

Interim Guidance: Public Health Management of Cases and Contacts Associated with Monkeypox in the Community Settings

July 29, 2022

Table of Contents

PREAMBLE	3
AUTHORITY	3
PUBLIC HEALTH GOAL	4
THE PATHOGEN	4
CLINICAL ILLNESS.....	4
DIFFERENTIAL DIAGNOSIS AND CO-INFECTIONS	5
VULNERABLE POPULATIONS	5
IMMUNE RESPONSE FROM PREVIOUS IMMUNIZATION	6
INFECTION PREVENTION AND CONTROL (IPC).....	6
INCUBATION PERIOD.....	6
EPIDEMIOLOGY.....	6
TRANSMISSION	7
PERIOD OF COMMUNICABILITY	8
DIAGNOSTIC TESTING.....	8
Sampling Recommendations for Suspect Cases.....	8
SURVEILLANCE AND REPORTING	9
REPORTING REQUIREMENTS	9
INTER-JURISDICTIONAL NOTIFICATION (IJN)	9
PUBLIC HEALTH MANAGEMENT OF CASES AND CONTACTS	10
CLINICAL MANAGEMENT OF CASES.....	10
CASE MANAGEMENT	10
CONTACT TRACING	12
CONTACT MANAGEMENT.....	13
APPENDICES	16
Appendix 1: Evidence Summary Regarding Zoonotic Transmission and Monkeypox in Animals	16
REFERENCES.....	18

PREAMBLE

The British Columbia Centre for Disease Control (BCCDC) has adapted the interim guidance from the Public Health Agency of Canada (PHAC) in consultation with Regional Health Authorities (RHA) for public health management of human illness caused by monkeypox.

This document intends to guide public health management of monkeypox in BC in the community settings, including case management, contact identification and management, and the use of Imvamune for post-exposure prophylaxis and pre-exposure prophylaxis. This guidance is based on currently available scientific evidence and expert opinion and is subject to change as new information on the clinical spectrum, transmissibility, epidemiology, and public health intervention effectiveness becomes available. This guidance builds upon relevant Canadian guidance developed for the current monkeypox outbreak, in addition to available guidance from the [World Health Organization \(WHO\)](#)¹. It has been developed based on the Canadian and BC situation. It should be read in conjunction with relevant provincial and local legislation, regulations and policies; therefore, may differ from guidance developed by other countries and provinces or territories. For information regarding current global status of monkeypox, visit the [BCCDC, Canada.ca](#) and [WHO Monkeypox](#) websites.²⁻⁹; furthermore, unique situations may require some discretion in adjusting these guidelines which are meant to be supportive, not prescriptive.

AUTHORITY

The authority for the control of communicable diseases, through case and contact management, including for monkeypox, exists under the [BC Public Health Act](#) (2008).

PUBLIC HEALTH GOAL

Monkeypox is an emerging infectious disease in Canada. The public health objectives are to stop the transmission chain (containment)¹, to prevent endemicity, to protect and preserve health and health systems and to reduce mortality and morbidity from monkeypox infections. In addition, reasonable measures should be taken to prevent spillover into animal populations, especially rodents, and to prevent establishment of an animal reservoir. These guidelines intend to inform policy and practice in the community settings, i.e. non-health care settings, to limit the transmission of Monkeypox.

Public health measures recommended in this document are informed by the following guiding principles:

- Current knowledge on the pathogen, the disease and the epidemiology of monkeypox in BC and elsewhere;
- Existence of a safe and effective vaccine to prevent infection, but with a limited access to vaccine supply;
- Proportionality of recommended measures with the disease severity and potential for transmission;
- Risk and benefits of interventions
- Utilization of means considered least restrictive for achieving the public health goal
- Perspectives of the affected population groups obtained through active community engagement

THE PATHOGEN

Monkeypox is a DNA virus belonging to the *Orthopox* genus, related to the smallpox virus. There are two circulating clades: West African Clade and Congo Basin Clade. The West African Clade is implicated in the current outbreak reported from countries outside of Africa, and is associated with less severe disease and lower case-fatality.

CLINICAL ILLNESS

Monkeypox resembles smallpox, but signs and symptoms are less severe¹². Symptoms can vary depending on different factors, including exposure characteristics, age, presence of conditions that alter immune response, previous immunity from smallpox vaccination and viral strain. Individuals can present with a [variety of signs and symptoms](#). People suspected of having monkeypox should be tested based on the [BCCDC Monkeypox Diagnosis & Testing](#).

The BCCDC [Monkeypox Symptoms](#) page provides a list of key symptoms that are related to monkeypox.

Classic monkeypox infection has two clinical phases, lasting 2-4 weeks, described in [Table 1](#) below. In this outbreak, lesions have occurred before or without the systemic symptoms.

Table 1: Signs and symptoms of monkeypox

Acute Phase	Symptoms
Prodromal Phase (Duration 1-5 days)	<p>Frequent signs and symptoms</p> <ul style="list-style-type: none"> • Lymphadenopathy, mainly inguinal⁵ • Fever • Fatigue • Intense headache • Myalgia • Back pain • Joint pain <p>Other signs and symptoms</p> <ul style="list-style-type: none"> • Sore throat • Cough • Nausea/vomiting (seldom) • Diarrhea (seldom)¹¹

<p>Skin Rash</p>	<p>Skin rash begins 1-3¹²⁻¹³ days after the prodromal phase. In the 2022 global outbreak, rash most frequently involves oral, inguinal and peri-anal regions.</p> <p>The rash generally progresses in the following order:</p> <ul style="list-style-type: none"> • Macules; • Papules; • Vesicles; • Pustules; • Crusting of the pustules, which then scale off. <p>Lesions are frequently painful and may be pruritic.</p> <p>The number of lesions and affected regions vary from few clustered lesions to a full disseminated rash. Both synchronous and asynchronous lesions have been described in the current global outbreak. Lesions have been found on all parts of the body, including palmar and plantar areas.</p> <p>Lesions frequently begin in the genital and anal areas, and the mouth. Some cases developed proctitis, which can present with rectal pain and/or bleeding. Facial lesions can potentially lead to ocular involvement, affecting the conjunctivae and cornea.</p>
<p>Complications</p>	<p>Secondary skin infections and long-term skin effects, such as prolonged ulcer healing, scarring and changes in pigmentation¹⁴ have been reported. Monkeypox infection have required hospitalization in a small proportion of patients^{43,44}. Among reported reasons for hospitalizations are pain control, particularly severe rectal pain, and soft tissue or oropharyngeal infections (ranging from severe pharyngitis to epiglottitis) that could impede oral intake.</p> <p>Data from previous outbreaks and cases in African countries also reported less common but serious complications, including</p> <ul style="list-style-type: none"> • Pneumonia • Sepsis • Encephalitis • Keratitis leading to vision loss • Fetal loss¹⁰

