



ABSTRACT BOOK

SIERRA LEONE FIELD EPIDEMIOLOGY TRAINING PROGRAM (SLFETP)



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PROGRAM OVERVIEW

The Field Epidemiology Training Program (FETP) is a globally recognized program modeled after the U.S. Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) program. It is acknowledged as an effective strategy for building a cadre of in-country field epidemiologists (disease detectives) and enhancing capacity in epidemiology, surveillance, and outbreak investigation and response.

As part of the post-Ebola recovery efforts to build strong and resilient public health systems, the US CDC, through implementing partners, primarily the African Field Epidemiology Network (AFENET), supported the Sierra Leone Ministry of Health (MoH) in establishing the Frontline level FETP in June 2016 followed by the Intermediate level in September 2017. The program, housed under the Directorate of Health Security and Emergencies, now the National Public Health Agency, was established to develop Sierra Leone's public health workforce's capacity to apply epidemiologic skills to reduce the threat of public health emergencies.

Residents of the program spend 25% of their time undergoing didactic training and 75% in the field working at their respective work areas to develop core competencies such as investigating disease outbreaks, improving disease surveillance, responding to public health emergencies, designing and implementing epidemiological studies and surveys, and using health data to make recommendations, and undertaking other field investigations. Since its establishment, the program has graduated 301 public health professionals from the Frontline and 90 from the Intermediate level, benefiting all health sectors, including human, animal, and environmental health.

The SLFETP has been at the forefront of investigating and responding to a wide range of public health emergencies, including epidemic-prone diseases and events of national or international concern. Its graduates have successfully handled over 78 cases, outbreaks, and public health emergencies reported from all districts of Sierra Leone. Notable outbreaks responded to include the COVID-19 pandemic, food poisoning, anthrax, Mpox, Lassa fever 2019, 2022, measles, 2018, 2019, African Swine fever, circulating vaccine-derived poliovirus (cVDPV) outbreak in 2020/21, and the 2017 mudslide which claimed more than 1,000 lives.

The program has implemented several quality improvement activities, including regular feedback surveys from trainees, graduates, various program managers, directors, and other stakeholders, to identify gaps in program implementation and address gaps related to skills and knowledge and utilization of skills gained during the course. During the 11th Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) Global Scientific Conference, held in Panama from September 4-9, 2022, the TEPHINET Global Accrediting Body (GAB) recognized the Sierra Leone FETP Intermediate level for demonstrating excellence in field epidemiology training. The GAB awarded the program accreditation status, making it one of the first programs to be accredited globally.

MESSAGES



Dear Colleagues and Friends,

The 2014-2015 Ebola outbreak exposed a critical vulnerability in Sierra Leone's public health system. Highlighting the urgent need for a well-trained workforce capable of effectively responding to disease threats. In response, we established the Field Epidemiology Training Program (FETP) in collaboration with the U.S. Centers for Disease Control and Prevention (CDC). This program, with its Frontline and Intermediate tracks launched in 2016 and 2017 respectively, has been instrumental in building a core group of public health professionals equipped for effective disease surveillance, investigation, and control. The abstracts presented in this book are a testament to the success of the FETP program. Authored by our trainees and graduates, these abstracts showcase the high-quality research being conducted and the program's significant impact on building our national public health capacity.

I am immensely grateful to the US CDC, the African Field Epidemiology Network (AFENET), and all those involved in supporting the FETP program. I also commend the dedication of our trainees, graduates, and faculty whose hard work has culminated in these impressive abstracts.

This initiative marks a turning point for public health in Sierra Leone. With a well-trained workforce, we are better positioned to prevent and respond effectively to future outbreaks.

Sincerely,

Professor Foday Sahr

Executive Director,

National Public Health Agency



Sierra Leone is building a more resilient future. The frequent public health events of national and international concern serve as a constant reminder of the importance of a robust public health response system. In this regard, the establishment of the Field Epidemiology Training Program (FETP) in partnership with the U.S. Centers for Disease Control and Prevention (CDC) marked a significant turning point.

The FETP program, with its comprehensive training modules, has empowered a new generation of public health professionals with the expertise to tackle public health challenges proactively. This book, featuring abstracts authored by FETP trainees and graduates, showcases the program's transformative impact on our national public health capabilities.

