

## **Mpox outbreak: Response and epidemiology of confirmed cases in Ireland from May 2022 to May 2023**

C. Dillon<sup>1</sup>, K. O'Donnell<sup>1</sup>, P. McKeown<sup>2</sup>, F. Lyons<sup>3</sup>, C. Browne<sup>4</sup>, U. Fallon<sup>5</sup>, A. Keegan<sup>6</sup>, K. Timoney<sup>1</sup>, O. Bruton<sup>7</sup>, P. Downes<sup>1</sup>, P. Mullane<sup>8</sup>, C. Carroll<sup>5</sup>, S. Doyle<sup>9</sup>, P. Barrett<sup>7</sup>, B. Cosgrove<sup>10</sup>, R. Kiernan<sup>11</sup>, A. Shanley<sup>12</sup>, R. Parlour<sup>2</sup>, D. Igoe<sup>2</sup>, E. Robinson<sup>1</sup>.

1. HPSC (Health Protection Surveillance Centre) – HSE
2. National Health Protection Office (NHPO) – HSE
3. Sexual Health and Crisis Pregnancy Programme (SHCPP)
4. Acute Operations – HSE
5. Department of Public Health – HSE Dublin and Midlands
6. HSE – National Immunisation Office (NIO)
7. Department of Public Health – HSE South West
8. Department of Public Health – HSE Dublin and North East
9. Department of Public Health – HSE Dublin and South East
10. Department of Public Health – HSE Mid West
11. Department of Public Health – HSE West and North West
12. MPOWER at HIV Ireland.

### **Abstract**

#### *Aim*

To describe the epidemiology of mpox cases and the response to the incident in Ireland between May 2022 and May 2023.

#### *Methods*

Mpox was made a notifiable infectious disease in Ireland on 27 May 2022 and included in the national Computerised Infectious Disease Reporting (CIDR) system. Data from CIDR were analysed from 27 May 2022 to 27 May 2023.

#### *Results*

Two-hundred and twenty-nine (229) confirmed cases of mpox were notified in the 12-month period. Among these, gender was male in 226 (98.7%) cases and female in three (1.3%) cases. Where known, 98.6% (206) identified as gbMSM. 20 (10.5%) were admitted to hospital. No deaths occurred. Since the onset of this incident, concerted efforts were

undertaken to coordinate the public health response in Ireland, including assessment, testing, contact tracing and risk categorisation, infection prevention and control, risk communication and community engagement, harm reduction, and vaccination.

### *Discussion*

The 2022-2023 multi-country outbreak of mpox and its emergence outside endemic areas, highlight that a global perspective is required to protect the health of the population of Ireland.

## **Introduction**

Mpox is a rare zoonotic disease caused by infection with monkeypox virus (MPXV) which belongs to the Orthopoxvirus genus in the family Poxviridae<sup>1</sup>. The specific animal reservoir of MPXV remains unknown. MPXV is found naturally in certain Central and West African countries. There are two main clades (variants) of mpox: Clade one (I) (formerly Congo Basin clade) and Clade two (II) (formerly West African clade). Clade II consists of two subclades (IIa and IIb). In addition to systemic symptoms, mpox is characterised by painful skin rash or mucosal lesions. Person to person transmission occurs through close contact with lesions, body fluids, respiratory droplets and contaminated materials such as bedding. Most cases of mpox infection are mild. Infections due to clade I are associated with more severe disease and a higher case fatality ratio.

Until April 2022, export of mpox beyond endemic regions in Africa was rare, and limited to cases that had travelled to endemic areas, or to zoonotic transmission from imported animals.<sup>1</sup> On 16 May 2022, the UK Health Security Agency reported four mpox cases among men with no links to an endemic area, and who self-identified as gay, bisexual and other men who have sex with men (gbMSM).<sup>2</sup> On 18 May 2022, Portugal reported five confirmed and 20 suspect mpox cases among gbMSM.<sup>3</sup> Global case numbers increased quickly. By 25 May 2022, 219 confirmed cases had been reported worldwide.<sup>4</sup>

On 23 July 2022, the World Health Organization (WHO), declared the global mpox outbreak a Public Health Emergency of International Concern (PHEIC).<sup>5</sup> Since 1 January 2022 and as of 8 May 2023, 87,377 confirmed cases including 140 deaths, have been reported from 111 countries.<sup>6</sup> Isolates from outbreak cases belonged to MPXV Clade II (previously known as the West African clade) - specifically subclade IIb.<sup>7</sup> On 10 May 2023, WHO determined mpox no longer constituted a PHEIC.<sup>8</sup>

We describe the epidemiology of mpox cases and the response to the mpox outbreak between May 2022 and May 2023.

