIA+ community.

What Partners Can Do to Help

Partners can help with messaging to specific communities and channels to increase awareness of monkeypox, while reducing the chances of stigmatizing those who may have contact with the virus.

We encourage partners to reach out to organizers of upcoming local events to provide a situational awareness of monkeypox and offer information and messages to share. The following are some tips:

- Conduct an environmental scan of upcoming, large-scale events in your community. Given that June is PRIDE month, consider festivals like PRIDE where there are often spin-off or side events like dances and gatherings where people may have close, skin-to-skin contact with others.
- Take an inventory of other venues where close, skin-to-skin contact can occur, such as massage parlors, spas, saunas, and sex clubs.
- Engage trusted community-based organizations, community leaders, and community healthcare workers to connect with event organizers and impacted communities.
- Have a clear call to action. This can include raising awareness by sharing information, asking people to seek healthcare if they experience a rash, directing community members to local healthcare providers who can coordinate testing, and promoting participation in surveys.
- Provide organizers with information and materials such as:
  - Messages that can be used on websites and social media sites
  - Talking points that event organizers can use when talking with their customers or attendees
  - Printed materials such as palm cards and fact sheets that can be passed out at events and in venues
  - A point of contact if they have more questions or need information
- Finally, one key tactic to avoid introducing stigma into messaging for disproportionately affected populations is to keep messages fact-based.
  - Consider messaging that underscores that while many of those affected in the current global outbreaks identify as gay or bisexual, infectious diseases rarely stay within community or geographic boundaries. It's important to reach the gay and bisexual community with non-alarmist, fact-based messaging about monkeypox that provides people with tools they can use to protect themselves and others.
  - Messaging and dissemination tactics may need to be adapted to reach the communities who need the information and resources as we learn more about the current monkeypox outbreak.
  - As you're developing resources and messages, consider keeping CDC's Health Equity Guiding Principles for Inclusive Communication in mind.

We must also be as sensitive as possible while providing people actionable information without creating stigma. It will take partnerships between healthcare providers, affected individuals, and public health officials to ensure people who need care can access it and know how to protect their loved ones.

For more information, please visit www.cdc.gov/monkeypox

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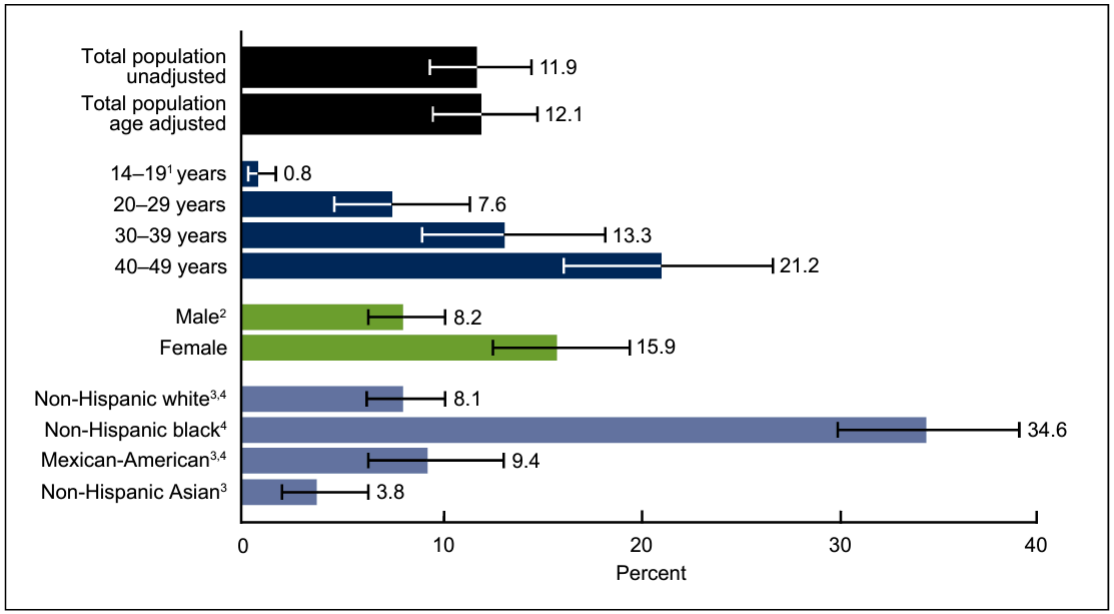
2022 Monkeypox and Stigma

- Pathogens and diseases do not care about race, birth country, gender, or sexual orientation

HSV-2 Epidemiology

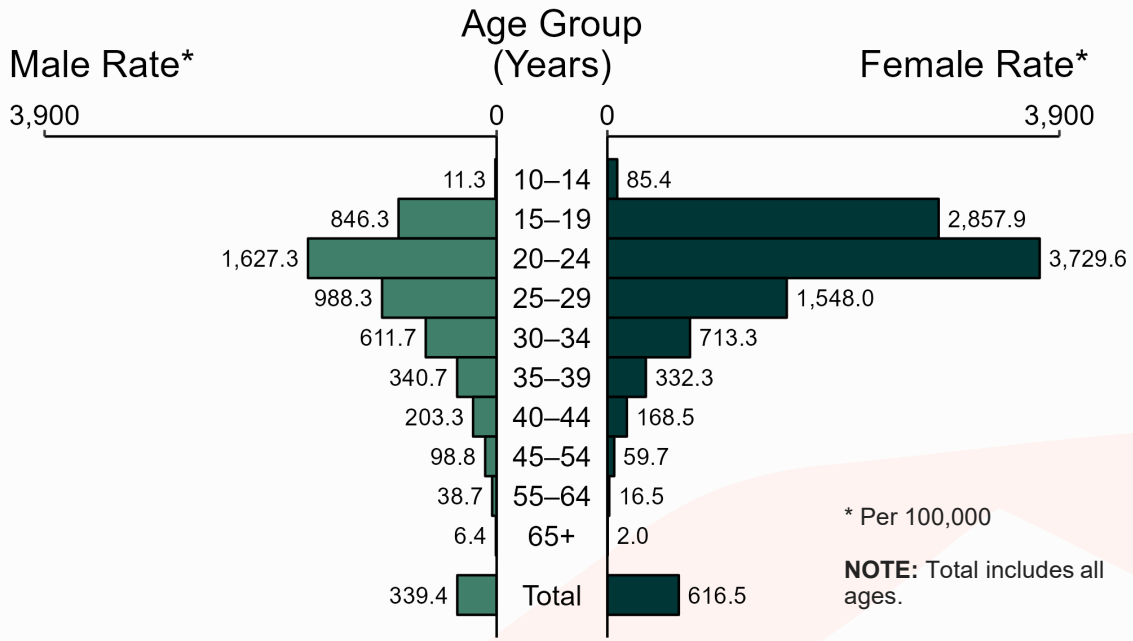


1Linear increase with age group.
2Significantly lower than females.
3Significantly lower than non-Hispanic black persons.
4Significantly higher than non-Hispanic Asian persons.
NOTES: Age adjusted by the direct method to the 2000 U.S. Census population, using age groups 14–19, 20–29, 30–39, and 40–49 years.
https://www.cdc.gov/nchs/data/databriefs/db304_table.pdf#3. SOURCE: NCHS, National Health and Nutrition Examination Survey, 2015–2016

2022 Monkeypox and Stigma

- Pathogens and diseases do not care about race, birth country, gender, or sexual orientation

Chlamydia Epidemiology-2020, U.S.

