Mpox (formerly Monkeypox) Resources To Consider

This list captures information shared by AABB and provides operational considerations for donor centers.

Updated Feb 26, 2024
TABLE OF CONTENTS:

1) **AABB’s Mpox Fact Sheet**

2) **FDA’s Information for Blood Establishments Regarding the Monkeypox Virus and Blood Donation**

3) **Transfusion Transmission**

4) **Blood Donor Considerations**

5) **Donor Eligibility Following Receipt of Vaccinations**
   - DHQ v4.0 Flowchart, Question 9
   - AABB Standards for Blood Banks and Transfusion Services 33rd edition

6) **Consignee Notification Considerations**

7) **Donor Center Staff Considerations**

8) **Disinfection Considerations**

9) **FDA Additional Information**

10) **Human Cell, Tissue, and Cellular and Tissue-based Product (HCT/P) Considerations**
    - FDA’s Important Information for Human Cell, Tissue, and Cellular and Tissue-based Product (HCT/P) Establishments Regarding Monkeypox Virus and HCT/P Donation

11) **Information shared by Dr. Lou Katz to AABB’s Transfusion Transmitted Diseases Committee Meeting** - 08/03/22:
Monkeypox Resources and Information:

1) AABB’s Mpox Fact Sheet (formerly Monkeypox)
A subgroup of the AABB Transfusion Transmitted Diseases (TTD) Committee recently published a supplement to Transfusion containing new and updated Fact Sheets including the Mpox Fact Sheet, which is also available on the Emerging Infectious Diseases page of our website:
   • Mpox Virus Fact Sheet (formerly Monkeypox) - updated February 2024 Transfusion, page S142-S147.

The TTD Committee continues to monitor the outbreak and will update the Fact Sheets as new information emerges.

2) FDA’s Information for Blood Establishments Regarding the Monkeypox Virus and Blood Donation
   • On Aug 12, 2022, FDA issued a Safety and Availability communication reiterating that existing safeguards provide sufficient protection against the potential for transfusion-transmission of monkeypox and ensure the continued safety and security of the blood supply.

   “Given the robustness of the existing safeguards for blood safety FDA does not recommend that blood establishments ask donors additional, specific questions about possible exposure to monkeypox virus,” the agency stated. “Further, FDA does not recommend using laboratory diagnostic tests to screen blood donors for monkeypox virus.”

3) Transfusion Transmission
   • There have been no documented cases of transfusion-transmitted Mpox. [Fact Sheet, page S143].

4) Blood Donor Considerations
   • No specific donor screening question is indicated at this time in the United States (US) as transfusion transmission has not been demonstrated. [Fact Sheet, page S145]
   • No FDA Guidance or AABB Standard has been issued at this time. [Fact Sheet, page S145]
   • The need for specific interventions to minimize a theoretical risk of transfusion transmission of Mpox Virus (MPV) during the unique 2022 epidemic is undetermined.
      o Donors must be well on the day of donation, undergo a limited skin examination, and have their temperature taken in the donor room.
      o Since 2020 in the US, MSM have been specifically deferred for 3 months after the most recent such contact to reduce the risk of collecting donations from recently HIV-infected donors. This interval is believed to be well beyond the duration of a putative MPV infectious viremia and high adherence to this donor criterion effectively mitigates any risk where donors continue to be directly
questioned about MSM activity.