I am deeply grateful to the CDC, the African Field Epidemiology Network (AFENET), and all stakeholders who have contributed to the success of the FETP program. I also commend the dedication of our trainees, graduates, and faculty whose efforts are reflected in these high-quality abstracts. Moving forward, we are committed to nurturing this research culture and encouraging the publication of these abstracts in peer-reviewed journals. This will further amplify the program's impact and solidify Sierra Leone's position as a leader in public health research within the region.

With a well-equipped and empowered public health workforce, we are confident in building a more resilient future for Sierra Leone.

Sincerely,

Dr. Sartie M. Kenneh

Chief Medical Officer,

Ministry of Health



I am pleased to present this collection of abstracts authored by participants in the Sierra Leone Field Epidemiology Training Program (FETP). Launched in collaboration with the U.S. Centers for Disease Control and Prevention (CDC) following the 2014-2015 Ebola outbreak, the FETP program has had a profound impact on strengthening our national public health research capacity.

The abstracts within this book address a wide range of public health concerns, demonstrating the program's effectiveness in equipping participants with the skills to investigate and analyze critical issues. The acceptance of these abstracts at prestigious international conferences, including the US CDC's Epidemic Intelligence Service conference, is a true testament to the quality of research produced by our FETP participants.

I extend my sincere gratitude to the US CDC, the African Field Epidemiology Network (AFENET), and all those who have supported the FETP program. I also thank the trainees, graduates, and faculty whose dedication and hard work have contributed significantly to this success.

This book is a valuable resource showcasing the cutting-edge research being conducted by Sierra Leone's public health professionals. I encourage you to delve into these abstracts and engage with the future leaders of our public health field.

Sincerely,

Dr. Mohammad A. Vand

Deputy Executive Director, Technical,

National Public Health Agency



The US government, through the Global Health Security Agenda (GHSA), is committed to supporting impactful programs like the Field Epidemiology Training Program (FETP) in Sierra Leone. The GHSA aims to prevent, detect, and respond to disease threats. This mission, shared by both the US government and the Government of Sierra Leone, has demonstrated real leadership in establishing and building disease surveillance capacity at both the local and national levels.

In many local, regional, and global scientific conferences, we have observed that FETP-originated scientific presentations from Sierra Leone were fascinating and highly applauded, with many dignitaries and epidemiologists having the golden opportunity to ask questions and receive appropriate responses. The achievements of the Sierra Leone FETP and public health professionals have placed the program on the map, highlighting the program's commitment to excellence in research and scientific presentations. These successes demonstrate the program's effectiveness in producing skilled graduates capable of competing globally in their respective fields.

The Sierra Leone FETP has contributed to building the capacity of public health professionals to write high-quality abstracts which have been accepted and presented at various global scientific conferences including the U.S. CDC's EIS conference, a notable scientific conference in the U.S. This demonstrates the program's quality, and I would like to express my appreciation to the entire leadership of the MOH, NPHA, FETP team, AFENET, and other stakeholders who contributed to this achievement. I would like to take this opportunity to thank all FETP trainees and graduates who worked hard to conduct field projects, develop successful abstracts, and present them on various platforms. Finally, I would like to thank the FETP RA, particularly, Dr. Gebrekrstos Negash Gebru, mentors, and staff who supported the trainees in building their research and scientific communication capacity.

Dr. Monique A. Foster,
U.S. CDC Country Director (Acting), Sierra Leone



I trust that the first abstract book of the Sierra Leone FETP (SLFETP) will be a source of inspiration and knowledge for you.

This abstract book includes 64 abstracts from the SLFETP, which were accepted and presented at global and regional scientific conferences held between June 2017 to June 2024. A total of 20 abstracts were presented at global scientific conferences, of which nine presented at FETP International Nights on the margins of the Epidemic Intelligence Surveillance Conference -EIS in Atlanta, USA. And 11 at TEPHINET scientific conferences in Thailand and the Republic of Panama, Central America. Similarly, 32 abstracts were presented at AFENET scientific conferences; as well as 12 at other regional scientific conferences, including at the International Classification of Diseases and the Lassa Fever International scientific conferences. Some of these and other outputs and success stories have been published on the TEPHINET and AFENET websites, and 23 abstracts have been turned into manuscripts and published in various impactful peer-reviewed journals. The program's significant contribution is also evident in the 29 manuscripts submitted: 12 to the Journal of Interventional Epidemiology and Public Health (JIEPH) and, 14 to the Sierra Leone Journal of Biomedical Research for publication as special issues.