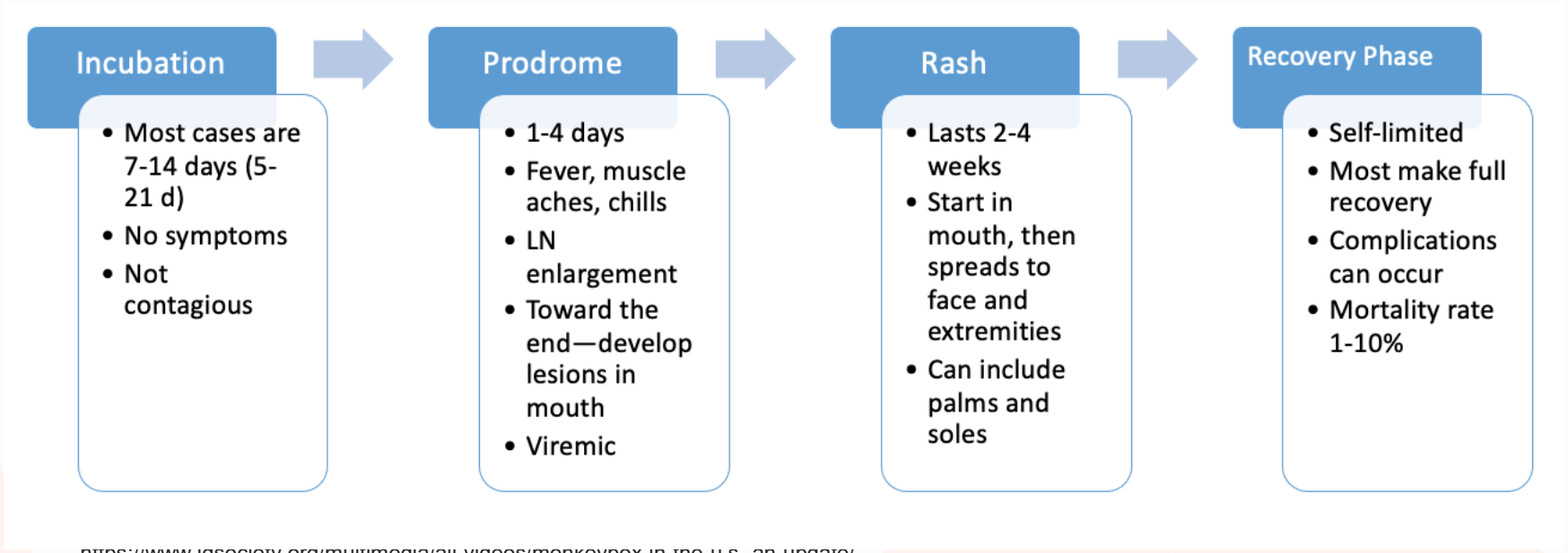


2022 Monkeypox and Stigma

- Pathogens and diseases do not care about race, birth country, gender, or sexual orientation

Infographic by Ruth Basagoitia and Maya Chastain
https://www.healthline.com/health/heart-disease/statistics

Monkeypox-Infection Phases



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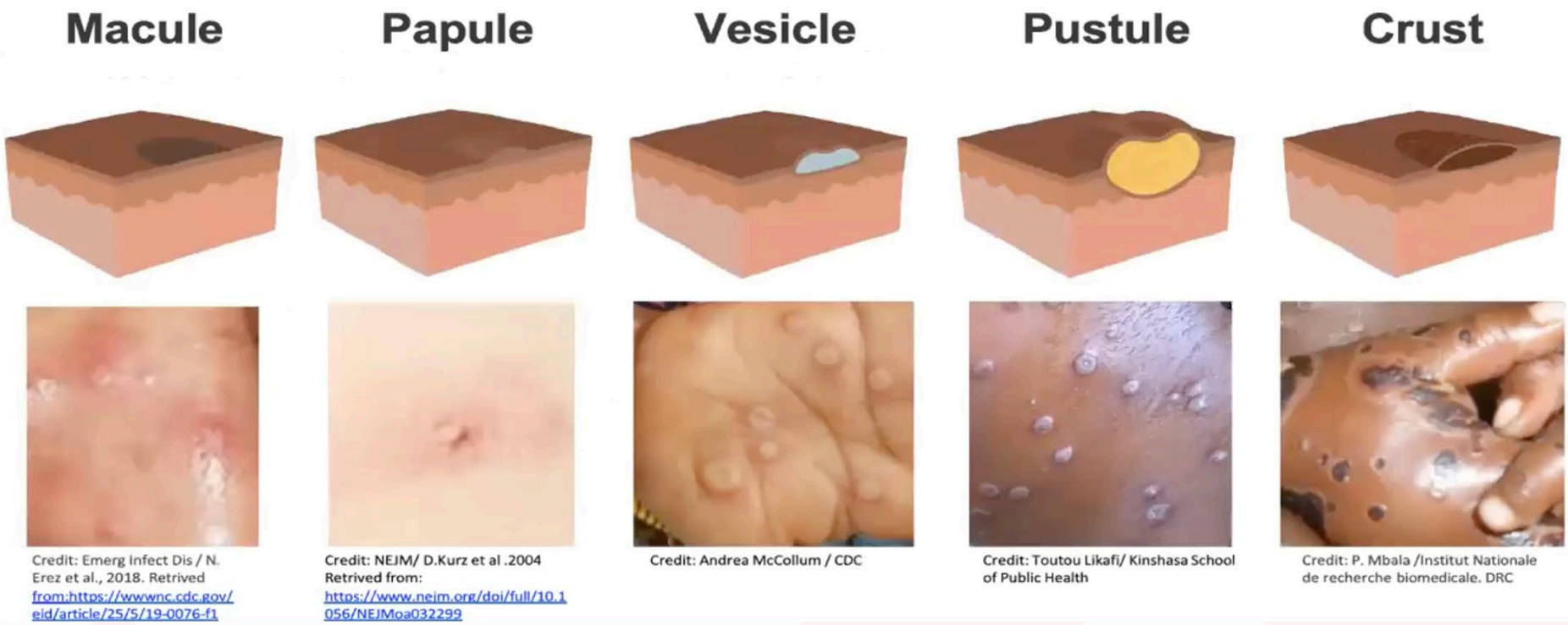
https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html
Titanji et al. 2022. Monkeypox-a contemporary review for healthcare professionals.

Monkeypox-Rash Evolution



https://www.idsociety.org/multimedia/all-videos/monkeypox-in-the-u.s.-an-update/

Monkeypox-Rash

- Lesions: similar size and in same stage (unlike chickenpox)
- 10-150 lesions
- Associated with LAD (unlike smallpox)
- Skin lesions are generally painful then itchy as they crust
- May be viremic when the rash is present
- Virus is present in the skin lesions
- Rash is infectious (from the time symptoms start until lesions scab and fall off, and a new layer of skin is formed).