- The US policy was changed by the FDA in May 2023 with most blood collection organizations planning to implement the change to an individual donor assessment by summer-fall 2023. According to the new policy, any individual with a new sexual partner or multiple partners, either engaging in anal sex within the prior 3 months, will be deferred for 3 months.
- In much of the world, the MSM deferral has been discarded and replaced by individual donor assessments. [Fact Sheet, page S145]

- Optional Development of a Local Deferral:
  - A medical director always has the option to add additional, more restrictive questions to the Donor History Questionnaire v4.0 (DHQ), as described in the DHQ v4.0 User Brochure, page 6:
    - Adding Questions: Blood centers may choose to add “local” questions in the area designated for additional questions found at the end of the DHQ.
    - This flexibility is built into the process, recognizing the medical director may elect to add additional donor screening criteria.
    - The Fact Sheet, page S145, provides the following information for use by donor centers considering a local deferral:
      - Prudent practice would be to defer infected donors at least until all lesions are fully resolved and a minimum of 21 days after the onset of symptoms.
      - Based on the incubation period, CDC has recommended that asymptomatic close contacts of infected people or animals be placed under fever surveillance for 21 days. The 21 days would be a minimum donor deferral if such contact has occurred.

5) Donor Eligibility Following Receipt of Vaccinations

- FDA’s Key Facts About Monkeypox Vaccine – Current as of 08/18/22

The Food and Drug Administration recommends no donor deferral for pre-exposure receipt of the Jynneos vaccine for smallpox and monkeypox, provided the donor is otherwise healthy as required under 21 CFR 630.10 and section 630.15.

AABB reminds members that monkeypox is not known to be transfusion-transmissible and there have been no reports of transfusion-transmitted cases.

DHQ v4.0 Flowchart, Question 9:

**Question 9:** In the past 8 weeks, have you had any vaccinations or other shots?

**Donor Eligibility:** FDA recommends deferral for replication-competent smallpox vaccines as stated in FDA's December 2002 Guidance, Recommendations for Deferral of Donors and Quarantine and Retrieval of Blood and Blood Products in Recent Recipients of Smallpox Vaccine (Vaccinia Virus) and Certain Contacts of Smallpox Vaccine Recipients Smallpox Vaccine and consistent with the flowchart below. Donors are not automatically deferred following other vaccinations and the vaccine deferral policy is determined by the responsible physician. When developing a deferral policy, the physician may consider the following:
When developing a deferral policy and SOPs, the physician may consider the following:

- **AABB ACCREDITED FACILITIES**: Refer to the current edition of the Standards for Blood Banks and Transfusion Services Reference Standard 5.4.1A for immunization and vaccination deferral requirements and AABB’s Updated Information on Donation of CCP, Blood Components and HCT/Ps During the COVID-19 Pandemic.

**Note on 9alt Flowchart**: The 9alt Flowchart provides a simpler but more restrictive deferral scheme in which all donors who received the smallpox vaccination are deferred for a minimum of 56 days, regardless of when the scab fell off. Blood centers using these criteria should use 9alt Flowchart.

![Flowchart Diagram]

1. **Q9**: In the past 8 weeks, have you had any vaccinations or other shots?
   - Yes
   - No

2. Was the vaccination for smallpox?
   - Yes
   - No

3. Did you receive the Jynneos vaccine?
   - Yes
   - No

   Continue this question on the next page.
Flowchart Question 9 continued:

- **Was it given more than 21 days ago?**
  - Yes: Defer donor for 21 days after vaccination date or until scab(s) spontaneously falls off, whichever is later.
  - No: Defer donor until 21 days after the vaccination date.

- **Is the scab(s) still on?**
  - Yes: Defer donor until 21 days after the vaccination date.
  - No: Defer donor 56 days after vaccination date.

- **Did the scab(s) fall off by itself?**
  - Yes: Defer donor until 14 days after symptoms resolve.
  - No: Defer donor until 21 days after the vaccination date.

- **Did you have any illness or complications due to the vaccination?**
  - Yes: Defer donor until 14 days after symptoms resolve.
  - No: Defer donor 56 days after vaccination date.