The program is highly indebted to the Sierra Leone Ministry of Health and the National Public Health Agency for endorsing and approving the program and providing excellent leadership for its implementation in Sierra Leone. Our special thanks go to U.S. Centers for Disease Control and prevention-CDC for funding the program through the African Field Epidemiology Network (AFENET) and also for providing continuous technical support to enhance and maintain its quality. I must acknowledge the invaluable contributions, commitment, and excellent leadership demonstrated by Brigadier General-Prof Sahr Foday (Executive Director, NPHA) Dr. Mohammad A. Vandi (Deputy Director, NPHA and FETP Program Director) Dr. Daphne Moffet (Former Country Director, U.S. CDC), Dr. Monique A. Foster (CDC Acting Country Director and Deputy Country Director for Programs) and Chinyere O. Ekechi (Deputy Country Director, U.S. CDC), who provided effective leadership for the successful implementation of the program and the development of these abstracts in particular. I want to express my enormous appreciation to my colleagues, especially the mentors who have built the scientific communication capacity of the SLFETP residents and graduates, which led to the success presentations and publication of these abstracts.

Finally, my special appreciation goes to Dr. Alden Henderson, Epidemiologist and Sandra Bedayo-Hanson, Public Health Advisor, U.S. CDC Atlanta for their dedication, commitment, and enthusiasm in supporting trainees, graduates, and mentors. Their technical support, motivation, and inspiration to the entire SLFETP are unforgettable.

Thank you,

Dr. Gebrekrstos Negash Gebru

Resident Advisor, Sierra Leone FETP

African Field Epidemiology Network





ABSTRACTS PRESENTED AT EIS/ FETP INTERNATIONAL NIGHT CONFERENCES

Investigation of Anthrax Outbreak, Sierra Leone, May 2022

Authors: Umaru Kapr Dumbuya, I. Gassama¹, K. Kamara, A. Sheriff², L. Hakizimana², U. Sesay, S. Sogbeh, A. Elduma², G. Gebru²

¹Ministry of Health and Sanitation, Freetown, Sierra Leone, ²Sierra Leone Field Epidemiology Training Program, Freetown, Sierra Leone

Background: Anthrax is a contagious zoonotic disease of public health concern. On May 05, 2022, the National Surveillance Program received a notification about suspected cases of anthrax among humans from the Karene District Surveillance Unit, following an anthrax cluster among animals in a neighbouring district. We investigated to confirm the diagnosis, determine the magnitude, identify risk factors, and institute control measures.

Methods: A confirmed case was an individual who had the pathognomonic eschar and tested positive for *Bacillus anthracis* in blood or skin swab. We interviewed case-patients and their families and reviewed medical records to collect data on demographics, clinical, and exposure history with animals or persons with symptoms suggestive of anthrax. We collected blood and swab samples and analyzed using polymerase chain reaction at the Central Public Health Reference Laboratory. We conducted active case searches in affected health facilities and communities.

Results: Nine suspected cases of cutaneous anthrax were identified; five samples were collected from five individuals and were positive for *Bacillus anthracis*. Three of the confirmed cases were below 10 years old, and three were females. Four cases were reported from Karene and one from Kailahun Districts. All five confirmed cases presented with fever, three with skin lesions and body weakness. Four cases developed symptoms after preparing meat for consumption from sheep which died of unknown causes. Twenty-seven contacts were identified and monitored for 14-days. None developed symptoms. There were no deaths.

Conclusions: This investigation confirmed an anthrax outbreak in Sierra Leone, the first reported since 2018. Preparing sheep meat from sheep that died of unknown causes is the possible source of this outbreak. We enhanced surveillance in affected communities, sensitized communities on anthrax preventive measures, restricted animal movement, burned and buried animal carcasses, and disinfected slaughterhouses. We recommend strengthening animal surveillance including laboratory testing of animal samples to prevent future outbreaks.

High COVID-19 Vaccine Hesitancy among General Population, Freetown, Sierra Leone, 2022: A Community-based Cluster Survey

Authors: Dauda Kamara, Mohamed Salieu Bah, Alieu Tommy, Stephen L.M. Kamara, Josephine A. Koroma, Ibrahim Gassama, Umaru Kapre Dumbuya, Alpha Umar Bai-Sesay, Alhaji Mamoud Conteh, Edward Elie, Musa Alloucious Sesay, Sahr A. Moiba, Fatmata I. Bangura, Sallu Lansana, Zainab Juheh Bah, Amara Alhaji Sheriff, Kassim Kamara, Jean Leonard Hakizimana, Solomon Aiah Sogbeh, Mr. Umaru Sesay, Adel Hussein Elduma, Gebrekrstos Negash Gebru

Background: In March 2021, Sierra Leone introduced the COVID-19 vaccine to halt the spread of the virus. As of November 30, 2022, the vaccination coverage among the general population has reached 40%, which is below the WHO-recommended threshold (70%). This survey aimed to determine the COVID-19 vaccine coverage, and factors associated with vaccine hesitancy.