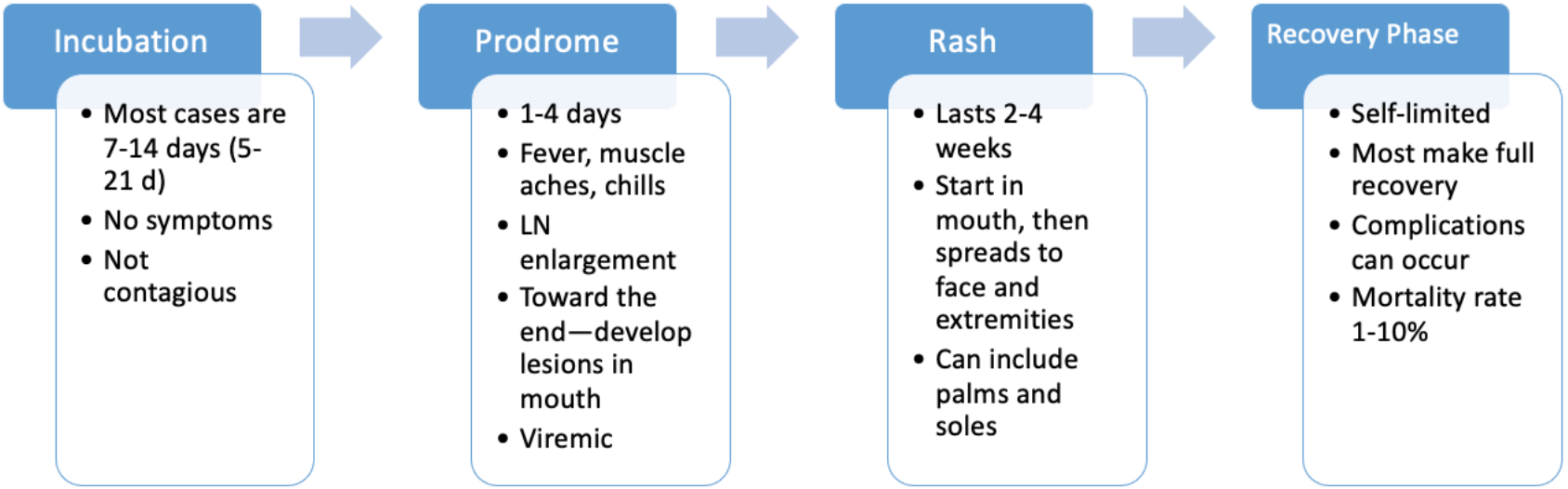
Photo credit: UK Health Security Agency

https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html

Monkeypox-population at risk for severe disease and complications

- Persons living with HIV not on treatment and with low CD4 counts
- Pregnant people
- Extremes of age
- Other immunocompromising condition
  - Transplant patients
  - Persons with cancer
  - Persons receiving chemotherapy
  - Persons receiving immunosuppressive therapy

Monkeypox-Infection Phases



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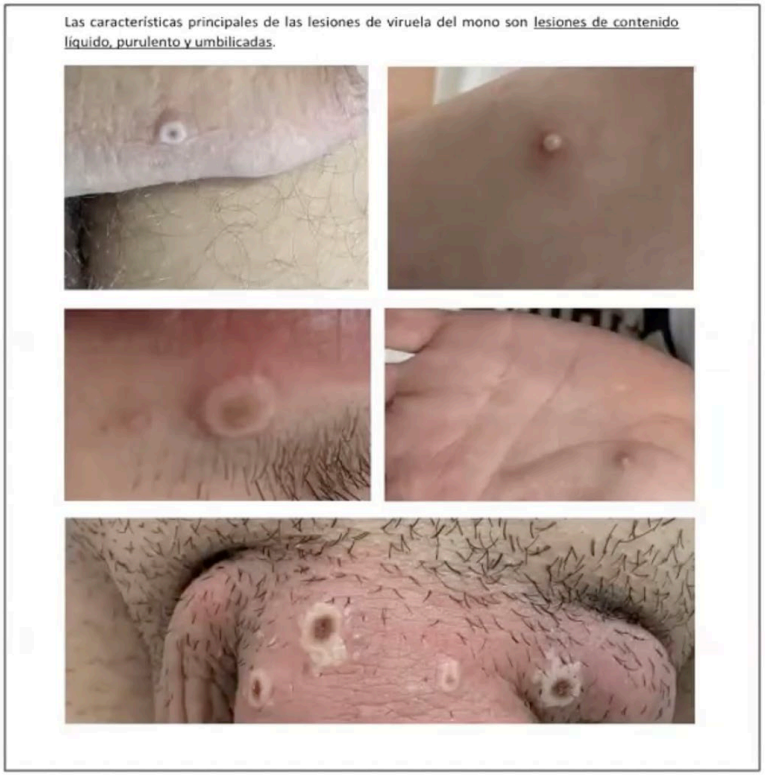
https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html
Titanji et al. 2022. Monkeypox-a contemporary review for healthcare professionals.

Monkeypox-Presentations, 2022 Outbreak

- Genital, peri-genital and perianal lesions common
- Prodrome is less prominent or absent
- Fewer lesions even a single lesion in some cases
- Most cases are mild
- Closely mimics other STIs



General Hospital University of Malaga
https://www.idsociety.org/multimedia/all-videos/monkeypox-in-the-u.s.-an-update/

Monkeypox- Case in 31-year-old male with perianal and penile lesions rectal pain and rash (Basgoz et al, NEJM. June 15, 2022)

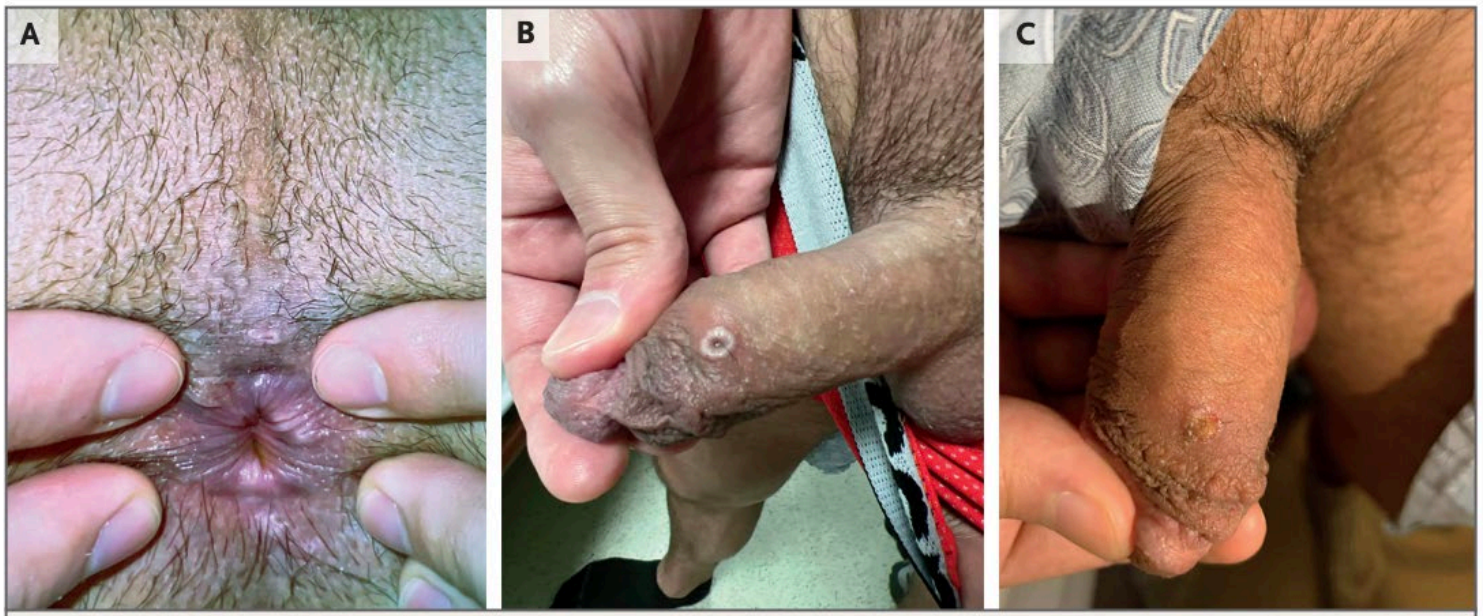


Figure 1. Photographs of Perianal and Penile Ulcers from 2 Days before Admission.

