Mpox Protocol by the Nigerian Association of Dermatologists: A Resource for Appropriate Clinical and Public Health Response

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ABSTRACT

Mpox (formerly monkeypox) is a zoonotic viral infection, primarily affecting the skin and mucous membranes, caused by the mpox virus of the Orthopoxvirus genus and Poxviridae family. Mpox has two clades (Clade I and II), each subdivided into a and b, depending on location and risk of transmission. Clade I (formerly Central African Clade) is common in Central Africa, with Clade Ia common in DRC and Clade Ib recently reported in Rwanda, Uganda, Burundi, and Kenya. While Clade II used to be common in West Africa, the 2022 global mpox outbreak showed Clade IIb reports from previously non-endemic regions outside Africa, while Clade IIa and b have been reported in Nigeria.

The World Health Organization (WHO) had reported 102,997 confirmed cases, 186 probable cases, and 223 deaths from 121 Member States across all 6 WHO regions (July 31, 2024), with the surge in Africa necessitating a second declaration of mpox as a public health emergency of international concern (PHEIC) by WHO and the first declaration of public health emergency of continental security by the Africa Centre for Disease Control (Africa CDC).

Multiple factors, such as viral, human, animal, and environmental factors, were implicated in the transmission, clinical features, and prognosis of mpox. Skin lesions, especially their distribution and morphology, are significant clinical features in diagnosing mpox. Some other clinical features include fever, lymphadenopathy, sore throat, oral ulcerations, anal pain, and bleeding in those practising receptive oral and anal intercourse, etc. The prompt recognition of the clinical features leads to a diagnosis confirmed by the polymerase chain reaction (PCR). It is important to note that the clinical severity varies with age, immune status, pre-existing dermatoses, comorbidities, and coinfections. Since mpox can mimic other skin infections, it is imperative for clinicians and members of the communities in resource-poor settings, where there is limited access to diagnostic tests, approved drugs, and vaccines, to have a high level of awareness and clinical suspicion based on case definitions.

Treatment of mpox is mainly supportive, but antivirals like tecovirimat and brincidofovir have been helpful. Prompt treatment centred around appropriate skin care is indispensable in the survival of mpox patients at risk of short-term and long-term cutaneous sequelae with impaired quality of life. Therefore, the Nigerian Association of Dermatologists (NAD) has employed veritable sources of information and very reliable clinical experience of its members on mpox to inform this protocol.

This protocol will serve as a guide for Dermatologists, other clinicians, and health workers in the care of mpox

patients through prompt case recognition, early diagnosis, and appropriate case management that will lead to healthy patients and populations who live the best of health even after mpox infection. It will also serve as a repertoire of clinical information for researchers and policymakers to engender appropriate scientific findings, enduring policies, and strategic plans on skin care for mpox and other infectious dermatoses in Nigeria and the world.

Keywords: Mpox, Nigeria, Dermatologist, protocol, management, surveillance

Résumé

Le Mpox (anciennement monkeypox) est une infection virale zoonotique, affectant principalement la peau et les muqueuses, causée par le virus Mpox du genre Orthopoxvirus et de la famille des Poxviridae. Le Mpox a deux clades (Clade I et II), chacun subdivisé en a et b, selon l'emplacement et le risque de transmission. Le Clade I (anciennement Clade d'Afrique centrale) est courant en Afrique centrale, le Clade Ia étant courant en RDC et le Clade Ib ayant récemment été signalé au Rwanda, en Ouganda, au Burundi et au Kenya. Alors que le Clade II était autrefois courant en Afrique de l'Ouest, l'épidémie mondiale de Mpox de 2022 a montré des rapports de Clade IIb provenant de régions auparavant non endémiques en dehors de l'Afrique, tandis que les Clade IIa et b ont été signalés au Nigéria.

L'Organisation mondiale de la santé (OMS) a signalé 102 997 cas confirmés, 186 cas probables et 223 décès dans 121 États membres répartis dans les 6 régions de l'OMS (31 juillet 2024), la recrudescence en Afrique nécessitant une deuxième déclaration de la Mpox comme une urgence de santé publique de portée internationale (USPI) par l'OMS et la première déclaration d'urgence de santé publique de sécurité continentale par le Centre africain de contrôle des maladies (CDC Afrique).

De multiples facteurs, viraux, humains/animaux et environnementaux, ont été impliqués dans la transmission, les caractéristiques cliniques et le pronostic de la Mpox. Les lésions cutanées, en particulier leur distribution et leur morphologie, sont des caractéristiques cliniques importantes dans le diagnostic de la Mpox. D'autres caractéristiques cliniques comprennent la fièvre, la lymphadénopathie, le mal de gorge, les ulcérations buccales, les douleurs anales et les saignements chez les personnes pratiquant des rapports sexuels oraux et anaux réceptifs, etc. La reconnaissance rapide des caractéristiques cliniques conduit à un diagnostic confirmé par la réaction en chaîne par polymérase (PCR). Il est important de noter que la gravité clinique varie en fonction de l'âge, du statut immunitaire, des dermatoses préexistantes, des comorbidités et des coinfections. Étant donné que le Mpox peut simuler d'autres infections cutanées, il est impératif que les cliniciens et les membres des communautés dans les milieux pauvres en ressources, où l'accès aux tests de diagnostic, aux médicaments approuvés et aux vaccins est limité, aient un niveau élevé de sensibilisation et de suspicion clinique basé sur les définitions de cas.

Le traitement du Mpox est principalement symptomatique, mais les antiviraux comme le tecovirimat et le brincidofovir se sont avérés utiles. Un traitement rapide centré sur des soins cutanés appropriés est indispensable à la survie des patients atteints de Mpox présentant un risque de séquelles cutanées à court et à long terme avec une qualité de vie altérée. Par conséquent, l'Association nigériane des dermatologues (NAD) a utilisé de solides sources d'information et l'expérience clinique très fiable de ses membres sur le mpox pour éclairer ce protocole.

Ce protocole servira de guide aux dermatologues, aux autres cliniciens et aux agents de santé dans la prise en charge des patients atteints de Mpox grâce à une reconnaissance rapide des cas, un diagnostic précoce et une gestion appropriée des cas qui conduiront à des patients et à des populations en bonne santé qui vivront la meilleure santé possible même après une infection par Mpox. Il servira également de répertoire d'informations cliniques aux chercheurs et aux décideurs politiques pour engendrer des découvertes scientifiques appropriées, des politiques durables et des plans stratégiques sur les soins de la peau pour le Mpox et d'autres dermatoses infectieuses au Nigéria et dans le monde.

Mots clés : Mpox, protocole, diangostic, prise en charge

1.0 Introduction

Mpox is a viral dermatological infection caused by the Mpox virus, a DNA virus belonging to the Orthopoxvirus genus and Poxviridae family, similar to the now-eradicated smallpox virus.[1-4] First isolated from monkeys in 1958 in Denmark, the initial name for the infection, monkeypox, has since been changed by the WHO to mpox, with its two clades also renamed to avoid discrimination.[1,5-7] The Central African Clade (which is more clinically severe) is now

called Clade I, and the West African Clade is called Clade II, subdivided into IIa (West African region) and IIb (previously non-endemic areas). The recent outbreak in Africa is caused by a new subclade Ib in Burundi, Rwanda, Uganda, and Kenya.[8]

Endemic regions for Clade I include Cameroon, the Central African Republic, and the Democratic Republic of the Congo (DRC), while Clade IIa is reported in Nigeria and Cameroon. Cameroon is unique in reporting both clades. Other non-endemic countries reporting new cases in the recent multi-country outbreak fall under Clade IIb.[7,8]

Mpox primarily affects the skin and mucous membranes but can also impact the eyes, the respiratory, central nervous, and gastrointestinal systems.

