Poster 1: Management of patient with mpox and dehydration

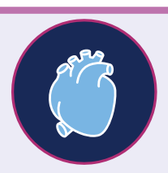
A B C D E assessment[1]

A

Airway: check patient for signs of obstruction, noises

B

Breathing: respiratory rate, depth, accessory muscles, nasal flaring, symmetry, SpO_2



C

Circulation: Pulse, blood pressure, Capillary refill time (CRT), urinary output

D

Disability: AVPU (Alert, verbal, pain, unresponsive), blood glucose, seizures

E

Exposure and history taking

Signs of shock

ADULTS

- Systolic blood pressure < 90–100 mmHg or mean blood pressure < 65 mmHg
- Weak/fast pulse (heart rate > 90 bpm)
- Increased respiratory rate (respiratory rate > 22 bpm)
- Abnormal state of consciousness (AVPU)
- Urinary output: < 0.5 mL/kg/h in adults
- Capillary refill time (CRT) > 3 seconds
- Cold extremities

CHILDREN

- Capillary refill time (CRT) ≥ 3 seconds
- Weak/fast pulse (<1 year: >160, 1-3 years: >150, 4-5 years: >140, 5-12 years: >120, >12 years: >100bpm)
- Cold extremities

Poster 2
Manage shock: Fluid challenge

YES

NO

Assessment of levels of dehydration (without shock)

	Mild dehydration (3–5% body mass)	Moderate dehydration (6–9% body mass)	Severe dehydration* (> 10% body mass)
Pulse	Normal	Rapid	Rapid, weak
Systolic blood pressure	Normal	Normal or low	Low
Oral mucosa	Mildly dry	Dry	Very dry
Skin texture	Normal	Slow/normal	Poor, slow
Urinary output Adult > 0.5 mL/kg/h Infants > 1 mL/kg/h	Normal	Adults < 0.5 mL/kg/h Infants < 1 mL/kg/h	Very low or anuric (< 0.5 mL/kg/h x 3 hours or more)
Respiratory rate	Normal	High	High
Others			Sunken fontanelle in infants, cold, mottled skin

MANAGEMENT OF MILD OR NO DEHYDRATION (WHO treatment plan A)

Water or ORS as required[1]

Weight	Quantity of ORS
< 5 kg	25–50 mL
5–10 kg	50–100 mL
10–20 kg	100–200 mL
< 2 years: ≥ 50–100 mL ≥ 2 years: ≥ 100–200 mL	
> 20 kg: administer > 200 mL and estimate losses	

In severe acute malnutrition (SAM)[2]

- Water or ReSoMal as required

PLUS

Give ReSoMal after every episode of diarrhoea or vomiting

MANAGEMENT OF MODERATE DEHYDRATION (WHO treatment plan B)

ORS for 4 h[3]

- Reassess and classify for dehydration.
- Select the appropriate plan to continue treatment.
- Begin feeding

Weight	Quantity of ORS
< 5 kg	200–400 mL
5–8 kg	400–600 mL
8–11 kg	600–800 mL
11–16 kg	800–1200 mL
16–30 kg	1200–2200 mL
> 30 kg	2200–4000 mL

In severe acute malnutrition (SAM)

- ReSoMal: 10 mL/kg/h for the first 2 hours
- 5 mL/kg every 30 minutes, then 5–10 mL/kg/h

If possible, alternate ReSoMal and F-75

Give ReSoMal after every episode of diarrhoea or vomiting

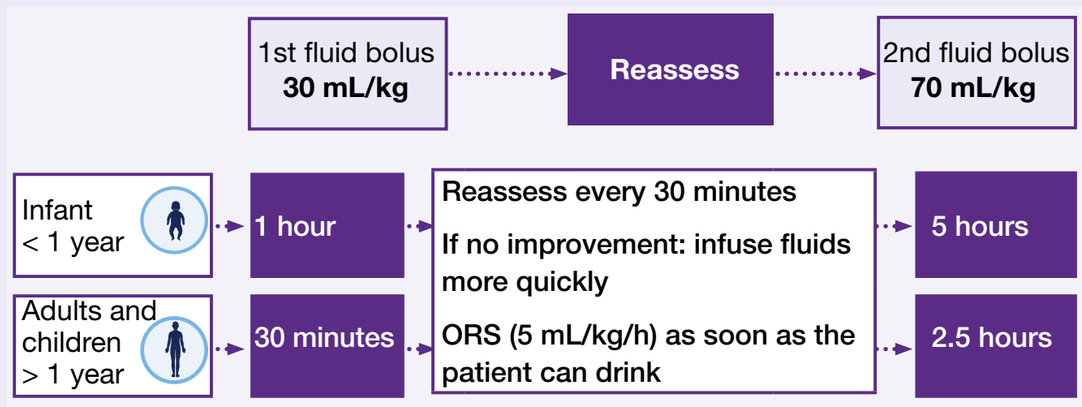
PLUS

Water or sweetened water as desired

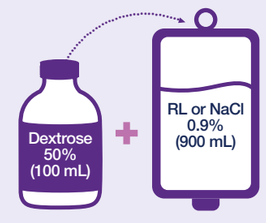
MANAGEMENT OF SEVERE DEHYDRATION (WHO treatment plan C)