Panel A shows a tender perianal ulcer, measuring less than 1 cm in diameter, with raised, firm margins. Panel B shows an ulcer on the dorsum of the penile shaft, measuring 7 mm in diameter, that is similar in appearance to the perianal ulcer. Panel C shows that the ulcer has heaped margins around a central dry base. In all panels, the patient's hands are shown.

Monkeypox- Case in 31-year-old male with perianal and penile lesions rectal pain and rash (Basgoz et al, NEJM. June 15, 2022)

Figure 2. Photographs of the Rash.

Panels A and B show scattered papulovesicular lesions on the chest that were present 2 days before admission. The lesions measure 2 mm in diameter, are filled with clear fluid, and have surrounding erythema. Panel C shows a lesion on the right palm that was present at the time of admission. Panel D shows a papulovesicular lesion on the left second finger, which was one of the last skin lesions to develop, approximately 2 weeks after the onset of symptoms.

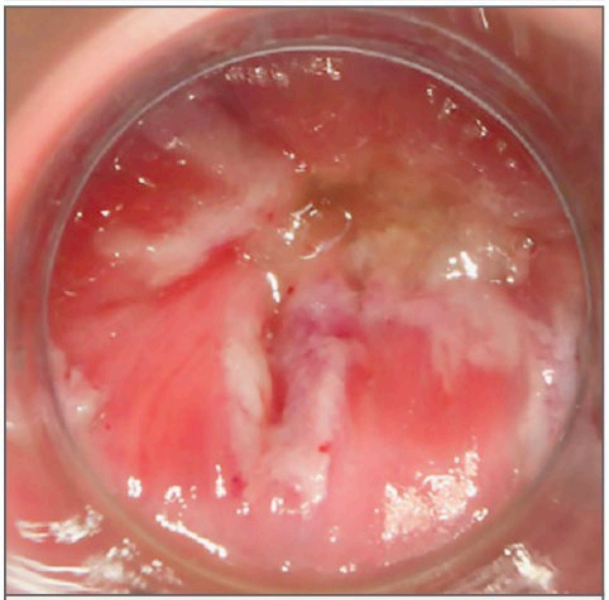
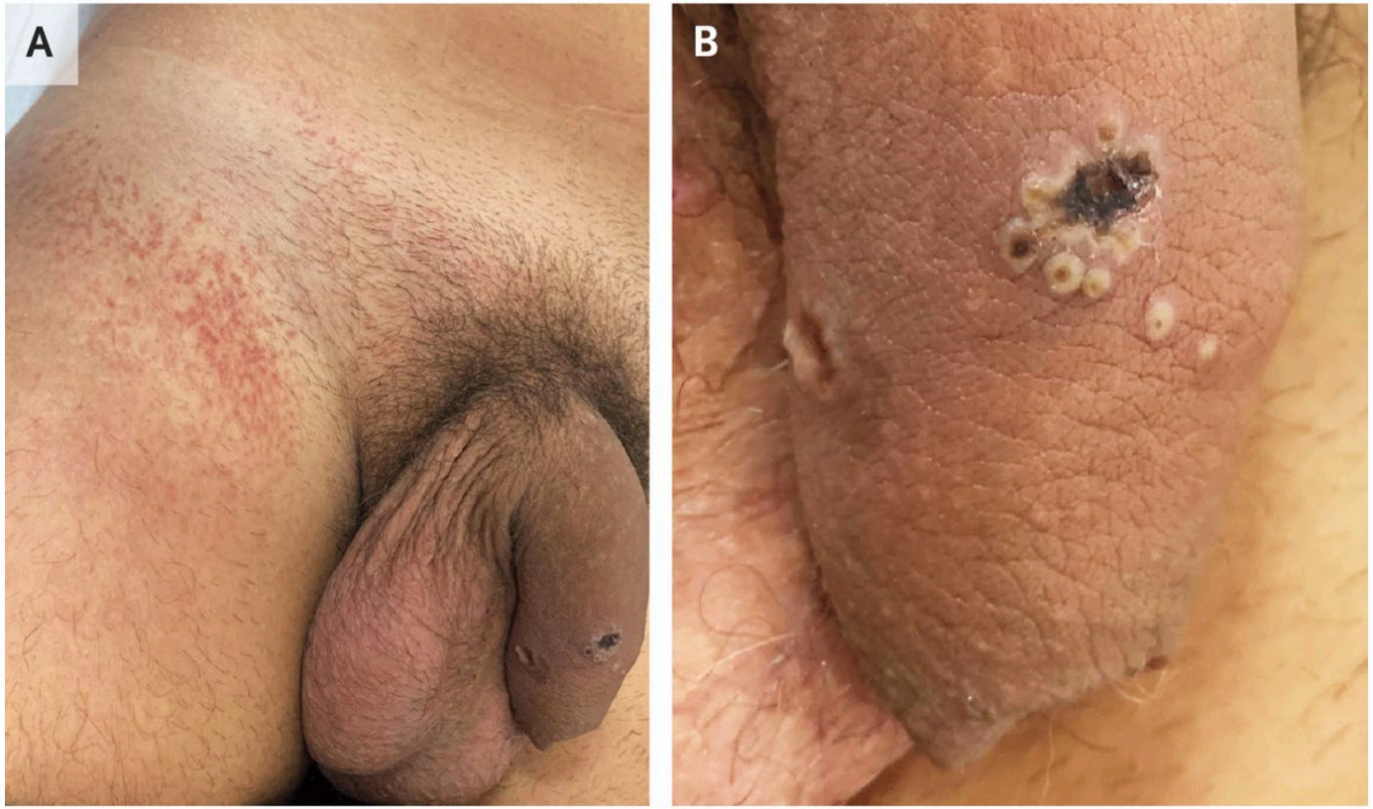


Figure 3. Photograph from Anoscopic Examination.

A photograph obtained during anoscopy, performed on the day of admission, shows intense rectal and anal inflammation with shallow ulcerations and purulent exudate, findings consistent with proctitis.

Monkeypox- Case in 31-year-old male with well-controlled HIV and 1 week of penile lesions (Rita Patrocinio-Jesus, M.D., D.T.M.H., and Francesca Peruzzu, M.D, NEJM. June 15, 2022)



