



Uganda Public Health Fellowship Program

8th National Field Epidemiology Conference

Theme:

**Sustaining efforts to build a resilient disease surveillance
and response system**

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Abstract Book





8th National Field Epidemiology Conference 2022



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Theme: Sustaining efforts to build a resilient disease surveillance and response system

Time	Event Title	Responsible Persons
08.00-08.30	Registration of Conference Participants	Admin
	<u>Opening Plenary Session</u>	Chair: Dr. Ario Alex
08.30-08.35	Welcome Remarks	NIPH
08.35-08.40	Remarks	AFENET
08.40-08.45	Remarks	CDC
08.45-08.50	Remarks	MoH
	Session I: COVID -19	Chair: Benon Kwesiga
09:00-09:10	Characteristics and factors associated with death among hospitalized COVID-19 patients in Mulago hospital during the third wave	Rose Nampeera
09:10-09:20	Comparison of three waves of Covid-19 in Uganda	Petranilla Nakamya
09:20-09:30	Risk factors associated with deaths among hospitalized pregnant women with COVID-19 in Uganda, June 2020 to August 2021	Stella Martha Migamba
09:30-09:40	Self-Medication in the Context of COVID-19: Experience from Uganda, 2022	Veronica Masanja
09:40-09:50	Spatial distribution and impact of COVID-19 lockdowns on particulate matter (PM2.5) in Kampala city, Jan 2020 - Jun 2022	Mackline Ninsiima
09:50-10:00	COVID-19 outbreak investigation among refugees in Nyakabande Transit Centre, Kisoro district, Southwestern Uganda	Peter Kawungezi
10:00-10:10	COVID-19 vaccine uptake and coverage in Uganda: a descriptive study, 2021 - 2022	Patrick King
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10:30-11:00	Break	
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11:10-11:20	Trends and spatial distribution of perinatal deaths in Uganda: A descriptive analysis of surveillance, 2017 - 2021	Brian Agaba

11:20-11:30	Trends and spatial distribution of pneumonia admission and mortality among children under five years of age in Uganda, 2013-2021	Mercy Wanyana
11:30-11:40	Syndromic surveillance during the Uganda Martyrs' Commemoration Mass Gathering, May - Jun 2022	Mackline Ninsiima
11:40-11:50	Rapid health assessment in the refugee and host communities in Kisoro district, Southwestern Uganda, Jun - July 2022	Brenda Ssimbwa
11:50-12:00	Increasing trends of antibiotic resistance in Uganda, 2018 - 2021	Saudah Namubiru
12:00-12:20	Q/A	
	Session 3: HIV/TB	Chair:Gonahasa Doreen
12:20-12:30	Maintenance of HIV viral load suppression at 6 months post-ART optimization among treatment-experienced clients aged ≤19 years in Kampala district, Uganda, 2020-2021	Allan Komakech
12:30-12:40	Flexi hours as an intervention to promote voluntary male medical circumcision in central Uganda, 2018-2019	Sarah Elayette
12:40-12:50	Geographical distribution of recent HIV infections and association with economic index in Uganda	Immaculate Atuhaire
12:50-01:00	HIV Test Positivity and Testing for Recent Infections among Adolescent Girls and Young Women Aged 10-24 years in Uganda, 2017 - 2021	Patience Mwine
01:00-01:20	Q/A	
01:20-02:10	Lunch	
	Session 4: Food Bourne Diseases	Chair: Migisha Richard
02:10-02:20	Methanol poisoning caused by adulteration of alcohol at production stage in a factory in Northwestern Uganda, August 2020	Robert Zavuga
02:20-02:30	Factors Associated with Acute Watery Diarrhea among Children Aged 0–59 Months in Obongi District, Uganda: A Case–Control Study	Edrisa Nsubuga
02:30-02:40	Q/A	
	Session 5: NCD	Chair:Steven Kabwama
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02:50-03:00	Trends and distribution of hypertension in Uganda, 2016 - 2020	Thomas Kiggundu
03:00-03:10	Effectiveness of a group-based education and monitoring program, delivered by health workers, to improve control of hypertension in island districts of Lake Victoria, Uganda	Andrew Kwingira
03:10-03:20	Q/A	
	Session 6: Parasitic Diseases	Chair: Job Morukileng
03:20-03:30	Investigation of Human Tungiasis Cases in Sheema District, November 2021-February 2022	Sherry Ahirwe

03:30-03:40	Scabies outbreak investigation in Hoima District, Feb - Jun 2022	Rebecca Akunzire
03:40-03:50	Burden and factors associated with BWF in Eastern Uganda	Alice Asio
03:50-04:00	Risk factors for death among children with severe malaria in Namutumba district, Eastern Uganda	Goretti Zalwango
04:00-04:10	Q/A	
	Session 7: Zoonotic Diseases	Chair: Paul Okello
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04:20-04:30	Knowledge, Attitudes and Practices in communities affected by Anthrax, Kazo District, 2022	Shaban Seyange
04:30-04:40	Anthrax outbreak investigation in Bududa district, May - Jun 2022	Zaina Kabaami
04:40-04:50	CCHF outbreak investigation in Rakai district	Jane Zalwango
04:50-05:00	Q/A	
	Departure	

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Session I: COVID -19

1.1 COVID-19 Treatment Availability and Prescribing Practices in Uganda, December 2021–January 2022

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Background: Uganda's Ministry of Health (MoH) published COVID-19 management guidelines in April 2020, including prescription recommendations to prevent superinfections and supportive care to improve outcomes in COVID-19 patients, based on disease severity. We assessed prescribing practices, including for oxygen use, in the clinical management of COVID-19 and their alignment with the Uganda guidelines.

Methods: We abstracted patient data from Mulago National Referral Hospital (MNRH) and Fort Portal Regional Referral Hospital (FRRH) for patients ≥ 18 years during December 2021 and January 2022. Disease was classified as mild (asymptomatic or symptomatic with no shortness of breath; guidelines recommend vitamin D, zinc, and paracetamol), moderate (with shortness of breath but $SPO_2 > 94\%$; guidelines recommend antibiotics, zinc and vitamin D), severe ($SPO_2 < 94\%$ on room air or > 30 breaths per min; guidelines recommend oxygen, antibiotics, steroids, zinc and clexane) and critical (severe with respiratory failure, septic shock, and/or multiple organ dysfunction; guidelines recommend oxygen, antibiotics, vitamin C, zinc and organ support if needed). We calculated agreement between treatment by clinical status and recommendations in the Uganda national guidelines.

Results: Among 332 patient records, 252 were from MNRH and 80 were from FRRH; 182 (55%) were female, median age was 57 (range 17–100) years, and 94 (28%) died. Forty-two (13%) patients had mild disease, 70 (21%) moderate, 121 (36%) severe, and five (2%) critical. Among 13 treated as moderate cases, 2 (15%) had moderate clinical status, 5 (38%) had mild, 5 (38%) had severe, and 1 (8%) died. Among 234 treated as severe cases, 86 (37%) had severe disease, 17 (7%) had mild, 53 (23%) moderate, 4 (2%) critical, and 74 (32%) died. Among 83 treated as critical, 1 (2%) had critical disease, 1 (2%) had mild, 8 (17%) had moderate, 25 (52%) had severe, and 48 (27%) died. Overall agreement of prescribing practices with the Uganda guidelines for both hospitals was 45%.

Conclusion: Overall agreement of prescribing practices in two regional referral hospitals in Uganda with guidelines was low; one-third of non-severe patients were over-treated. Further investigation into the reasons for poor agreement, including guideline appropriateness and drug availability, may inform further action.

Key words: COVID-19, treatment, prescribing

1.2 A comparison of the three waves of COVID-19 cases in Uganda, 2020-2022

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Background: Uganda has experienced three major waves of COVID-19 since March 2020, driven by the Alpha variant (wave 1; W1), Delta variant (wave 2; W2), and Omicron variant (wave 3; W3). We compared the epidemiology of cases across the three waves to inform decision-making in pandemic control.

Methods: We compared W3 cases to previously-published results for W1 and W2 cases in Uganda and used the same methods and patient numbers as the previous study. We collected medical records for 200 PCR-confirmed hospitalized patients (HP) from Entebbe and Mulago Referral Hospitals during W3. We interviewed 200 randomly-selected, PCR-confirmed non-hospitalized patients (NHPs) in W3 identified from lab records and interviewed them by phone. Data on demographics, clinical characteristics, and vaccination status were collected from patients or next-of-kin (for fatal cases).

Findings: There was no difference in median age between patients in any wave. Among HP, the proportions of female in W1, W2, and W3 were 27%, 46%, and 36%, respectively; all comparisons were significantly different ($p < 0.05$). Among NHP, the proportions of female in W1, W2, and W3 were 42%, 48%, and 43%, respectively, none significantly different. Among HP and NHP, the commonest comorbidity in all 3 waves was hypertension. W1, W2, and W3 had 18%, 28%, and 17% of HP with hypertension (significantly different between W3 and W2 ($p = 0.009$) but not W3 and W1 ($p = 0.79$)). There were no differences in the proportion of NHP with hypertension between any of the waves. No patients were vaccinated in W1. Among HP, more were fully vaccinated in W3 than in W2 (46% vs 1%, $p < 0.001$). Among HP, 6%, 26%, and 11% died in W1, W2, and W3, respectively, with W3 having significantly lower proportions of HP dying than W2 ($p < 0.001$), but not W1 ($p = 0.073$).