IV or IO[4]

1. **Place two cannulas (IV or IO)**
2. **Start IV fluids immediately:** Bolus of Ringer Lactate or 0.9% NaCl
3. **Determine flow rate**



4. **a) Transition to maintenance fluids: (RL or NaCl 0.9%) +D5%**



b) Determine the quantity of IV maintenance fluids: Total 100mL/kg

In children and adults, estimate the daily needs:

- 100 mL/kg/day for the first 10 kg (1 L)
- 50 mL/kg/day for the second 10 kg (1.5 L)
- 20 mL/kg/day for each kg > 20 kg

[1]If watery stool, ORS 5–10 mL/kg

[3]
- **Patient's weight (in kg) x 75mL**
- **if weight not known, use age (children between 1–10 years): (age in years + 4) x 2**

Pay attention to the development of shock, which may need additional circulatory support

[4] ORS if IV or IO are not possible/available and patient can drink. Check weight

[2] Severe acute malnutrition (SAM): presence of edema in both feet or severe wasting (weight-for-height/length<-3SD or mid upper arm circunference <115mm)

[5] For febrile patients consider insensible losses: approx. 2.5 mL/kg/day for each degree > 37 °C

[1] www.who.int/publications/i/item/9789241513081

- Clinical Management of mpox https://www.who.int/teams/health-care-readiness/clinical-management-of-monkeypox
- Optimized supportive care for ebola virus disease: clinical management standard operating procedures (Adaptation of table for fluid resuscitation) https://www.who.int/publications/i/item/9789241515894

World Health Organization

Poster 2: Management of patient with mpox and shock: Fluid challenge protocol

A B C D E assessment[1]

A
Airway: check patient for signs of obstruction, noises

B
Breathing: respiratory rate, depth, accessory muscles, nasal flaring, symmetry, SpO_2

C
Circulation: Pulse, blood pressure, Capillary refill time (CRT), urinary output

D
Disability: AVPU (Alert, verbal, pain, unresponsive), blood glucose, seizures

E
Exposure and history taking

Signs of shock

ADULTS
- Systolic blood pressure < 90–100 mmHg or mean blood pressure < 65 mmHg
- Weak/fast pulse (heart rate > 90 bpm)
- Increased respiratory rate (respiratory rate greater than or equal 22 bpm)
- Abnormal state of consciousness (AVPU)
- Urinary output: < 0.5 mL/kg/h in adults
- Capillary refill time (CRT) > 3 seconds
- Cold extremities

CHILDREN
- Capillary refill time (CRT) ≥ 3 seconds
- Weak/fast pulse (<1 year: >160, 1-3 years: >150, 4-5 years: >140, 5-12 years: >120, >12 years: >100bpm)
- Cold extremities

YES

NO → **Poster 1** Manage dehydration (no shock)

FLUID CHALLENGE

1. If SpO2 < 94%, give oxygen therapy to maintain SpO_2 > 94%
2. Place two cannulas (IV or IO)
3. Infuse bolus RL or NaCl 0.9%
   Determine the quantity and flow rate of fluids

If severe acute malnutrition (SAM)[1] 10–15 mL/kg for 60 minutes, max. 30 mL/kg
Caution: In children rapid fluid therapy may be harmful if there is severe dehydration, anaemia (Hct < 0.15 or Hb < 50 g/L) or malnutrition*

Adult → Give 500 mL–1 L over 15–30 minutes. Administer increments of 500 mL

Child → Initial bolus: 10–20 mL/kg for 30 to 60 minutes

Reassess
Vital signs every 30 minutes to asses response to fluid challenge

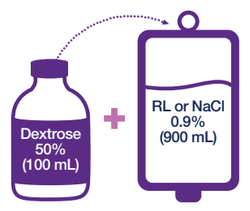
IF NOT RESPONDING
- Another bolus up to 30 mL/kg in the first 3 hours or until normal perfusion → If shock still present, consider vasopressors
- **Reassess**
- 10 mL/kg over 30 minutes* → If shock still present, consider vasopressors

Markers of adequate perfusion
- Systolic blood pressure (SBP) > 90–100 mmHg in adults or mean blood pressure > 65 mmHg or age appropriate SBP in children*
- Strong peripheral pulse
- Normal Respiratory rate
- Normal state of consciousness (AVPU)
- Urinary output:
  > 0.5 mL/kg/h in adults
  > 1.0 mL/kg/h in children
- Capillary refill time (CRT) < 2 seconds
- Warm and dry extremities
- Absence of skin mottling
- Normalization of lactate
- In children: Improved heart rate (tachycardia is an early sign of septic shock and low BP is a late finding)

***SBP in children**
< 1 month: 60 mmHg
1–12 months: 80 mmHg
1–12 years: 70+ (2 x age) mmHg
> 12 years: 90 mmHg

Are targets of perfusion met?