Methods: We conducted a community-based cross-sectional cluster survey among the general population from January to December 2021. We used multistage sampling to select 367 participants. Using a structured questionnaire, we collected data on demographics, vaccination status, and hesitancy including associated factors. We used Epi Info 7 to compute frequencies and proportions; calculated adjusted Odd Ratio (aOR), with a 95% Confidence Interval (CI) at p-value of <0.05 to identify risk factors.

Results: All 367 participants selected for the interview responded, with a median age of 35 years (Range: 18 – 91 years). Of the total respondents, 55% (200/367) were females. Thirty-seven percent (136/367) received at least one dose of the COVID-19 vaccine. Of those unvaccinated, 63% (146/231) reside in formal communities. Of the respondents, 97% (356/367) mentioned the availability of the COVID-19 vaccine. A total of 40% (147/367) of respondents were hesitant to take the COVID-19 vaccine. Forty-four percent (66/150) of the respondents among formal community dwellers and 38% (82/217) among individuals who live in informal settlements were hesitant to take the vaccines. Lack of trust in COVID-19 vaccine safety was independently associated with COVID-19 hesitancy (aOR: 0.4, 95% CI: 0.2 – 0.8, p-value = 0.007).

Conclusions: COVID-19 vaccine coverage was relatively low with high hesitancy, especially in formal communities. Lack of trust in COVID-19 vaccine safety was identified as the leading factor for vaccine hesitancy. We recommend the Ministry of Health heighten vaccination uptake by intensifying awareness campaigns through community stakeholders, media engagements and risk communication on COVID-19 vaccine safety.

Behavioral Practices Towards Antibiotic Use Among Health Care Workers, Sierra Leone, 2021

Authors: Koroma Aminata, Baryon Brima, Gamanga Brima, Sillah Foday, Lebbie Munis, Ngobeh Daniel, Moiwo Matilda, Morison Jeffrey, Sesay AbuDimDin, Kamara Samba, Mustapha Jalloh, Nyandemoh Haurace, Massaquoi Momoh, Hakizimana Leonard, Abdalla Adel, Gbessay Saffa, Gevao Philip, Kamara Kassim, Squire James, Vandi Mohammed, Gebru Gebrekrstos Negash

Background: Antimicrobial resistance (AMR) is a global public health threat. Globally, 700,000 people die from AMR annually. Understanding health care workers' (HCWs) behavioral practice towards antibiotic use can help reduce irrational use of antibiotics and decrease the development of drug resistant pathogens. However, in Sierra Leone, there is limited data on antibiotic use among HCWs. We assessed antibiotic prescribing practices and associated factors among HCWs in Sierra Leone.

Methods: We conducted a cross-sectional survey among HCWs. We used a multistage sampling to select participants and collected data using a pretested questionnaire containing a Likert scale for 5 categories for 10 antibiotic prescribing practices. Scores (6–10) were categorized as good practice and coded as “1”; scores (0–5) were categorized as poor and coded as “0”. Bivariate and multivariate logistic regression models calculated adjusted odds ratios (aOR) and 95 % confidence intervals (CI) to identify risk factors.

Results: All 337 (100%) HCWs selected for this study responded and 45% scored good practice. A total of 292 (86.6%) HCWs reported that the more antibiotics are used, the higher the risk of AMR. However, 131 (38.9%) considered that fever is always an indication of antibiotics. The majority of HCWs, 280 (83.1%) agreed that they prescribe antibiotics without performing microbiological tests and 114 (33.8%) reported that they prescribe a shorter course of antibiotics compared to guidelines. Factors significantly associated with good practice were being a doctor (aOR=1.95; CI=1.07–3.56), internet as a source of information (aOR=2.00; CI=1.10–3.66), having a high perception that AMR is a problem in the health facility (aOR=1.80; CI=1.01–3.23), and believing that there is a connection between one's prescription and AMR (aOR=2.15; CI=1.07–4.32).