Conclusion: The characteristics of HP and NHP with COVID-19 were modestly different in three COVID-19 waves in Uganda. Overall, W3 cases were somewhat more similar to those in W1 than W2. However, the disease appeared to be less severe in W3 and W1 than in W2. As the SARS-CoV-2 pandemic continues to evolve, monitoring waves and new variants should remain a priority to inform the response.

Key words: COVID-19, Waves, Hospitalised, Non-hospitalised, Delta, Omicron, Uganda

1.3 Risk factors associated with deaths among hospitalized pregnant women with COVID-19 in Uganda, June 2020 to August 2021

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Background

Pregnant women are at higher risk than other COVID-19 patients for severe COVID-19 disease. Few studies have been done to understand risk factors for death among COVID-19-infected pregnant women in Africa. We investigated risk factors for death among hospitalized pregnant women with COVID-19 in Uganda.

Methods

We abstracted demographic and clinical characteristics from files of pregnant women admitted during any trimester with confirmed SARS-CoV-2 infection at eleven hospitals in Uganda. We conducted a case-control study among hospitalized pregnant women with COVID-19 during June 2020-August 2021; cases were those who died while controls were those who recovered and were discharged during the same period. We enrolled 33 cases and 109 controls. We analysed risk factors for death using multivariable logistic regression adjusted for age, trimester, parity, presence of comorbidities, and year of admission because these factors have previously been associated with COVID death or maternal death.

Results

Of 33 cases and 109 controls, 32 (97%) cases and 73 (67%) controls were hospitalised in 2021 ($p=0.01$). Among 31 cases and 105 controls with trimester data, similar proportions of cases (70%) and controls (68%) were in the third trimester of pregnancy ($p=0.73$). Thirty-two (97%) cases and 85 (78%) controls had COVID-19 symptoms at admission ($p=0.04$). Nineteen (58%) cases and nine (8%) controls had severe or critical COVID-19 disease at admission ($p<0.001$). The median length of hospitalisation for cases was 3 days (IQR: 1-6) while that for controls was 7 days (IQR: 4-11) ($p<0.001$). Having severe or critical disease at admission ($OR_{adj}=8.7$, 95% CI: 1.2-61) increased odds of death, while not receiving oxygen ($OR_{adj}=0.05$, 95% CI: 0.01-0.41) and being hospitalised >5 days ($OR_{adj}= 0.15$, 95% CI: 0.03-0.81) reduced odds of death.

Conclusion

Hospitalized pregnant women with COVID-19 (cases) who died presented for admission very ill, received oxygen, and died few days after hospitalization. Those who survived presented with less severe disease, did not need oxygen, and were discharged when it was safe for them to be discharged. Encouraging earlier admission for COVID-19 positive pregnant women could improve outcomes.

Keywords: COVID-19, pregnant, hospitalized, death, risk factors, Uganda

1.4 Self-Medication in the context of COVID-19: Experience from Uganda, 2020-2021

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Background: Self-medication outside of formal healthcare can lead to increased morbidity, mortality, delays in appropriate care, adverse drug reactions, and antimicrobial resistance. The COVID-19-related lockdown in March 2020 in Uganda interrupted access to health services for many and may have increased practices of self-medication (SM) for COVID-19. We investigated the frequency and drivers of SM for COVID-19 in Uganda, May 2020-June 2021.

Methods: The authors sent a Google Forms survey to their contact lists, who were asked to share it widely. The survey included questions about SM practices for COVID-19, reasons for SM, medicines used, and sources of information about these medicines. Randomly-selected healthcare workers at COVID-19 treatment units (CTUs) participated in key informant interviews (KIIs) about their own and their community's SM practices, perceptions of SM, and possible reasons for SM. Household heads randomly selected from a village list of households with suspected or confirmed COVID-19 cases from May 2020-June 2021 were interviewed about SM practices, perceptions, and drivers in their communities. We used logistic regression to identify predictors of SM. Inductive thematic analysis was used to identify themes from the qualitative data.

Results: In total, 563 respondents (51% male, median age 32 years) participated. Of these, 349 (62%) reported practicing SM for COVID-19; 216 (62%) of these experienced COVID-19 symptoms. Antibiotics (268; 76%) and vitamin supplements (236; 67%) (vitamins were recommended by Ministry of Health as part of home-based care) were the most commonly used SM. Among those practicing SM, information was obtained from social media (192; 55%) and friends (145; 41%). Fear of COVID-19 infection (162; 32%) and institutional isolation (107; 31%) drove SM practices versus formal healthcare. Having a comorbidity (aOR=2.4, 95% CI:1.2-5.0) and prior information on SM (aOR=4.7, 95% CI:1.2-2.7) increased odds of SM. Reasons for SM in qualitative analysis included fear of institutional isolation, lack of transport to health facilities, financial constraints to healthcare, emergency illnesses, and influence from media and friends.

Conclusion: Self-medication to prevent and treat COVID-19 was practiced frequently in Uganda. Underlying disease and prior information on SM from social networks were associated with SM; lack of healthcare access drove some SM practices. Improved access to healthcare and regulation of access to prescription medicines could reduce SM in this setting.

Keywords: Self-medication, Prevalence, COVID-19, Pandemic

1.5 Spatio-temporal trends and effect of COVID-19 lockdowns on air quality in Kampala City, 2020 – 2022

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Background: Fine particulate matter (PM_{2.5}) is among the air pollutants that pose health risks to humans, with levels >15 µg/m³ being associated with serious health effects. Vehicular emissions contribute 20-30% of PM_{2.5} levels. During the COVID-19 pandemic, Uganda experienced periodic lockdowns that prohibited vehicle transport in Kampala City. We evaluated PM_{2.5} levels in Kampala, using COVID-19-related lockdowns from 2020-2022 to understand variation and the contributions of vehicular traffic.

Methodology: PM_{2.5} mass concentration data were generated by calibrated Clarity Node Solar-Powered monitors stationed in Kampala City. We computed the 24-hourly, monthly, and quarterly average PM_{2.5} from January 1, 2020–June 30, 2022, in the city overall and the five city divisions. Seasonal Mann-Kendall statistical test was applied to assess the significance of the observed quarterly trends based on Kendall’s tau correlation coefficient (r). We used the Mann-Whitney U-test to compare the median 24-hourly average PM_{2.5} concentration during lockdown periods with that before and after the lockdown periods (March 30–May 26, 2020 and June 7–July 30, 2021).

Results: The 24-hour average PM_{2.5} was 59 µg/m³ (24-hourly average range: 18-152 µg/m³ from January 1, 2020–June 30, 2022). Kawempe Division experienced the highest 24-hour average PM_{2.5} levels of 62.7 µg/m³; Makindye Division had the lowest levels (52.7 µg/m³). The highest PM_{2.5} ranges (73.3–77.0) were reported during the morning (10-11 am) hours in Kampala City. PM_{2.5} increased over the April–June quarter during all evaluation years [2020 (r=0.56, p=0.006), 2021 (r=0.26, p=0.030), and 2022 (r=0.37, p=0.030)]. PM_{2.5} concentration reduced during the first lockdown (March 30–May 26, 2020; 45.5 µg/m³) compared to before the lockdown (Jan 1–March 29, 2020; 62.4 µg/m³) and after (May 27–June 6, 2020; 66.1 µg/m³) (p<0.001). There was a significant difference in PM_{2.5} concentration (p <0.001) between the first lockdown (March 30–May 26, 2020; 45.5 µg/m³) and second lockdown (June 7–July 30, 2021; 60.5 µg/m³).

Conclusion: PM_{2.5} air concentrations in Kampala City exceeded the maximum WHO-recommended levels even in times without vehicle traffic. Studies are needed to identify sources of pollution in Kampala City to develop interventions to improve air quality.

Keywords: Particulate Matter (PM), Fine Particulate Matter (PM_{2.5}), spatio-temporal, attributable deaths

1.6 Investigation of a COVID-19 outbreak among refugees at Nyakabande Transit Centre, Kisoro District, Southwestern Uganda, March–July 2022

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Background: Nyakabande Transit Centre (NTC) is a temporary shelter for refugees arriving in Kisoro District from the Democratic Republic of Congo (DRC). Due to conflict in DRC, approximately 34,000 persons arrived at NTC between March and June 2022. On June 12, 2022, Kisoro District reported that there had been >330 cases of COVID-19 among NTC residents over the last two months. We investigated this outbreak to assess its magnitude, identify risk factors, and recommend control measures.