DIFFERENTIAL DIAGNOSIS AND CO-INFECTIONS

Lesions associated with monkeypox can resemble other infections, including: herpesviruses (e.g. herpes simplex virus, varicella zoster virus [i.e. shingles and chicken pox]), syphilis (*Treponema pallidum*), chancroid (*Haemophilus ducreyi*), other poxviruses (e.g. molluscum contagiosum virus) and lymphogranuloma venereum (*Chlamydia trachomatis* serotypes L1, L2 and L3). Co-infection has been described with varicella¹⁴ and STIs (for ex. gonorrhoea, chlamydia and syphilis⁴³).

VULNERABLE POPULATIONS

Children, pregnant women and some immunocompromised individuals are considered at higher risk for severe disease^{27,33}. Cases identified in 2022 in Canada and western countries have been described as mild³⁹. As of May 2022, no deaths have been reported in European or North American countries. The case-fatality rate with the West African clade has previously been estimated at approximately 1%³⁴

In the 2022 outbreak, a high proportion of cases are in people who self-identify as gay, bisexual and other men who have sex with men (gbMSM)³⁵. Though the reported cases thus far have been primarily among gbMSM, it is important to note that anyone can become exposed and infected.

IMMUNE RESPONSE FROM PREVIOUS IMMUNIZATION

There may be cross-immunity with previous smallpox immunization. However, the effectiveness and durability of previous smallpox vaccination is not known. In British Columbia, the smallpox immunization program ended in 1975.

INFECTION PREVENTION AND CONTROL (IPC)

The recommended Personal Protective Equipment (PPE) is determined by the nature of interaction between the host and source of the pathogen (human, animal, or fomite). Typically, PPE in the community settings would consist of gloves and masks. Eye protection would be necessary if splashes of contaminated materials could occur, including respiratory droplets. Gowns and N95 respirators would be less commonly indicated in community settings. Gloves, in addition to hand hygiene, can prevent transmission by direct contact of a lesion or via fomites. Depending on the potential extent of the exposure, gowns may be required, albeit their use is uncommon outside health care settings. A well-fitting mask is expected to offer good protection against respiratory droplets and unintentionally dispersed infectious particles (e.g. handling contaminated clothing or linens). Airborne transmission has not been reported¹⁶. N95 respirators are not considered essential in community settings except for potentially aerosol-generating procedures (e.g. nebulization). More details on various types of masks are available on the [BCCDC website](#).

Monkeypox-specific IPC guidance has been developed for health care settings and can be found on Provincial Infection Control Network of British Columbia ([PICNET](#)).

INCUBATION PERIOD

The incubation period is the time interval between initial contact with an infectious agent and the appearance of the first sign or symptom of the disease in question. The incubation period for monkeypox is 5-21 days^{12,36}, with many cases in the current outbreak reporting initial symptoms at the lower end of the typical range.

EPIDEMIOLOGY

Since May 2022, monkeypox cases have been identified in multiple non-endemic countries worldwide. In Canada, the first case was confirmed on May 19, 2022 in Montreal. British Columbia's first reported case was confirmed on June 6, 2022. Monkeypox was not known to be present in British Columbia prior to the current outbreak. All cases in non-endemic countries are of the West African clade. This strain is related to previous outbreaks seen in Nigeria, UK, USA, Israel and Singapore prior to 2022.

As many global cases have no identifiable link to infected cases, animals, or to travel, it is possible that monkeypox had circulated in non-endemic regions before May 2022. This suggests community person-to-person spread and not zoonotic or travel-related acquisition.

In BC, [cases of Monkeypox](#) have been among men who have sex with other men with a median age in the mid-30s. There have been rare reports of cases in women and children in Europe. Investigations of the 2022 global outbreak show that a high proportion of cases are people who self-identify as gay, bisexual and other men who have sex with men (gbMSM). Though the reported cases as of July 2022 have been primarily among gbMSM, it is important to note that anyone can become exposed and infected. The recent cases among gbMSM are likely due in part to shared social networks, as well as large gatherings that may have facilitated transmission. Commonly reported activities in cases include having more than one sexual partner,^{6,17} attending social events and meeting through dating applications.

The Government of Canada has developed a [Monkeypox Outbreak Update webpage](#) that provides more information on additional cases in Canada as the investigation evolves.

TRANSMISSION

HUMAN-TO-HUMAN TRANSMISSION

The 2022 global outbreak involves human-to-human transmission in the community and is primarily facilitated by direct contact with cutaneous or mucosal lesions. Fomites have been reported to be implicated in some transmission events^{29,45}. Respiratory droplets may play a role in transmission as the virus has been detected by PCR in respiratory secretions although respiratory route is unlikely to play a significant role in population transmission, if any at all⁷.

Monkeypox is not known to linger in the air and is not transmitted during short periods of shared airspace¹⁶. Special air handling is not necessary. Activities that can suspend viral particles, such as shaking linens or clothing, should be avoided.

Monkeypox virus has been detected in many body sites and fluids including seminal fluid³⁷. However, the significance of this finding on the potential for sexual transmission through semen is not yet known. Transmissions in the context of sexual activity are likely related to close contact, e.g. skin-to-skin contact as described above.

Monkeypox virus can cross the placental barrier.^{16, 18} No case of vertical transmission has been reported in non-endemic countries. However, a case of fetal infection with pathological signs¹⁹ of monkeypox has been described from an endemic country, indicating the potential for vertical transmission¹⁶.

