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# Presymptomatic transmission, vaccine breakthrough and anonymous contacts: a cluster of mpox in Canberra, Australian Capital Territory, 2024

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Outbreak report


## Abstract

This report outlines a localised cluster of mpox detected in July 2024, in Canberra, Australian Capital Territory. Investigation identified nine cases, including likely presymptomatic transmission by a vaccinated primary case with a high-contact profile. Five of the nine cluster cases had breakthrough infections and had received two mpox vaccinations more than 18 months earlier. The public health response involved targeted community engagement and a pop-up vaccination clinic, although a high proportion of anonymous sexual partners made contact tracing challenging. These findings underscore the potential for presymptomatic transmission and the importance of ongoing preventive measures, even with vaccination, in high-contact environments.



Keywords: mpox; outbreak investigation; contact tracing; vaccination; presymptomatic transmission


## Background and methods

Mpox is a usually self-limiting illness caused by infection with the monkeypox virus (MPXV) and characterised by a maculopapular rash that may be preceded by prodromal symptoms including lymphadenopathy, fever, and myalgia.[1] Although it is a zoonotic illness, mpox is primarily transmitted via skin-to-skin contact–including sexual contact–with an infected person, or via fomites. In Australia, the first cases of mpox were detected in May 2022, as a part of a multi-country outbreak mainly among gay, bisexual and other men who have sex with men (GBMSM).[2] In July 2022, mpox was declared to be a public health emergency of international concern by the World Health Organization, and a Communicable Disease Incident of National Significance (CDINS) by the Australian Chief Medical Officer.[2] The CDINS was stood down in November 2022. Mpox became a notifiable condition in the Australian Capital Territory (ACT) in June 2022, and the first cases were notified the following month. However, sustained locally acquired transmission of mpox was not observed in Australia until 2024.[2] Until late July 2024, eight ACT cases had been notified, with only two infections acquired locally, both from a case infected overseas.

On a single day in late July 2024, a clinician at the Canberra Sexual Health Centre (CSHC) notified ACT Health of two cases of suspected mpox with epidemiological links; a third suspected case was identified by contact tracing conducted by the notifying clinician. Two cases had not travelled outside of the ACT; the third reported multiple sexual contacts. Positive polymerase chain reaction (PCR) results for all three were received the following day.

Cases and contacts were managed according to the *CDNA National Guidelines for Public Health Units Version 3.0.*[3] To improve case finding, a clinician alert was released on 2 August 2024. Suspected cases were interviewed by Public Health Nurses from ACT Health, using a standardised questionnaire on a REDCap survey.[4] For contacts who were unable to be contacted by ACT Health but who could be messaged directly by cases via dating apps, ACT Health staff provided wording to be sent by the cases. This wording included information about post-exposure vaccination and advice to seek health care if symptomatic. Case and contact data were managed in REDCap and were reported using REDCap project dashboards and Microsoft Excel.

Ethics approval was not sought for this cluster investigation, as it was conducted under the auspices of the *Public Health Act 1997* (ACT).

## Description of cluster

A cluster case was defined as a laboratory-confirmed mpox case in an ACT resident with onset of symptoms between two dates in July and August 2024 with:

- likely acquisition in the ACT

AND/OR

- attendance at an identified exposure location in the ACT during their exposure and/or infectious period.

Nine cluster cases were detected. Following the detection of the first three cases, two more were found via contact tracing, and a further four presented for testing with symptoms (Figure 1, Table 1). All cases were male adults who reported sex with men; none were co-infected with human immunodeficiency virus (HIV). Case characteristics, exposures and symptoms are shown in Tables 1 and 2. No cases were hospitalised and none experienced complications.

Whole genome sequencing was performed on specimens for six cases; the same Clade IIb lineage was detected in all sequenced specimens.

Investigations suggested that the primary case had had sexual contact with anonymous males interstate between twelve and nine days before symptom onset, either of which may have resulted in his infection. He then had sexual contact with several other men two days before his symptom onset, resulting in two known infections. This primary case had received two mpox vaccines more than 18 months before illness onset.

