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Epidemiological characteristics and transmission dynamics of the first 66 confirmed mpox cases, Nakasongola District, Uganda, September–November 2024

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Summary

Background: The Uganda Ministry of Health (MoH) declared the first mpox outbreak on August 2, 2024, after two confirmed mpox cases were reported in Kasese District. On September 9, 2024, Nakasongola District registered its first confirmed mpox case. We described the epidemiological characteristics and transmission dynamics of the first 66 confirmed mpox cases in Nakasongola District to inform interventions for ongoing mpox outbreaks in other districts.
Methods: We conducted case investigations to obtain data on socio-demographic characteristics, exposures, signs, symptoms and contacts. We reported the mean age, proportions of the cases by sex, age and occupation. We calculated the attack rates (ARs) per sex, age group, and sub-county by determining the number of cases per population per 100,000.
Findings: Between September 9–November 30, 2024, a total of 66 confirmed cases were reported in Nakasongola District. The majority of cases were male [36 (55%)] and aged ≥15 years [51(77%)] with the mean age of 26 years (IQR 20-30). The highest proportion of cases were fisherfolks [16(25%)] and commercial sex workers (CSWs) [8(13%)]. Females (AR=27/100,000) and males (28/100,000) were similarly affected. The most affected age group were ≥15 years (AR=43/100,000) than those in other age groups [<5 years (AR=13/100,000), and 5–14 years (12/100,000). Lwampanga Town Council (TC) was the most affected subcounty (AR=266/100,000). There were five clusters of transmission in Lwampanga TC, with the largest two occurring at Zengebe Landing Site and Kijaluwo Village, primarily facilitated by sexual contact with six linkages.
Conclusion: CSWs played a key role in transmission and both fisherfolk and CSWs were at higher risk of acquiring mpox. Prompt isolation of mpox cases, along with targeted risk communication and community engagement efforts directed at these high-

risk groups in the most affected town council may help prevent further spread to other sub-counties and town councils.

Background

The first mpox (formerly known as monkeypox) caused by monkeypox virus (MPXV), was identified in the Democratic Republic of Congo (DRC) (1,2). Mpox has been endemic in West and West African regions of the continent (2,3). However, there was a global increase in the number of mpox cases in 2022. While cases initially declined, mpox cases increased again in 2024 leading to the declaration as a public health emergency of international concern in 2024 (4,5). Mpox has affected many continents, but more on the African continent and DRC, which neighbors Uganda, has faced the greatest public health burden (4,6,7).

On August 2, 2024, the Ministry of Health (MoH), Uganda, declared its first mpox outbreak in the country (11). On September 9, 2024, Nakasongola District reported its first confirmed mpox case. As of October 31, 2024, a cumulative of 287 cases were reported across 28 districts of the country (12). Among the 28 districts, Nakasongola was among the top five districts with the most cases. We described the epidemiological characteristics and transmission dynamics of the first 66 confirmed mpox cases in Nakasongola District and recommended evidence-based measures to inform ongoing response elsewhere in Uganda.

Methods

Nakasongola District is situated in Central Uganda. The district is divided into eight sub-counties and seven town councils. The district is bordered by Lake Kyoga in the north, northeast, and east with fishing landing sites, especially in Lwampanga TC, making fishing an important socioeconomic activity in this area.

We defined suspected, probable, and confirmed cases as per the MoH Uganda standard case definition for mpox.

We conducted field investigations and used the MoH standardized case investigation, contact listing and follow up forms to collect data on confirmed cases and contacts of cases. Data were collected on demographics, clinical characteristics, and exposures of the cases. We calculated attack rates using projected populations from the Uganda Bureau of Statistics. For the confirmed mpox cases, we calculated proportions and attack rates by sex, age group, and sub-county or town council. We plotted epidemic curve of confirmed cases by date of symptom onset to demonstrate trends, stratified by occupation. Using choropleth maps in Quantum Geographical Information System (QGIS), we depicted attack rates of confirmed mpox cases per sub-county or town council of residence.