ZOONOTIC TRANSMISSION

Past transmissions in non-endemic countries were commonly zoonotic and acquired through close contact with infected live or dead rodents or non-human primates (bite, scratch or ingesting meat) during travel. The 2003 monkeypox outbreak in humans in the Midwestern US was associated with contact with infected prairie dogs (*Cynomys* sp) acquired as personal pets from a common distributor that imported Gambian rats (*Cricetomys* sp.) and other exotic species³². The current global outbreak, however, is facilitated by human-to-human transmission in the community. The UK joint Human Animal Infections and Risk Surveillance group conducted a qualitative assessment of the risk to the human population of monkeypox infection from various pet animal species. The Public Health Agency of Canada is leading a human-animal interface working group that is compiling evidence of animal susceptibility and associated risks to humans and animals.

[Appendix 1 Evidence summary regarding zoonotic transmission and monkeypox in animals](#) provides more details, including information on the management of animals when an animal owner has been diagnosed with monkeypox, or when animals are visiting or residing in a facility affected by monkeypox.

TRANSMISSIBILITY

The preliminary estimates of the current outbreak suggest a basal reproduction rate (R₀) greater than 1 in gbMSM^{46,47}. In European countries with high transmission, models using May and June 2022 data estimate a R₀ range from 1.4 to 2.0. Previous estimates have been reported to be as high as 2.13 (CI 1.46 – 2.67)^{21,46}.

ENTRY POINTS

Monkeypox can enter through the skin, respiratory tract and mucous membranes (eyes, nose, mouth, genitals, and anus).

RESERVOIR

The reservoir remains unknown, however it has been found that rodents¹⁶ and small mammals in central and western Africa may play a part in the monkeypox life cycle and transmission to people. A number of animal species are susceptible to monkeypox, especially rodent and non-human primate species, but the full range of animals that are susceptible to monkeypox remains unknown.^{22, 23,30} It is now accepted in the scientific community that non-human primates are not a reservoir for monkeypox despite the name of the virus.

PERIOD OF COMMUNICABILITY

The period of communicability is the time during which an infectious agent may spread directly or indirectly from an infected person to another person; it is also known as the 'infectious period'.

There is still limited evidence on the period of communicability for monkeypox. It is considered that a case is infectious from the beginning of symptoms (including the prodromal illness) until lesions have resolved, i.e. crusts fall off and new skin is forming underneath. Lesions can be considered resolved if they are epithelialized and have a light pink/shiny pearl appearance. There is no evidence of asymptomatic transmission at this time.

DIAGNOSTIC TESTING

Monkeypox virus infection can be diagnosed by polymerase chain reaction (PCR), a type of nucleic acid testing (NAT) method to detect the presence of DNA in the patient sample. Monkeypox serology (IgG/IgM) is not currently available.

Monkeypox is considered a Category A pathogen. Appropriate biosafety and handling measures are required, however there is a temporary exemption to allow samples collected from suspect cases to be shipped to the laboratory in a routine manner (i.e. Category B).

Testing details can be found on the [BCCDC Health Professionals page](#), or the [eLab Handbook](#).

Sampling Recommendations for Suspect Cases

- For all individuals, if skin or mucosal lesions are present, it is recommended to collect lesion material (roofs, crusts, aspirate, exudate, tissue) into a sterile container, or submit the aspirate or swab of a vesicular/pustular lesion in Universal Transport Medium (UTM). Samples should be shipped refrigerated for monkeypox virus testing.
- For individuals who do not have skin lesions and are suspected to be in the first stage of illness (prodrome), oropharyngeal swabs, nasopharyngeal swabs, EDTA blood and urine can also be considered for testing. Consult the BCCDC Medical Microbiologist at 604-661-7033 if any other site requires testing based on patient symptoms.
- Analytic sensitivity and specificity of PCR for fluid-filled lesions (vesicles, pustules, ulcers) and tissues are very high (>98%).
- If monkeypox test results are negative or indeterminate, and the clinical suspicion remains high based on clinician/Medical Health Officer (MHO) assessment (e.g. collected sample was of suboptimal quality or collected outside of optimal diagnostic window), retesting should be considered.

SURVEILLANCE AND REPORTING

Monkeypox is a reportable disease for clinicians and laboratory under the Public Health Act.

The Public Health Agency of Canada updated its case definition in mid-2022, leading to development of the BC case definitions. These case definitions can be found on the BCCDC website on the [Case Definitions](#) page by clicking on the Monkeypox link.

For more information regarding case counts, visit to the [BCCDC Monkeypox](#) webpage.

REPORTING REQUIREMENTS

Health professionals are expected to report all confirmed and probable cases to the MHO for which clinical presentation is highly suggestive of monkeypox as per clinical assessment.

Local public health should report confirmed and probable cases to BCCDC as follows:

1. **Confirmed** cases – report via the Health Authority’s respective electronic public health reporting system within **24 hrs**. The Monkeypox Case Report Form (CRF) should also be submitted electronically.
2. **Probable** cases:
 - a. If **pending lab** results, report within 24 hours of receiving lab result.
 - b. If **no pending lab** results (e.g. client could not be tested), then report via electronic public health reporting system within 24 hours and complete the Monkeypox CRF.

BCCDC Public Health Laboratory reports all positive results to the ordering provider, MHO and BCCDC.

BCCDC will report confirmed and probable cases as reported by health authorities to PHAC.

INTER-JURISDICTIONAL NOTIFICATION (IJN)

Inter-jurisdictional notification to other provinces, territories or countries may be required in some situations, including but not limited to:

- Investigating a case with a home address in another jurisdiction; or
- Identifying a contact from another jurisdiction
- Flight notification if case investigation and contact tracing determine that a significant exposure has occurred

British Columbia Regional Health Authorities (RHAs) are responsible for notifying other RHAs of cases or contacts identified in their area. BCCDC will facilitate IJN communication between provinces, territories and other countries about monkeypox cases and contacts. If an out of province case or contact is identified, an IJN must be sent via email to BCCDC at monkeypoxIJN@bccdc.ca using the [British Columbia Monkeypox Inter-jurisdictional Notification Form](#). If you are unable to send the [British Columbia Monkeypox Inter-jurisdictional Notification Form](#) via email, you may send it via fax to BCCDC at 604-707-2515. BCCDC monitors and actions monkeypox IJNs 7 days per week, including statutory holidays. These notifications will then be shared with the appropriate province, territory or country through the usual inter-jurisdictional notification channels.

Information required for case and contact management is included in the British Columbia Monkeypox Inter-Jurisdictional Notification Form.