Methods: We defined a confirmed case as a positive SARS-CoV-2 antigen test in an NTC resident during March 1–June 30, 2022. We generated a line list through medical record reviews and interviews with residents and health workers. We observed the setting to understand possible infection mechanisms. In a case-control study, we compared exposures between cases (persons staying ≥ 5 days at NTC between June 26 and July 16, 2022, with a negative COVID-19 test at NTC entry and a positive test at exit) and unmatched controls (persons with a negative COVID-19 test at both entry and exit who stayed ≥ 5 days at NTC during the same period). We used multivariable logistic regression to identify factors associated with illness.

Results: Among 380 case-persons, 206 (54.2%) were male, mean age was 19.3 years (SD=12.6); none died. The attack rate (AR) at NTC was higher among exiting persons (3.8%) than entering persons (0.6%) ($p < 0.0001$). Among 42 cases and 127 controls, close contact with symptomatic persons (aOR=9.6; 95% CI=3.1-30) increased odds of infection; having a face mask (aOR=0.06; 95% CI=0.02-0.17) decreased odds. We observed overcrowding in shelters, poor ventilation, and most NTC residents not wearing face masks.

Conclusion: A COVID-19 outbreak at NTC was facilitated by overcrowding and failure to use personal protective measures. Enforcing face mask use and expanding shelter space could reduce the risk of future outbreaks.

Keywords: COVID-19 outbreak, refugees, forcibly displaced persons, emergency response, Uganda

1.7 COVID-19 Vaccine Uptake and Coverage in Uganda, March 2021- June 2022

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Background: COVID-19 vaccine reduces COVID-19-associated morbidity and mortality. Uganda began COVID-19 vaccination in March 2021 and has used a variety of vaccines, including AstraZeneca, Johnson & Johnson, Moderna, Pfizer, Sinopharm and Sinovac. The WHO Global strategy on COVID-19 vaccination targeted national coverage of 10% by September 2021, 40% by December 2021 and 70% by June 2022. We assessed COVID-19 vaccination uptake and coverage in Uganda during March 2021 through June 2022 to evaluate progress towards targets and identify gaps for evidence-based recommendations.

Methods: We used secondary data from the national COVID-19 vaccination database from March 2021 through June 2022. Vaccine uptake was defined as the proportion of the population vaccinated with ≥ 1 COVID-19 vaccine dose. Coverage was the proportion of persons who had received the full number of doses ('schedule') of the relevant vaccine. For single-dose vaccines, uptake equaled coverage. We calculated uptake and coverage at national, regional and district levels and analyzed by sex and age groups. We used chi-square test to assess differences between categories.

Results: In total, 17,369,476 individuals received ≥ 1 COVID-19 vaccine dose, and 11,833,911 individuals had received the full schedule by June 2022. National uptake was 4.1%, 26.4% and 39.6% by September 2021, December 2021, and June 2022, respectively. Coverage (1.4% in September 2021, 10.2% in December 2021, and 26.8% in June 2022) was below WHO targets. Western Region (33.2%) had significantly higher coverage than Eastern (31.4%), Central (22.4%) and Northern regions (21.6%) ($p < 0.0001$). Females (10.6%) had higher coverage than males (8.6%) ($p < 0.0001$). Persons > 50 years of age had higher coverage (24.9%) than persons aged 40-49 (21.8%), 30-39 (19.0%), 18-29 (4.7%) and 12-17 (2.9%) years ($p < 0.0001$).

Conclusion: COVID-19 vaccine coverage and uptake were below WHO targets in Uganda in June 2022. Targeted vaccination efforts could improve uptake and coverage, particularly for groups and areas with the lowest coverage.

Key Words: COVID_19 Vaccine, Vaccine Uptake and Coverage

Session 2: Surveillance

2.1 Timeliness and completeness of reporting of weekly surveillance data on epidemic-prone diseases in Uganda, 2020–2021

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Background: Incomplete and late disease surveillance data are common challenges in planning, monitoring, and evaluation of health sector performance and service delivery. In Uganda, weekly surveillance data are sent from health facilities and entered into the District Health Information System version 2 (DHIS2) for aggregation into district, regional, and national level datasets. We describe completeness and timeliness of weekly surveillance data reporting for epidemic-prone diseases in Uganda during 2020-2021.

Methods: We abstracted weekly completeness and timeliness data for epidemic-prone diseases for 146 districts of Uganda from the DHIS2. Timeliness is the proportion of all expected weekly reports that were submitted to DHIS2 by 12:00pm Monday of the following week. Completeness is the proportion of expected weekly reports that were completely filled and submitted to DHIS2 by 12:00pm Wednesday of the following week. Targets for both timeliness and completeness are $\geq 80\%$. We evaluated completeness and timeliness of reporting by year, quarter, health region, and district.

Results: National reporting timeliness and completeness improved from 44% to 48% ($p=0.006$) and 72% to 78% ($p=0.005$), respectively, from the first quarter of 2020 to last quarter of 2021. In both years, timeliness and completeness were lowest during the first quarter. Six of 15 health regions attained the completeness target in all quarters except the first quarter of 2020; Lango attained 100% completeness from the second quarter of 2020 to the fourth quarter of 2021. No region achieved the timeliness target in either 2020 or 2021. Only one district achieved the timeliness target in 2020 and nine (6%) achieved it in 2021, while 65 (45%) districts attained the completeness target in 2020 and 71 (49%) attained it in 2021.

Conclusion: Weekly surveillance reporting on epidemic-prone diseases improved modestly during 2020–2021, but timeliness is still poor. Further investigations to identify barriers to surveillance data reporting timeliness are needed.

Key words: Disease surveillance, Epidemic Prone Diseases, Weekly Surveillance Data Reporting, Completeness, Timeliness, Uganda,

2.2 Trends and spatial distribution of perinatal deaths in Uganda: a descriptive analysis of surveillance data, 2017–2021

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Background: Over the last decade, there have been multiple interventions aimed at reducing the burden of perinatal deaths in Uganda. These include perinatal death audits and newborn care packages. Despite these, the country has not reached the <12 deaths per 1,000 births target stipulated in WHO's Sustainable Development Goals. We describe temporal and spatial trends of perinatal deaths during 2017 to 2021 to evaluate progress towards targets.

Methods: We extracted data on macerated stillbirths (MSB), fresh stillbirths (FSB), early newborn deaths (END), and total births from the District Health Information System (DHIS2) from 2017-2021. FSB was intrauterine death of a fetus ≥ 28 weeks of gestation or $\geq 1,000$ grams. MSB was intrauterine death of a fetus before labor onset in which the fetus showed degenerative changes. END was death of a baby (≥ 28 weeks of gestation/ $\geq 1,000$ g) at 0-7 days of life. MSB, FSB, and END were summed to obtain total perinatal deaths; rates were calculated per 1,000 total births. We analyzed trends using logistic regression and described spatial distribution by region and district.

Results: Among 139,948 perinatal deaths (53,001 MSB, 51,566 FSB and 35,381 END), the annual average perinatal death rate was 23/1,000 births, reducing from 28/1,000 in 2017 to 19/1,000 in 2021 (OR=0.92, CI=0.91-0.92). The largest reduction in perinatal deaths was 14%, occurring between 2020 and 2021. The average annual reduction in MSB was 10% (OR=0.90, CI=0.90-0.91), in FSB was 7% (OR=0.93, CI=0.93-0.94) and in END was 10% (OR=0.91, CI=0.90-0.92). Central Region had the highest perinatal death rate (27/1,000), while Eastern Region had the lowest (20/1,000).

Conclusion: Perinatal deaths declined between 2017-2021 but remained above the WHO Sustainable Development Goals target. Central Region was the most affected. It may be necessary to evaluate the implementation of existing interventions and, if needed, implement additional interventions to achieve targets.

Keywords: Perinatal deaths, trends, spatial distribution

2.3 Pneumonia hospital admissions and mortality among children under five years in Uganda, 2013-2021

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Background: Pneumonia is the second leading cause of hospital admissions and deaths among children <5 years in Uganda. While the pneumococcal conjugate vaccine was introduced to the routine immunisation schedule in 2013, little is known about the country's progress since then in reducing pneumonia admissions and deaths. We described the trends and spatial distribution of pneumonia hospital admissions and mortality among children <5 years in Uganda during 2013–2021.

Methods: We analyzed aggregate secondary data on pneumonia admissions and deaths from the District Health Information System 2 from 2013–2021. Reporting rates were defined as the percentage of complete submitted monthly reports over the study period divided by the number of expected reports. Pneumonia admissions and mortality rates were calculated per 100,000 children <5 years at national, regional, and district levels. Logistic regression was used to assess the significance of the trend.

Results: There were 753,978 pneumonia admissions and 13,632 deaths during 2013–2021 among children <5 years. Reporting rates for admissions and death during this period increased from 78% to 92% (100,000) in Kotido and Gulu Districts. Annual mortality rates decreased by 6% (OR=0.94, 95% CI: 0.93-0.95) over the study period, with the smallest decline in Eastern Region (OR=0.95, 95% CI: 0.94-0.96) and the largest in Central Region (OR=0.93, 95% CI: 0.92-0.94). Gulu District had the highest mortality rates (40 to 110/100,000) over all 9 years.