## Methods

Mpox was made a notifiable disease in Ireland on 27 May 2022.<sup>9</sup> Cases were reported to Ireland's Computerised Infectious Disease Reporting (CIDR) system.<sup>10</sup> In addition to the standard notification, Public Health Areas (PHAs) collected additional data about cases, including demographic factors, clinical details, potential exposures and vaccination history.

Laboratory testing for MPXV was undertaken at the National Virus Reference Laboratory<sup>11</sup> and the Molecular Virology Laboratory at St James's Hospital.

PHAs also undertook contact tracing and risk assessment for close contacts. A national database was developed which allowed information on mpox close contacts to be recorded, including the setting in which exposure may have occurred (i.e. household, sexual, occupational), and vaccination status (e.g. previously vaccinated, or provided with post-exposure prophylaxis).<sup>12, 13</sup>

Data are presented on all confirmed mpox cases notified on CIDR up to midnight 27 May 2023 and extracted on 30 May 2023.

## Results

### *Epidemiology of mpox cases*

Between 27 May 2022 and 27 May 2023, 229 confirmed cases of mpox were notified. The first case was notified on 31 May 2022 (week 22 2022) (Figure 1). The earliest known date of onset of symptoms among confirmed cases was 13 May 2022 (week 19 2022). Cases peaked in week 34 2022 (21-27 August 2022). In the first 23 weeks of 2023, only two confirmed cases were notified, one each in January and April.

Gender was male in 226 cases and female in three cases. Median age was 35 years (range 16-68 years), with 46% of cases aged between 18-34 years and 79.8% aged between 18-44 years. The majority of cases were either born in Ireland (46.8%) or Latin America (32.3%). Summary characteristics of confirmed mpox cases are presented in Table 1.

### *Contact tracing*

Interim public health guidance for the management of mpox outbreak cases and their contacts was released on 3 June 2022, adapted from earlier guidance for sporadic mpox cases.<sup>14</sup> The purpose of contact tracing initially was to limit transmission, to identify vulnerable contacts at risk for more severe disease (pregnant women, young children and immunocompromised), and to raise awareness among contacts so that they would seek medical help early if they became symptomatic. Later, when vaccine was available, eligible contact were offered post exposure prophylaxis (PEP) vaccination.

Initially, mpox was viewed as a High Consequence Infectious Disease (HCID) with high-risk contacts recommended to quarantine for 21 days.<sup>15</sup> As understanding of the clinical severity and transmission risks increased, this approach was modified. Following ongoing dynamic risk assessments; quarantine of contacts was no longer required; there was a progressive easing of the definition of a high-risk contact; and cases (and their clinical samples and waste) linked to the global outbreak i.e. caused by MPXV subclade IIb, were no longer managed as HCID.

#### *Establishment of an Incident Management Team*

A national incident management team (IMT) first met on 16 May 2022, the same day as the UK first issued their alert. Given the close links between gbMSM communities across Europe, and in particular between Ireland and the UK, the likelihood of cases arising in Ireland was considered high. The IMT was responsible for monitoring of national and global situation, ongoing risk assessment, and advising on and coordinating the response measures. The IMT initially met daily when the event first emerged, and then weekly. Recognising the breadth of the response required, involving input across many different parts of the health service, and in particular the magnitude of implementing a national vaccination programme, the IMT transitioned into a National Crisis Management Team (NCMT) led by the Acute Operations division of the HSE in September 2022. The IMT and subsequent NCMT included representation from a wide range of disciplines and sectors across the health service including: public health; virology; clinical services including sexual health, infectious diseases, paediatrics, obstetrics, occupational health and general practice; infection prevention and control; the National Immunisation Office (NIO); the HSE Sexual Health and Crisis Pregnancy Programme (SHCPP); the National Ambulance Service; HSE Communications; acute hospital and community operations. From the onset, the IMT included representation from the gbMSM community with members from the Gay Health Network (GHN), an alliance of organisations with mandates to promote the sexual health of gbMSM in Ireland, and the MPOWER programme at HIV Ireland, a peer-driven community-level programme focusing on the sexual health and wellbeing among gbMSM<sup>16, 17</sup>. On transitioning to the NCMT format, MPOWER continued to be represented on the group.