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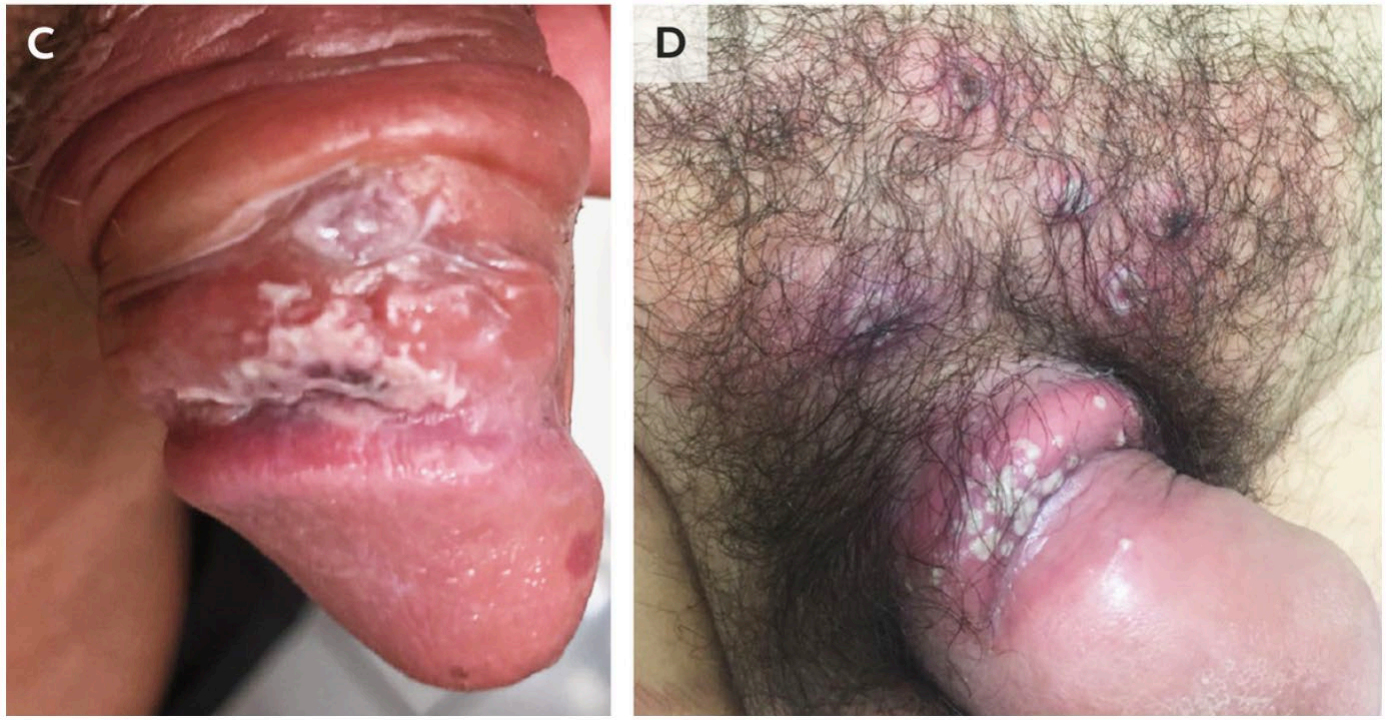
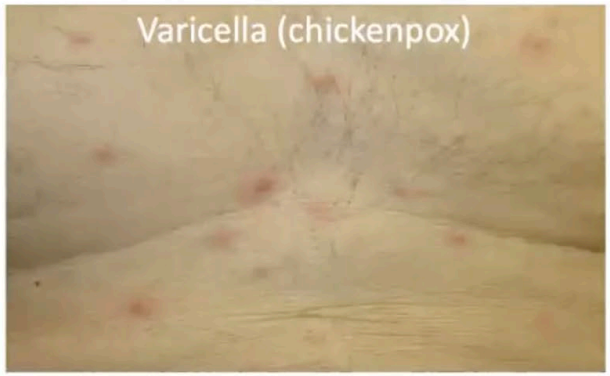


Close Mimics of Monkeypox Rash



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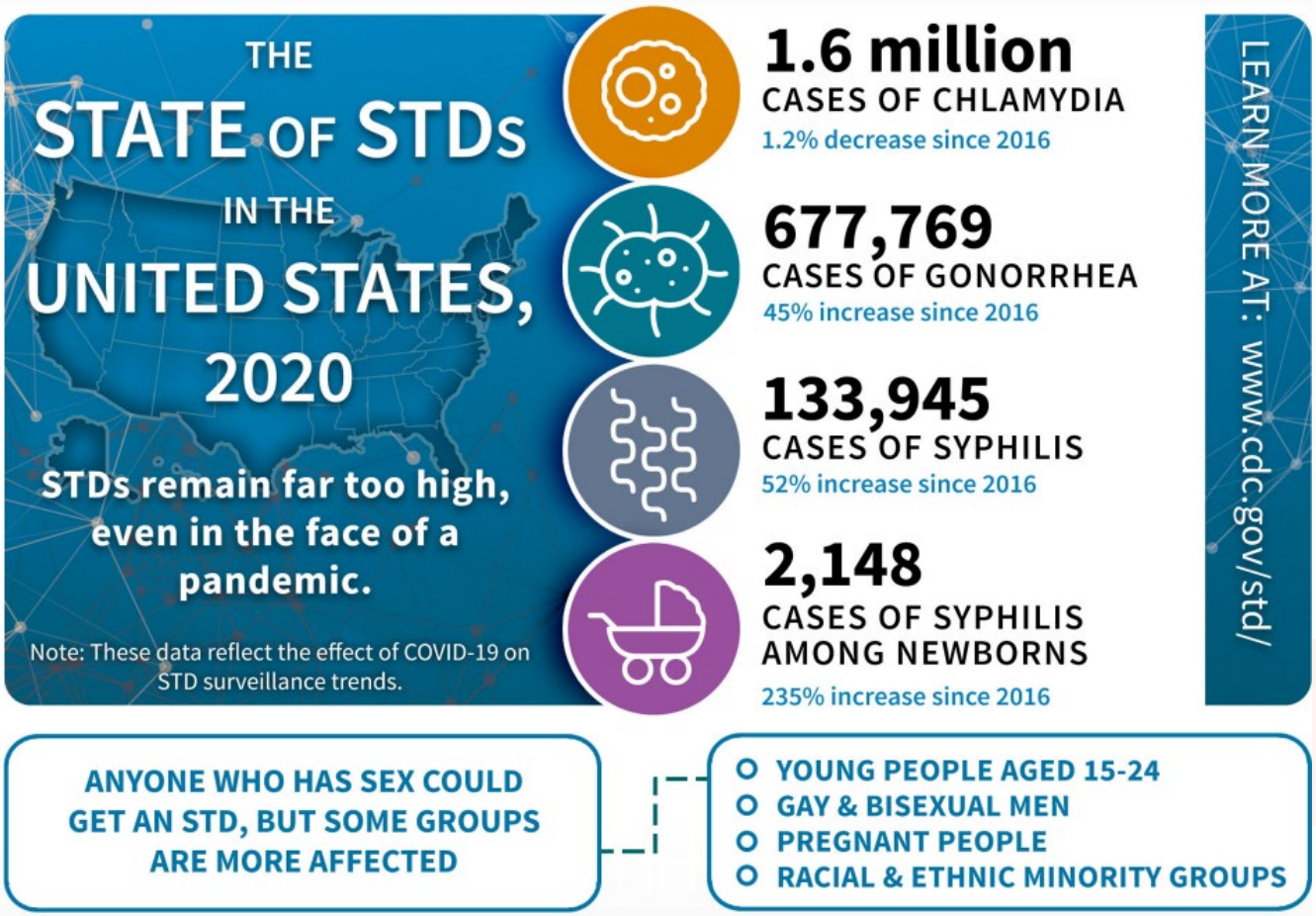
Burden of STIs in the United States



Monkeypox cases – 2022

- Cases primarily are in men who report sexual contact with other men

- Differing presentation?
  - Genital and/or perianal lesions
  - Proctitis
  - Prodromal symptoms may not have appeared

- Individuals may present to **sexual health clinics for care**

- *Monkeypox is not a STI* in the typical sense (intimate contact)

- **Concurrent STIs** have been reported in patients with Monkeypox

ULCERATIVE STIs

- Herpes simplex virus
- Syphilis
- Chancroid
- Lymphogranuloma venereum (LGV)
- *Granuloma Inguinale*