This investigation was conducted in response to public health emergency by the National Rapid Response Team. The Ministry of Health Uganda provided administrative clearance to conduct this investigation. In addition, we received a non-research determination clearance from the US Centers for Disease Prevention and Control (US CDC). This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy. § §See e.g., 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq. Furthermore, all the respondents gave individual verbal consent or assent for interviews since the investigation presented no more than minimal risk of harm and involved no procedures for which written consent is normally required in other contexts. We conducted the interviews in privacy to ensure confidentiality and the data kept under password protection by the study team.

Results

Descriptive epidemiology

As of November 30, 2024, there were 66 confirmed mpox cases and 10 probable mpox cases with no death. Of the 66 confirmed cases, five (23%) tested HIV positive. The hospitalization rate was 63%.

All confirmed cases had skin rash/lesions. Fifty-four percent presented with fever**,** 49% had sore throat, and 46% headache **(**Figure 1). Lesions most often presented on the face, followed by the arms and genitals, with 48% having genital lesions (Figure 2).

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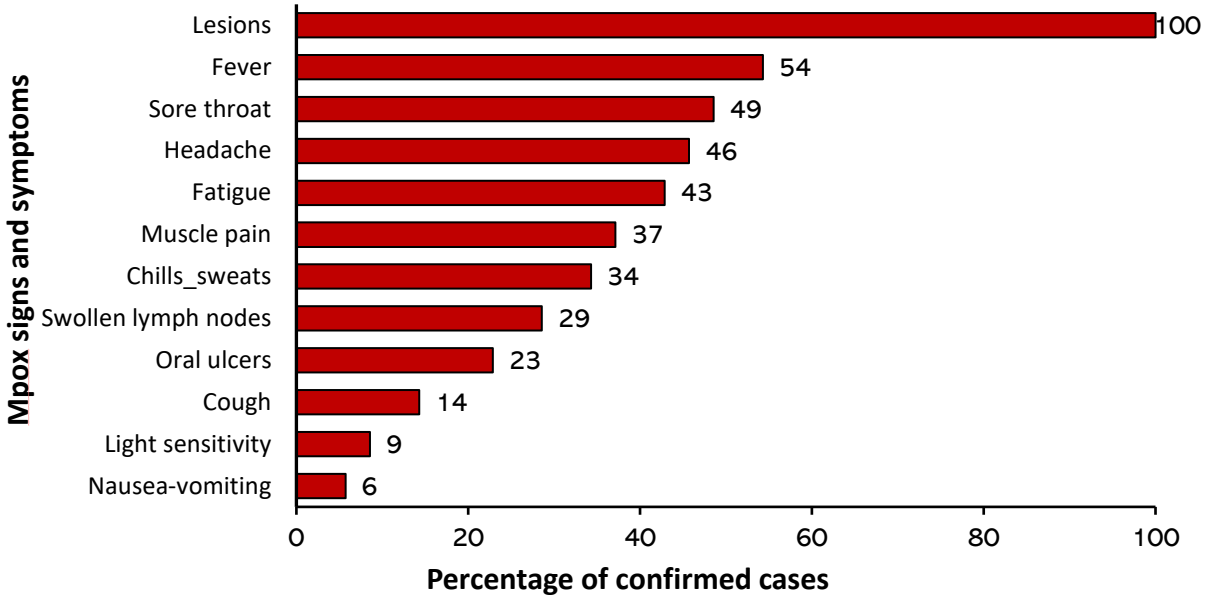

Figure 1: Clinical presentation of confirmed mpox cases, Nakasongola District, Uganda, September–November 2024