1.1 Transmission:

Mpox is primarily a zoonotic disease, although the natural reservoir for mpox has yet to be fully understood. There are reports of viral isolation in rope squirrels, sooty mangabey monkeys, Gambian giant rats, prairie dogs, dormice, tree squirrels, dogs, and other non-human primates.[8-10] Animal-to-human transmission occurs from the bites or scratches from an infected animal, inappropriately handled, and inadequately cooked meat of infected animals.[8] Human-to-human transmission can occur through direct contact, which can be through skin-to-skin contact (by touching infected skin through sex), mouth-to-mouth or mouth-to-skin (kissing), and face-to-face (respiratory droplets transmission from talking/ breathing at close range with a person with mpox through respiratory droplet).[8,11] Indirect transmission can occur via contact with infected surfaces or materials, such as bedding or clothing.[8] While asymptomatic transmission is not fully established, some studies suggest it might occur, as evidenced by cases reported in Belgium and France and earlier findings in Cameroon.[12-14] However, further research is needed to confirm asymptomatic transmission.

1.2 Epidemiological Trends

Monkeypox was reported in both endemic and previously non-endemic countries, with very recent outbreaks in Africa necessitating the declaration of Public Health Emergency of Continental Security (PHECS) and Public Health Emergency of International Concern (PHEIC) by the Africa Centre for Disease Control and Prevention as well as WHO respectively.[15,16] A global outbreak of mpox began in May 2022, and as of July 31, 2024, the World Health Organization (WHO) had recorded 102,997 confirmed cases and 186 probable cases, with 223 deaths from 121 Member States across all 6 WHO regions.[17] Cumulatively, the majority of the cases have been from the Americas and Europe, affecting mainly homosexual men, with human-to-human sexual contact being the primary mode of transmission.[17] However, reports from July 2024 have shown an increase from Africa (54.9% vs 24.2% for the African Region and the Americas (24.2% respectively).[17]

The more virulent Clade 1 has ravaged Central Africa and East Africa with cumulative cases from 2022 till July 28, 2024, showing a total of 37,583 cases and 1,451 deaths (case fatality rate of 3.9%) from 15 African Union Member States.[18] This reflects an annual increase of 78 % and 160% between 2022, 2023, and 2023 to 2024, respectively.[15,18] From the concerning burden of 14,250 cases (2,745 confirmed; 11,505 suspected) and 456 deaths with a case fatality of 3.2% (from January to July 28, 2024), DRC accounted for 96% and 97% of total cases and deaths, respectively.[18]

Nigeria ranks high among the Africa member states reporting mpox since its resurgence in 2017.[17,18] The Majority of cases in Nigeria are from the southern region. However, the northern states have more mpox reports than the pre-2022 outbreak.[19] Recent reports have shown a relative increase in suspected and confirmed cases since the 2024 PHECs and PHECS declaration. Out of the 40 confirmed cases (on August 18, 2024), the age group 0-20 years is more affected when compared to previous reports (2017-2023) that relative has a higher burden among the 21-40 age group.[19] Fatalities in Nigeria were primarily among those with comorbidities.

This epidemiological shift within countries and continents suggests wider spread and higher burden of mpox, which may have resulted from factors such as possible viral evolution, rising human population density, absence of smallpox immunity in children and populations below 45 years, climate change, increased human movement, the impact of the COVID-19 pandemic among others. These factors are further engendered by increased interactions with synanthropic rodents, a growing immunologically

naive population, and worsening economic conditions.

Therefore, proactive measures, including heightened surveillance and a high index of suspicion, are crucial for diagnosing, managing, and controlling mpox, especially in the face of the second declaration of PHEIC within two years by the WHO and the first-ever PHECS by Africa CDC. This protocol aims to bridge knowledge gaps about the virus, its transmission, and its skin manifestations while providing essential information for policy development, advocacy, implementation, and evaluation in Nigeria. It also seeks to guide skin care in the management of mpox as well as training on mpox.

2.0 Aim

This protocol aims to provide clinical and epidemiological information on mpox, focusing on its transmission and skin-related examination features and care.

2.1 Specific Objectives

1. Document the virological characteristics of the mpox virus, including its reservoirs and transmission modes.
2. Highlight dermatological diagnostic features of mpox to aid in diagnosis and management.
3. Outline triage, management, and notification protocols for responding to and managing mpox infections.
4. Provide information for policy formulation, implementation, monitoring, and evaluation.
5. Recommend measures to strengthen surveillance efforts.

3.0 Clinical Manifestations of Mpox

Mpox symptoms and signs can be divided into typical and atypical categories.

3.1 Typical Features:

The prodromal, eruptive, and convalescent/healing phases. Some of these features are as elucidated below:

(a) Prodromal Phase: The prodromal period occurs first and usually precedes skin lesions.[3,7] Symptoms include fever, headache, chills, poor appetite, malaise, fatigue, sore throat, body weakness, vomiting, and myalgia. However, in a few cases, the febrile or prodromal period may occur after the onset of the rash or not at all.[7] Lymphadenopathy is quite common, especially in submental, submandibular, cervical, and inguinal nodes, and can help differentiate mpox from other similar rashes like varicella zoster (chickenpox) infections.[3,20] The lymph nodes can occur on any region of the body, unilateral or bilateral, and are usually tender.[21]

(b) Eruptive Phase: The rash appears 0-5 days after prodromal symptoms. It progresses from macular to papular to vesicular and pustular stages and eventually forms crusts, scales, and scabs. In children, a morbilliform rash may be the initial presentation. It is worthy of note that before skin eruptions, there may be transient lesions in the mucosa (oral, conjunctival, or genital) commonly referred to as an enanthem, which is also one of the earliest features.[3] This enanthem often passes unnoticed by the patients and caregivers. Mpox skin lesions can occur on any body part but are typically more pronounced on the face, palms, and soles. Skin rashes usually start from the face and then spread to various other parts of the body.[3] It affects the palms and soles in 75% of cases. The typical mpox skin lesion at presentation is a deep-seated, well-circumscribed papule or pustule with central umbilication and some crusting.[3] Nodules have also been reported, particularly in the immunosuppressed (uncontrolled HIV infection or organ transplant patients).[22,23] Erosions and ulcerations can also occur on the genitalia and oral, conjunctival, vaginal, and anal mucosal surfaces. Mpox skin lesions can be monomorphic or polymorphic and may take mixed features of associated coinfections in the case of mpox and chickenpox, herpes simplex virus, or syphilis.[24,25] Bacterial superinfection may also influence the appearance of lesions due to impetiginization. The extent and severity of skin lesions depend on the stage of the rash, associated comorbidities, immunosuppression, bacterial infection, and attempted treatment, among others.[24,25] The lesion count and the presence of complications often determine clinical severity. Usually, the combination of the typical pattern of umbilicated papules and pustules, starting from the face after a prodromal period with the involvement of the

palms and soles and lymphadenopathy, may help with diagnosis.

© **Convalescent/Healing Phase:** The rash typically lasts 2-4 weeks depending on the severity, physical manipulation through scratching or picking, superimposed bacterial infection, and other factors.[3,7, 24,25] However, it can persist longer with immunosuppression caused by chronic conditions or poor nutrition.[3,7, 24,25] Until the crust over the skin lesions clears, the patient can still infect others.[3,7,24,25]

3.2 Atypical Features:

Some atypical presentations include:[3,7,23,24,25,26]

Onset of rash in the genitals and not on the face.