PUBLIC HEALTH MANAGEMENT OF CASES AND CONTACTS

CLINICAL MANAGEMENT OF CASES

Guidance on the clinical management of people with monkeypox can be found at: <http://www.bccdc.ca/health-professionals/clinical-resources/monkeypox#management>

CASE MANAGEMENT

Case investigation and management provides education and support to cases of monkeypox, and is important to prevent transmission. In some situations, finding a source case can also identify other chains of transmission.

Strategies to prevent secondary transmission include:

1. Minimizing contact with susceptible individuals.
2. When contact is unavoidable, utilizing measures such as Personal Protective Equipment (PPE) to minimize risk of transmission
3. Minimize the risk of transmission through fomites and the environment
4. Minimizing the risk of a spillover into animal populations and potential establishment of an animal reservoir

Specific recommendations for cases of monkeypox are listed in [Table 2](#). Public Health Authorities can pursue active monitoring of cases at a frequency that is determined necessary to provide support to the case.

These recommendations apply to confirmed and probable cases for the duration of the period of communicability, as well as to suspect cases until the case is reclassified based on test results. If the test results are negative, restrictions should be removed unless clinical suspicion remains high and repeat testing is being considered.

As the duration of these restrictions could last a few weeks, emotional and social support for the case may be required. Referral and collaboration with community organizations could help to alleviate unintended consequences of public health measures. In general, the least restrictive measures should be implemented to achieve public health goals. Recommendations are targeted to avoid direct contact, (for ex. coverage of lesions, frequent hand hygiene, avoidance of sharing objects), respiratory precautions (wearing a medical mask with other people) and avoiding high-risk persons.

Table 2: Recommendations for cases during the period of communicability. Period of communicability ends when the scabs fall off and new skin is present.

Route	Recommendations
Prevent transmission by direct contact and/by droplets	<ol style="list-style-type: none"> a) All sexual contact involving direct contact, sharing of objects, or face to face contact should be deferred b) In-person social interactions that may result in close contact should be minimized. The following measures should be taken: <ol style="list-style-type: none"> i. Avoid any direct, unprotected close contact with others, particularly skin-to-skin contact. Cover lesions with clothing, bandage, or facial coverings to prevent direct contact as well as contamination of objects in the environment ii. Wear a mask when within 2 meters of other people. If this is not possible (e.g. a child with monkeypox), then others should wear a mask when in the presence of the monkeypox case. iii. Meet others in outdoor spaces

	<ul style="list-style-type: none"> iv. If seeking health care, alert the health care team before arrival, whenever possible, or advise them at the time of arrival c) Avoid indoor gatherings as much as possible d) Avoid close contact with known immunocompromised persons, children less than 12 years old and pregnant people; e) Apply respiratory hygiene: <ul style="list-style-type: none"> i. Cough or sneeze into a tissue or the bend of the arm, not the hand ii. Throw any used tissues into a waste container that has a plastic bag in it, as soon as possible iii. Perform hand hygiene immediately afterwards f) In the situation of a breastfeeding case (suspect, probable and confirmed), a discussion should occur between the case and the appropriate health care provider. g) Do not donate blood or any other bodily fluid(s) (e.g. sperm) or tissue while infectious. h) Non-essential travel should be deferred
<p>Prevent transmission by indirect contact, fomites, and the environment</p>	<ul style="list-style-type: none"> a) Avoid sharing objects used or touched by the case (for example, bedding, clothing, utensils, sex toys, etc.). Where feasible, the case should clean and disinfect the objects and surfaces. If another individual must clean, then they should avoid any unprotected direct contact with these objects by using the appropriate PPE and apply hand hygiene afterwards. b) The following household-specific measures are recommended: <ul style="list-style-type: none"> i. Do not share a bed ii. Avoid common areas (e.g. bathroom) in the home iii. Remaining in a separate room as much as possible while you are contagious; iv. If (ii) and (iii) above are not possible, clean and disinfect common areas after contact by the case c) Dishware and utensils can be cleaned in a dishwasher (standard cycle is sufficient) or by hand d) Laundry can be performed in a standard washing machine using hot water with detergent, and should be dried in a drying machine. Avoid shaking or handling contaminated laundry, including linens, in a way that may disperse infectious particles into the air. Any surfaces that come into contact with contaminated laundry should be cleaned and disinfected. e) It is recommended that surfaces and objects the case may come into contact with are frequently cleaned and disinfected, with particular attention paid to high-touch surfaces and objects (e.g., tabletops, countertops, toilets, door handles, light switches, computer keyboards, etc.) with soapy water and store-bought disinfectants. For more details on cleaning and disinfection, including the use of bleach, consult the BCCDC website. f) Dispose of masks or other contaminated materials in a manner that prevents access by pets or wild animals (rodents in particular). For example, trash should be thrown in a high quality garbage bag and kept in an animal-proof receptacle.

Prevent potential transmission to animals

Refer to [Appendix 1](#)

CONTACT TRACING

The purpose of contact tracing is to offer post exposure prophylaxis, when indicated, to provide education on the symptoms of monkeypox, when and how to get a medical assessment, and appropriate measures to prevent further transmission. Symptomatic contacts should also be offered testing as soon as possible. Contact tracing should occur for confirmed and probable cases, and at the direction of the MHO for suspect cases.

Contacts who are adequately immunized (two previous doses of Imvamune) at the time of exposure are at lower risk of developing disease. Vaccine efficacy is estimated to be about 85%.²⁴ Contacts who are using adequate PPE (see [Infection Prevention and Control](#)), and without known breaches, are considered to be at no additional risk. Transmission via the droplet route would be considered a lower risk in outdoor environments than indoor environments.

The following table aims to classify exposures into high, medium, and low risk categories. MHOs may exercise their discretion based on unique circumstances of a situation that may change the risk category described below in [Table 3](#).