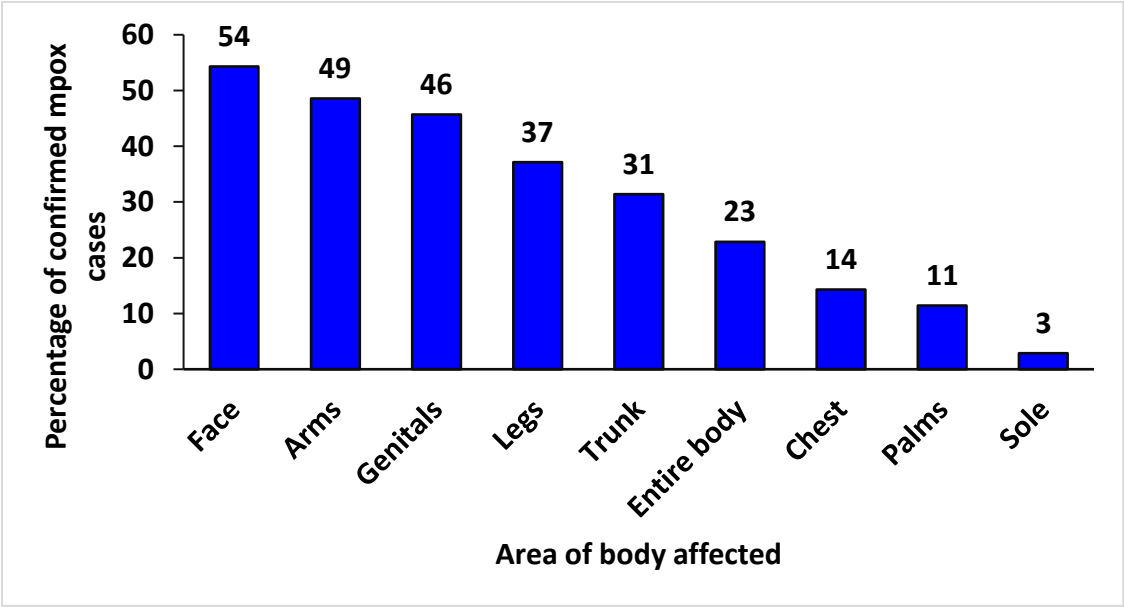

Figure 2: Distribution of skin rash on body parts among mpox confirmed cases, Nakasongola District, Uganda, September–November 2024

Among the 66 confirmed cases, the majority were male [36(55%)], aged 15 years and above [51(77%)], with the mean age of 26 years (IQR 20-30). The highest occupational

categories among confirmed cases were fisherfolk [16(25%)] and commercial sex workers (CSWS) [8(13%)] (Figure 3).

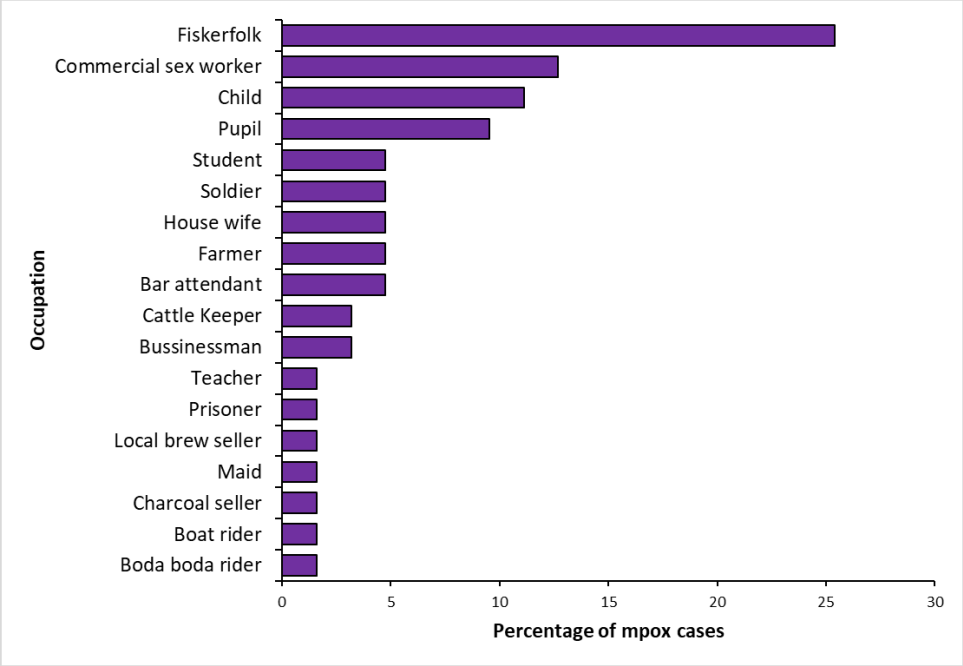

Figure 3: Distribution of confirmed mpox cases by occupation, Nakasongola District, Uganda, September–November 2024

Among the confirmed mpox cases, males (AR=28/100,000) and females (AR=27/100,000) were similarly affected. Those aged 15 years and above were the most affected (AR=43/100,000).