#### *Guidance and service development*

IMT members initially, and subsequently the Pathways of Care Programme of the NCMT, worked with the Health Protection Research and Guideline Development Unit in developing and maintaining a suite of guidance on clinical and public health management of probable and confirmed cases and their close contacts, including assessment and testing, contact tracing, infection prevention and control, transportation, and waste management.<sup>18</sup> Guidance was reviewed and updated at regular intervals as the outbreak evolved and understanding increased.

### *Community engagement*

Supported by the Sexual Health Crisis Pregnancy Programme (SHCPP) and HSE Communications, GHN and MPOWER continued to develop and deliver a range of communications and engagement activities for the gbMSM community including posters at social venues and events, social media messaging, adverts and news pieces in gbMSM media, out-reach activities and community stakeholder events. This collaborative and peer-led approach ensured the delivery of key messaging that is intended to be informative but not stigmatising. It has been recognised as an example of best practice for risk communication and community engagement on mpox by ECDC and the WHO.<sup>19, 20</sup>

### *Vaccination*

On 27 May 2022, Ireland's National Immunisation Advisory Committee (NIAC) recommended that modified Vaccinia Ankara-Bavarian Nordic (MVA-BN), be offered to high and intermediate risk contacts of a case of mpox as PEP and healthcare workers at highest risk of exposure as pre-exposure prophylaxis (PREP).<sup>21</sup> On 13 June 2022, the first doses of MVA-BN vaccine were delivered to community vaccination centres (CVCs), where PEP was primarily administered, occasionally supported by mobile vaccination teams, hospitals, and PHA teams.<sup>21</sup>

On 29 July 2022, NIAC recommended mpox vaccine as PrEP to those at high risk of exposure. Given the limited vaccine supply in the context of a global outbreak, the HSE through the advice and guidance of clinical and ethical experts and by working closely with gbMSM advocacy and support groups, offered PrEP in a phased manner. In the first phase (commencing August 2022), eligible people (gbMSM and transgender people who had a notification of early infectious syphilis between December 2021 and July 2022) were invited for vaccination in sexual health clinics. In November 2022, PrEP vaccination was extended to self-identified individuals at risk of mpox who could register online for vaccination and was administered in CVCs.<sup>23</sup>

Based on advice of the EMA, on 22 August NIAC endorsed lower dose intradermal administration rather than subcutaneous administration. This increased the number of people who could be offered vaccination<sup>23, 24</sup>. By the end of May 2023, 5,214 people had been fully vaccinated.

### **Discussion**

In Ireland, as in many countries, the mpox outbreak peaked in late summer 2022, followed by a rapid decline in cases. The reason for the decline is likely to be multifactorial, including

effectiveness of risk communication and community engagement among gbMSM, and increasing immunity among key populations due to a combination of natural immunity and vaccination.

The clinical presentation of cases in Ireland was generally mild, with no ICU admissions, and no deaths. Across Europe, a similar clinical presentation of generally self-limited disease was observed.<sup>25</sup> Nevertheless, mpox had a substantial impact on those infected due to direct physical effects such as severe pain and the indirect mental and social effects of prolonged isolation.

The multi-faceted response involving services across the HSE working alongside gbMSM representative groups, at both national and regional levels, enabled a prompt and adapted responses. Nevertheless, there were inequities in the response. Despite representing a high proportion of cases, gbMSM born in Latin America had a lower case to vaccination ratio than those born in Ireland (personal communication, Ruth Ceannt). Other barriers including difficulty isolating due to unsuitable accommodation and job insecurity were also recognised among this group<sup>26</sup>.