Next question
### AABB Standards for Blood Banks and Transfusion Services 33rd edition

Reference Standard 5.4.1A Requirements for Allogeneic Donor Qualification

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria/Description/Examples</th>
<th>Deferral Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunizations and Vaccinations</td>
<td>• <strong>Receipt of Jynneos vaccine</strong> for Smallpox and Monkeypox (Attenuated, live, nonreplicating vaccine).</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• <strong>Smallpox Vaccinia Vaccine</strong> (Live virus vaccine comprised of Vaccinia Virus – “replication competent” vaccine)</td>
<td>Evaluate for deferral, as required in FDA Guidance²</td>
</tr>
</tbody>
</table>

6) **Consignee Notification Considerations**

If a blood collection organization receives information that a donor has received a diagnosis of MPV infection after donation and decides to notify consignees of this information and voluntarily withdraw untransfused in-date products, the most appropriate message is that the MPV has never been shown to be transmitted by transfusion, the donor was healthy at the time of donation and that the risk, if any, is believed to be minimal.

7) **Donor Center Staff Considerations:**

- Donor center staff reporting a Monkeypox infection:
  - The staff member should follow CDC guidance and remain isolated at home at least until signs and symptoms are gone, all scabs have separated, and the skin healed.
  - According to CDC, “a person with monkeypox can spread it to others from the time symptoms start until the rash has fully healed and a fresh layer of skin has formed. The illness typically lasts 2–4 weeks.”

- Donor center staff reporting a Monkeypox exposure
  - Assess the nature of the exposure. Was it a close contact exposure?
    - According to CDC, a close contact is:
      - Direct contact with monkeypox rash, scabs, or body fluids from a person with monkeypox.
      - Touching objects, fabrics (clothing, bedding, or towels), and surfaces that have been used by someone with monkeypox.
      - Contact with respiratory secretions.
    - Such employees should be monitored for the development of illness for 21 days. Isolation is recommended for those who develop an illness consistent with monkeypox.

- Notification of donor center staff following exposure in the donor center
  - Consider notification of donor center staff following an exposure to an individual with a confirmed Monkeypox infection to facilitate monitoring for illness.

- Notification of donors following an exposure in the donor center
  - Consider notification of donors following an exposure to an individual with a confirmed Monkeypox infection.
8) Disinfection Considerations:
   • Refer to CDC’s Monypox>Healthcare Professionals>Infection Control

9) FDA - Additional Information:
   • FDA’s Information for Blood Establishments Regarding the Monkeypox Virus and Blood Donation – current as of 08/12/2022

   • FDA’s Update on Agency Response to Monkeypox Outbreak – July 29, 2022
     In this bulletin FDA provides "an update to it’s multipronged response to monkeypox in the United States including its efforts in areas of diagnostics, vaccines and therapeutics."

   • FDA Monkeypox Response – webpage describing FDA’s roles in monkeypox preparedness and response – current as of 03/30/23

10) Human Cell, Tissue, and Cellular and Tissue-based Product (HCT/P) Considerations
   FDA’s Important Information for Human Cell, Tissue, and Cellular and Tissue-based Product (HCT/P) Establishments Regarding Monkeypox Virus and HCT/P Donation – 08/29/22

   • Worldwide there have been no reports of transmission of monkeypox virus through use of human cells, tissues, or cellular or tissue-based products (HCT/Ps); therefore, the risk of infection transmitted by implantation, transplantation, infusion, or transfer of HCT/Ps remains theoretical.

   • Routine screening measures are already in place for evaluating risk factors and conditions as well as clinical evidence and physical evidence of infection in HCT/P donors. Allogeneic donor screening includes a donor medical history interview and review of relevant medical records to look for risk factors and conditions that may lead to a determination that a donor is ineligible. Accordingly, “due to the robustness of existing donor screening recommendations,” the agency does not recommend using laboratory diagnostic tests to screen HCT/P donors for monkeypox virus.

   • Existing regulations require that the HCT/P establishment’s responsible person must determine and document the eligibility of an allogeneic cell or tissue donor. Similar to their approach early in the COVID-19 pandemic, FDA stated that, based on information available at this time, establishments may wish to consider, whether, in the 21 days prior to HCT/P recovery, the donor:  
     o was diagnosed with or was suspected of having a monkeypox infection;
had close contact with a person or an animal diagnosed with or suspected of having monkeypox infection regardless of the donor’s vaccination status; or developed a rash or other symptoms suggestive of monkeypox infection.