The overall mpox attack rate in Nakasongola District was 28 /100,000 cases. Lwampanga TC (AR=266/100,000), Lwabiyata Subcounty (SC), (AR=63/100,000), Nakasongola TC (AR=38/100,000**),** Lwampanga SC (31/100,000) were the most affected sub-counties/town councils (Figure 4).

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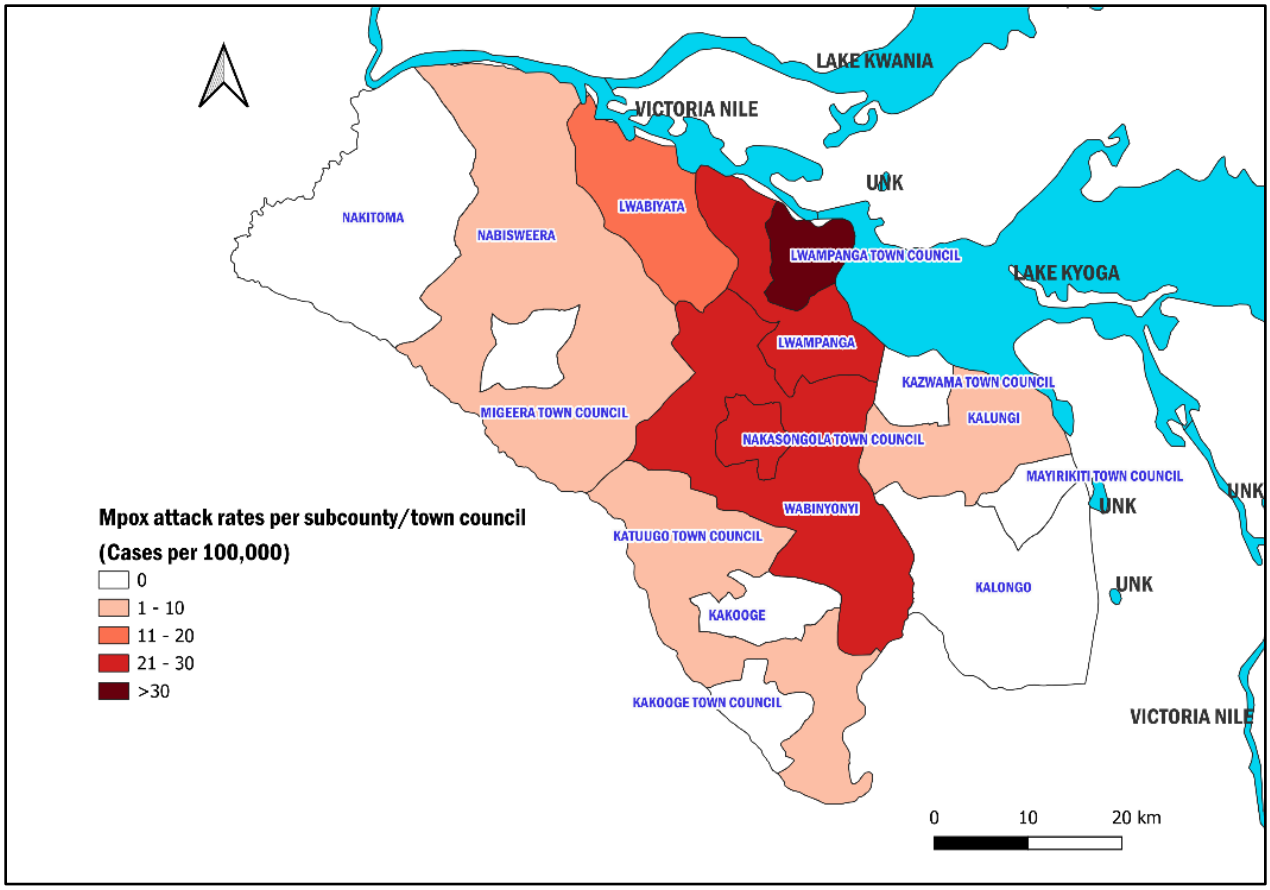

Figure 4: Attack rates of confirmed mpox cases by sub-county or town council, Nakasongola District, Uganda, September–November, 2024

The early confirmed mpox cases were mainly fisherfolks and commercial sex workers (Figure 5). Mpox cases after September 17, 2024 were mainly of students, children and housewives. Furthermore, from October 16–November 30, 2024 there were few cases among fisherfolk and CSWs as seen on the epi curve.