NON INFECTIOUS (less common)

- Recurrent aphthous stomatitis
- Behcet's Disease
- Trauma
- Squamous cell carcinoma
- Drug-induced
- Other

INFECTIONS CAUSING DIFFUSE RASHES

- Syphilis
- Varicella/VZV
- Disseminated herpes
- Molluscum contagiosum
- Other pox viruses
- Disseminated fungal infections
- Disseminated gonococcal infection

STI Syndromes PROCTITIS

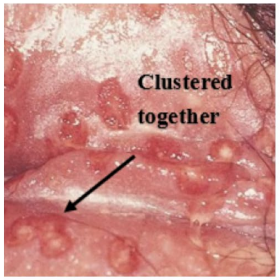
- Chlamydia including LGV serovars
- Gonorrhea
- HSV
- Syphilis

ULCERATIVE STIs

- Herpes simplex virus
- Syphilis
- Chancroid
- Lymphogranuloma venereum (LGV)
- *Granuloma Inguinale*

HERPES SIMPLEX VIRUS





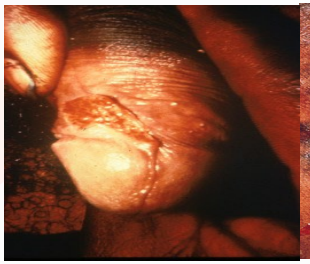
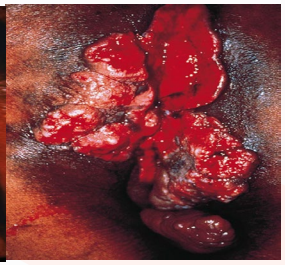
SYPHILIS




CHANCROID


LGV


GRANULOMA INGUINALE

Sources: cdc.gov; NY City Department of Health and Mental Hygiene, and the NY City STD PTC. The Diagnosis and Management of Syphilis: An Update and Review. www.nycptc.org; Latini *et al. BMC Infect Dis* 17, 386 (2017).; https://doi.org/10.1186/s12879-017-2484-8;https://stdcenterny.com/herpes-signs.html

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INFECTIONS CAUSING DIFFUSE RASHES

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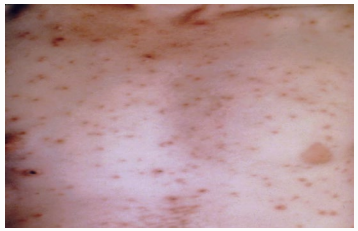
Sources: cdc.gov; Southeast STD/HIVTD PTC teaching images; NY City Department of Health and Mental Hygiene, and the NY City STD PTC. The Diagnosis and Management of Syphilis: An Update and Review. March 2019. available at www.nycptc.org.

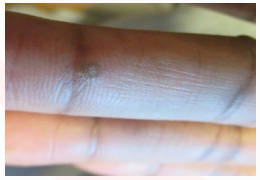
VARICELLA




MOLLUSCUM CONTAGIOSUM


CRYPTOCOCCOSIS


DISSEMINATED GONORRHEA



INFECTIONS CAUSING DIFFUSE RASHES

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Sources: cdc.gov; Southeast STD/HIVTD PTC teaching images; https://phil.cdc.gov

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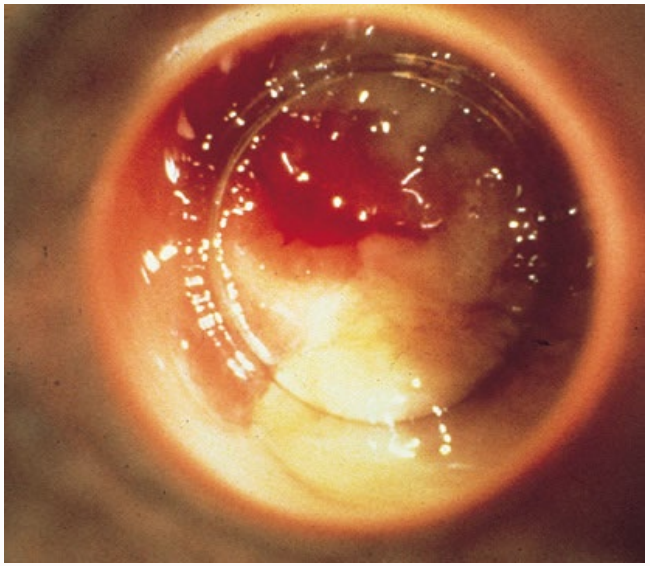
STI Syndromes PROCTITIS

- Chlamydia including LGV serovars
- Gonorrhea
- HSV
- Syphilis

Risk factors	**Anal receptive exposures:** • **oral-anal** • **digital-anal** • **genital-anal**
Anatomic location	Inflammation of the **rectum** (distal 10-12 cm)
Symptoms	Inflammation of the rectum Anorectal pain Rectal discharge



Diagnostic testing

- Anoscope exam
- Rectal specimens for pathogen specific tests (GC/CT…)
- HIV, RPR testing

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Resources to Support STI Management

STD Treatment Resources: www.nnptc.org Clinical Consultations: www.STDCCN.org

Monkeypox-Provider Information

- Case definition

  - *Suspected Case*: New characteristic rash **OR** meets one of epidemiologic criteria* and high clinical suspicion for monkeypox

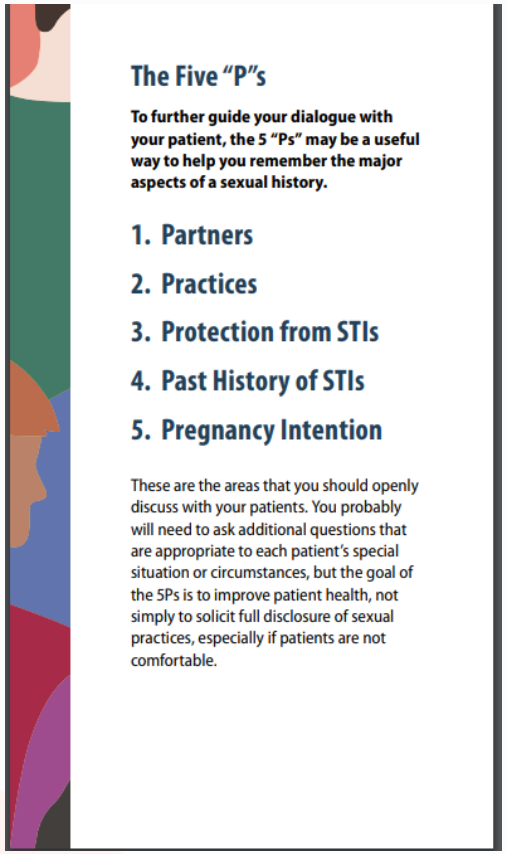
  - *Probable Case*: No suspicion of other recent Orthopoxvirus exposure (I.e., recent Vaccina virus vaccination) **AND** presence of positive Orthopoxvirus testing

  - *Confirmed Case*: Presence of *Monkeypox virus* DNA by PCR, next-generation sequencing or culture from a clinical specimen

Monkeypox-Ambulatory Provider Information

- Epidemiologic Criteria (Within 21 days of illness onset)
  - Contact with person with similar rash or receipt of diagnosis of confirmed or probable monkeypox **OR**
  - Close or intimate in-person contact with individuals in a social network experiencing monkeypox activity **OR**
  - Travel outside the US to a country with confirmed cases of monkeypox or where *Monkeypox virus* is endemic **OR**
  - Contact with dead or live wild animal or exotic pet that is an African endemic species or used product derived from such animals (ex game meat)

Monkeypox-History



The Five "P"s

To further guide your dialogue with your patient, the 5 "Ps" may be a useful way to help you remember the major aspects of a sexual history.