Table 3: Risk assessment for monkeypox exposures

Exposure Risk Level	Characteristics	Examples
High Risk	<p>Direct contact between a person's skin or mucous membrane and the case's skin lesions, mucosal lesions or bodily fluids without appropriate PPE</p> <p>Unprotected skin or mucous membrane contact with objects that have been in contact with infectious bodily fluid or lesions (i.e. clothing, bedding, sex toys)</p> <p>Any procedure that may generate aerosols from bodily fluids, skin lesions, or dried exudates without the use of respirators (e.g., N95 or equivalent respirators) or a medical masks and other personal protective equipment (e.g., gloves, gowns, and eye protection)</p>	<ul style="list-style-type: none"> Sexual contact People sharing the same bed Household members
Medium Risk	Face-to-face contact within 2 metres for at least one hour, AND does not meet the high-risk exposure characteristics	<ul style="list-style-type: none"> Co-workers within two meters for one hour or more
Low Risk	Brief close contact AND does not meet the high/medium-risk exposure characteristics	<ul style="list-style-type: none"> Brief social interactions

CONTACT MANAGEMENT

In order to achieve public health objectives of containment, contact tracing and monitoring recommendations are outlined in Table 4. Public health should conduct contact tracing to identify all high and medium risk contacts and assess unknown risk contacts.

Table 4: Contact tracing and monitoring modalities for monkeypox contacts

Contact Risk Level	Contact Education	Monitoring	Post Exposure Prophylaxis (PEP)
High	By public health	Active monitoring (daily or other appropriate frequency) for 21 days after last exposure	Recommended
Medium	By public health	Passive surveillance or modified active monitoring (initial contact with or without follow up at 21 days)	Generally not required unless recommended by MHO
Low	By case or public health	Passive surveillance or modified active monitoring	Generally not required unless recommended by MHO

PUBLIC HEALTH RECOMMENDATIONS FOR ASYMPTOMATIC MONKEYPOX CONTACTS, INCLUDING CAREGIVERS

While monkeypox is not known to be transmissible prior to the onset of symptoms, early non-specific symptoms, such as fatigue, may not be easily recognized. Therefore, it is essential for contacts to be vigilant about monitoring for signs and symptoms of monkeypox. Contacts can go to work, school and most regular activities as long as they are asymptomatic. In addition to offering post-exposure prophylaxis to eligible contacts, the following additional measures in Table 5 are recommended.

Table 5: Public health recommendations for contacts

Type of Contact	Recommendations
All Contacts	<ul style="list-style-type: none"> • Be aware of signs and symptoms of monkeypox • Self-monitor for 21 days after last exposure • Avoid taking any anti-pyretics, such as acetaminophen and ibuprofen, to avoid suppressing a fever. If these medications need to be taken, body temperature should be recorded prior to administration. • Be aware of where and how to seek clinical care should symptoms occur • If symptoms occur, follow recommendations in Table 2 until clinical and/or lab assessment has ruled out monkeypox • Follow respiratory etiquette and hand hygiene <ul style="list-style-type: none"> ○ Cough or sneeze into a tissue or the bend of their arm, not their hand ○ Throw any used tissues into a waste container that has a plastic bag in it, as soon as possible ○ Perform hand hygiene immediately afterwards • Follow any site or facility-specific infection control protocols (e.g. health care settings) • Apply hand hygiene before and after any contact with a case or after touching surface/object within the case's environment, especially those that the case has had contact with (i.e., touched with hands, sat on, lay upon, skin has touched, mouth has touched, etc.). Hand hygiene involves one of: <ul style="list-style-type: none"> ○ Washing one's hands regularly with soap and water for at least 20 seconds ○ Using hand sanitizer containing at least 60% alcohol

	<ul style="list-style-type: none"> ○ If hands are visibly soiled, soap and water is the preferred method.
High Risk Contacts only	<ul style="list-style-type: none"> • All sexual contact involving direct contact, sharing of objects, or face to face contact should be deferred during the 21 days after last exposure to the case • Be vigilant with self-monitoring if working or living with people at higher risk of severe disease (children under 12, pregnant women and immunocompromised). • Avoid unnecessary contact with people at higher risk. Note, this measure does not restrict anyone's ability to work, including health care workers • For animal owners, specific advice is available in Table 7 (Appendix 1)

It is recommended that a single caregiver be identified for the case, where possible. Unless necessary, this person should not be at higher risk of severe disease (children, pregnant woman and immunocompromised people). The caregiver should receive specific advice on adequate PPE, symptoms to monitor, as repeated exposure is expected to occur during the period of communicability. Post-exposure prophylaxis could be discussed even if no identifiable high-risk or medium-risk exposure occurred.

POST-EXPOSURE PROPHYLAXIS

Imvamune® vaccination is recommended for high-risk contacts of confirmed and probable cases if within 14 days of their last contact with the case while infectious. PEP may be offered to medium-risk contacts if risk assessment suggests a significant exposure that is compatible with current evidence of transmission. Imvamune® is not indicated for cases of monkeypox. If a contact shows symptoms that are highly suggestive of monkeypox, diagnostic testing can be considered before provision of vaccine. The decision to test before provision of PEP should be based on index of clinical suspicion based on exposure and symptoms, and potential reduction of PEP effectiveness as a result of delayed vaccine administration.

The vaccine is ideally administered within 4 days of exposure, but can be administered up to 14 days after exposure to an infectious case or to potentially infectious material. Data suggest that early immunization within four days is necessary to prevent infection. Between 4 and 14 days, immunization may reduce the severity of the disease³⁸.

Vaccine efficacy against monkeypox was assessed through preclinical animal studies and clinical immunogenicity studies on humans that included people living with HIV. Based on current knowledge, one dose of Imvamune® provide adequate protection against the development of monkeypox infection.²⁵ In the context of limited supply, a single dose is recommended for post-exposure prophylaxis. A second dose of vaccine may be recommended 4 weeks after the first dose if there is ongoing risk of exposure.

Guidance on administration, indications, contraindications, precautions and adverse effects is available in the [BC Immunization Manual](#).

PRE-EXPOSURE PROPHYLAXIS (PrEP)

Contact tracing, although essential, can be limited when several contacts cannot be identified and reached. To help curb transmission and achieve public health goals, an additional pre-exposure prophylaxis (PrEP) approach, targeting people at high-risk of infection, has been implemented in BC.

Eligibility criteria is outlined in Table 6. NACI guidelines, dated June 10, 2022, recommends pre-exposure series to individuals who are at risk of occupational exposure to the virus in a laboratory setting⁴².