- Presence of rash without prodromal symptoms.
- infection in the absence of rash.
- Rashes in the same body region at different stages of development (pleomorphic).
- Scanty or solitary rashes mimicking abscesses or acne.[3,7,23]
- Sore throat, odynophagia, and oral ulceration, especially in those practising oral intercourse.[7,9]
- Anal pain and bleeding which are primarily associated with a history anal intercourse.[7,9]
- Peri-anal, perineal, and peri-oral rashes.[7,9]

Many of such atypical features are reported with clade IIb mpox infections in homosexual men in non-endemic regions. However, genital involvement had been documented in Nigeria before the 2022 global outbreak.[23,26]

3.3 Differential Diagnoses

Generally, mpox can be mistaken for several other conditions (Figure 1-7):[24,25,27-29]

- ***Viral Infections:*** Smallpox, chickenpox, measles, genital herpes, disseminated herpes zoster, molluscum contagiosum, cowpox.
- ***Bacterial Infections:*** Impetigo, chancroid, syphilis, disseminated gonococcal infection, lymphogranuloma venereum, meningococcal septicemia, yaws, rickettsia pox
- ***Fungal Infections:*** Cutaneous cryptococcosis, disseminated histoplasmosis.
- ***Other Conditions:*** Scabies, insect bites, eczema herpeticum, eczema vaccinatum, drug reactions (e.g., Stevens-Johnson syndrome), Behcet's disease, oral aphthous ulcers, tanapox.

However, for better understanding, the differentials can be grouped by the patient's age, rash morphology, rash distribution (regional dermatological differentials), typical or atypical presentation, solitary or multiple/diffused/disseminated rashes, and ulcerated or non-ulcerated.

(a) **Age:** scabies, insect bites, measles, and molluscum contagiosum tend to be more common in children, while

(b) **Rash morphology**[24,25]

- ***Macular:*** Can resemble measles, early drug eruptions, and secondary syphilis.[24,25]
- ***Vesicular/Papular/Blister:*** Can mimic scabies, chickenpox, impetigo, molluscum contagiosum, herpes simplex virus, and vesiculobullous/immunobullous disorders like bullous pemphigoid.[24,25]
- Nodular: Can resemble nodulocystic acne, genital scabies (Figure 7), lepromatous leprosy, rosacea, and neurofibromatosis.[24,25]
- Genital Rashes: Genital mpox ulcers must be differentiated from genital herpes, syphilis, lymphogranuloma venereum, chancroid, etc.[24-26,28]
- Umbilicated rashes are typical of mpox but not pathognomonic and are also seen in molluscum contagiosum, cutaneous cryptococcosis, histoplasmosis, smallpox, and penicilliosis.[24-26]

- **Differentiating Chickenpox:** Chickenpox, caused by the varicella-zoster virus, presents with less severe fever, malaise, and headache.[30-31] Lesions are more superficial, centripetally distributed, pleomorphic, and often spare the palms and soles, Figure 2.[30-31] Lymphadenopathy is uncommon.[30-31]

Differentiating features are a history of contact with a confirmed or probable case of mpox and characteristic rash progression. However, the clinical suspicion of mpox should always be confirmed with a laboratory diagnosis.

3.4 Varicella Zoster Virus-Monkeypox coinfection

This was reported in Nigeria in the 2022 mpox outbreak, as coinfection with varicella-zoster virus (VZV) can worsen the prognosis. Patients with coinfection may have a flu-like viral prodrome but are

less likely to have symptoms such as cough, sore throat, axillary lymphadenopathy, or mouth sores.[32] They may have fewer lesions than with mpox infection alone but more lesions than with VZV infection alone.[32] Lesions on the face, thorax, arms, palms, and soles are also less common in coinfection cases than in mpox cases. The reduced rash burden in coinfection could suggest that the dual viral burden tends to have a modulatory effect.[32] However, there is an increase in malaise, weakness, and prostration in coinfection cases.[32]

4.0 Management of Mpox – Case Definition, Triage, Diagnosis and Treatment

After appropriate history and careful examination, case definition is instrumental in arriving at the diagnosis of mpox for all suspected patients. Treatment then follows the principles of ensuring the structural and functional integrity of the skin and mucous membranes, rehydration therapy, symptomatic treatment, adequate dietary intake, treatment of complications, psychosocial support, treatment of comorbidities/coinfections and postmortem care.

4.1 Case Definitions

For the effective management, surveillance, and control of mpox, succinct case definitions are essential to guide prompt and efficient action from the patient's first contact with a health worker. Regional and international public health agencies and organizations have case definitions developed based on local or international epidemiological patterns. Recognized case definitions include those of the Nigeria Centre for Disease Control and Prevention (NCDC), the Centre for Disease Control and Prevention (CDC), and the World Health Organization (WHO), Table 1.

The Nigerian Association of Dermatologists recommends the NCDC guideline for managing mpox in Nigeria as this guideline considers the dynamics of mpox in Nigeria. The regular NCDC situation reports also include case definitions dictated by the contemporary pattern, burden, and dynamics of mpox in Nigeria.

The NCDC mpox case definition and management guidelines have been used in Nigeria since 2018, although a review is ongoing. It has also been a template for formulating other guidelines like the WHO and CDC mpox guidelines.

4.2 Diagnosis

The management of mpox requires a high index of suspicion alongside appropriate triage of patients at the entry points, Figure 1. Confirmation of mpox infection is achieved by polymerase chain reaction (PCR) of skin lesion samples, which is the gold standard for diagnosis.[3,7] Clinicians and health workers can also order other investigations such as virus isolation by cell culture, Enzyme-Linked Immunosorbent assay (ELISA) immuno-histochemistry, or electron microscopy and antigen detection tests.[3,7] Other necessary supportive tests may include full blood count, liver function test, blood culture, electrolyte, Urea and creatinine, serology for other coinfections like syphilis, hepatitis, human immunodeficiency virus (HIV), etc.[3,7,9]

PCR is the mode of diagnosis in Nigeria. Optimal samples for PCR are from skin lesions- fluid from vesicles and pustules for swabs, as well as crusts or scabs. According to the NCDC guideline, samples should only be collected by trained personnel in specific media and containers using triple packaging for transportation to the National Reference Laboratory. Appropriate sample collection and transportation determine the result and avoid false negatives that may occur due to improper sample collection and transportation. Blood is not ideal for PCR in mpox diagnosis because of the transient nature of the viraemia. Antibody testing is not recommended for definitive diagnosis of mpox but can be used for research purposes or if the active infection has resolved. Genomic sequence for the Clades has also strengthened surveillance in light of the spread of clades across known country borders and continental boundaries.

4.3 Treatment Strategies for Mpox[33]

Human mpox infection is primarily self-limiting, with most cases resolving in 2-4 weeks. Supportive and symptomatic care is necessary for managing mpox patients, Figure 8.

4.3.1 Principles of Treatment

4.3.1.1. Patient Assessment: Care should be individualized and based on a thorough history, examination, and assessment of clinical severity, as these will determine whether the patient requires

admission or can be managed at home. The mode of transmission, clinical features, and lesion counts are essential.

4.3.1.2. General Care

- Ensure the protection of the skin and mucous membranes.
- Rehydrate, considering fluid loss through vomiting, diarrhoea, and skin lesions.
- Provide symptomatic treatment - e.g. analgesia (PCM or NSAIDs) for pain, antihistamines for pruritus, antibiotics for bacterial superinfection, and anti-emetics for nausea and vomiting.
- Ensure adequate dietary intake: a diet rich in proteins, vitamins A, C, D, and E, and minerals like zinc and selenium. Supplementation may be given as necessary.
- Manage complications -immediately or long-term.
- Offer psychosocial support given possible depression, loneliness, and impaired quality of life.
- Treat comorbidities and coinfections like HIV and Diabetes Mellitus.
- Follow proper postmortem care procedures.