Conclusion: Both hospital admissions and mortality from pneumonia among children <5 years declined from 2013-2021 in Uganda despite increases in reporting. Interventions to improve early identification and appropriate treatment of pneumonia at community and outpatient levels could accelerate the declines.

Keywords: Pneumonia admission, mortality, children under five years of age

2.4 Syndromic surveillance during 2022 Uganda Martyrs' commemoration, May–June 2022

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Background: Mass gatherings frequently include close, prolonged interactions between people, which can present opportunities for infectious disease transmission. During May 25–June 3, 2022, over 4 million pilgrims gathered at Namugongo Catholic and Protestant shrines to commemorate the annual Uganda Martyr's Day. We described syndromes suggestive of key priority diseases among visiting pilgrims during this period to inform future planning for mass gatherings in Uganda.

Methodology: We interviewed every tenth pilgrim in the lines at the main entrance gates and in the designated zonal areas about symptoms of priority public health illnesses (COVID-19 and viral hemorrhagic fevers (VHF)). A suspected COVID-19 case was defined as ≥ 2 of: fever >37.5 C, flu, cough, and difficulty breathing. A suspected VHF case was defined as fever >37.5 C and unexplained bleeding. We also abstracted secondary data on 5,582 pilgrims who sought medical care for the same public health conditions at designated medical tents from Health Management Information Systems (HMIS) registers and conducted descriptive analysis.

Results: Among 1,350 pilgrims interviewed, 767 (57%) were female and mean age was 37.9 (± 17.9) years. A total of 236 (18%) reported ≥ 1 case definition symptom and 25 (2%) reported ≥ 2 symptoms. Twenty-two (1.6%) were suspected COVID–19 cases and three (0.2%) were suspected VHF cases, two (from Kampala City and Lira District) bleeding from the nose and one (from Sironko District) with bloody vomitus and urine. Among 5,582 pilgrims who sought care at the medical tents, 538 (9.6%) had suspected COVID-19 and one had suspected VHF. None had samples collected for laboratory testing.

Conclusion: Almost one in fifty pilgrims at the 2022 Uganda Martyrs' commemoration had symptoms of COVID-19 or VHF. Despite the epidemic potential for these diseases, none of the case-patients were tested, providing an opportunity for disease introduction and spread. Both intensified syndromic surveillance and planned laboratory testing capacity at mass multi-day gatherings could facilitate early detection of public health emergencies that could stem from such events.

Keywords: Syndromic surveillance, mass gathering, missed opportunities

2.5 Completeness and timeliness of disease surveillance information reporting in Uganda, 2020-2021

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Background: In Uganda, electronic District Health Information System (DHIS2) surveillance data are entered by health facilities on a weekly or monthly basis. Monthly outpatient department (OPD) data are segregated into data from Ugandan nationals, data from refugees, and data from foreigners. We assessed completeness and timeliness of monthly OPD data from Ugandan nationals from January 2020 to December 2021.

Methods: We used DHIS2 data from all 15 regions and 146 districts of Uganda from January 2020-December 2021. Completeness was defined as the number of submitted reports divided by the number of expected reports from the same health facility, district, or region. Timeliness was defined as the number of reports submitted by the deadline (15th day of the succeeding month) divided by reports received. Facilities, districts, or regions with completeness or timeliness <80% were regarded as having submitted incomplete or untimely reports.

Results: The median completeness of facility OPD reports was high in 2020 (99.5%; IQR 97.8-100%) and 2021 (100%; IQR 98.7-100%), as was the median timeliness (2020, 82.8%, IQR 74.6-91.8%; 2021, 94.9%, IQR 86.5-99.1%). In 2020, only Namisindwa district failed to reach $\geq 80\%$ completeness, while in 2021 all districts reached $\geq 80\%$ completeness. Failure to reach the timeliness threshold was identified in 59 (40%) districts in 2020 and 21 (14%) districts in 2021. In terms of regions, no region reported below the 80% OPD completeness threshold; Kampala region (comprising Kampala, Wakiso, and Mukono districts) was the only region that consistently failed to reach $\geq 80\%$ OPD timeliness (2020: 44%; 2021: 65%).

Conclusion: There was an overall good performance in submission of complete and timely monthly OPD reports in both 2020 and 2021 in the DHIS2 across most districts and regions in Uganda. There is a need to strengthen the good reporting practices exhibited and offer support to regions and districts with challenges to timeliness.

Keywords: Completeness, Timeliness, Disease Surveillance

2.6 Rapid health assessment in the refugee host communities in Kisoro District, South Western Uganda, June–July 2022

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Background

In late March 2022, conflicts in the Democratic Republic of Congo (DRC) led to >50,000 persons crossing into Kisoro District, Uganda. While the district has a well-organized transit centre to house refugees, most stayed in the Bunagana Town Council (BTC; population ~18,000), the nearest town across the border, as they awaited return home. We carried out a rapid health assessment in July 2022 to establish the health gaps in BTC and recommend public health actions for rapid response.

Methods

We carried out 5 key informant interviews with the local leaders in Kisoro District to establish areas affected by the influx from DRC and used a checklist to assess resource gaps in the community. We adapted the WHO standardized health assessment tool for assessing 23 health facilities in Kisoro and BTC. Scores <70% were ‘low preparedness.’

Results

Key informants reported uncontrolled entry and exit of refugees with no screening for diseases at the border. They also reported that persons stayed in BTC instead of the refugee transit centre due to fear of being permanently and involuntarily resettled, fear of mandatory vaccination, and separation of husbands and wives at the centre. There were two health facilities with 14 health workers, two public toilet facilities, and two major water sources to serve the permanent BTC population and all refugees in BTC. The 2 health facilities in BTC reported drug stockouts as their biggest challenge. Among the 23 facilities assessed for preparedness in Kisoro District, 22 (96%) scored <70%.

Conclusion

BTC was not adequately prepared in terms of either health capacity or water sources for a large refugee influx; a transit centre organized to address such influxes was considered undesirable by some. Given its proximity to DRC, such an influx is likely to happen again. Educating refugees about resettlement and consideration of rules that allow families to stay together might encourage greater acceptance of the transit centre. Having a plan at BTC as well as in the transit centre for drug supplies and health care could support preparedness.

2.7 Trends and patterns of antimicrobial resistance among organisms isolated from patient's sterile site samples in Uganda: analysis of National AMR surveillance data 2018-2021

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Background: Continuous monitoring of antimicrobial resistance (AMR) among clinical isolates can inform effective drug selection for patients. In Uganda, human AMR surveillance occurs at national and regional referral hospitals and in selected public universities. Patient isolates are subjected to drug susceptibility testing; the results are used in real-time for patient care. Isolates are subsequently sent to the National Microbiology Reference Laboratory (NMRL) for re-analysis as part of quality assurance. Results from NMRL are considered the official AMR surveillance data, but there is limited utilization of these data. We evaluated trends and patterns of AMR to common antibiotics used in Uganda.

Methods: We analyzed pathogenic blood, cerebrospinal, peritoneal, and pleural fluid isolates in AMR surveillance data from 2018-2021. We calculated the proportions of isolates that were resistant to common antimicrobial classes. We used the chi-square test for trends to evaluate changes in AMR resistance over time.

Results: Among 537 isolates with 15 pathogenic bacteria, 478 (89%) were from blood, 34 (6.3%) were from pleural fluid, 21(4%) were from cerebrospinal fluid, and 4 (0.7%) were from peritoneal fluid. The most common pathogen was *Staphylococcus aureus* (20.1%), followed by *Salmonella spp* (18.8%). Annual resistance was highest for sulphonamides (63–84%), fluoroquinolones (46–71%), macrolides (46–76%), phenicols (48–71%), penicillins (42–97%), β -lactamase inhibitors (20–92%), and aminoglycosides (17–53%). It was lower for cephalosporins (8.3–90%), carbapenems (5.3-26%), and glycopeptides (0–20%). Annual resistance rates to ciprofloxacin increased from 2018-2021 for Gram-positive organisms (26-45% p=0.02). Among Gram-negative organisms, there were increases in resistance to ceftriaxone (8-72%, p=0.003), ciprofloxacin (17-43%, p=0.004), imipenem (6-26%, p=0.004), meropenem (7-18, p=0.03), and tetracycline (29-78%, p<0.001).

Conclusions: There is a high and increasing burden of drug resistance to common antibiotics in Uganda. Continuous monitoring of AMR trends at the national level can support appropriate action to combat drug resistance.

Keywords: Antimicrobial agents, Antibiotic, Resistance, isolate

Session 3: HIV/TB

3.1 Maintenance of HIV viral load suppression at six months post-antiretroviral therapy regimen optimization among treatment-experienced clients aged ≤ 19 years, Kampala, Uganda, 2020–2021

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Background: Antiretroviral therapy (ART) optimization aims to enhance long-term treatment effectiveness, adherence, tolerability, safety, convenience, and affordability. In Uganda, optimized regimens are offered to treatment-experienced people living with HIV (PLHIV) with viral load suppression (VLS), defined as VL $< 1,000$ copies/ml, and to treatment-naïve PLHIV. While optimization efforts with dolutegravir-based regimens initially focused on adults, recent efforts have expanded to children and adolescents. We assessed VLS among treatment-experienced children and adolescents placed on optimized regimens in Kampala, Uganda.