Table 6: Eligibility criteria for monkeypox pre-exposure prophylaxis with Imvamune

Eligible individuals are transgender people or those who self-identify as belonging to the gay, bisexual and other men who have sex with men community and answer yes to any of the questions below:
Have you had two or more sexual partners in the last 21 days? or
Have you received a diagnosis of a bacterial STI (i.e. chlamydia, gonorrhea, and/or syphilis) in the past two months? or
Have you attended venues or other locations (i.e. bath houses, sex clubs, park play) or are planning to?, or
Have you had anonymous sex in the past 21 days (i.e. using apps, online sites, formal/informal gatherings) or are planning to?, or
Do you engage in sex work or plan to, either as a worker or a client?

APPENDICES

Appendix 1: Evidence Summary Regarding Zoonotic Transmission and Monkeypox in Animals

Species Susceptibility

At this time, there is evidence that a number of animal species are susceptible to monkeypox, especially rodent and non-human primate species, but the full range of animals that are susceptible to monkeypox remains unknown^{22, 31}. The susceptibility of other companion and food-producing animal species is largely unknown.

Transmission Dynamics

The natural lifecycle of monkeypox is unknown but animal-to-animal transmission among rodent and non-human primate species is documented. Animal-to-human transmission from rodent species (e.g. squirrels) has, historically, been the suspected source of human monkeypox cases in endemic areas through bites, scratches or handling, preparing or eating wild animals. To date, in the 2022 global outbreak neither animal-to-human nor human-to-animal transmission has been documented.

In animals, monkeypox viruses have been detected in skin lesions, urine, feces, oral, nasal, and conjunctival exudates. Estimates of the incubation period in animals range from 3 days to 18 days and possibly much longer in potential reservoir rodent species. Symptoms in rodents include: fever, depression, anorexia, conjunctivitis, respiratory signs (ie. sneezing, nasal discharge), diarrhea, oral ulcers, and skin lesions. There is limited evidence that some rodent species may carry monkeypox virus asymptotically²³.

Animal health goals

- Rapid detection of animal monkeypox cases and animal exposures to human monkeypox cases
- Prevent subsequent animal transmission to humans (animal-to-human transmission has been recognized in African countries endemic with monkeypox and in the 2003 US outbreak associated with imported rodents and speciality pets³²);
- Prevent infected domestic animals, or their waste, from transmitting the virus to wildlife or other domestic animals; and
- Prevent Canadian animal species becoming domestic reservoirs for the virus.

Animal health recommendations

To address these animal health goals, **monkeypox in any animal species is deemed a reportable disease in BC** under sections 10(3)(a) and (b) of Appendix I of the BC Reportable and Notifiable Diseases Regulation⁴⁰. This includes the requirement for a veterinarian or an animal owner to report any animal exposed to monkeypox, possibly infected with monkeypox or testing positive to monkeypox. Reports must be made within 24 hours to BC's Chief Veterinarian at chief.veterinarian@gov.bc.ca. Reports should include animal and owner identification, location and contact information, animal signalment, history, clinical signs, diagnostic results and any treatment, as per section 20(3) of the *Animal Health Act*⁴¹.

The Chief Veterinarian or their delegate will report any confirmed animal cases of monkeypox to BC public health agencies.

If animals become ill after contact with a case, owners should contact their veterinarian for an assessment. <https://www.cdc.gov/poxvirus/monkeypox/veterinarian/index.html>

When an animal owner has been diagnosed with monkeypox or is a high-risk contact of a case, the following measures are recommended to protect animals, limit onward spread to other domestic or wild animals, and limit potential transmission back to humans:

Table 7: Measures to Prevent Transmission to Animals for monkeypox cases and high-risk contacts

Prevent Transmission to Animals	
Avoid close contact with animals, especially rodents and non-human primates	<p>If possible, have another member of their household care for their animals</p> <p>Do not</p> <ul style="list-style-type: none"> • Let them lick you • Snuggle or kiss them • Share food with them • Let them sit on your lap • Let them sleep in your bed
Caring for animals during your illness	<p>If you need to care for animals during your illness</p> <ul style="list-style-type: none"> • Practise good hand hygiene and respiratory etiquette • Cover any rash that appears • Wear gloves and a well-fitting mask when caring for your animal(s) • Wash or sanitize your hands regularly, especially before and after touching animals, their food, or their supplies • Dispose of masks or other contaminated materials in a manner that prevents access by pets or wild animals (rodents in particular). For example, trash should be thrown out in a high quality garbage bag and kept in an animal-proof receptacle.
Rodent species specific care	<ul style="list-style-type: none"> • Keep pet rodents²⁸ away from people and animals that reside outside of your household for 21 days after the end of your infectious period. • Monitor pet rodents closely for signs of illness including: fever, depression, anorexia, conjunctivitis, respiratory signs (ie. sneezing, nasal discharge), diarrhea, oral ulcers, and skin lesions • Contact your veterinarian by phone for further guidance if you suspect illness in your animal(s). Do not transport your animal(s) to the veterinary facility without prior discussion with your veterinarian. • Disposal of rodent litter and waste: <ul style="list-style-type: none"> ○ Spray until saturated with diluted bleach (0.5% sodium hypochlorite): 2 parts bleach to 3 parts water ○ Using 2 garbage bags, double bag the damp material and place in an animal-proof receptacle for pick-up and disposal.
Other animal specific care	<ul style="list-style-type: none"> • Keep your pet away from people and animals that reside outside your household until you're no longer infectious. • Keep your cat indoors at all times. • Keep your dog in a private fenced area or ensure they're on a leash when you take them outside to defecate or urinate. • Preferably dispose of pet waste (not the litter) by flushing it down a toilet.