4.3.1.3 Specific Care:

- ***Skin lesions:***
  - Use pH-balanced cleansers and antiseptics to clean the affected skin surface
  - Apply light dressings for extensive rashes.
  - Moisturize with plain emollients like Vaseline or liquid paraffin
  - Advise against scratching lesions and cut nails short.
- ***Skin and Genital Ulcers:***
  - Clean with mild/dilute antiseptics.
  - Warm saline sitz baths for vulvovaginal ulcers.
  - Light ulcer dressings with petrolatum-infused gauze
- ***Oral Sores:***
  - Encourage gargling with warm saline every 4 hours.
  - Administer vitamin supplements, especially vitamins C and E.
  - Administer analgesia
- ***Conjunctivitis:*** This is best treated in collaboration with the Ophthalmologist. This is necessary given the ocular manifestations and complications of mpox.
- ***Rehydration Therapy:*** Oral rehydration for mild dehydration and intravenous fluids for moderate to severe dehydration.
- ***Antiviral Therapy:*** Two antivirals (Brincidofovir and Tecovirimat) initially developed for smallpox have been used for mpox treatment, although these are not available for general patient care in Nigeria. They were used during the 2022/23 global mpox outbreak in the US, under the Expanded Access Investigational New drug protocol, and in some European countries following authorization from the European Medicines Agency. They give promising results; the latter is preferred due to its lower side effect profile.[34,35]
- Vaccinia immune globulin (VIG) may be used for severely ill or immunocompromised patients with mpox under clinical study settings.

4.1.3.4 Psychological Support:[36]

This is done in collaboration with the Mental Health Physicians

- Regular assessment of emotional and psychological state.
- Quality of life assessment can be done using the Dermatology Life Quality Index (DLQI) questionnaire. DLQI is not time-consuming and has been validated and translated into Nigerian English.
- Pre-discharge psychological evaluation.
- Post-discharge counselling and mental health support.

4.3.1.5 Isolation Protocol:[3,37]

- Limit contact to essential personnel with appropriate PPE.
- Keep the patient informed about diagnosis and management.
- Explain isolation purposes and ensure the necessary duration.
- Use the patient's primary language for information and education.
- Ensure decontamination of holding areas/consulting rooms/wards where mpox patients were examined or treated.

4.1.3.6. Decontamination:[3,38]

For decontaminating areas where mpox patients are seen or treated, we recommend the following solutions and protocols:

- ***Bleach Solution:*** Use a 0.5% sodium hypochlorite (bleach) solution for disinfecting surfaces (tables, chairs, door handles). Prepare the bleach solution fresh daily to ensure its efficacy.
- ***Alcohol-Based Solutions:*** Use solutions containing at least 70% alcohol for disinfecting hands.
  - ***Decontaminating Protocol***[3]

- ***Surface cleaning:*** Clean surfaces with soap and water (appropriately prepared with 0.5% sodium hypochlorite) before applying disinfectants to remove any organic material that might reduce the disinfectant's efficacy.
- ***Application of Disinfectant:*** Apply the disinfectant to surfaces and allow it to remain wet for the recommended contact time, usually around 10 minutes, to ensure complete virus inactivation.
- ***Personal Protective Equipment (PPE):*** Staff performing the decontamination should wear appropriate PPE, including gloves, gowns, masks, and eye protection.
- ***Ventilation:*** Ensure proper ventilation in the decontaminated area to prevent fumes from buildup from disinfectants.
- ***Frequent Cleaning:*** Clean and disinfect frequently high-touch surfaces such as doorknobs, light switches, and medical equipment.

4.1.3.7. Post Admission Care:

- Evaluate psychological status before discharge.
- Replace items destroyed during decontamination.
- Provide continuous counselling and mental health support.
- Follow up and manage long-term skin complications like post-inflammatory pigmentary changes, scars, hair loss, etc.
- Use teleconsultation if dermatologists are unavailable.
- Correct skin defects with skin grafts if necessary.
- Continuous monitoring of quality of life using the Dermatology Life Quality Index (DLQI)

4.4 Home Care Management protocol[3]

1. Manage only stable patients at home. i.e. low-moderate grade fever, normal pulse rate, blood pressure, respiratory rate, uncomplicated skin lesions
2. Patient to isolate at home in a room separate from others.
3. Patients will report progress virtually and teach them to monitor temperature, pulse rate, and blood pressure.
4. Hospital Visitation during Isolation/Active Infection: Provide adequate information to the hospital before the visit.[3] Ensure the patient does not mix with other patients, and create an isolated area to review the patient.[3] Transport the patient in a vehicle with proper infection control measures, inform the driver to use appropriate PPE, and disinfect the vehicle and consultation/examination areas with 0.5% sodium hypochlorite after the visit.[3]

4.5 Closed Facility (e.g. Prison) Management Protocol

1. ***Provision of Medical Care:*** Ensure continuous medical care in isolation. Establish a holding area or makeshift isolation unit in every closed facility.
2. ***Contact Monitoring:*** List and monitor contacts for fever and rash for 21 days from the last contact.
3. ***Infection Control and Health Education:*** Maintain high infection prevention and control levels. Educate inmates about mpox symptoms and infection prevention.
4. ***Visitation Biosafety Measures:*** Implement biosafety measures during public visitations and minimize movement in and out of enclosed spaces.
5. ***Hospital visitation:*** same as above.

4.6 WHO IPC Recommendations for Mpox[7]

1. ***Infection Precautions:***
   - Use contact and droplet precautions for suspected mpox patients.
   - Implement airborne precautions if varicella-zoster virus is suspected.
   - Use respirators as necessary and airborne precautions during aerosol-generating procedures.
   - Clean and disinfect areas frequently used by patients.

2. ***Handling Linens and Waste:***

   Treat all bodily fluids, waste beddings, and fomites as potentially infectious.

3. ***Patient Interaction and Sexual Activity:***

   - Support interactions with loved ones to enhance well-being.
   - Advise patients to avoid sexual activity until all lesions have crusted, scabs have fallen off, and new skin has formed.
   - Use condoms for 12 weeks post-recovery.

4. ***Handling Human Remains:***

   Use appropriate infection prevention and control precautions for handling the remains of suspected or confirmed mpox patients who die.

4.7 Pregnant Women:[7,39]

- Admit those with severe or complicated infections to a health facility.
- Provide woman-centred, respectful care, including mental health support.
- Consider preferred delivery modes based on obstetricians' recommendations.
- Encourage regular prenatal and postpartum care.

4.8 Health Professional Exposure:

- Evaluate and manage health workers exposed to mpox.
- Monitor asymptomatic exposed workers for 21 days.
- They do not need to isolate unless they develop symptoms
- Consider potential medical therapies (e.g., vaccination or antiviral therapy)

4.9 Complications and Prognosis

4.9.1 Complications can arise from the progression of mpox affecting various organs, typically occurring in the presence of comorbidities and are indicators of severity. They include:

- Skin: Abscess formation, cellulitis, necrotizing fasciitis, exfoliative dermatitis, purpura, ecchymosis, hypoalbuminemia, sepsis, and skin failure.
- Lungs: pneumonia (primary viral or secondary bacterial), respiratory failure following sepsis.
- Central Nervous System: Viral encephalitis
- Eyes: Corneal opacity and blindness
- Gastrointestinal Tract: Diarrhoea and vomiting, leading to dehydration
- Genitourinary Tract: Urinary tract infection.
- Kidneys: Acute kidney injury from sepsis and or severe dehydration
- Hematological: thrombocytopenia, lymphocytosis, DIC
- Skin: Atrophic or hypertrophic scarring, keloids, post-inflammatory hypo- and hyper-pigmentation, usually following scratching or lesion manipulation.
- Strictures: other organs that can have scarring or strictures include pharynx, penile foreskin, vulva, vagina, urethra, or rectum.
- Psychiatric: Anxiety, depression due to stigmatization, and post-mpox skin complications. Cases of suicide following mpox infection have been reported.[34]

4.9.2 Prognosis

Mpox is usually self-limiting, especially the Clade IIa found in Nigeria, which is less virulent and associated with lower mortality. Immunosuppressed individuals and those with underlying chronic conditions (E.g. uncontrolled HIV infection, uncontrolled diabetes mellitus, chronic kidney disease, cancer, or post-organ transplantation), pre-existing inflammatory skin conditions, and children are at higher risk of severe infection, complications, and death from mpox.[3,7,40] When healthcare workers do not correctly manage the skin lesions, post-inflammatory hyperpigmentation and scarring may occur after the patient has recovered from the acute symptoms and signs.