Methods: We conducted a retrospective cohort study at four HIV clinics in the Kampala district during February 2020–October 2021. All patients were treatment-experienced PLHIV aged ≤ 19 years with VLS prior to optimization. We evaluated maintenance of VLS at 6 months post-optimization. We abstracted data from medical records on age, sex, individual clinical characteristics (point of entry into care, WHO clinical stage of HIV), drug regimen, and ART adherence (recorded by clinicians using a checklist and generally referring to patients taking $>95\%$ of their doses). Descriptive summary statistics were calculated, and associations established using multivariable modified Poisson regression analysis.

Results: We reviewed records of 1,013 clients; mean age was 11 years (standard deviation=4.7 years). Forty percent of clients were in the age group 10-14 years, and 59% were female. Eight-six percent were at WHO clinical stage 1 at enrollment; 97% had good adherence. Seventy-five percent were on a dolutegravir-based regimen while 25% were on lopinavir-based regimen. Ninety-four percent maintained VLS at 6 months. No factors evaluated were found to be associated with viral load non-suppression.

Conclusion: Almost all pediatric and adolescent patients on optimized regimens maintained VLS after 6 months. However, a comparison group may be needed to evaluate the impact of optimization. Larger cohorts could provide information on reasons for viral load non-suppression among this population.

Key words: Viral load suppression, pediatric, adolescents, regimen optimization, Uganda

3.2 Improving HIV pre-exposure prophylaxis uptake among pregnant and breastfeeding women at increased risk for HIV acquisition at Katakwi General Hospital, May-October, 2022

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Background: In 2020, the Uganda Ministry of Health (MoH) rolled out oral pre-exposure prophylaxis for HIV (PrEP) among pregnant and breastfeeding women at substantial risk of HIV acquisition ('high-risk') as part of a comprehensive prevention strategy. However, review of PrEP registers at Katakwi General Hospital from January 2020 to April 2022 indicated that few high-risk women were enrolled on PrEP. We conducted a quality improvement (QI) project to increase PrEP uptake among high-risk pregnant and breastfeeding women at Katakwi General Hospital.

Method: We defined 'baseline' as January 2020-April 2022, 'midline' as May-July 2022 and 'endline' as August-October 2022. We reviewed PrEP registers at baseline to establish the number of high-risk pregnant and breastfeeding women enrolled on PrEP. A quality improvement team was formed and trained on the Plan-Do-Study-Act approach. Together with the team, we analysed the root causes of low PrEP uptake among high-risk pregnant and breastfeeding women using fishbone analysis and implemented interventions. To evaluate the intervention success, we reviewed PrEP data for high-risk pregnant and breastfeeding women at midline and endline and assessed changes from baseline in proportions of targeted women who enrolled in PrEP using chi-square test.

Results: Fishbone analysis identified reasons for low PrEP uptake as lack of healthcare worker training, screening, and facility-based PrEP sensitization. Training of healthcare providers offering PrEP and facility based PrEP sensitizations were conducted. At baseline, only 186/955 (19%) high-risk pregnant women and 48/420 (11%) high-risk breastfeeding women were enrolled on PrEP. Among high-risk pregnant women, uptake increased to 125/220 (57%) at midline ($p < 0.0001$) and to 264/265 (100%) at endline ($p < 0.001$). Among high-risk breastfeeding women, uptake increased to 120/182 (67%) at midline ($p < 0.0001$) and to 202/203 (100%) at endline ($p < 0.0001$).

Conclusion: Targeted training of healthcare providers enabled increases in PrEP uptake among at risk pregnant and breastfeeding women. Regular facility-based sensitizations and trainings could encourage continued engagement in PrEP uptake at Katakwi General Hospital.

Key words: Pre-exposure prophylaxis, pregnant, breastfeeding, increased risk for HIV acquisition.

3.3 Geographic Distribution and Economic Factors Associated with Rapid Test for Recent HIV Infection (RTRI)-Recent HIV infections in Uganda, 2019-2021

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Background

As Uganda moves towards HIV epidemic control, it is increasingly important to rapidly identify recent infections and transmission hotspots. HIV recent infection surveillance is one approach to finding such infections and hotspots. We determined the geographical distribution of Rapid Test for Recent Infection (RTRI)-recent HIV infections and assessed the association of the district economic index with the frequency of recent infections in Uganda.

Methods

We used program surveillance data for newly-identified HIV cases tested by RTRI for recent HIV infection (acquired <12 months ago) during November 2019-October 2021 in 112 districts carrying out recency testing. We abstracted data on RTRI-HIV recency results and overlaid a map of district wealth quintiles with recency data. Wealth quintiles were derived from aggregated household-level data from the 2018 Malaria Indicator Survey, with the bottom two quintiles being 'poor', the middle quintile being 'moderately wealthy', and the top two quintiles being 'wealthy'. We regrouped these into wealth tertiles for this study. We conducted an adjusted (adjusted for age and sex) logistic regression to determine the association between HIV RTRI-recency and geographical location and economic index.

Results

Among 12,274 newly-identified HIV infections, 1,230 (10%) were RTRI-recent. Quarterly rates of RTRI-recent infections ranged from 7-26%. RTRI-recent HIV infections were more frequent in the Western Region (12%) than other regions (Central: 9%; Northern: 10%; Eastern: 9%). Western region had higher odds of recent HIV infection compared to Central region (aOR=1.3; 95%CI=1.1-1.5). The odds of recent infection were lower in districts categorized as wealthy (aOR=0.60, 95%CI=0.47-0.85) compared to districts categorised as poor.

Conclusion

Residence in Western Uganda was significantly associated with RTRI-recent HIV infections during 2019-2021. Lower socioeconomic status may also increase risk for RTRI-recent HIV infections. Further studies that evaluate the impact of these variables at the individual (non-aggregated) level on recent infection and the addition of viral load data to enhance the reliability of recency results could help identify hotspots for new HIV infections.

Session 4: Food Bourne Diseases

4.1 Cyanide poisoning outbreak linked to cassava consumption in Pakwach District, September 2022

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Background

Cassava is a staple food in Uganda. Raw cassava contains cyanogens and requires lengthy manual processing for 12-14 days; inadequately processed cassava can retain residual cyanide at levels >10 mg/kg, which are considered unsafe and can cause poisoning if consumed. Cassava poisoning events are rare. On September 8, 2022, Pakwach District reported an outbreak of suspected food poisoning, including four deaths, among persons who recently ate cassava. We investigated to determine the cause, scope, and risk factors, and recommend control and prevention measures.

Methods

We defined a case as acute onset of ≥ 2 of headache, vomiting, abdominal pain, loss of consciousness, general body weakness, nausea, rapid heartbeat, dizziness, fever, diarrhea, sweating, muscle weakness, blurred vision, and rapid breathing in a Pakwach District resident from September 1-15, 2022. To find cases, we reviewed medical records and carried out active community case-finding. We described cases by person, place, and time and tested samples of implicated cassava for cyanogen glycosides at the Government Analytical Laboratory.

Results

We identified three separate geographic clusters comprising 41 persons in four affected families. One cluster each was found in the neighboring Alwii, Panyimur and Pakwach subcounties. The most common symptoms were headache (n=36; 88%), vomiting (n=23; 56%), and abdominal pain (n=21; 51%). Eight (19.5%) case-patients died, all aged ≤ 14 years. Females (attack rate [AR]=7.1) were more affected than males (AR=4.9). Persons aged ≤ 14 years (AR=2.5) were more affected than those 15-54 years (AR=1.5) and ≥ 55 years (AR=0.3). Cassava sources were independent for all three clusters (harvested from separate gardens located >15 km from each other). Persons in all clusters reported shortened processing times for cassava (mean: 9 days, range, 8-11 days). Among 3 samples of cassava flour from the 3 clusters, cyanogen glycoside levels ranged from 82-94mg/kg.

Conclusion

Three separate but simultaneous outbreaks in Pakwach District were likely caused by eating inadequately-processed cassava. The reasons for concurrent, unlinked outbreaks associated with a rare exposure remain unknown. Continuous community health education to encourage proper processing and routine random testing of cassava flour for cyanogen glycosides could reduce the impact of such outbreaks in the future.

Keywords: Cyanide toxin, food poisoning, cassava

4.2 Methanol poisoning caused by adulteration of alcohol at production stage in a factory in North Western Uganda, August 2022

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Background: Methanol is a toxic industrial solvent that, when ingested, can cause vision loss, severe illness, and death. The maximum safe limit of methanol in drinking alcohol is 50mg/L. In August 2022, the Uganda Ministry of Health was notified of a cluster of sudden deaths in Arua City and Madi-Okollo districts among persons who had consumed gin (Gin X) produced from a local fruit wine manufacturer (Manufacturer A). We investigated to determine the scope of the problem, identify risk factors for the sudden deaths, and recommend control and prevention measures.