REFERENCES

1. World Health Organization. (2022, May 22). *Surveillance, case investigation and contact tracing for Monkeypox : interim guidance*. <https://www.who.int/publications/i/item/WHO-MPX-surveillance-2022.1>
2. UK Government. (2022, May 27). *Monkeypox: contact tracing guidance*. <https://www.gov.uk/government/publications/monkeypox-contact-tracing>
3. UK Government. (2022, May 30). *Principles for monkeypox control in the UK: 4 nations consensus statement*. <https://www.gov.uk/government/publications/principles-for-monkeypox-control-in-the-uk-4-nations-consensus-statement>
4. CDC. (2022, May 22). *Monkeypox : Monitoring People Who Have Been Exposed*. <https://www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html> (consulted on May 30 2022)
5. Direction de Sante Publique de Montreal. (2022, May 19). *Outbreak of genital and oral lesions associated with the monkeypox virus in Montreal and other regions*. <https://santemontreal.qc.ca/en/professionnels/directeur-de-sante-publique-de-montreal/appels-a-la-vigilance/> (French version available online)
6. European Centre for Disease Prevention and Control. (2022, May 23). *Rapid Risk Assessment: Monkeypox multi-country outbreak*. <https://www.ecdc.europa.eu/sites/default/files/documents/Monkeypox-multi-country-outbreak.pdf>
7. Adler H, Gould S, Hine P, Snell L, Wong W, Houlihan C.F., et al. (2022) Clinical features and management of human monkeypox: a retrospective observational study in the UK. *The Lancet*. doi: [https://doi.org/10.1016/S1473-3099\(22\)00228-6](https://doi.org/10.1016/S1473-3099(22)00228-6)
8. Antia, R., Regoes, R. R., Koella, J. C., & Bergstrom, C. T. (2003). The role of evolution in the emergence of infectious diseases. *Nature*, 426(6967), 658–661. doi: <https://doi.org/10.1038/nature02104>
9. Beer, E.M., Rao, V.B. (2019). A systematic review of the epidemiology of human monkeypox outbreaks and implications for outbreak strategy. *PLOS Neglected Tropical Diseases*, 13(10). doi: <https://doi.org/10.1371/journal.pntd.0007791>
10. Hughes, C. M., Liu, L., Davidson, W. B., Radford, K. W., Wilkins, K., Monroe, B., Metcalfe, M. G., Likafi, T., Lushima, R. S., Kabamba, J., Nguete, B., Malekani, J., Pukuta, E., Karhemere, S., Muyembe Tamfum, J., Okitolonda Wemakoy, E., Reynolds, M. G., Schmid, D. S., & McCollum, A. M. (2021). A Tale of Two Viruses: Coinfections of Monkeypox and Varicella Zoster Virus in the Democratic Republic of Congo. *The American Journal of Tropical Medicine and Hygiene*, 104(2), 604–611. doi: <https://doi.org/10.4269/ajtmh.20-0589>
11. Huhn, G. D., Bauer, A. M., Yorita, K., Graham, M. B., Sejvar, J., Likos, A., Damon, I. K., Reynolds, M. G., & Kuehnert, M. J. (2005). Clinical characteristics of human monkeypox, and risk factors for severe disease. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America*, 41(12), 1742–1751. <https://doi.org/10.1086/498115>
12. World Health Organization. (2022, May 19). *Signs and Symptoms for Monkeypox: Newsroom* <https://www.who.int/news-room/fact-sheets/detail/monkeypox> ;
13. CDC. (2022, May 22). *Monkeypox: Symptoms* <https://www.cdc.gov/poxvirus/monkeypox/symptoms.html>
14. CDC. (2022, May 23). *Monkeypox: Clinical Recognition* <https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html>
15. UK Government. (2022, June 10). *Investigation into monkeypox outbreak in England: technical briefing 1* <https://www.gov.uk/government/publications/monkeypox-outbreak-technical-briefings/investigation-into-monkeypox-outbreak-in-england-technical-briefing-1>
16. CDC. (2022, June 09). *CDC Monkeypox Response: Transmission* <https://www.cdc.gov/media/releases/2022/0509-monkeypox-transmission.html>
17. Antinori, A., Mazzotta, V., Vita, S., Carletti, F., Tacconi, D., Lapini, L. E., D'Abramo, A., Cicalini, S., Lapa, D., Pittalis, S., Puro, V., Rivano Capparuccia, M., Giombini, E., Gruber, C., Garbuglia, A. R., Marani, A., Vairo, F., Girardi, E., Vaia, F., Nicastrì, E., ... INMI Monkeypox Group (2022). Epidemiological, clinical and virological characteristics of four cases of monkeypox support transmission through sexual contact, Italy, May 2022. *Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin*, 27(22), 2200421. <https://doi.org/10.2807/1560-7917.ES.2022.27.22.2200421>
18. Khalil, A., Samara, A., O'Brien, P., Morris, E., Draycott, T., Lees, C. & Ladhani, S. (2022). Monkeypox and pregnancy: what do obstetricians need to know? *Ultrasound In Obstetrics & Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology*. doi: doi.org/10.1002/uog.24968 <https://obgyn.onlinelibrary.wiley.com/doi/10.1002/uog.24968>
19. Mbala, P.K., Huggins, J.W., Riu-Rovira, T., Ahuka, S.M., Mulembakani, P., Rimoin, A.W., Martin, J.W. & Muyembe, J.J.T. (2017). Maternal and Fetal Outcomes Among Pregnant Women With Human