**Figure 1: Mpox cluster cases by symptom onset (epidemiological week), Australian Capital Territory, 2024**

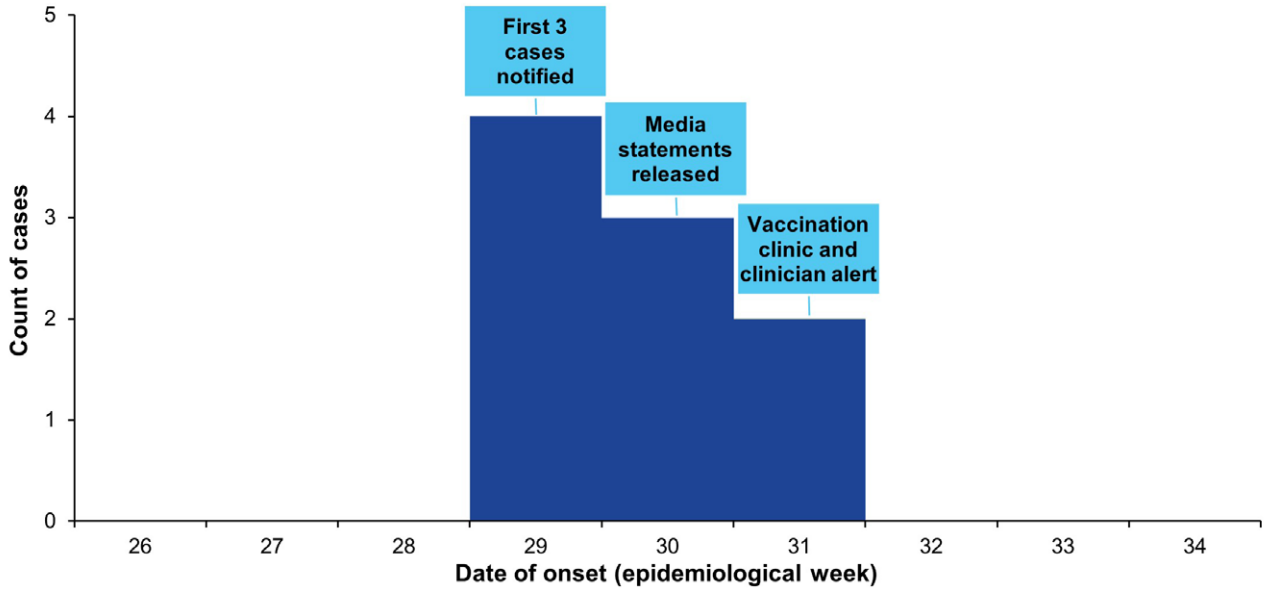


**Table 1: Characteristics of cases in mpox cluster, July–August 2024, Australian Capital Territory**

| Characteristic | Category | Count (total cases N = 9) | Proportion |
|---|---|---|---|
| **Demography** | Male sex | 9 | 100% |
| | Male gender | 9 | 100% |
| | Median age | 33 years | — |
| | Aboriginal | 1 | 11% |
| **Case ascertainment** | Found by contact tracing | 3 | 33% |
| | Found by clinical presentation | 6 | 67% |
| **Exposures** | Used dating app | 4 | 44% |
| | ACT acquired | 8 | 89% |
| | Interstate acquired | 1 | 11% |