Methods: We defined a suspected case as acute onset of blurred vision with abdominal pain, general body weakness, headache, or profuse sweating in a resident of Arua City or Madi-Okollo districts from 16–26 August 2022. We conducted a retrospective cohort study to identify risk factors for death among cases. Together with Uganda Police Force and the Uganda National Bureau of Standards, we collected samples of Gin X from Manufacturer A for toxicologic analysis at the Government Analytical Laboratory in Kampala and reviewed production permits on-site. Autopsies were carried out on all deceased case-patients who were taken to Arua Regional Referral Hospital.

Results: We identified 48 cases (47 male); 18 (38%) died. The median age of cases was 32 years (IQR 26-46). Compared with case-patients who consumed ≤ 1 200ml bottle of Gin X, the risk of dying was 10 times higher (RR=10.7, 95% CI: 1.5-75, p=0.02) among those who drank ≥ 3 bottles. The mean methanol content among five Gin X samples collected from manufacturer A was 594,424 mg/L (range 259,263-809,193 mg/L). Autopsies of eight case-patients all showed liver inflammation oedema, gastrointestinal bleeding, and pulmonary oedema, consistent with methanol poisoning. A disagreement between the chemist and owner at Manufacturer A had led to the abrupt recent departure of the chemist, four days before the first case-patient's onset on 17 August 2022. In July 2022, Manufacturer A had been denied a license to produce gins.

Conclusion: This outbreak was caused by consumption of gin that was adulterated with methanol at production stage before reaching the market. We recommend strict enforcement of the laws that govern alcohol production and distribution.

Keywords: Methanol, alcohol poisoning

4.3 Factors Associated with Acute Watery Diarrhea among Children Under 5 Years in Obongi District, Uganda: A Case–Control Study

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Background: Diarrheal diseases are a leading cause of morbidity in Ugandan children. Despite having a 2-dose rotavirus vaccination coverage of >95% from 2019-2021, Obongi District consistently reported the highest incidence of acute watery diarrhea (AWD) in the country from 2017-2021. We assessed the factors associated with AWD among children <5 years in Obongi District during April 2022.

Methods: We conducted a 1:2 unmatched case–control study. We defined a case of AWD as the passage of ≥ 3 loose/liquid stools per day with negative malaria and pneumonia tests in a child <5 years residing in Itula or Parolinya subcounties from 1-30 April 2021. We reviewed medical records and interviewed case persons caregivers. A control was a child <5 years from a neighboring household with no AWD from 1-30 April. We used logistic regression to identify factors associated with AWD.

Results: Among 193 cases and 386 controls, 104 (54%) cases and 183 (47%) controls were male ($p=0.14$) and 58 (30%) cases and 127 (33%) controls were aged 12-23 months ($p=0.56$). In total, 187 (97%) cases and 369 (96%) controls had received at least one dose of rotavirus vaccine ($p=0.45$) and 58 (30%) cases and 120 (34%) control households ($p=0.34$) treated their drinking water by boiling/chlorine. Suffering from a comorbidity (undernutrition, diabetes mellitus, and/or HIV) (AOR=12; CI: 2.5-53), having a caregiver who did not wash hands with soap and water after visiting the toilet (AOR=3.9; CI: 1.2-13), and living in households that used borehole water versus piped water (AOR=4.0; CI: 1.7-9.6) were associated with AWD.

Conclusions: Comorbidities, failure of caregivers to wash their hands with soap after visiting toilets, and use of borehole water were the factors associated with AWD. Community sensitization on handwashing at critical times, using clean water and soap, and expanded use of piped water could reduce AWD incidence in this area.

Keywords: Acute watery diarrhea, Children under 5 years, Associated factors, Obongi District, Uganda

Session 5: Non-Communicable Diseases (NCDs)

5.1 Increasing rates of anemia among pregnant women in Uganda, 2017-2021

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Introduction: Anemia in pregnancy is a public health problem associated with serious adverse pregnancy outcomes. Tracking trends in anemia in pregnancy is important to assess the impact of interventions that target its prevention. In Uganda, iron and folic acid supplementation are provided at all antenatal care (ANC) visits. However, little is known about current trends and distribution of anemia in pregnancy in Uganda. We described the five-year trends of anemia among pregnant women in Uganda during 2017–2021.

Methods: We analysed nutrition surveillance data from 2017–2021 from the District Health Information System (DHIS2). We defined anemia in pregnancy as hemoglobin (Hb) concentration <11g/dl. We calculated anemia prevalence/1,000 women attending ANC at district, regional, and national levels, and by the first and fourth ANC visits. We used logistic regression to determine the significance of trends.

Results: Among 8.2 million first ANC visits and 5.3 million fourth ANC visits, the average annual prevalence was 16/1,000 pregnant women at the first ANC visit and 7/1,000 at the fourth ANC visit. The prevalence of anemia among pregnant women attending the first ANC visit increased from 2017-to 2021 by 50% (OR=1.5; CI:1.4-1.6, P<0.001) while that of pregnant women attending the fourth ANC visit increased by 20% (OR=1.2; CI:1.1-1.3, p<0.001). Districts with a persistently high prevalence of >60/1,000 pregnant women at least 3 of the 5 years were all in Northern Region and included Nakapiripirit, Adjumani, Napak, Nabilatuk, and Obongi Districts.

Conclusion: The proportion of pregnant women with anemia reduced from the first to the fourth ANC visit during 2017-2021 by more than half, suggesting potential recovery from anemia after a first visit. However, the prevalence at each visit increased significantly during the study period. We recommend further investigation to confirm this finding and investigate reasons for the apparent increase in anemia across ANC visits.

Keywords: Anemia, pregnant women, Antenatal care, Uganda

5.2 Trends and Distribution of Hypertension in Uganda, 2016-2021

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Background

Hypertension increases the risk of both cardiovascular and cerebrovascular diseases, leading to the premature death of an estimated 9.4 million persons per year worldwide. The most recent data in Uganda reported the overall prevalence of hypertension among adults at 31.5% with the central region having the highest at 34.3% in 2016. However, the trends and distribution of hypertension in Uganda have not been described recently. We described the trends and distribution of Hypertension in Uganda from 2016 to 2021.

Methods

This was a descriptive analysis of extracted national, regional, and district-level aggregated surveillance data on Hypertension from District Health Information System (DHIS2). The study population was adults ≥ 19 years with hypertension from 2016 to 2021. Data were cleaned and analyzed using MS Excel and Epi Info. Logistic regression was used to assess trends of hypertension from January 2016 to December 2021. We described the spatial distribution of hypertension by region.

Results

The overall incidence of hypertension increased significantly from 47 per 1000 in 2016 to 64 per 1000 in 2021 (OR=1.07 95%CI 1.07-1.07), with a 7.4% annual increase. The Western Region had the largest increase in the incidence of hypertension (OR=1.13 95%CI 1.13-1.13), the Central Region (OR=1.05 95%CI 1.05-1.05), the Eastern Region (OR=1.04 95%CI 1.04-1.04), and Northern Region had the smallest (OR=1.10 95%CI 1.10-1.11). The Western Region had the largest increase of 12.6% between 2016 and 2021. There was an overall positive trend of hypertension in all regions of Uganda. The trend observed was statistically significant ($p < 0.001$).

Conclusion

Hypertension is increasing in Uganda hence the need to implement focused public health interventions such as increasing awareness of the causes of hypertension and promoting lifestyle modifications to reduce its burden.

Keywords: Trends, Distribution, Hypertension, Uganda

5.3 Effectiveness of a Group-based Education and Monitoring Program Delivered by Community Health Workers to Improve Control of High Blood Pressure in Island Districts of Lake Victoria, Uganda, 2022

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Introduction: Identifying and treating high blood pressure can prevent a range of health problems. However, individuals with poor access to healthcare may be unaware of their high blood pressure. While the use of community health workers (CHWs) can address gaps in human resources for health, CHWs in Uganda have not been used previously for blood pressure (BP) screening and management. We report the results of an initiative to train CHWs to evaluate BP and administer group-based education in the island districts of Lake Victoria, Uganda.

Methods: We randomly selected 42 of 212 villages in two island districts. We trained 84 island-based CHWs on measuring BP for 5 days. From February-March 2022, these CHWs visited all households in selected villages and invited all adults ≥ 18 years to be screened for high blood pressure. We used World Health Organization's STEPwise tool to collect demographic and behavioral data and BP measurements. CHWs created and led support group meetings among individuals identified with high blood pressure at baseline. At each group meeting, CHWs re-measured BP and administered self-management and lifestyle education to participants. We determined the prevalence of high blood pressure and used modified Poisson regression to assess factors associated with high blood pressure. The paired t-test was used to compare mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) before and after the intervention. Generalized estimating equations (GEE) were used to model changes in BP.