- For donors who have received a vaccine:
  - the ACAM2000 vaccine, a licensed live replicating virus vaccine indicated for active immunization against smallpox that may be used against monkeypox, recommendations outlined in the 2007 guidance on HCT/P donor eligibility remain applicable. The guidance also includes recommendations for donors with clinically recognizable vaccinia virus infection from contact with someone who received a live replicating virus smallpox vaccine.
  - The licensed non-replicating virus vaccine indicated for prevention of monkeypox (JYNNEOS) does not carry this same concern.

- For cadaveric (non-heart-beating) donors, FDA recommended that HCT/P establishments determine whether an autopsy was not performed due to a perceived risk of transmission of communicable disease or, if an autopsy was performed, whether any special precautions were taken that would suggest there was a special concern over the risk of transmission of a communicable disease from the donor.

11) Information shared by Dr. Lou Katz to AABB’s Transfusion Transmitted Diseases Committee meeting - 08/03/22

Slides begin on page 10
Major increase in human monkeypox incidence 30 years after smallpox vaccination campaigns cease in the Democratic Republic of Congo

“At the end of the smallpox eradication campaign, the Global Commission for the Certification of Smallpox Eradication concluded that continued smallpox vaccination to prevent monkeypox was not justified, despite the cross-protective immunity vaccinia vaccination provided against human monkeypox infection.”

Smallpox vaccination was officially discontinued in DRC in 1980.

Rimoin A et al. PNAS. 2010
"Classic" human monkeypox

- 1950s in non-human primates (lab outbreaks in Denmark)
- 1970 human infection. Now thousands of cases/year in endemic areas
- Animal reservoirs, so eradication unlikely c.f. smallpox
- US: 2003 outbreak (34 confirmed cases) from imported African rodents to prairie dogs in pet stores to humans. 2 travel-associated cases in 2021.
- 2 clades: Central & West African. Latter more clinically "mild"
- Animal-to-human: bites & scratches, body fluid contact & indirect from contaminated environment, bushmeat consumption
- Human-to-human: direct contact, droplets (rare), indirect from contaminated environment. STI?
- High clinical penetrance (conventional wisdom), asymptomatic not studied

Monkeypox

- Febrile prodrome (≈2 days)
  - Less common in 2022 epidemic
- Macule to papule to vesicle to umbilicated vesicle to crust & detachment
- Mucosal involvement occurs
- Mortality 1-10% (depending on clade & availability of care)
  - 2022 outbreak mortality much lower than this
- Pediatric & immunocompromised hosts especially at risk for badness
  - Pneumonia
  - Encephalitis
  - Keratitis
  - Secondary bacterial infection
- Multiple mutations in 2022 strain of undetermined significance
Cumulative cases: Global & US: 7 Aug 2022

Monkeys: Cumulative confirmed cases

https://ourworldindata.org/monkeys

US 6598
Spain 4577
Germany 2887
UK 2759
France 2239
Brazil 1474
New York 1862
California 826
Florida 633
Texas 606
Illinois 602
Georgia 596

WHO, CDC

Characteristics of current infections: 3 Aug. 2022

- >99% male (at this point)
  - MSM predominate (>95%) among those for whom information on sexual behaviors is available
  - Esp. with multiple (median 5 in three months) & anonymous recent partners
  - High rates of HIV infection (=40%) & of PrEP use (57%)
  - Mean age 38 (range 18-68)
  - Mean incubation 7.6 days (95% CI: 6.2-9.7)
  - Worldwide mortality very low outside endemic countries, but substantial morbidity primarily related to pain

26,208 cases in 87 countries
344: 7 endemic countries
25,864: 80 non-endemic countries