**Table 2: Vaccination status and symptoms of cases in mpox cluster, July–August 2024, Australian Capital Territory**

| Classification | Category | Vaccination status | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unvaccinated | | | | Received two vaccines | | | | |
| **Case ID** | **—** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| Duration from second vaccine to onset (months)[a] | — | N/A | N/A | N/A | N/A | 18.3 | NS[b] | 21.9 | 21.1 | 21.2 |
| Symptoms | Prodrome | | Y | | Y | Y | Y | | | |
| | Fever | | | | | Y | | | | |
| | Headache | | Y | | | | | | | |
| | Myalgia | Y | Y | | | Y | | | | |
| | Lymphadenopathy | Cervical | | Inguinal | Cervical | | Inguinal | | | |
| | Fatigue | | | | Y | Y | | | | |
| | Sore throat | | | Y | | | | | | |
| | Rectal pain/bleeding | | | | | Y | | | Y | Y |
| | Rash/lesions | Y | Y | Y | Y | Y | Y | Y | Y | |
| Location of rash/lesions | Face | Y | Y | Y | | | | | | |
| | Arms | | | Y | | | | | | |
| | Legs | | | Y | | | | | | |
| | Palms of hands | | | Y | Y | | | | | |
| | Trunk | | | Y | | | | | | |
| | Genitourinary | Y | | Y | Y | Y | Y | | | |
| | Perianal | | | | | | | | Y | |
| Location of first lesions | — | Lip and groin | Chin | Unknown | Finger | Buttocks | Unknown | Unknown | Perianal | N/A[a] |

a N/A: not applicable

b NS: not stated. Case was vaccinated with two doses, but not recorded on the Australian Immunisation Register.

## Public health response

ACT Health worked closely with Meridian, Canberra's LGBTIQA+ community organisation, to develop media statements encouraging people at risk of mpox to learn more about the virus, including symptoms, risk factors, prevention strategies and the importance of getting vaccinated. Meridian, in partnership with CSHC, held a pop-up mpox vaccination clinic, with 14 individuals receiving a vaccine dose. As sex-on-premises venues (SOPVs) are high-risk settings for mpox transmission,[3] ACT Health and Meridian staff met with ACT SOPV management to provide mpox information, discuss updated resources for patrons, and provide infection control guidance. Several cases reported contacts in New South Wales, so ACT Health staff also liaised with their counterparts at the Southern New South Wales and Murrumbidgee Local Health Districts.

## Discussion

This cluster of nine mpox cases in the ACT provides evidence supporting the possibility of presymptomatic transmission of mpox. At the time, the national guideline indicated that the mpox infectious period begins with symptom onset.[3] However, our investigation suggests that one case likely infected several others two days before becoming ill. Presymptomatic transmission was also observed in a large contact tracing study undertaken on cases detected in the United Kingdom in 2022.[5] A systematic review of the 2022–2023 global outbreak found that presymptomatic transmission may be an infrequent but potentially important feature of mpox transmission dynamics.[6] This suggests that mpox transmission may not be prevented by abstaining from sexual contact during the symptomatic period alone. The updated version of the *CDNA National Guidelines for Public Health Units (Version 5.0)* recommends that public health units consider tracing sexual contacts up to four days before symptom onset.[2]

In this cluster, more than half of the cases had breakthrough infection occurring more than 18 months after receipt of two mpox vaccine doses. No cases were hospitalised, and data on illness duration was not collected. However, none of the five vaccinated cases reported extragenital lesions, and only one case each among the five vaccinated cases reported fever or lymphadenopathy. These observations align with findings from a much larger concurrent outbreak in New South Wales, in which fully vaccinated people had a substantially reduced risk of hospitalisation, extragenital lesions and systemic symptoms compared with unvaccinated people.[7] Evidence of onward transmission from a fully vaccinated individual in this ACT cluster suggests that, while vaccination may reduce disease severity, other prevention measures for individuals[8] and SOPVs[9] remain important for control of mpox.

While media engagement and a vaccination clinic held 10 days after detection of the cluster may have assisted in limiting the cluster, contact tracing efforts were hampered by the substantial proportion of anonymous partners. Public health units may find it useful to provide cases with tailored communications to send to contacts through dating apps. The primary case in this cluster reported numerous sexual contacts. This feature of GBMSM sexual contact networks—in which a small proportion of individuals has a disproportionately high number of contacts—may lead to a rapid initial spike in a cluster, but may also help to limit its extent once these individuals develop some immunity from infection.[10]

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