Results: We trained 84 CHWs to measure BP. Among 2,016 community members, 570 (28%) were hypertensive; of these, 63 (11%) had been diagnosed previously. The prevalence of high blood pressure was higher among persons aged 40-49 years (aPR=2.7; 95% CI=1.3-5.5) and ≥ 50 years (aPR=3.6; 95% CI=1.8-7.3) than those 18-19 years, after adjusting for sex, education, alcohol use, and tobacco smoking. There were significant post-intervention reductions in SBP (-6.86 ± 13.61) and DBP (-2.66 ± 9.91 mmHg). GEE showed decreases of -1.133 (SBP) and -0.543 mmHg (DBP)/fortnight.

Conclusion: High blood pressure was common but undiagnosed in the island districts of Lake Victoria. CHW-led group-based self-management and education for improving the control of high blood pressure was effective. Scaling up the intervention in other hard-to-reach districts could reduce the burden of undiagnosed high blood pressure and improve blood pressure control on a large scale across Uganda.

Keywords: Prevalence, High blood pressure, Uganda

Session 6: Parasitic Diseases

6.1 Investigation of Human Tungiasis Cases, Sheema District, Uganda, November 2021 to February 2022

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Background: No formal surveillance system exists in Uganda for tungiasis, and outbreaks are frequently reported through media. On 27 January 2022, a news alert reported a jiggers (tungiasis) outbreak in Sheema District, Southwestern Uganda. We investigated to establish the magnitude of the problem and identify possible exposures associated with infestation to inform control measures.

Methods: We defined a confirmed case as visible *Tunga penetrans* in the skin of a resident of any of the 6 affected villages in Bwayegamba Parish in February 2022. A suspected case was self-reported *T. penetrans* infestation during three months preceding the interview. We visited all households in the 3 most affected villages to identify cases and conduct interviews. We assessed social-economic status, house construction, mitigation measures against jiggers, and observed participants (feet, clothes, nails, walking barefooted) and their compounds for hygiene. A 'yes' response to any one hygiene variable was considered 'poor hygiene'. We conducted one case-control study comparing case-households (with ≥ 1 case) with control-households (without any cases), and one comparing individual cases (suspected and confirmed) to neighbourhood controls.

Results: Among 278 households, we identified 60 cases, among whom 34 (57%) were male. Kiyungu West was the most affected village (attack rate=31/1,000). Cases had higher odds of being male (OR_{MH}=2.3, 95% CI=1.3-4.0), ≤ 20 years of age (OR_{MH}=2.0, 95% CI=1.1-3.6), unmarried (OR_{MH}=2.97, 95% CI=1.7-5.2), unemployed (OR_{MH}=3.28, 95% CI=1.8-5.8) and having poor personal hygiene (OR_{MH}=3.73, 95% CI=2.0-7.4) than controls. In the household case-control study, case-households had higher odds of having dirty or littered compounds (OR_{MH}=2.3, 95% CI=1.2-4.6) and lower odds of practicing mitigation measures against jiggers (OR_{MH}=0.33, 95% CI=0.1-0.8) than control-households.

Conclusion: Males, unemployed persons, and poor personal or household hygiene increased odds of tungiasis in this outbreak. Multi-sectoral, tailored interventions that improve standards of living could reduce the risk of tungiasis in this area. Adding tungiasis to national surveillance reporting tools could facilitate early identification of future outbreaks.

Keywords: Tungiasis, Jiggers, Investigation, Uganda

6.2 Scabies outbreak investigation in Hoima District, Western Uganda, February–June 2022

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Background: Scabies is endemic in most resource-limited tropical areas, including Uganda. Hoima District in Western Uganda has had 4 scabies outbreaks in the last 5 years. On May 21, 2022, the Ministry of Health was notified of >1,000 cases of scabies in Hoima District. We investigated to assess the scope of the problem and identify associated factors.

Methods: We defined a suspected scabies case as the onset of an itchy pimple-like skin rash filled with pus, wounds, or crusting from February–June 2022 in a resident of Hoima District, Uganda. We reviewed medical records, performed active case-finding, and computed attack rates by age, sex, and village per 1,000 population. We compared exposures among 100 case-patients and 100 unmatched controls living in Rwentale Landing Site in Hoima during June 2022.

Results: We found 2,236 suspected scabies cases in Hoima district. Rwentale Village had the highest attack rate (AR=233/1,000 population) among area villages. Children aged 5–14 years were more affected (AR=64/1,000) than persons aged ≥ 15 years (AR=8/1,000) ($p < 0.0001$). Males (AR=22/1,000) were as affected as females (AR=20/1,000) ($p = 0.76$). Rwentale Village includes a fishing area known as Rwentale Landing Site where 1,119 (50%) cases in Hoima district were identified. At this landing site, cases began in April, shortly after the end of the peak fishing and trading season. Being aged 5–14 years (AOR=4.9, 95%CI 2.0–12), being male (AOR=2.4, 95%CI 1.1–5.1), living with another case (AOR=3.1, 95%CI 1.5–6.2), and sharing personal items with persons infested with scabies (towel, beddings, clothes, or sponges) (AOR=8.9, 95%CI 2.2–36) were associated with case status.

Conclusion: This scabies outbreak was likely initiated by person-person interactions that occurred during the peak fishing and trading months at a landing site and propagated by close household interactions. There is a need for community sensitization on scabies, especially before fishing and trading seasons, for early identification and prevention of future outbreaks.

Keywords: Scabies, *Sarcoptes scabiei*, Outbreak, Uganda

6.3 Establishing Sentinel Surveillance for Black Water Fever in Uganda, January – June 2022

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Background: Blackwater fever (BWF) is a complication of malaria in which blood cells hemolyze, releasing hemoglobin into blood vessels and urine. In Uganda, BWF is commonly reported from the Eastern region; however, its true national distribution and epidemiologic characteristics were unknown. We established nationwide sentinel surveillance to inform geographic and epidemiological characteristics of BWF in Uganda.

Methods: A suspected BWF case was self-reported dark urine in any patient aged 0-17 years newly admitted to pediatric wards of the sentinel sites (16 of the 17 regional referral hospitals in Uganda) from March-June 2022. A confirmed case was a suspected case with high-grade fever (>37.00c), anorexia, fatigue, abdominal pain, abdominal distention, anemia, jaundice, headaches, or vomiting and an admission urine sample scoring >5 on the Hillmen urine colour chart. We collected information from confirmed cases at all sites on demographics, clinical presentation, and outcome. We calculated attack rates (AR) per 1,000 malaria cases aged <18 years reported from the corresponding region during the same period.

Results: Among 730 case-patients, 475 (65%) were males. Case-patients presented with fever (97%), anemia (95%), vomiting (92%), and abdominal pain (91%); 50 (7%) died. Mean age was 6.4 (SD=4.3) years, (range, 0-17 years). Males were more affected than females (AR=91 vs 56/1,000 regional malaria cases; p=0.049). Children aged 5-17 years were more affected than those 0-4 years (AR=107 vs 45/1,000; p=0.005). Recurrence was common, with 131 (18%) reporting >5 previous BWF episodes before the current episode and 336 (46%) with 2-5 previous episodes. Among the 15 health regions, the 3 most-affected (AR>10/1,000 regional malaria cases) were neighboring regions in Eastern Uganda.

Conclusion: Children with malaria in Eastern Uganda experienced high rates of both new and recurrent BWF; many died. Further investigation is needed to uncover reasons for the geographic differences in BWF occurrence in Uganda.

Keywords: Black Water Fever, BWF, Anaemia, Jaundice, Eastern Uganda

6.4 Risk factors for death among children with severe malaria in Namutumba District, Eastern Uganda, September 2021 - February 2022

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Background: On February 17, 2022, Uganda Ministry of Health received a report from Namutumba District of a “strange disease” causing multiple deaths in children since late 2021. The disease was subsequently confirmed as severe malaria. We investigated risk factors for deaths among children ≤ 12 years with severe malaria in Ivukula Subcounty, Namutumba District, to inform programming for the prevention of malaria-associated deaths among children in Uganda.

Methods: We conducted an unmatched case-control study in Ivukula Subcounty in March 2022. We defined a case as death with history of fever plus convulsions, difficulty breathing, yellow eyes or palms, tea-colored urine, anemia, loss of consciousness, or reduced urine output in a child ≤ 12 years from September 2021 to February 2022. Controls were severe malaria survivors ≤ 12 years in the same time period. Cases and controls were identified by Village Health Teams (VHT) in a ratio of 1:2. Using a semi-structured questionnaire, we obtained demographic, clinical, and risk factor information from cases and controls or their caretakers. We interviewed healthcare workers about drug stocks and other barriers to caring for severe malaria patients. We analyzed using multivariate logistic regression and thematic analysis.

Results: Among 46 cases, 63% were < 5 years and 23 (50%) were female. Death was associated with anemia (aOR=4.4, 95%CI: 1.5–13), treatment non-completion (aOR=4.0, 95%CI: 1.6–10), and caretakers’ educational level below secondary level (aOR=3.0, 95%CI: 1.2–7.3). Healthcare workers reported lack of transport after referral, stockouts of antimalarial drugs and blood products, and absence of integrated community case management of childhood illness (iCCM) programs as challenges in managing children with severe malaria.