While the global outbreak has substantially receded, a small number of cases continued to be identified across the world during 2023. In May 2023, WHO determined that while the global mpox outbreak no longer represented a PHEIC, mpox continued to present significant public health challenges requiring a robust response, particularly in those countries where mpox is endemic and where access to vaccination is curtailed. Globally, travel-related cases are a continued threat, and all countries should maintain testing capacities and continue to act promptly when needed.

Table 1: Summary characteristics of confirmed mpox cases, 27 May 2022 to 27 May 2023

		Number of events	% of events (where known)	
<b>Sexual orientation</b>	gbMSM	206	98.6	
	Other	3	1.4	
	Not known	20		
<b>Country of birth</b>	Ireland	87	46.8	
	Europe	25	13.4	
	Latin America	60	32.3	
	Other	14	7.5	
	Unknown/missing	43		
<b>Mode of transmission</b>	Sexual transmission	166	96.5	
	Person-person	6	3.5	
	Unknown/missing	57		
<b>Sexual/Intimate skin-skin contact</b>	Yes	186	95.4	
	No	9	4.6	
	Unknown/missing	34		
<b>Sex of recent contact</b>	Male-male	179	98.2	
	Male and Female	3	1.8	
	Unknown/missing	4		
<b>Number of sexual partners (in 21 days prior to onset)</b>	Median (range)	2 (0-75)		
<b>HIV status</b>	Positive	52	28.3	
	Negative	132	71.7	
	<b>On HIV pre-exposure prophylaxis (PrEP)</b>	Yes	64	
		No	42	
		Unk	26	
Unknown/missing	45			
<b>Travel outside of Ireland in exposure period</b>	Yes	117	61.3	
	No	74	38.7	
	Unknown/missing	38		
<b>Admitted to hospital</b>	Yes	20	10.5	
	No	171	89.5	
	Unknown/missing	38		

		Number of events	% of events (where known)
<b>Reason for admission to hospital</b>	Isolation	3	15.0
	Clinical care for mpox	15	75.0
	Unknown/missing	2	10.0

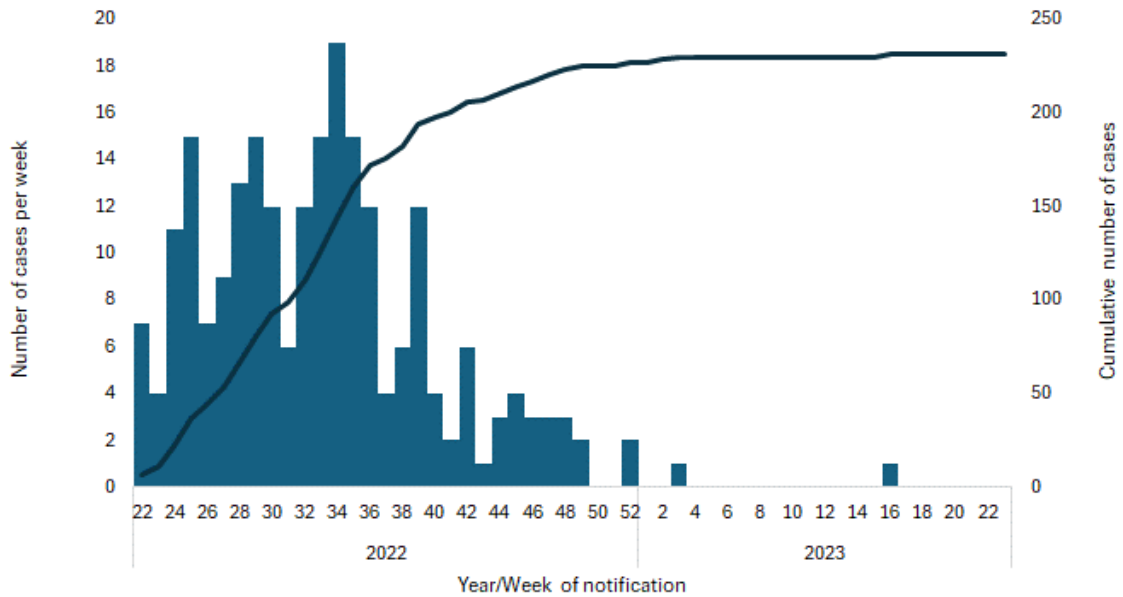


Figure 1: Confirmed cases of mpox and cumulative number reported by year and week on CIDR in Ireland, 27 May 2022 to 27 May 2023



### Declarations of Conflicts of Interest:

None declared.