5.0 Mpox Coordination of Care and Interventions

5.1 Mpox Prevention and Control

- Handle and prepare animals and their products correctly.
- Avoid unprotected contact with infected animals or their body fluids
- Avoid unprotected contact with infected humans and their bedding or clothing
- Avoid direct contact with secretions and fluids from humans
- Wash hands regularly with soap and water or use

alcohol-based hand sanitizers.
- Decontaminate infected surfaces, clothing, and linens with chlorinated water.
- Disseminate accurate information to prevent rumours and do not spread unconfirmed information.
- Report suspected cases to the hospital's Mpox response team or local public health authorities, such as the Disease Surveillance Notification Officers (DSNOs), state epidemiologists, and state Director of Public Health, NCDC.
- Participate in public health education on Mpox.
- Avoid stigmatizing those diagnosed with Mpox.
- Anyone with symptoms should immediately seek treatment at the nearest hospital.

5.2 Vaccination for Mpox

Vaccines such as ACAM2000 and JYNNEOS, based on replicating and non-replicating viral components, respectively, have been approved for use against Mpox. These vaccinia-based vaccines were originally used for smallpox and have shown efficacy in protecting against Mpox.[3,7,25,41]

Nigeria received the first 10,000 doses of the Jynneos vaccine, which was to be administered in a two-dose schedule to 5000 persons (close contacts and frontline health workers) in five states with the highest burden of mpox. The Nigerian Agency for Food and Drug Administration and Control (NAFDAC) has granted Emergency Use under Authorisation (EUA) for the vaccine.[42]

5.3 Mpox Animal Surveillance and Control

Mpox is primarily a zoonotic infection, and transmission from animals to humans occurs via bites, aerosol inhalation, or direct contact with lesions, blood, or body fluids. Handling, preparation, and consumption of wild animal meat (bush meat) can predispose to mpox. Mpox virus infection can cause clinical signs in some animals (e.g., non-human primates), while others may be asymptomatic carriers. The animal incubation period ranges from 4 to 13 days, depending on the transmission route.

The NCDC, Federal Ministry of Health, Federal Ministries of Agriculture and Rural Development (FMARD), National Veterinary Research Institute (NVRI), and the Environment collaborate under the One Health platform to mitigate zoonotic disease outbreaks.

6.0 Mpox Prevention, Control Strategy and Recommendations

6.1 Specialists and Professionals to Coordinate Care

The One Health approach (involving animal, human, and environmental health experts) is the gold standard of care for the surveillance, diagnosis, management, and control of mpox. For care coordination, the collaboration of various health professionals at the possible entry points is necessary, Figure 8-10. Thus, the following coordinating team:

- Dermatologist and Venereologist
- Infectious Disease Physician
- Public Health Physician & Epidemiologist
- Family Physician
- Clinical or Medical Microbiologist
- Virologist
- Paediatrician
- Veterinarian
- Morbid Anatomist
- Mental Health Physician
- Laboratory Physician
- Obstetrician and Gynecologist
- Plastic Surgeon
- Urologist
- Isolation ward Nurse
- Medical Laboratory Scientist
- Medical Social worker
- Mathematician with expertise in disease outbreak modelling

The Mpox global outbreak highlights the need for early detection and cross-sector collaboration involving healthcare professionals, epidemiologists, media, community leaders, policymakers, and political leaders at all levels of government to control this potential biological threat effectively.

6.2 Step-wise health interventions

6.2.1 Individuals: Health education for every individual should focus on:

A - routes of transmission
B - Source of infection
C - Symptoms

D - Where to seek help
E - Relevance of self-isolation of infected persons
F - Avoidance of stigmatization of those who have healed

Health education should be conducted by all health workers, including specialist clinicians, public health physicians, community pharmacists, nurses, environmental health officers, community health workers, and DSNOs. Health education should include print media, electronic media, and verbal communication. The relevant agencies to be involved in individual health education include (Figure 10):

- Ministries of Health (State and Federal)
- Ministry of Agriculture and Rural Development
- National Primary Healthcare Development Agency (NPHCDA)
- National Orientation Agency
- Media agencies
- Nigerian Association of Dermatologists (NAD)
- Nigerian Infectious Disease Society (NIDS)
- College of Nigerian Pathologists
- Clinical Microbiology and Infectious Diseases Society of Nigeria (CLIMIDSON)
- Pediatric Association of Nigeria
- Society of Family Physicians of Nigeria

6.2.2 Hospitals:

Establish a mpox response unit which will include:

- Doctors and nurses from various outpatient clinics (General, Medical, Surgical, Pediatric, O& G, Emergency, Isolation/ Infectious diseases)
- Public/Community health physicians & Epidemiologists
- Medical Microbiologists and laboratory scientists
- Hospital Incident Manager
- Health Records Officer

There should be a mpox registry and gallery at hospitals, state, and national levels. Interventions at the community, state, and national levels are summarized in Figures 9 and 10, respectively.

7.0 Conclusion

Mpox is a viral infection that primarily affects the skin but has extracutaneous manifestations. It is endemic in some African nations but has extended to other parts of the world. The need for immediate control has necessitated a declaration of mpox as a PHEIC and PHECS. With the changing dynamics in transmission and clinical presentation, a protocol that bridges the knowledge gaps about its cutaneous manifestations guides appropriate skin care and serves as a tool for training, policy formulation, implementation, and evaluation. With strengthened surveillance and bolstered public health response, mpox control and eradication will be achieved.

References

1. World Health Organization, Europe. Mpox. 2022. Mpox EURO. Available from:https://www.who.int/europe/health-topics/Mpox#tab=tab_1. Accessed September 15, 2022.
2. Yinka-Ogunleye A, Aruna O, Dalhat M, Ogoina D, McCollum A, Disu Y, et al. Outbreak of human Mpox in Nigeria in 2017-18: a clinical and epidemiological report. Lancet Infect. Dis. 2019; 19:872–879.
3. Nigerian Centre for Disease Control. National Mpox Public Health Response Guideline, 2019. [cited 2022 April 3] Available from: https://ncdc.gov.ng/themes/common/docs/protocols/96_1577798337.pdf.
4. Alakunle E, Moens U, Nchinda G, Okeke MI. Mpox virus in Nigeria: infection biology, epidemiology, and evolution. *Viruses*. 2020; 12:1257. doi: 10.3390/v12111257
5. Happi C, Adetifa I, Placide M, Njouom R, Nakoune E, Happi A. Urgent need for non-discriminatory and non-stigmatizing nomenclature for Mpox virus. https://virological.org/t/urgent-need-for-a-non-discriminatory-and-non-stigmatizing-nomenclature-for-Mpox-virus/853. Accessed July 6, 2022
6. World Health Organization. Mpox: experts give virus variants new names. Mpox: experts give virus variants new names https://www.who.int/news/item/12-08-2022-Mpox--experts-give-virus-variants-new-names. Accessed September 17, 2022.
7. World Health Organization (WHO). Clinical Management and Infection Prevention and Control for Mpox: Interim rapid response guidance, 10 June 2022. WHO-MPOX-

Clinical_and_IPC-2022.1-eng.pdf file:///C:/Users/Surfaces/Desktop/MPOX%20IN%20NIGERIA/WHO-MPOX-Clinical_and_IPC-2022.1-eng.pdf. Accessed July 6, 2022.