Conclusion: Specific modifiable factors, including not completing malaria treatment and stockouts of antimalarials and blood, contributed to malaria mortality among children ≤ 12 years in Ivukula Subcounty. We recommended proper health facility quantification of antimalarial drugs, improved blood product supply, referral support for severe malaria patients, and activation of iCCM.

Keywords: Severe malaria, Anaemia, Death, Plasmodium falciparum

Session 7: Zoonotic Diseases

7.1 Time to care-seeking and factors influencing appropriate EVD care among Ebola case patients in Uganda, September to November 2022

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Background

Early isolation of and appropriate care for EVD patients at Ebola Treatment Units (ETU) curbs outbreak spread and reduces case fatality. When conducted appropriately, contact tracing facilitates early isolation. However, the influence of contact tracing on timing of ETU entry and factors associated with delays in reaching ETUs during the 2022 EVD outbreak in Uganda were not well understood. We explored these issues during September–November 2022 in Uganda.

Methods

We included only RT-PCR-confirmed EVD cases from the Ministry of Health line list during September–November 2022. We calculated days from patient symptom onset to ETU entry ('delay'). We compared the median delay by status as a known contact before diagnosis using the Wilcoxon rank-sum test. We also compared age and sex between case-patients who had delays ≤ 2 days ('short') and delays ≥ 3 days ('long') using the chi-square test. We conducted key informant interviews with 17 EVD case-patients, who had short (n=8) and long (n=9) delays to qualitatively assess factors associated with delays. Data were analysed using content analysis to derive themes.

Results

Among 141 confirmed cases, 59% were male; the mean age was 29 years (± 13.8). The median delay was 4 (IQR 2-6) days. Overall, 30% of patients sought care < 2 days, 42% in 3-5 days, and 29% in ≥ 6 days. Persons previously listed as contacts sought care in fewer median days than those not previously listed as contacts (3 vs. 4 days, $p < 0.001$). Enablers of short delays included knowing that one was a contact of a confirmed case, knowing EVD symptoms, encouragement from a trusted person, and belief that early treatment-seeking was lifesaving. Patients with long delays experienced fear of Ebola treatment centres, slow response by contact tracers to alerts made by the patients, inability of healthcare workers and patients to recognise symptoms, and failure of healthcare workers to refer patients to ETUs.

Conclusion: Few case-patients were isolated early after onset. Being a known contact reduced delays to ETU care. Strengthening contact tracing, engaging health facilities to 'think Ebola first,' and conducting community outreach to allay fears about the ETU could facilitate more rapid presentation and improve outcomes.

Keywords: Ebola, Healthcare seeking behaviour, Outbreak, Uganda

7.2 Knowledge, Attitudes, and Practices regarding anthrax among affected communities in Kazo District, South-western Uganda, May 2022

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Background: Despite health education about the risks of anthrax from eating meat from carcasses, some districts in Uganda, including Kazo District, experience repeated anthrax outbreaks associated with this risk factor. We assessed knowledge, attitudes, and practices (KAP) around anthrax in previously-affected communities in Kazo District.

Methods: We conducted a mixed-methods study in six villages in Kazo District from May 23–June 4, 2022. We administered structured questionnaires to 200 systematically-sampled community respondents aged ≥ 18 years about anthrax-related KAP and experiences with livestock loss. We conducted three KAP-based focus group discussions with community members identified as anthrax case-patients in previous outbreaks and those whose animals died suddenly in the previous year. We assessed overall knowledge through a set of eight questions on anthrax; species affected, signs and symptoms, transmission and prevention in humans and animals. We scored participants' responses to KAP questions as "1" (correct) or "0" (incorrect); adequate knowledge score was ≥ 4 . Qualitative data were analyzed using content analysis.

Results: Among respondents, 65% were female; mean age was 45 years. In total, 94% had heard of anthrax and 73% knew transmission could occur through eating meat from carcasses. Overall, 77% of respondents had adequate knowledge about anthrax. Only 16% had lost their livestock suddenly in the last year; of these, 21% consumed the meat and 53% buried the carcasses. Qualitative data indicated that farmers did not vaccinate livestock against anthrax due to cost and difficulty accessing vaccine and veterinary services. Poverty and limited access to protein were cited as drivers for consuming meat from carcasses despite the risk.

Conclusion: Good awareness about anthrax among residents of a repeatedly-affected community in Uganda did not translate to safe practices. Alternative preventive approaches, such as compensating farmers for anthrax-positive carcasses in exchange for permitting safe animal disposal, might reduce risk in high-risk communities.

Key words: Anthrax, Knowledge-attitude-practice, Kazo District, Uganda

7.3 Anthrax outbreak associated with eating meat from dead cows – Bududa District, Uganda, February - May 2022

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Background: Over the past four years, anthrax has begun appearing in new districts in eastern Uganda that have not previously reported anthrax but are adjacent to districts previously reporting anthrax. Such outbreaks are nearly always associated with exposure to cows that die suddenly. On May 16, 2022, the District Health Officer of Bududa District informed the Ministry of Health of 11 cows that died suddenly in one village. There were also suspected anthrax human cases in the same village and neighbouring villages. Bududa district had not reported anthrax previously but is adjacent to multiple districts newly reporting anthrax during 2018-2021. We investigated to determine the outbreak scope and identify risk factors.

Methods: We identified human cases through active case search and review of medical records at health facilities serving the two affected sub-counties. For Bududa District residents in January-May 2022, we defined suspected human cutaneous anthrax as new onset of skin papules, vesicles, or eschars; suspected gastrointestinal anthrax was onset of abdominal pain and ≥ 1 of diarrhea, vomiting, lymphadenopathy, pharyngitis, or oropharyngeal lesions; confirmed anthrax was suspected anthrax with PCR-positivity for *Bacillus anthracis* from a swab from skin lesions/vesicles or blood. We conducted a retrospective cohort study among all household members in affected villages to identify risk factors.

Results: Among 216 village residents, 21 case-patients (15 suspected, 6 confirmed, 1 death) were identified with onsets February-May 2022. Sixteen (76%) case-patients were male. Mean age was 29 (range, 5-72) years. Twelve (57%) had cutaneous anthrax, four (19%) had gastrointestinal anthrax, and five (24%) had both. Cooking (aRR: 16, 95% CI: 7.8-33) and eating meat from an animal that died suddenly (aRR: 84, 95% CI: 18-388) increased risk of any form of anthrax.

Conclusion: Anthrax continues to spread to new districts in eastern Uganda. As in previous outbreaks, exposure to meat from an animal that died suddenly increased risk of anthrax amongst humans in this outbreak. The continued spread indicates a need for more widespread risk communication about anthrax in both humans and animals, as well as consideration of broad vaccination of livestock in this region.

7.4 Another Crimean-Congo Hemorrhagic Fever outbreak in the cattle corridor of Uganda, July 2022: time to think about a national tick control program?

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Background: Crimean-Congo Hemorrhagic Fever (CCHF) is a viral zoonotic disease that poses a threat to global health due to its epidemic potential. On July 13, 2022, the Uganda Ministry of Health was notified of a confirmed CCHF case in Rakai District. We investigated to determine the magnitude of the outbreak, identify the source of infection, and recommend control measures.

Methods: A suspected case was defined as sudden onset of fever ($\geq 37.5^{\circ}\text{C}$) and unexplained bleeding with ≥ 1 of malaise, headache, muscle pain, nausea, vomiting, diarrhoea, abdominal pain, joint pain, or anorexia during July 1–17, 2022 in a Rakai District resident. A confirmed case was a suspected case with a positive RT-PCR result from a blood sample. We reviewed medical records and searched the community for cases, whom we interviewed about demographics, symptoms, and animal-related activities. The confirmed case-patient's contacts were tested for CCHF virus by RT-PCR. We conducted environmental assessments, key informant interviews with the district health and veterinary officers, and a focus group discussion with farmers in the affected village to understand possible contributing factors.

Results: The outbreak involved only one confirmed case-patient. One suspected case-patient was identified following field investigations and tested negative for CCHF. Forty-eight contacts of the confirmed case tested negative for CCHF as well. The confirmed case-patient was an 18-year-old male from Rakai District living near shrubby grounds where tick-infested cattle graze. We observed inconsistent tick spraying patterns among farmers, no acaricide rotation, use of acaricides in concentrations higher than recommended, and acaricide mixing with agrochemicals. The district lacks a formal One Health team and had no coordination between the health and veterinary departments outbreak response.

Conclusions: A tick bite likely led to this CCHF outbreak in Rakai District. This is Uganda's twenty-ninth confirmed CCHF outbreak in the last decade, most of which have been associated with tick bites. A well-established national tick control strategy based on shared human and veterinary health responsibility through a One Health approach could reduce the incidence of CCHF outbreaks in Uganda.

Keywords: Crimean Congo Hemorrhagic Fever, Outbreak, Uganda, One Health Approach



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