Conclusions: This study identified a low level of good practice towards antibiotic prescription. We initiated health education campaigns and recommended continuous professional development programs on antibiotic use and AMR.

Has COVID-19 Pandemic Affected Routine Immunization Activities? Secondary Data Analysis, Sierra Leone, 2021

Authors: Nyandemoh Haurace, Kamara Kassim, Saffa Gbessay, Hakizimana Leonard, Gevao Philip, Abdalla Adel, Gebru Gebrekrstos Negash

Background: The Government of Sierra Leone has prioritized COVID-19 response for the last 23 months. Post-Ebola recovery activities boosted the expanded program on immunization (EPI) services. COVID-19 may have affected the coverage of essential immunization services in Sierra Leone. We analyzed the national routine immunization (RI) data to assess the effect of the COVID-19 epidemic on routine immunization services in Sierra Leone.

Methods: We conducted a secondary data analysis of national RI data. We extracted the data from the District Health Information System (DHIS-2) for the period 2018–2021. We computed vaccination coverages for Penta1, Penta3, Measles Rubella1 (MR1), and Measles Rubella2 (MR2). We also computed the dropout rates (DOR) between Penta1 and Penta3 and MR1 and MR2 coverage of $\geq 90\%$ was considered as meeting the national target and a dropout rate (DOR) of $< 10\%$ for antigens was considered as meeting program targets.

Results: From 2018–2019, the national coverages of Penta1 and Penta3 increased from 93.9% to 96.2%, and from 90.6% to 96.2%, respectively. From 2020–2021, Penta1 and Penta3 national coverages decreased from 93.3% to 75.5% and from 91.3% to 74.4%, respectively. The country achieved MR1 coverage target only in 2019 with 93.8% but failed to achieve the MR2 target coverage for all the years under review. Prior to the COVID-19 outbreak in Sierra Leone, 10 of the 16 districts had consistently achieved their Penta3 coverages but only 4 districts achieved their target since the outbreak of COVID-19 in the country.

Conclusions: COVID-19 had a negative impact on EPI services in Sierra Leone. We observed a decrease in coverage for all the antigens assessed from 2019 to 2021. The EPI program and its partners should re-strategize to improve the coverage of key.

Protective Behavioural Practices Toward Coronavirus Disease 2019 (COVID-19) Among Health Care Workers in Sierra Leone, 2019

Authors: ¹Kadijatu Nabie Kamara, ¹A. Foday, ¹A. Sesay, ¹J. Bangura, ¹P. Swaray, ¹J. Macavoray, ¹M. Mansaray, ¹M. Abu, ¹D. Moses, ¹U. Sesay, ¹I. Tarawalay, ¹S. Jalloh, ¹S. Samba, ¹Alfered Fomba, ²L. Hakizimana, ²U. Ogbonna, G. Gebru², ²K. Nyarko, ³A. Henderson, ³T. Singh

¹Sierra Leone Field Epidemiology Training Program, ²African Field Epidemiology Network, Field Epidemiology Training Program, Sierra Leone, ³ Centers for Disease Control and Prevention, Sierra Leone

Background: Coronavirus disease (COVID-19) is a global public health threat. Health care workers (HCWs) are at high risk of infection because they treat COVID-19 patients. In Sierra Leone, HCWs were affected disproportionately by COVID-19 at the beginning of the pandemic. HCWs' practices towards COVID-19 are crucial to prevent nosocomial COVID-19 transmission. We assessed protective practices toward COVID-19 and associated factors among HCWs in Sierra Leone.

Methods: We conducted a cross-sectional study among 465 HCWs in hospitals and health centers. We used multistage sampling to select participants and collected data on a pretested standardized questionnaire. Eight behavioural practice-related variables were scored on a Likert scale from 1 to 5. A participant's total score could range from 8 to 40, and scores from 32 to 40 were classified as "good practice." Bivariate and multivariate logistic regression models were used to calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI) and used to identify risk factors.

Results: All 465 (100%) HCWs selected for this study responded. A total of 59% (95% CI 54–64%) HCWs scored "good practice," with 55% reporting they always washed their hands, and 57% reported wearing a mask most of the time. Of the 265 (57%) who wore a mask most of the time, only 74 (28%) wore the mask correctly, and 106 (40%) did not wear a mask during their interview. Factors significantly associated with good COVID-19 preventive practice were working outside Freetown (aOR 3.7; 95% CI 2.2–6.2), having a colleague who had COVID-19 (aOR 1.6; 95% CI 1.0–2.6), having a high perception that COVID-19 can be serious (aOR 3.7; 95% CI 1.9–7.5), and having a low perception that COVID-19 is a problem in a health facility (aOR 2.1; 95% CI 1.1–4.4).