1. **Partners**
2. **Practices**
3. **Protection from STIs**
4. **Past History of STIs**
5. **Pregnancy Intention**

These are the areas that you should openly discuss with your patients. You probably will need to ask additional questions that are appropriate to each patient's special situation or circumstances, but the goal of the 5Ps is to improve patient health, not simply to solicit full disclosure of sexual practices, especially if patients are not comfortable.

- Travel History
- Sexual History
- Close contacts with people with similar rash or suspected/confirmed Monkeypox

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Monkeypox-Who Needs Testing?

- Observation of the classic Monkeypox rash
- Observation of a rash that could be consistent with Monkeypox in persons with epidemiologic risk factors
  - Contact with
    - People with similar looking rash
    - People diagnosed with Monkeypox
    - Close/intimate contact with people in a social network experiencing Monkeypox activity
      - Men who have sex with men who meet partners through online website, digital apps, social events.
    - History of recent travel to a country currently reporting cases
- Contact with dead or live wild animal or exotic pet that is an African endemic species or used product derived from such animals (ex game meat)

www.cdc.gov/monkeypox

Monkeypox-Diagnosis

Step 1

- Orthopox Generic Testing
- Confirms presence of orthopox virus DNA
- Positive = orthopox case*
- Performed in state labs that are part of the Laboratory Response Network (N= 120) (https://emergency.cdc.gov/lrn/)

Step 2

- Confirmatory testing
- Real-time PCR
- Positive = confirmed Monkeypox case
- Only available at the CDC

*Treat all orthopox positives as Monkeypox until proven otherwise

Monkeypox-Ramping Up Testing Options

Labcorp To Begin Monkeypox Testing Today, Doubling Nationwide Testing Capacity

Media Statement

For Immediate Release: Wednesday, July 6, 2022
Contact: Media Relations
(404) 639-3286

Starting today, Labcorp will begin testing for monkeypox using CDC's orthopoxvirus test (which detects all non-smallpox related orthopoxviruses, including monkeypox).

"The ability of commercial labs to test for monkeypox is a key pillar in our comprehensive strategy to combat this disease," said CDC Director Rochelle Walensky, M.D., M.P.H. "This will not only increase testing capacity but will make it more convenient for providers and patients to access tests by using existing provider-to-lab relationships."

Labcorp will offer this testing at its largest facility in the United States and will be able to accept specimens from anywhere in the country. Labcorp expects to be able to perform up to 10,000 tests per week, which will double the current capacity provided through CDC's Laboratory Response Network (LRN), which itself has rapidly expanded testing capacity over the last seven weeks.

On June 22, HHS announced that five commercial laboratory companies would soon begin offering monkeypox testing. Since then, CDC shipped the tests to the laboratories and their employees have been trained on their administration, among other steps.

Anyone with a rash that looks like monkeypox should talk to their healthcare provider about whether or not they need to get tested, even if they don't think they had contact with someone who has monkeypox. Healthcare providers, nationwide, can order the orthopoxvirus test from Labcorp just as they normally would order other tests. The public will not be able to go to a Labcorp lab and submit a specimen. Labcorp will use electronic laboratory reporting (ELR) to report results to jurisdictions as outlined in the CDC reporting guidance.

CDC anticipates additional commercial laboratories will come online and monkeypox testing capacity will continue to increase throughout the month of July. Healthcare providers can access information on Labcorp's test at www.labcorp.com/monkeypox*. The latest CDC information on monkeypox is available at www.cdc.gov/monkeypox.

*Linking to a non-federal site does not constitute an endorsement by HHS or any of its employees of the sponsors or the information and products presented on the site.

July 6, 2022. https://www.cdc.gov/media/releases/2022/s0706-monkeypox-labcorp.html

- Labcorp—July 6
- Mayo Clinic Labs—July 8
- Quest—July 13

- Aegis Science
- Sonic Healthcare

- Order the orthopoxvirus test from companies just as they normally would.

- Test results will be reported to the health department in the patient's state or territory of residence

Monkeypox-What to do if you suspect it

- Step 1: Isolate patient (Private room, door closed)
  - *Place patient on respiratory enhanced precautions*

- Step 2: Report (according to system guidance).
  - State and Local Health Departments
  - CDC Emergency Operations Center: 770-488-7100

- Step 3: Don PPE https://www.cdc.gov/hai/pdfs/ppe/PPE-Sequence.pdf
  - Gown
  - Gloves
  - Eye protection (i.e., goggles or a face shield that covers the front and sides of the face)
  - NIOSH-approved particulate respirator equipped with N95 filters or higher

https://www.cdc.gov/poxvirus/monkeypox/clinicians/prep-collection-specim
https://www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-healthcare.html

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Monkeypox-What to do if you suspect it

- Step 4: Specimen Collection
  - Vigorously swab or brush lesion with two separate sterile dry polyester or Dacron swabs
  - Do not add or store in viral or universal transport media.

https://www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-healthcare.html
https://epi.dph.ncdhhs.gov/cd/lhds/manuals/cd/monkeypox.html

Specimen Collection: Other Tests

Step 5: Test for mimics and coinfection(s)

- In addition to monkeypox testing (see below), please work up for causes:
  - Sexually transmitted infections
    - Serum RPR
    - Urine gonorrhea and chlamydia PCR
    - HSV PCR of suspect lesion
    - HIV testing
  - Patients with rashes more characteristic of common infections like chickenpox or herpes, send separate swabs and testing:
    - HSV PCR
    - VZV PCR

https://epi.dph.ncdhhs.gov/cd/lhds/manuals/cd/monkeypox.html

What do I tell my patient with suspected/confirmed Monkeypox

- Avoid close contact with others until symptoms have gone away and the rash has healed completely
  - Sex/intimate contact
  - Crowds
  - Animals (pets, domestic animals, and wildlife).
- Cover rashes with clothing, gloves or bandages.
- Wash hands often
- Clean and disinfect surfaces and materials touched while symptomatic (bedding, towels, clothing, sex toys, and surfaces such as door handles or counter tops.
- Standard household cleaning/disinfectants are effective.

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Monkeypox-Treatment

- Treatment
  - Most cases are mild and require only supportive care
  - No FDA approved agents
  - Antiviral agents with activity
    - Tecoviromat (TPOXX)
    - Cidofovir
    - Brincidofovir
  - Vaccinia Immunoglobulin Intravenous (VIVIG)-approved for complication of vaccinia virus vaccination
  - Available through CDC

Tecovirimat (also known as TPOXX or ST-246) is FDA-approved for the treatment of human smallpox disease caused by *Variola virus* in adults and children. However, its use for other orthopoxvirus infections, including monkeypox, is not approved by the FDA. Therefore, CDC holds a non-research expanded access Investigational New Drug (EA-IND) protocol that allows for the use of tecovirimat for primary or early empiric treatment of non-variola orthopoxvirus infections, including monkeypox, in adults and children of all ages.

https://www.cdc.gov/poxvirus/monkeypox/clinicians/Tecovirimat.html

Monkeypox-Treatment

Titanji et al. 2022. https://academic.oup.com/ofid/advance-article/doi/10.1093/ofid/ofac310/6615388