- Monkeypox Infection in the Democratic Republic of Congo. *The Journal of Infectious Diseases*, 216(7), 824–828. doi: <https://doi.org/10.1093/infdis/jix260>
20. OCSO. (2022, June 10). Monkeypox OCSO Scan Of Evidence #2 covering the Periods of June 4 to June 10 2022
 21. Grant, R., Nguyen, L. L., & Breban, R. (2020). Modelling human-to-human transmission of monkeypox. *Bulletin of the World Health Organization*, 98(9), 638–640. doi: <https://doi.org/10.2471/BLT.19.242347>
 22. Reynolds MG, Doty JB, McCollum AM, Olson VA, Nakazawa Y. (2019) Monkeypox re-emergence in Africa: a call to expand the concept and practice of One Health. *Expert Review Anti-Infective Therapy*, 17(2), 129-139. doi:10.1080/14787210.2019.1567330
 23. CFSPH. (2020, November). *Monkeypox* <https://www.cfsph.iastate.edu/Factsheets/pdfs/monkeypox.pdf>
 24. CDC. (2022, June 02). *Monkeypox and Smallpox Vaccine Guidance*. <https://www.cdc.gov/poxvirus/monkeypox/clinicians/smallpox-vaccine.html>
 25. Public Health Agency of Canada. (2022, June 10). *Summary Of National Advisory Committee On Immunization (Naci) Rapid Response Of June 10, 2022 Interim guidance on the use of Imvamune® in the context of monkeypox outbreaks in Canada*. <https://www.canada.ca/content/dam/phac-aspc/documents/services/immunization/national-advisory-committee-on-immunization-naci/guidance-ivmavune-monkeypox/summary-june-10-2022/summary-june-10-2022-en.pdf>
 26. Your Local Epidemiologist. (2022, 26 May). *MPX State of Affairs: May 26*. <https://yourlocalepidemiologist.substack.com/p/mpx-state-of-affairs-may-26?s=r>
 27. World Health Organization. (2022, May 21). *Multi-country monkeypox outbreak in non-endemic countries*. <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON385>
 28. UK Government (2022, May 27) *Qualitative assessment of the risk to the UK human population of monkeypox infection in a canine, feline, mustelid, lagomorph or rodent UK pet*. <https://www.gov.uk/government/publications/hairs-risk-assessment-monkeypox/qualitative-assessment-of-the-risk-to-the-uk-human-population-of-monkeypox-infection-in-a-canine-feline-mustelid-lagomorph-or-rodent-uk-pet#about-the-human-animal-infections-and-risk-surveillance-group>
 29. Vaughan A, Aarons E, Astbury J, Brooks T, Chand M, Flegg P, et al. (26 April 2020) Human-to-Human Transmission of Monkeypox Virus, United Kingdom, 2018. *Emerging Infectious Diseases*. 26(4), 782-785. doi: <https://doi.org/10.3201/eid2604.191164>
 30. CDC. (2022, June 24). Monkeypox in Animals. Retrieved June 29, 2022, from <https://www.cdc.gov/poxvirus/monkeypox/veterinarian/monkeypox-in-animals.html>
 31. Parker, S., & Buller, R. M. (2013). A review of experimental and natural infections of animals with monkeypox virus between 1958 and 2012. *Future Virology*, 8(2), 129–157. doi: <https://doi.org/10.2217/fvl.12.130>
 32. Reed, K.D., Melski, J.W., Graham, M.B., Regnery, R.L., Sotir, M.J., Wegner, M.V., Kazmierczak, J.J., Stratman, E.J., Li, Y., Fairley, J.A., et al. (2004). The detection of monkeypox in humans in the Western Hemisphere. *New England Journal of Medicine*, 350(4), 342–350.
 33. CDC. (2022, June 30). *Clinician FAQs*. <https://www.cdc.gov/poxvirus/monkeypox/clinicians/faq.html>
 34. World Health Organization. (2022, May 16). *Monkeypox - United Kingdom of Great Britain and Northern Ireland*. <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON381>
 35. European Centre for Disease Prevention and Control. (2022, June 28). *Considerations for contact tracing during the monkeypox outbreak in Europe, 2022*. <https://www.ecdc.europa.eu/en/publications-data/considerations-contact-tracing-during-monkeypox-outbreak-europe-2022>
 36. Public Health Agency of Canada. (2022, June 08). *Monkeypox: Symptoms and management*. <https://www.canada.ca/en/public-health/services/diseases/monkeypox/symptoms-management.html>
 37. Antinori, A., Mazzotta, V., Vita, S., Carletti, F., Tacconi, D., Lapini, L. E., D'Abramo, A., Cicalini, S., Lapa, D., Pittalis, S., Puro, V., Rivano Capparuccia, M., Giombini, E., Gruber, C. E., Garbuglia, A. R., Marani, A., Vairo, F., Girardi, E., Vaia, F., & Nicastri, E. (2022). Epidemiological, clinical and virological characteristics of four cases of monkeypox support transmission through sexual contact, Italy, May 2022. *Eurosurveillance*, 27(22). <https://doi.org/10.2807/1560-7917.es.2022.27.22.2200421>
 38. UK Health Security Agency. (2022, June 17). *Recommendations for the use of pre and post exposure vaccination during a monkeypox incident*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1083791/Recommendations-for-pre-and-post-exposure-vaccination-during-a-monkeypox-incident-17-june-2022.pdf
 39. European Centre for Disease Prevention and Control. (2022, June 15). *Epidemiological update: Monkeypox multi-country outbreak*. <https://www.ecdc.europa.eu/en/news-events/epidemiological-update-monkeypox-multi-country-outbreak-15-june>
 40. Animal Health Act - Reportable and Notifiable Disease Regulation. (2022, July 19). https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/7_2015
 41. Animal Health Act. (2014, May 29). <https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/14016>

42. Public Health Agency of Canada. (2022, June 10). *NACI Rapid Response - Interim guidance on the use of Imvamune® in the context of monkeypox outbreaks in Canada*. <https://www.canada.ca/content/dam/phac-aspc/documents/services/immunization/national-advisory-committee-on-immunization-naci/guidance-ivamune-monkeypox/guidance-ivamune-monkeypox-en.pdf>
43. Thornhill, J. P., Barkati, S., Walmsley, S., Rockstroh, J., Antinori, A., Harrison, L. B., Palich, R., Nori, A., Reeves, I., Habibi, M. S., Apea, V., Boesecke, C., Vandekerckhove, L., Yakubovsky, M., Sendagorta, E., Blanco, J. L., Florence, E., Moschese, D., Maltez, F. M., ... Orkin, C. M. (2022). Monkeypox virus infection in humans across 16 countries — April–June 2022. *New England Journal of Medicine*. <https://doi.org/10.1056/nejmoa2207323>
44. UK Health Security Agency. (2022, July 28). *Investigation into Monkeypox Outbreak in England: Technical briefing 3*. Research and analysis: Investigation into monkeypox outbreak in England: technical briefing 3. <https://www.gov.uk/government/publications/monkeypox-outbreak-technical-briefings/investigation-into-monkeypox-outbreak-in-england-technical-briefing-3>
45. World Health Organization. (2022, July 28). 2022 Monkeypox Outbreak: Global Trends. https://worldhealthorg.shinyapps.io/mpx_global/#2_Global_situation_update
46. Kwok, K. O., Wei, W. I., Tang, A., Shan Wong, S. Y., & Tang, J. W. (2022). Estimation of local transmissibility in the early phase of Monkeypox Epidemic in 2022. *Clinical Microbiology and Infection*. <https://doi.org/10.1016/j.cmi.2022.06.025>
47. Endo, A., Murayama, H., Abbott, S., Ratnayake, R., Pearson, C. A., Edmunds, W. J., Fearon, E., & Funk, S. (2022). Heavy-tailed sexual contact networks and the epidemiology of Monkeypox outbreak in non-endemic regions, May 2022. *MedRxiv*. <https://doi.org/10.1101/2022.06.13.22276353>