Conclusions: More HCWs must improve their practices of protective behaviours towards COVID-19 to reduce transmission. We initiated continuing education and encouraged the enforcement of infection prevention and control procedures among HCWs.

Investigation of Circulating Vaccine-derived Poliovirus (cVDPV) Type 2 Outbreak, Sierra Leone, December 2020

Authors: Alfred Fomba, Joseph Bangura, Patrick Swaray, Idrissa Tarawalie, Salieu Jalloh, Sheku Samba, Leonard Hakizimana, Uzoma Ogonna, Eboh Victor, Gebrekrstos Negash Gebru, Kofi Nyarko, Alden Henderson, Tushar Singh

Background: Circulating vaccine-derived poliovirus (cVDPV), is a genetic mutation of the Sabin virus. Sierra Leone reported its last case of wild poliovirus in 2010. In December 2020, the national disease surveillance program was notified of three people with acute flaccid paralysis who had cVDPV2. We investigated to identify the source, determine the magnitude of the outbreak, and the risk factors.

Methods: We assessed the clinical and vaccination status of the cases, searched for trivalent-Oral Polio Vaccine (tOPV) and monovalent-OPV (mOPV2) in the health facilities serving the affected communities. We searched for additional cases in affected communities and collected stool specimens from contacts of case-patients. We assessed cold chain management and routine immunization services. We conducted a vaccination coverage survey using WHO's zero-dose case investigation form in 128 randomly selected households in affected communities.

Results: Case-patients were a 26-month old male from Kambia, a 16-month old female from western area rural, and a 15-month old female from Tonkolili district. All had fever and acute paralysis. No tOPV or mOPV were found in the facilities. Poliovirus strains found in two case-patients were genetically linked to cases in Guinea and Côte d'Ivoire. There was no history of travel within 21 days of symptom onset for all cases. All received three doses of OPV, and two received one dose of inactivated polio vaccine (IPV). Nine (47.4%) contacts tested positive for poliovirus type-2. Cold chain status at facilities was poor. Only 47% (44/93) of children 0–59 months surveyed received three doses of OPV and 48% (30/63) received one dose of IPV.

Conclusions: The cVDPV2 may have been imported from neighbouring countries. OPV and IPV coverage was low, and poor cold chain may have reduced the vaccine potency. We conducted enhanced surveillance and prepared for nOPV2 vaccination. We recommend strengthening AFP surveillance, routine immunization, and cold chain management.

Lassa fever outbreak investigation in Tonkolili district, Sierra Leone, November 2019- outbreak

Authors: ¹Joseph S. Bangura, ²L. Hakizimana, ²U. Ogbonna, ²E. Ikoona, ²G. Gebru, ²K. Nyarko, ¹A. Falama, ³A. Henderson, ³T. Singh

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Introduction: Lassa fever (LF) is endemic in Sierra Leone and has pandemic potential. The last case of LF in Tonkolili district was reported in 2016. On November 20, 2019, Tonkolili district was notified of a confirmed case of LF, a surgeon in a referral hospital. Two additional health workers from the same hospital reported LF-like symptoms. We investigated to confirm the diagnosis and identify the source.

Methods: We collected clinical information, exposure history, and blood samples from suspected cases. We conducted active case search in the hospital and community, created a line-list of cases and contacts, and followed them for 21 days. An environmental assessment was also conducted.

Results: Five cases were identified; three were health care workers and three died (Case fatality ratio: 60%). Surgeon-1, surgeon-2, and anaesthetist operated on patient-1 and patient-2 on November 4, 2019. Patient-1 died November 4 from excessive bleeding. Surgeon-1 developed symptoms on day six, tested positive for LF on day nine, and died on day 11 after the operation. Surgeon-2 and anaesthetist developed symptoms on day seven and day 12, respectively and were confirmed LF positive. Patient-2 had fever and bleeding 12 days after being operated and died three days later. LF was not suspected for Patient-1 and Patient-2 initially. None of the 71 contacts developed symptoms. The assessment at the hospital revealed non-adherence to Infection Prevention and Control (IPC) procedures. Unhygienic conditions and inappropriate storage of food items were observed at patient-1's residence. No rodents were caught for LF testing.