8. World Health Organization (WHO). Mpox fact sheet. https://www.who.int/news-room/fact-sheets/detail/mpox#:~:text=There%20are%20also%20growing%20outbreaks,squirrels%20and%20monkeys%20are%20susceptible. Accessed August 30, 2024
9. Khodakevich L, Jezek Z, Kinzanzka K. Isolation of Mpox virus from wild squirrel infected in nature. Lancet. 1986; 1:98–99.
10. Radoni A, Metzger S, Dabrowski PW, Couacy-Hymann E, Schuenadel L, Kurth A, et al. Fatal Mpox in wild-living sooty mangabey, Côte d'Ivoire, 2012. Emerg. Infect. Dis. 2014; 20:1009–1011.
11. Thornhill JP, Barkati S, Walmsley S, Rockstroh J, Antinori A, Harrison LB, et al. Mpox Virus Infection in Humans across 16 Countries - April-June 2022. N Engl J Med. 2022 Aug 25; 387(8):679-691.
12. De Baetselier I., Van Dijck C., Kenyon C. et al. Retrospective detection of asymptomatic Mpox virus infections among male sexual health clinic attendees in Belgium. Nat Med (2022). https://doi.org/10.1038/s41591-022-02004-w
13. Marie Ferré V, Bachelard A, Zaidi M, Armand-Lefevre L, Descamps D, et al. Detection of Mpox Virus in Anorectal Swabs From Asymptomatic Men Who Have Sex With Men in a Sexually Transmitted Infection Screening Program in Paris, France. 2022. https://doi.org/10.7326/M22-2183. Accessed September 18, 2022.
14. Guagliardo SAJ, Monroe B, Moundjoa C, Athanase A, Okpu G, Burgado J, et al. Asymptomatic Orthopoxvirus Circulation in Humans in the Wake of a Mpox Outbreak among Chimpanzees in Cameroon. Am J Trop Med Hyg. 2020 Jan; 102(1):206-212.
15. Africa Centre for Disease Control and Prevention. Africa CDC declares mpox a public health emergency of continental security, mobilizing resources across the continent. https://africacdc.org/news-item/africa-cdc-declares-mpox-a-public-health-emergency-of-continental-security-mobilizing-resources-across-the-continent/ Accessed on August 20, 2024
16. World Health Organization. WHO Director-General declares mpox outbreak a public health emergency of international concern. https://www.who.int/news/item/14-08-2024-who-director-general-declares-mpox-outbreak-a-public-health-emergency-of-international-concern. Accessed on August 20, 2024
17. World Health Organization. 2022-2024 mpox (monkeypox) outbreak: Global trends. https://worldhealthorg.shinyapps.io/mpx_global/ Accessed August 30, 2024.
18. Africa Centre for Disease Control. Mpox situation in Africa July 2024. https://africacdc.org/disease-outbreak/mpox-situation-in-africa/. Accessed August 11, 2024.
19. Nigeria Centre for Disease Control and Prevention. An update of monkeypox outbreak in Nigeria. https://ncdc.gov.ng/diseases/sitreps/?cat=8&name=An%20Update%20of%20Monkeypox%20Outbreak%20in%20Nigeria . Accessed August 30, 2024.
20. World Health Organization. Mpox. https://www.who.int/news-room/fact-sheets/detail/Mpox. Accessed September 19, 2022.
21. Macneil A, Reynolds MG, Braden Z, Carroll DS, Bostik V, Karem K et al. Transmission of atypical varicella-zoster virus infections involving palm and sole manifestations in an area with Mpox endemicity. Clin Infect Dis. 2009 Jan 1;48(1):e6-8. doi: 10.1086/595552
22. Echekwube P, Mbaave P, Abidakun O, Utoo B, Swende T. Human Mpox and Human Immunodeficiency Virus Co-infection: A Case Series in Makurdi, Benue State, Nigeria. J B Med Res Clin Pract [Internet]. 2020; 3(2):375-81.
23. Ogoina D, Iroezindu M, James H.I, Oladokun R., Yinka-Ogunleye A., Wakama P., et al. Clinical Course and Outcome of Human Mpox in Nigeria. Clinical Infectious Diseases. 2020; 71(8), e210–e214.
24. Oiwoh S.O, Ibekwe P.U, Ajani A.A, Olanrewaju F.O, Oripelaye M.M, Cole-Adeife M.O et al. Systemic and Dermatologic impact of mpox: An overview of guideline-based management for Nigerian health care workers. Nig Med J. 2023; 64(1):4-12.

25. Cole-Adeife OM, Akinkugbe AO, Sodipo O, Oiwoh SO. Creating global awareness of re-emerging Mpox disease for Healthcare workers. Community Skin Health Journal. 2022; 18(1): 1-7.
26. Oiwoh SO, Tobin EA, Asogun DA, Erameh CO, Iraoyah KO, Okoeguale J et al. Atypical presentation of mpox in Irrua environs: a case report. J Med Case Rep. 2023 Nov 26; 17(1):492. doi: 10.1186/s13256- 023-04225-0.
27. Cyrelle Fermin R., Arturo Saavedra P., Hal Flowers R. A Woman With a Rash on Her Palms and Soles | Consultant360 [Internet]. consultant 360. com. 2022 Sep 15
28. Ogoina D, Dalhat MM, Denue BA, Okowa M, Chika-Igwenyi NM, Yusuff HA et al. Clinical characteristics and predictors of human mpox outcome during the 2022 outbreak in Nigeria: a cohort study. Lancet Infect Dis. 2023 Aug 22:S1473-3099(23)00427-9. doi: 10.1016/S1473-3099(23)00427-9. Epub ahead of print. PMID: 37625431.
29. Centre for disease control and prevention. Interim clinical guidance for the treatment of Mpox. [posted 2022 July 28] Available from: https://www.cdc.gov/poxvirus/Mpox/clinicians/treatment.html
30. Moore M.J, Rathish B, Zahra F. Mpox.https://www.ncbi.nlm.nih.gov/books/NBK574519/ Accessed September 20, 2022
31. Cameli Alexandra, Stratman Eric J. Mpox - Dermatology Advisor. Newsletter 2022 Sep 4. https://www.dermatologyadvisor.com/home/decision-support-in-medicine/dermatology/Mpox/
32. Hughes CM, Liu L, Davidson WB, Radford KW, Wilkins K, Monroe B, et al. A Tale of Two Viruses: Coinfections of Mpox and Varicella Zoster Virus in the Democratic Republic of Congo. Am J Trop Med Hyg. 2020 Dec 7; 104(2):604-611.
33. Gupta AK, Talukder M, Rosen T, Piguet V. Differential diagnosis, prevention, and treatment of mpox (monkeypox): a review for dermatologists. American Journal of Clinical Dermatology. 2023; 24(4):541-56.
34. Centre for Disease Control. Mpox treatment information for health care professionals. https://www.cdc.gov/poxvirus/mpox/clinicians/treatment.html. Accessed on September 2, 2024
35. Hermanussen L, Brehm TT, Wolf T, Boesecke C, Schlabe S, Borgans F et al. Tecovirimat for the treatment of severe Mpox in Germany. Infection. 2023; 51(5):1563-8.
36. Smith AK, Storer D, Lancaster K, Haire B, Newman CE, Paparini S, et al. Mpox illness narratives: Stigmatising Care and Recovery during and after an emergency outbreak. Qualitative Health Research. 2024 Mar; 10:10497323241234482.
37. Kuehn R, Fox T, Guyatt G, Lutje V, Gould S. Infection prevention and control measures to reduce the transmission of mpox: A systematic review. PLOS Glob Public Health. 2024 Jan 18;4(1):e0002731. Doi: 10.1371/journal.pgph.0002731. PMID: 38236835; PMCID: PMC10796032.
38. Kuehn R, Fox T, Guyatt G, Lutje V, Gould S. Infection prevention and control measures to reduce the transmission of mpox: a systematic review. PLOS Global Public Health. 2024 Jan 18;4(1):e0002731.
39. Ubom AE, Oiwoh SO, Ajiboye AD, Nyeche S, Appiah-Kubi A, Sokunbi AE et al. Mpox in pregnancy: Management, risks and challenges in Africa and lessons from the COVID-19 pandemic. Int J Gynaecol Obstet. 2023; 163(2):466-475.
40. Centre for disease control and prevention. Interim clinical guidance for the treatment of Mpox. [posted 2022 July 28] Available from: https://www.cdc.gov/poxvirus/Mpox/clinicians/treatment.html. Accessed September 2, 2024
41. Centre for Disease Control and Prevention (CDC). Consideration for Mpox vaccine: What you need to know. https://www.cdc.gov/poxvirus/Mpox/considerations-for-Mpox-vaccination.html. Accessed July 6, 2022.
42. World Health Organization. First-ever delivery of mpox vaccine in Africa outside of clinical trial arrives in Nigeria. https://www.afro.who.int/countries/nigeria/news/first-ever-delivery-mpox-vaccines-africa-outside-clinical-trials-arrives-nigeria. Assessed September 2, 2024.