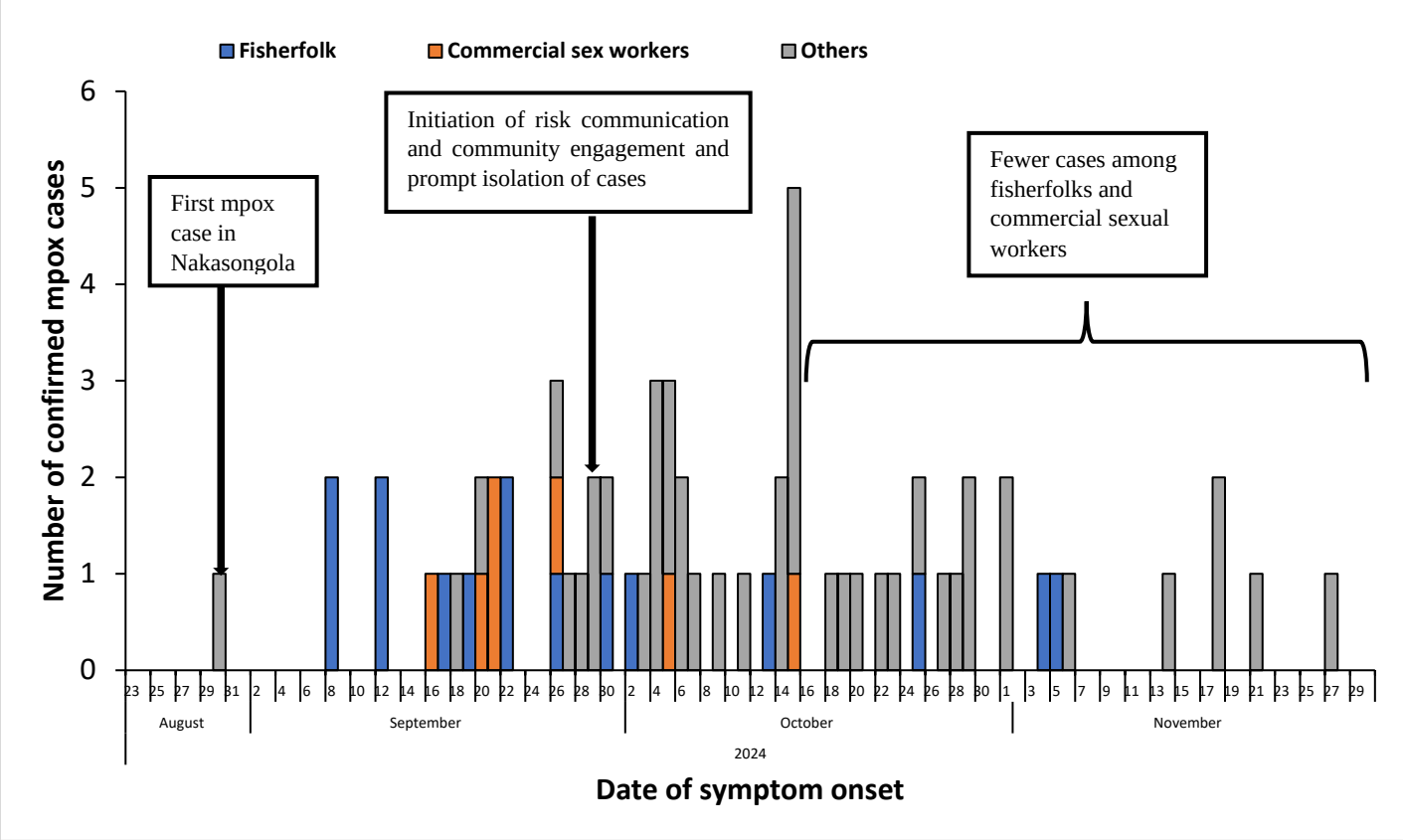

Figure 5: Distribution of cases over time, highlighting the effect of different interventions, Nakasongola District, Uganda, September–November, 2024

Mpox transmission dynamics

During the mpox outbreak in Nakasongola District, transmission was predominantly driven by close contact, with sexual transmission as the most common mode of spread.