Conclusion: Patient-1 was probably infected before coming to the hospital. Low index of suspicion and non-compliance to IPC procedures might have contributed to the spread of infection in the hospital. Health workers were sensitized on LF and trained on IPC. We recommend regular rodent testing in the region to identify source of infection.

Factors contributing to delays in accessing maternal delivery services in health facilities - Sierra Leone, 2018: A community based cross-sectional study

Authors: Charles Keimbe, Henry Bangura, Doris Bah, Isha Sesay, Fatmata Bangura, Saffa Saffa, Amara Sheriff, Francis Tamba, Sahr Gborie, Andrew Bangalie, Mohammed Jalloh, Gildo Okure, Gebrekrstos Gebru, Eric Ikoona, Kofi Nyarko, Tushar Singh

Background: At 1360 deaths per 100,000 live-births, Maternal Mortality Ratio (MMR) is highest in Sierra Leone, globally. National data indicates that over 98% of maternal deaths are related to delays in accessing obstetric services, but no empirical study conducted to identify associated factors. We identified factors contributing to delays in accessing maternal delivery services as perceived by women in Sierra Leone.

Methods: We conducted a community-based cluster survey among women who delivered from May 1, 2017, to June 30, 2018, in four of 16 districts across Sierra Leone. We calculated a sample size of 605 using epi-info7. Data on socio-demographics, perceived delays in deciding to seek facility-based delivery (delay one), perceived delays in reaching facility-based delivery services (delay two), and on the determinants of the delays were collected using questionnaires. We calculated frequencies and proportions for factors contributing to delays as well as Prevalence Odds Ratios (POR) and 95% Confidence Interval (CI) to identify risk factors for the delays.

Results: A total of 614 mothers were interviewed, median age 28 years (14-52 years). The prevalence of delay one was 23.3 % (143/614), and delay two was 26.9% (165/614). The significant factors contributing to delay-one were low socio-economic status, costly services, lack of essential medicines, and limited knowledge of pregnancy-related complications. Factors contributing to delay-two were long distances and transport difficulties to health facilities. Bivariate analysis showed an association between perceived delay-two and previous pregnancy-related complications (POR=1.80; 95%CI, 1.13-2.83) and poor condition of roads (POR= 2.34; 95%CI, 1.15-4.77).

Conclusion: We found a high prevalence of perceived delays one and two for mothers to access obstetric services. Delays were mainly related to transport difficulties, low knowledge of pregnancy-related complications, and costly obstetric services. A practical strategy for birth preparedness and readiness to reduce delays is urgently needed.

Lassa Fever outbreak with high case-fatality in a low resource setting, Bo District, Sierra Leone-2023

Authors: Mr. Saffa Gbessay, Ms. Delia Akosua Bandoh, Dr. Donne Kofi Ameme, Dr. Gebrekrstos Negash Gebru, Prof. Ernest Kenu

Background: On February 1, 2023, a healthcare worker from Dambala village reported one suspected Lassa fever death of an infant who had unexplained fever to the Bo district health management team. The district public health emergency rapid response team conducted an investigation to confirm the outbreak, assess the risk factors and implement preventive and control measures.

Methods: We interviewed healthcare workers and community members and reviewed health facility records clinical presentation. A case of Lassa fever was any person in Dambala village with unexplained fever or death from January 1 to March 15, 2023. We conducted active case-finding in Dambala and neighbouring villages. Blood samples were collected from suspected cases for confirmation and from trapped rodents for the presence of Lassa fever virus. We assessed the environment for the presence of risk factors. Cases-patients were line-listed and data was analyzed descriptively.

Results: All four cases (two confirmed and two probable) identified from one household; died (case fatality=100%). The index case was a 21-year-old female who fell ill showing similar symptoms at the same time with her daughter, mother, and male partner. Mother and partner tested positive for Lassa fever. All 29 contacts tested negative after 21 days of follow-up. All four cases lived in mud houses with broken-down doors. All rooms had no ceiling. Rodent holes and droppings were found in the rooms. Food storage containers in the households were uncovered and were left open. Houses had no toilet facilities. One rat tested positive for the Lassa fever virus.

Conclusion: Lassa fever with high case fatality was confirmed at Damballa village. Poor environmental and hygiene conditions could have facilitated the transmission. We conducted health education on Lassa fever in the community and fumigated the households.