### Corresponding author:

Kate O'Donnell,  
HPSC (Health Protection Surveillance Centre) – HSE,  
Co. Dublin,  
Ireland.  
E-Mail: kate.odonnell@hpsc.ie

### References:

1. World Health Organization. (2022a, May 29). *Multi-country monkeypox outbreak in non-endemic countries: Update*. <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON388>
2. Vivancos et al., (2022). Community transmission of monkeypox in the United Kingdom, April to May 2022. *Eurosurveillance*, 27(22). <https://doi.org/10.2807/1560-7917.es.2022.27.22.2200422>
3. European Centre for Disease Prevention and Control. (2022, May 19). *Monkeypox cases reported in UK and Portugal*. <https://www.ecdc.europa.eu/en/news-events/monkeypox-cases-reported-uk-and-portugal>
4. Dhawan, M., Emran, T. B., & Islam, F. (2022). The resurgence of monkeypox cases: Reasons, threat assessment, and possible preventive measures. *Travel medicine and infectious disease*, 49, 102367. <https://doi.org/10.1016/j.tmaid.2022.102367>
5. World Health Organization. (2022b, July 23). *WHO Director-General's statement at the press conference following IHR Emergency Committee regarding the multi-country outbreak of monkeypox - 23 July 2022*. <https://www.who.int/director-general/speeches/detail/who-director-general-s-statement-on-the-press-conference-following-IHR-emergency-committee-regarding-the-multi-country-outbreak-of-monkeypox--23-july-2022>
6. World Health Organization. (2023a, May 11). Multi-country outbreak of mpox, External situation report #22 - 11 May 2023. <https://www.who.int/publications/m/item/multi-country-outbreak-of-mpox--external-situation-report--22---11-may-2023>
7. Gao, L., Shi, Q., Dong, X., Wang, M., Liu, Z., & Li, Z. (2023). Mpox, caused by the MPXV of the Clade IIb Lineage, Goes Global. *Tropical Medicine and Infectious Disease*, 8(2), 76–76. <https://doi.org/10.3390/tropicalmed8020076>
8. World Health Organization. (2023b, May 11). *Fifth Meeting of the International Health*