YES →
- **Stop fluid challenge**
- Maintenance fluid (IV): (RL or NaCl 0.9%)+D5% or oral fluids
- Vital signs



NO

Is there fluid overload?

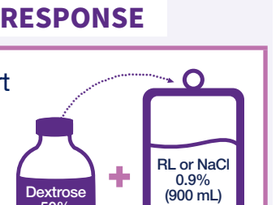
YES →
- **Stop fluid challenge**
- Monitor vital signs and appropiate treatment

Signs of fluid overload (pulmonary oedema/cardiac failure)
- Dysponea, drop in SpO_2
- Increased respiratory rate (RR>22 bpm)
- Raised jugular vein pressure (JVP) (> 12 cm)
- Peripheral oedema
- Hepatomegaly (children)

NO → **Repeat fluid challenge** ❶❷❸ and reassess the perfusion targets*
Compensate for fluid losses

NO RESPONSE → **Refractory shock**

RESPONSE
- **Stop fluid challenge** and start maintenance fluids*
  (RL or NaCl 0.9%) + D5%



Administer vasopressors
- Norepinephrine (Noradrenaline)/Epinephrine (Adrenaline)
- Epinephrine (Adrenaline) preferred in children as first option

- Titrate dose to perfesion targets (e.g. mean arterial pressure)
- Frequent monitoring and discontinue appropiately at earliest opportunity

[1] Severe acute malnutrition (SAM): presence of edema in both feet or severe wasting (weight-for-height/length<-3SD or mid upper arm circunference <115mm)

Vasopressors/inotropes: How to give vasopressors

Adult	**Norepinephrine (noradrenaline): 4 mg = 4 mL of 1:1000** **Epinephrine (adrenaline): 4 mg = 4 mL of 1:1000**	**50 mL of D5** **Remove 4 mL = 46 mL**	**Add 4 mL norepinephrine or epinephrine to 46 mL of D5**	**Concentration: 80 µg/mL** *** total volume 50 mL**
Child	**Norepinephrine (noradrenaline): 1 mg = 1 mL of 1:1000** **Epinephrine (adrenaline): 1 mg = 1 mL of 1:1000**	**50 mL of D5** **Remove 1 mL = 49 mL**	**Add 1 mL L norepinephrine or epinephrine to 49 ml of D5**	**Concentration: 20 µg/mL** *** total volume 50 mL**

Monitoring

- Adequate staffing to provide close haemodynamic monitoring.
- Close monitoring of IV site to ensure no extravasation. If signs of extravasation, administer 5–10 ml of phentolamine diluted in 10 ml of of 0.9% saline subcutaneously at site.
- Use lowest dose to achieve perfusion target.

The signs of IV extravasation include: pain, burning sensation or swelling at the IV site or surrounding areas; skin changes: reddened skin, blanching, discoloration, or blistering; and tissue damage: development of dry black scar (dead tissue).

Norepinephrine or epinephrine

Initial dose: 0.1 µg/kg/min, increase dosage by 0.1 µg/kg/min every 10–15 minutes
Usual maintenance dose: 0.25–0.5 µg/kg/min, max. dose: 1 µg/kg/min

[1] www.who.int/publications/i/item/9789241513081
- Pocket book of hospital care for children: Second edition Guidelines for the management of common childhood illnesses https://iris.who.int/bitstream/handle/10665/81170/9789241548373_eng.pdf?sequence=1
- Clinical Management of mpox https://www.who.int/teams/health-care-readiness/clinical-management-of-monkeypox
- Optimized supportive care for ebola virus disease: clinical management standard operating procedures (Adaptation of table for fluid resuscitation) https://www.who.int/publications/i/item/9789241515894

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Supplementary information for *Mpox clinical management poster series: fluid management*

Methods

This product has been developed as part of the *Clinical management and infection prevention and control for mpox: living guideline and* finalised during the *Mpox global meeting on optimizing standards of care (OSoC)*, held in Nairobi, Kenya, 10–12th June 2025. The contents were underpinned by evidence reviews presented in the guideline, and expert review of the contents to ensure clinical relevance and accessibility. Full details of the deliberations are available in the main guideline https://app.magicapp.org/#/guideline/10286/section/232778.

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Conflicts of interest

Full conflict of interest details are available at https://app.magicapp.org/#/guideline/10286/section/236716. All participants to the guidance development meeting completed conflict of interest declarations. The WHO technical team reviewed these, and determined no significant conflicts for this work.

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- MSF clinical guidelines: Diagnosis and treatment manual. Dehydration chapter. (https://medicalguidelines.msf.org/en/viewport/CG/english/dehydration-62194197.html)

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