Sources: CDC, WHO, Thornhill et al, NEJM, 2022
### Current characteristics¹ (WHO, 3 Aug 2022), N=19326

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Missing data</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSM</td>
<td>7328 (97.5%)</td>
<td>186 (2.5%)</td>
<td>11812</td>
</tr>
<tr>
<td>HIV-Positive</td>
<td>2979 (37.6%)</td>
<td>4944 (62.4%)</td>
<td>11403</td>
</tr>
<tr>
<td>Health worker</td>
<td>339 (13.5%)</td>
<td>2171 (86.5%)</td>
<td>16816</td>
</tr>
<tr>
<td>Travel History</td>
<td>785 (35.3%)</td>
<td>1438 (64.7%)</td>
<td>17103</td>
</tr>
<tr>
<td>Sexual Transmission</td>
<td>4807 (91.5%)</td>
<td>447 (8.5%)</td>
<td>14072</td>
</tr>
<tr>
<td>Hospitalized²</td>
<td>561 (7.1%)</td>
<td>7297 (92.9%)</td>
<td>11468</td>
</tr>
<tr>
<td>ICU</td>
<td>3 (0.1%)</td>
<td>3715 (99.9%)</td>
<td>15608</td>
</tr>
<tr>
<td>Died</td>
<td>2 (0.0%)</td>
<td>10652 (100.0%)</td>
<td>8672</td>
</tr>
</tbody>
</table>

¹ Includes endemic & epidemic countries
² May have been hospitalized for isolation or medical treatment

---

### US Monkeypox

**Epidemiologic and Clinical Characteristics of Monkeypox Cases — United States, May 17–July 22, 2022**

#### Gender identity (1,196)

<table>
<thead>
<tr>
<th>Category</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man (94% with recent MSM)</td>
<td>1,178 (98.7)</td>
</tr>
<tr>
<td>Transgender man</td>
<td>3 (0.3)</td>
</tr>
<tr>
<td>Woman</td>
<td>5 (0.4)</td>
</tr>
<tr>
<td>Transgender woman</td>
<td>5 (0.4)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>4 (0.3)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

#### Race & ethnicity (1,064)

<table>
<thead>
<tr>
<th>Category</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian, non-Hispanic</td>
<td>48 (4.6)</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>278 (26.2)</td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>428 (40.6)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>296 (28.1)</td>
</tr>
<tr>
<td>Multiple, non-Hispanic</td>
<td>6 (0.6)</td>
</tr>
<tr>
<td>Missing</td>
<td>141</td>
</tr>
</tbody>
</table>

[CDC.gov. 8 Aug. 2022](https://www.cdc.gov)
Clinical to 22 July: US

<table>
<thead>
<tr>
<th>Sign/symptom</th>
<th>During illness* (N = 1,007)</th>
<th>At onset of illness (N = 461)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rash</td>
<td>1,004 (100.0)</td>
<td>0</td>
</tr>
<tr>
<td>Fever</td>
<td>596 (63.3)</td>
<td>345 (36.7)</td>
</tr>
<tr>
<td>Chills</td>
<td>550 (59.1)</td>
<td>381 (40.9)</td>
</tr>
<tr>
<td>Adenopathy</td>
<td>545 (58.5)</td>
<td>387 (41.5)</td>
</tr>
<tr>
<td>Malaise</td>
<td>531 (57.1)</td>
<td>399 (42.9)</td>
</tr>
<tr>
<td>Myalgia</td>
<td>507 (55.0)</td>
<td>415 (45.0)</td>
</tr>
<tr>
<td>Headache</td>
<td>469 (50.8)</td>
<td>454 (49.2)</td>
</tr>
<tr>
<td>Rectal pain</td>
<td>201 (21.9)</td>
<td>715 (78.1)</td>
</tr>
<tr>
<td>Pus/blood in stools</td>
<td>184 (20.5)</td>
<td>713 (79.5)</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>96 (11.5)</td>
<td>742 (88.5)</td>
</tr>
<tr>
<td>Rectal bleeding</td>
<td>90 (10.0)</td>
<td>810 (90.0)</td>
</tr>
<tr>
<td>Tenesmus</td>
<td>90 (10.0)</td>
<td>809 (90.0)</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>83 (9.2)</td>
<td>817 (90.8)</td>
</tr>
</tbody>
</table>