NCDC case definition	CDC case definition	WHO case definition for non - endemic regions
Suspected case • Acute illness with fever >38.3°C, • Intense headache, • Lymphadenopathy, • Back pain, • Myalgia, and • asthenia followed 1 – 3 days later by: • Progressive rash often begins on the face and then spread s to other body parts, including palms and soles	**Suspected case** • New characteristic rash **OR** • Meets one of the epidemiologic criteria and has a high clinical suspicion of Mpox	**Suspected case** A person of any age presenting in a Mpox non -endemic country with an unexplained acute rash AND one or more of the following signs or symptoms since 15 March 2022: • headache, • acute onset of fever (> 38.5°C) • lymphadenopathy • myalgia • asthenia (profound weakness) AND • The following common causes of acute rash do not explain the clinical picture-varicella zoster, herpes zoster, measles, herpes simplex, bacterial skin infections, disseminated gonococcus infection, primary or secondary syphilis, chancroid, lymphogranuloma venereum, granuloma inguinale, molluscum contagiosum, allergic reactio n (e.g. to plants); and any other locally relevant common causes of papular or vesicular rash.
Probable case • A case that meets the clinical case definition is not laboratory - confirmed but has an epidemiological link to a confirmed case.	**Probable case** • There is no suspicion of other recent *Orthopoxvirus* exp osure (e.g. *Vaccinia virus* in ACAM2000 vaccination), **AND** • demonstration of the presence of *Orthopoxvirus* DNA by polymerase chain reaction of a clinical specimen **OR** • *Orthopoxvirus* using immunohistochemical or electron microscopy testing methods **OR** • Demonstration of detectable levels of anti-orthopoxvirus IgM antibody during 4 to 56 days after rash onset.	**Probable case** • A person meeting the case definition for a suspected case **AND** one or more of the following: • Epidemiological link (face -to-face exposure, including health care workers without appropriate PPE; direct physical contact with skin or skin lesions, including sexual contact; or contact with contaminated materials such as clothing, bedding, or utensils) to a probable or confirmed case of Mpox in the 21 days before symptom onset. • They r eported travel history to a Mpox endemic country 21 days before symptom onset. • Multiple or anonymous sexual partners in the 21 days before symptom onset

		• It has a positive result from an orthopoxvirus serological assay without smallpox vaccination or other known exposure to orthopoxviruses. • He is hospitalized due to the illness.
Confirmed case • A clinically compatible case that is laboratory - confirmed.	**Confirmed case** • Demonstration of mpox viral DNA by polymerase chain reaction testing or next-generation sequencing of a clinical specimen **OR** isolation of mpox virus in culture from a clinical specimen.	**Confirmed case** • A case meeting the definition of either a suspected or probable case **AND** • Laboratory confirmation of the Mpox virus is achieved by the detection of unique sequences of viral DNA either by real -time polymerase chain reaction (RT- PCR) or sequencing.
Contact Any person who has been in direct or indirect contact with a confirmed case since the onset of symptoms, i.e. contact with skin lesions, oral secretions, urine, faeces, vomitus, blood, sexual contact, sharing a common space (anyone who has been near or wit hout physical contact with a confirmed case) **Type 1:** Direct contact with skin lesions of a confirmed mpox case - vesicles, pustules, crusts, etc. (including sexual contact) OR direct contact with a confirmed animal case. **Type 2:** Direct contact with body fluids of confirmed Mpox case (blood, urine, vomitus, faeces, stool, sputum, etc.) **Type 3:** Sharing common space with case (e.g. vehicle, household, shared room, office, flight, etc.)	**Epidemiologic criteria** **Exclusion criteria** A case may be excluded as a suspect, probable, or confirmed case if: • An alternative diagnosis can fully explain the illness **OR** • An individual with symptoms consistent with Mpox does not develop a rash within 5 days of illness onset **OR** • A case where high - quality specimens do not demonstrate the presence of *Orthopoxvirus* or *Mpox virus* or antibodies to orthopoxvirus."	**Discarded case** • A suspected or probable case for laboratory testing of lesion fluid, skin specimens, or crusts by PCR and sequencing is negative for the MPOX virus. However, a retrospectively detected probable case for which lesion testing can no longer be adequately performed (i.e. after the crusts fall off) would remain classified as probable."

IMAGES

Figure 1a: Umbilicated papules on the dorsum of the left hand, labia majora, around intranatal cleft and superomedial thigh
(Courtesy Prof Bolaji Otike-Odibi)

Figure 1b: Few nodules on the face in a patient with mpox *(Courtesy: Dr Sebastine Oiwoh)*

Figure 2a and b: Intact and excoriated vesicles at different stages of development in patients with chickenpox.
(Courtesy of Dr Sebastine Oiwoh)

Figure 3: Multiple intact and ruptured blisters with crust on the trunk and left upper limb in a patient with drug-induced pemphigus. *(Courtesy of Dr Sebastine Oiwoh)*

Figure 4a: Hyperpigmented healing scars in a patient with mpox (two weeks after eruption) *(Courtesy: Dr Sebastine Oiwoh)*

Figure 4b: Hyperpigmented patches with denuded skin surfaces on the back of a patient with drug-induced pemphigus *(Courtesy: Dr Sebastine Oiwoh)*

Figure 6a: Scattered erythematous patches and erosions interspersed with papules and pustules at the internatal cleft with curd-like discharge.
(Courtesy of Prof Bolaji Otike-Odibi)

Figure 6b: ulcer with surrounding erythema around the vaginal orifice with discharge.
(Courtesy of Prof Bolaji Otike-Odibi)

Figure 7: Erythematous nodules on the penile shaft and scrotum in a patient with scabies
(Courtesy: Dr Umar Abdullahi)