- Regulations (2005) (IHR) Emergency Committee on the Multi-Country Outbreak of mpox (monkeypox).* [https://www.who.int/news/item/11-05-2023-fifth-meeting-of-the-international-health-regulations-\(2005\)-\(ihr\)-emergency-committee-on-the-multi-country-outbreak-of-monkeypox-\(mpox\)](https://www.who.int/news/item/11-05-2023-fifth-meeting-of-the-international-health-regulations-(2005)-(ihr)-emergency-committee-on-the-multi-country-outbreak-of-monkeypox-(mpox))
9. Irish Statute Board. (2022, May 27). *S.I. No. 390/1981 - Infectious Diseases Regulations 1981.* <https://www.irishstatutebook.ie/eli/1981/si/390/made/en/print>
  10. Health Protection Surveillance Centre. (2004). *CIDR - Health Protection Surveillance Centre.* <https://www.hpsc.ie/cidr/>
  11. UCD National Virus Reference Laboratory. (2022, June 17). *Handling of samples from suspected Monkeypox virus (MPXV) cases.* <https://nvrl.ucd.ie/node/269>
  12. Timoney, C., Dillon, C., Fallon, U., Robinson, E., Igoe, D., O'Donnell, K., et al, Network Analysis of Mpox in Ireland, Poster, Summer Scientific Meeting, 2023. <https://imj.ie/royal-college-of-physicians-of-ireland-summer-scientific-meeting-2023-abstract-papers/>
  13. Timoney, C., Fallon, U., Bruton, O., Downes, P., Dillon, C., Igoe, D., et al, The Development of a Mpox Contact Database Key Learnings, Poster, Summer Scientific Meeting, 2023. <https://imj.ie/royal-college-of-physicians-of-ireland-summer-scientific-meeting-2023-abstract-papers/>
    1. 14. Health Protection Surveillance Centre. (2023). *Interim Public Health Guidance for the Management of mpox Cases and their Contacts.* <https://www.hpsc.ie/a-z/zoonotic/monkeypox/guidance/Public%20Health%20Advice%20for%20Monkeypox%20Infection%20advice%20for%20confirmed%20cases%20and%20close%20contacts.pdf>
  14. Centre for Disease Control and Prevention. (2022, November 25). Monitoring and Risk Assessment for Persons Exposed in the Community. Centre for Disease Control and Prevention. <https://www.cdc.gov/poxvirus/mpox/clinicians/monitoring.html>
  15. Gay Health Network. (2022). *Network Members.* <https://gayhealthnetwork.ie/about-us/network-members/>
  16. MPOWER. (2023). *MPOWER Programme at HIV Ireland.* <https://mpower.hivireland.ie/>
  17. Health Protection Surveillance Centre. (2022a). *Monkeypox Guidance.* <https://www.hpsc.ie/a-z/researchandguidelinedevelopmentunit/guidance/#mpx>
  18. World Health Organization. (2023, February 16). *Designing responses at different stages of the mpox outbreak; how MPOWER in Ireland is working with partners and engaging communities to eliminate the disease.* <https://www.who.int/europe/news/item/16-02-2023-designing-responses-at-different-stages-of-the-mpox-outbreak--how-mpower-in-ireland-is-working-with-partners-and-engaging-communities-to-eliminate-the-disease>
  19. GCN. (2022, July 26). *MPOWER, Man2Man and GCN to host community discussion on monkeypox.* <https://gcn.ie/gcn-mpower-man2man-community-discussion-monkeypox/>
  20. Royal College of Physicians of Ireland. (2023, February 17). *NIAC Immunisation*

*Guidelines. Chapter 13 a. Mpox (Monkeypox).*

[https://rcpi.access.preservica.com/uncategorized/IO\\_d6e12caf-767b-40d9-99da-028ba42fe92d/](https://rcpi.access.preservica.com/uncategorized/IO_d6e12caf-767b-40d9-99da-028ba42fe92d/)

21. Health Protection Surveillance Centre. (2023b, April 25). Guidance - Health Protection Surveillance Centre. <https://www.hpsc.ie/a-z/zoonotic/monkeypox/guidance/>
22. European Medicines Agency. (2022, August 19). *EMA's Emergency Task Force advises on intradermal use of Imvanex / Jynneos against monkeypox.* <https://www.ema.europa.eu/en/news/emas-emergency-task-force-advises-intradermal-use-imvanex-jynneos-against-monkeypox>
23. Royal College of Physicians of Ireland. (2022, August 22). *Recommendations for the use of monkeypox Modified Vaccinia Ankara vaccines, Ankara or Jynneos, by the intradermal route.* Available: <https://rcpi-live-cdn.s3.amazonaws.com/wp-content/uploads/2022/08/20220822-NIAC-Recommendations-re.-Use-of-Monkeypox-Modified-Vaccinia-Ankara-vaccines-Imvanex-or-Jynneos-by-the-intradermal-route.pdf>.
24. European Centre Disease Control. (2023, May 4). *Joint ECDC-WHO Regional Office for Europe Monkeypox Surveillance Bulletin.* <https://monkeypoxreport.ecdc.europa.eu/>
25. Somers, E., Carrol, C., O'Gorman, T., McLoughlin, M., Gavin, K., Kelly, N., De Paor, M., Gilmer, B., Moynihan, G., Barrett, S., Fitzpatrick, G., O'Meara, M., Mullane, P. Migrants and the exacerbation of existing inequities associated with the emergence of a monkeypox outbreak in Ireland. Faculty of Public Health Medicine Winter Scientific Meeting 2022.

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