Therapy	Mechanism of action	Typical dosing	Formulation	FDA approval status	Side effects and adverse events
Cidofovir	Blocks viral DNA synthesis through competitive inhibition of DNA polymerase	5 mg/kg/dose once weekly for ≥2 doses (with concomitant probenecid)	IV; off-label: topical, intravesicular	CMV retinitis in patients with AIDS[84] (1996)	Nephrotoxicity; neutropenia; decreased intraocular pressure, nausea, vomiting
Brincidofovir	Lipid conjugate pro-drug of cidofovir	4 mg/kg once weekly for 2 doses (max 200 mg/dose)	Oral	Smallpox (2021)[85]	Abdominal pain, nausea, vomiting, diarrhea, elevated liver transaminases and bilirubin
Tecovirimat	Inhibits activity of the protein VP37, which prevents creation of virions which can be released from an infected host cell, thereby preventing replication and dissemination within the host	IV: 35 to <120 kg: 200 mg q12 hours ≥120 kg: 300 mg q12 hours Oral: 40 to <120 kg: 600 mg q12 hours ≥120 kg: 600 mg q8 hours All regimens for 14 days	IV and oral (off-label topical)[86]	Smallpox (2018)[87]	IV: pain and swelling at infusion site; extravasation at infusion site; headache[88] Oral: headache, abdominal pain, nausea, vomiting
VIGIV	Passive immunity through OPXV-specific antibodies collected from pooled human plasma of persons immunized with smallpox vaccine	6,000 units/kg as a single dose (up to 9,000 units/kg) Dose can be repeated depending upon symptoms	IV	Complications of vaccinia vaccination (progressive vaccinia, severe generalized vaccinia, etc.) (2005)[89]	Infusion reaction; local injection-site reaction (contraindicated in persons with IgA deficiency and possible IgA hypersensitivity)

Monkeypox-Vaccines

- Infection with *Orthopox viruses confers* immunological cross-protection between viruses of the same genus
- No Monkeypox-specific vaccines
- Vaccinia virus protect against Monkeypox
  - ACAM2000 (live, replication-competent *Vaccinia* virus)
  - JYNNEOS (non-replicating modified *Vaccinia Ankara* virus vaccine)
  - Both approved for person 18 years and older

Titanji et al. 2022. https://academic.oup.com/ofid/advance-article/doi/10.1093/ofid/ofac310/6615388
CDC COCA call May 24, 2022

Monkeypox-Vaccines

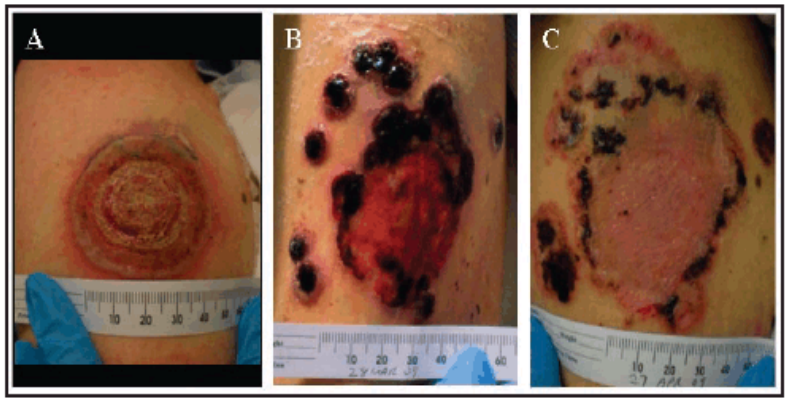
	ACAM2000	JYNNEOS
Vaccine virus	Replication-competent vaccinia virus	Replication-deficient Modified vaccinia Ankara
"Take"	"Take" occurs	No "take" after vaccination
Inadvertent inoculation and autoinoculation	Risk exists	No risk
Serious adverse event	Risk exists	Fewer expected
Cardiac adverse events	Myopericarditis in 5.7 per 1,000 primary vaccinees	Risk believed to be lower than that for ACAM2000
Effectiveness	FDA assessed by comparing immunologic response and "take" rates to Dryvax*	FDA assessed by comparing immunologic response to ACAM2000 & animal studies
Administration	Percutaneously by multiple puncture technique in single dose	Subcutaneously in 2 doses, 28 days apart

Titanji et al. 2022. https://academic.oup.com/ofid/advance-article/doi/10.1093/ofid/ofac310/6615388

CDC COCA call May 24, 2022

Severe Vaccinia Virus Complications-Uncontrolled Viral Replication

Progressive vaccinia

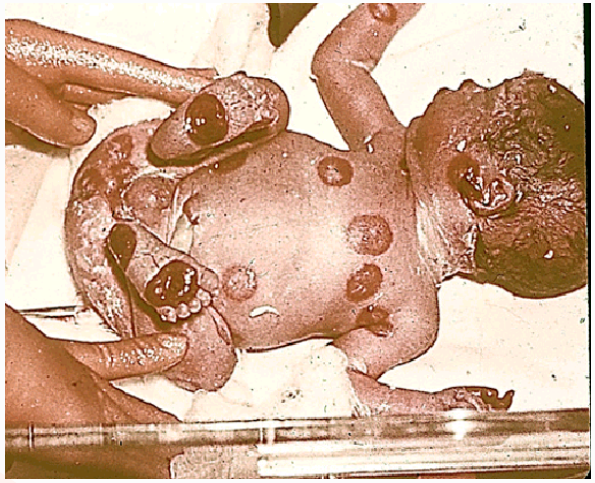


Eczema vaccinatum

Courtesy of CD

Severe Vaccinia Virus-Inadvertent Transmission

Fetal vaccinia



Autoinoculation / inadvertent inoculation

Ocular infections

Courtesy of CD

Severe Vaccinia Virus-Complication with unknown etiology

- Post vaccinial encephalitis
- Myopericarditis

Monkeypox-Vaccination--National Strategy

Phase 1
(135,000 doses distributed)

- use currently available vaccine stocks
- close contact with people known to have monkeypox
- high-risk exposures in venues or areas where monkeypox is actively spreading.

Phase 2

- when more JYNNEOS vaccine is available, broader vaccination of persons who may be at risk for future monkeypox exposure may be considered.

Monkeypox-Vaccination--National Strategy—Phase 1

- Sexual partner in the past 14 days received a monkeypox diagnosis
- Multiple sexual partners in the past 14 days in a jurisdiction with known monkeypox
  - Known contacts who are identified by public health via case investigation, contact tracing, and risk exposure assessments
  - People who are aware that one of their sexual partners from the past 2 weeks has received a monkeypox diagnosis.
  - Gay, bisexual, other men who have sex with men, and transgender people who report any of the following in the past 2 weeks:
    - Group sex or sex with multiple partners.
    - Sex at a commercial sex venue or in association with an event, venue, or defined geographic area where monkeypox transmission has been reported.

- ACIP currently recommends persons whose jobs expose them to Monkeypox should be vaccinated.

- Vaccine Safety monitored closely by CDC (Vaccine Adverse Reporting System)

Monkeypox-Conclusions

- Patients most likely to presents to outpatient settings with rash
- Be aware of atypical presentations
- Maintain a high index of suspicion and low threshold for testing in individuals with epidemiologic risk factors for monkeypox
- Be aware of close clinical mimics
- Most infections so far are self-limited and patients make full recovery.
- If you need guidance:
  - State or Local Health Department
  - CDC Emergency Operations Center: 770-488-7100

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AETC AIDS Education & Training Center Program Southeast

We can do hard things!

Thank you for all that you do !