*Percent calculated excluding missing data

CDC. MMWR. 2022

Monkeypox prevention and control

- High-risk & exposed prophylaxis with (approved) “smallpox and monkeypox vaccine, live, non-replicating” (JYNNEOS) pre- & up to 14 days post-exposure. From MVA. Well tolerated
  - Receipt of the JYNNEOS for preexposure prevention requires no donor deferral
  - “Smallpox (vaccinia) vaccine, live” (ACAM-2000). Replication competent for use if above contraindicated? Associated with myo-pericarditis & many contraindications

- Hyperimmune globulin available for treatment

- Tecovirimat (TPOXX): approved for smallpox via “animal rule”. Protected NHP from fatal monkeypox virus infection
  - EUA for use during the current outbreak
  - RCT planned to start enrollment in Sept.
  - Off-label cidovir or brincidofovir

- CDC for infection control/isolation/quarantine
  - [https://www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-home.html](https://www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-home.html)
Monkeypox and transfusion?

- No reported or alleged transfusion transmission
- “DNA-emia”, as viremia proxy, in a proportion of human infections
  - Little data on presence of infectious virus in humans (that available is negative)
  - Virtually no data on presymptomatic viremia/DNA-emia
- IV transmission & infectious viremia documented in NHP & other animal models
- 2003 outbreak in US (34 confirmed cases)
  - No mandated donor interventions
  - CBER: no recommendations except deferral for recent smallpox vaccination (which was/is recommended for monkeypox exposure)
- Donors must be well & the skin of the donation site must be inspected & intact
  - No validated donor history questions or education materials
  - No screening assays suitable for donors, but NAT companies are engaged

Nan S et al. Research Square. 2022. DOI: https://doi.org/10.21203/rs.3.rs-1725831/v1

EID fact sheet

- The need for specific interventions to minimize a theoretical risk of transfusion transmission of MPXV during the unique 2022 epidemic is undetermined.
  - Donors must be well on the day of donation, undergo a limited skin examination, & have their temperature taken in the donor room.
  - In the US, MSM are specifically deferred for three months after the most recent such contact to reduce the risk of collecting donations from recently HIV-infected donors. This interval is believed to be well beyond the duration of a putative MPXV infectious viremia & high adherence to this donor criterion effectively mitigates any risk where donors continue to be deferred for MSM activity
  - In much of the world, the MSM deferral has been discarded & replaced by individual donor risk assessments. These recognize the importance of behaviors, as opposed to sexual preference, in disease transmission risk, e.g., multiple recent & new sex partners & traumatic sexual practices. In the context of the current epidemiology of the outbreak, overwhelmingly affecting MSM, it may be necessary in such venues to add specific inquiries regarding potential exposures to MPXV, as has been recommended by the European Centers for Disease Control.

*Also for receipt of PrEP
Whither monkeypox—discussion points for TTD

• At this stage of the U.S. outbreak, are specific measures necessary to prevent phlebotomy of infected donors e.g., written materials, direct questioning, enhanced examination, donor testing?
  • For donors of SOHO the ECDC recommends that...
    “...potential donors should be carefully interviewed regarding contacts with infected (confirmed or suspected) MPX cases, infected animals or travels to affected areas....”
• (At least) 21-days deferral if donor volunteers contact with monkeypox?
• Deferral of infected until all lesions healed (reepithelialized)?
• Consignee notification of prior donations from infected &/or contacts and advice to hospitals on how to respond?

TTD to monitor the evolving epidemic & update membership PRN