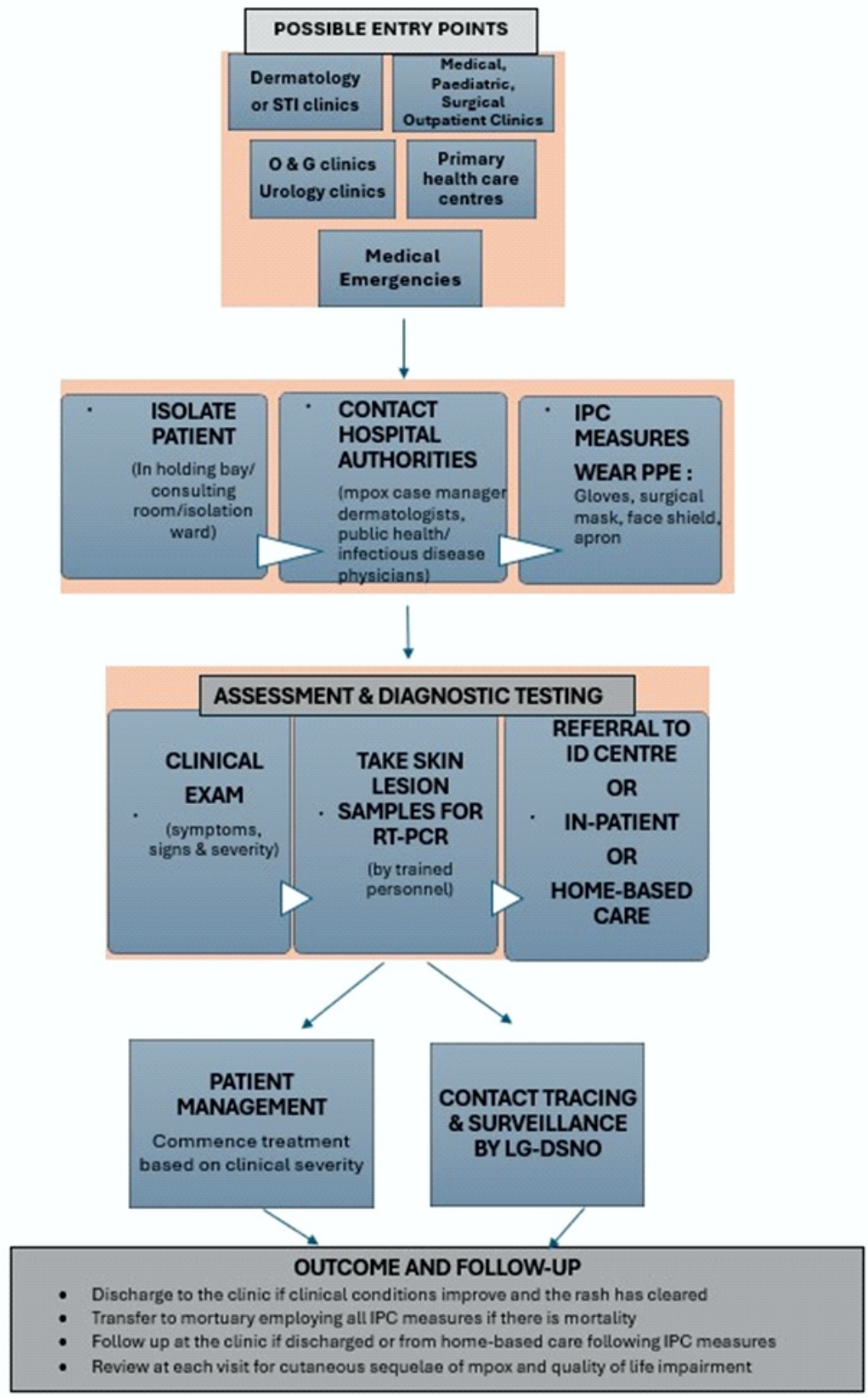

Figure 8: Algorithm for mpox triage and care (Triage of patient care[3,7])

STI: Sexually Transmitted Infections; ***MOPD:*** Medical Outpatient Department; ***GOPD:*** General Outpatient Department; ***SOPD:*** Surgical Outpatient Department; ***POPD:*** Pediatric Outpatient Department; ***O&G:*** Obstetrics and Gynecology; ***PHC:*** Primary Health Centre; ***IPC:*** Infection, Prevention and Control ; ***PPE:*** Personal Protective Equipment; ***RT-PCR:*** Real Time Polymerase Chain Reaction; ***LG:*** Local Government; ***DSNO:*** Disease Surveillance and Notification Officer; ID: Infectious Disease

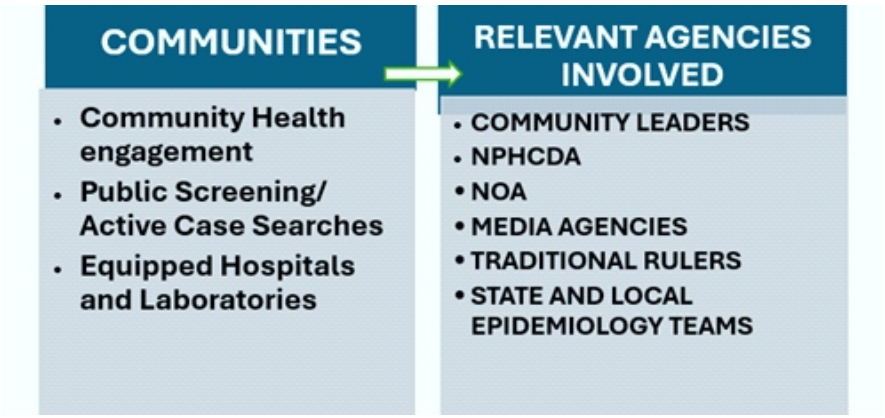

Figure 9: Community strategies for Mpox control
NOA: National Orientation Agency;
NPHCDA: National Primary Health Care Development Agency

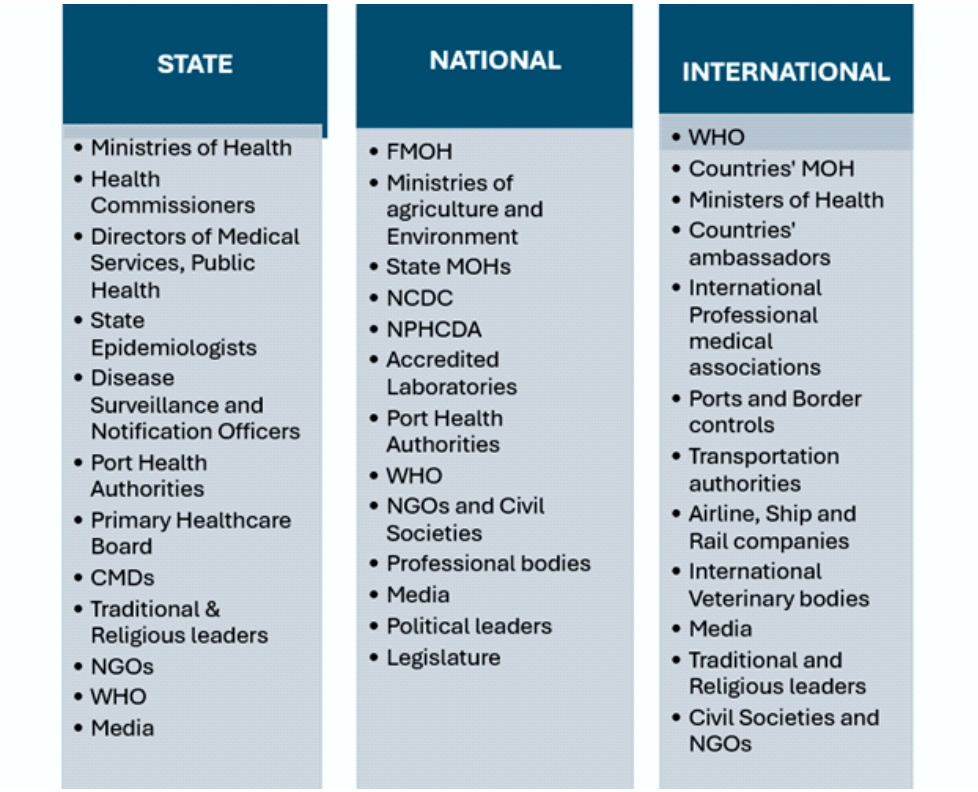

Figure 10: State, National, and International organizations involved in Mpox control
WHO: World Health Organization; ***CMDs:*** Chief Medical Directors;
NGOs: Non-Governmental Organizations; ***FMOH:*** Federal Ministry of Health;
NCDC: Nigeria Centre for Diseases Control and Prevention;
NPHCDA: National Primary Health Care Development Agency