In Lwampanga TC and Lwampanga SC, which accounted for the majority of cases, 60% of transmissions had sexual contact, particularly among CSWs, fishermen, and community members engaging in casual sexual relationships. Household and close physical contact accounted for 30%, including contacts among family members, neighbors, and caregivers. The remaining 10% of cases appeared to be sporadic, with no clear epidemiological link established, suggesting community transmission in the later stages of the outbreak. Transmission hotspots included: Zengebe Landing Site, where interactions between CSWs and fishermen facilitated rapid spread. Bars and shared residences among CSWs in Lwampanga TC, contributing to clustering of cases.

In other sub-counties beyond Lwampanga TC and SC, three distinct clusters were identified. Family-based transmission in Kalungi and Wabinyonyi sub-counties, accounting for about 25% of the cases outside Lwampanga, primarily through close

physical contact within households. Sexual contact among fisherfolk and CSWs contributed to around 50% of transmissions in these areas. Twenty-five percent of cases remained unlinked, including students, prisoners, and bar attendants, indicating possible ongoing community transmission.

Discussion

All confirmed mpox cases had skin rash or lesions with about half presenting with genital lesions. Females and males were similarly affected. Fisherfolks and CSWs drove transmission in the early phase of mpox in Nakasongola District. Early transmission was primarily driven by fisherfolk and CSWs, particularly in Lwampanga TC, the most affected subcounty. Transmission routes included sexual contact, close physical contact and possible community transmission.

Fisherfolk and CSWs were identified as key populations driving early transmission due to their high-risk sexual behaviors. Lwampanga TC, with fish landing sites and a high CSW population, had the highest attack rates. Following targeted risk communication and engagement with these groups from late September 2024, there was a decline in mpox transmission. Risk communication likely promoted safer sexual behaviors, contributing to reduced new infections. Similar interventions have been effective in previous mpox outbreaks (13).

Human-to-human transmission, particularly through sexual contact dominated the early phase of the outbreak, which has been documented before (14–16). However, household clusters also occurred, likely through close physical contact or respiratory droplets. Sporadic cases without clear epidemiological links suggested community transmission. Notably, four sporadic cases were students, with no evidence of school-based transmission. Between October 9 and November 30, 2024, few cases were reported among fisherfolk and CSWs. During this period, heightened school-based surveillance was implemented, and community alerts decreased from 20 to fewer than 10 per week.

Study limitations: During the field investigations, there was a possibility of recall bias on past behaviors such as sexual contacts and travel history which could have led to inaccurate or incomplete information. However, conducting timely investigations minimized memory decay. There could have been social desirability on engagement in commercial sex work due to fear of stigma and judgment which might have affected the underreporting of transmission by sexual contact. However, we ensured anonymity and confidentiality from the respondents.

Conclusion: Fisherfolk and CSWs, through sexual contact, drove transmission in the early phase of mpox outbreak in Nakasongola District. Prompt isolation of mpox cases and targeted risk communication and engagement to fisherfolks and CSWs in Lwampanga TC and SC interrupted transmission among these groups and areas.

Transmission to other groups such as students and families in the later phase of the outbreak was likely through close human-to-human contact and respiratory droplets. We recommended prompt isolation of identified mpox cases among key populations and students in schools, and targeted interventions such as risk communication and engagement to other affected areas of the country such as Kampala to interrupt further spread of infection.

Conflict of interests: The authors declare that they have no conflict of interest.

Authors' contributions: DW, AK, EN, HK, BN, JR, MN, MW, RA, AB, KR, SKH, IA, and DO participated in the design, field investigations, data collection, analysis, and interpretation. DW led the writing of the bulletin article. BK, RM, LB, and ARA participated in bulletin writing and review to ensure scientific integrity and intellectual content. All the authors contributed to the final draft of the bulletin.

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