ABSTRACTS PRESENTED AT TEPHINET SCIENTIFIC CONFERENCES

Factors associated with Coronavirus Disease 2019 deaths, Sierra Leone, 2020-2022

Authors: Stephen L M Kamara, Kassim Kamara, Leonard Hakizimana, James Squire, Sheriff Amara, Elduma Adel, Gebrekrstos Gebru

Background: The Coronavirus Disease 2019 (COVID-19) constitutes a global public health threat and has claimed the lives of over 6 million people. Understanding predictors of COVID-19 deaths can help target interventions to reduce deaths. Therefore, we described COVID-19 deaths and identified associated factors in Sierra Leone.

Methods: We conducted a retrospective secondary data analysis of COVID-19 deaths among patients reported from March 31, 2020, to March 31, 2022. We extracted information on demographic, clinical, and pre-existing medical conditions from the District Health Information System-2. We analyzed data by person and place to identify patterns of deaths. We calculated adjusted odds ratios (aOR) and 95% confidence intervals (CI) to identify risk factors for death.

Results: Of 8,595 COVID-19 cases, 3.2%(276/8595) died. The median age of decedents was 60 (1-98) years, with most death among aged 60+ years, 55% (153/276). Health care workers accounted for 3.6% (10/276) of the deaths. Over half of the deaths, 60% (165/276), occurred in the capital, Freetown and 17% (45/276) of the deaths occurred at the decedent's home. Of the decedents, symptoms were recorded for 167 (61%) with fever 75% (126/167) as the most common symptom. There were 26% (72/276) decedents with pre-existing conditions. The most common pre-existing conditions were hypertension, 65% (47/72), and diabetes, 39% (28/72). Unconsciousness (aOR=16.6, 95% CI: 4.1-67.5), difficulty in breathing (aOR=3.2, 95% CI: 2.2-4.6), cardiac disease (aOR=2.9, 95% CI: 1.4-6.4), hypertension (aOR=2.9, 95% CI: 1.8-4.6), and diabetes (aOR=2.6, 95% CI: 1.5-4.7) were significant factors associated with COVID-19 deaths. Symptomatic cases were 3.6 times more like to die than asymptomatic cases (aOR=3.6, 95% CI: 2.0-6.4).

Conclusion: Pre-existing conditions and clinical severity were associated with an increased risk of COVID-19 deaths. People with pre-existing conditions should be aware of the increased risk of death if they have COVID-19. We emphasized the need for health authorities to prioritize the elderly and those with pre-existing conditions for COVID-19 vaccination.

Factors associated with unfavourable treatment outcomes among multidrug-resistant tuberculosis patients, Sierra Leone, 2017 to 2021

Authors: Josephine Amie Koroma, Elduma Adel, Leonard Hakizimana, Sheriff Amara, Kassim Kamara, Gebrekrstos Gebru

Background: Multidrug-resistant tuberculosis (MDR-TB) is a major public health problem globally. The tuberculosis rate in Sierra Leone is 298 per 100,000 populations, and it is considered a high tuberculosis burden country. In Sierra Leone, there is limited information regarding MDR-TB treatment outcomes, especially those exacerbated by COVID-19. We identified factors associated with unfavorable treatment outcomes among MDR-TB patients in Sierra Leone.

Methods: We conducted a cross-sectional study to analyse hospital-based MDR-TB data for 2017 to 2021. Demographic, clinical, and treatment outcome data were abstracted from the main MDR-TB referral hospital database. We defined unfavorable outcomes as patients who died, were lost to follow-up, or defaulted. We calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI) to identify predictors of MDR-TB treatment outcomes.

Results: Between 2017 and 2021, 628 MDR-TB patients were reported at Lakka hospital; 441 (71%) were male, with a median age of 34 years (range: 1-70). Clinically, 21 % of the 628 MDR-TB patients were HIV-positive, and 413 were malnourished (66 %). Seventy per cent (440) of MDR-TB patients were receiving tuberculosis treatment. The majority of patients, 457 (73 %), were treated with the short treatment regimen, and 126 (20 %) experienced unfavourable outcomes. Age group less than 20 years (aOR=5.08; CI:1.87 – 13.82), tuberculosis retreatment (aOR=3.23; CI:1.82 – 5.73), age group 21- 45 years (aOR=2.22; CI:1.40 – 3.54), HIV (aOR=2.16; CI:1.33 – 3.53), malnourishment (aOR=1.79; CI:1.12 – 2.86).

Conclusion: This analysis found a high proportion of unfavorable treatment outcomes among MDR-TB patients in Sierra Leone. Malnourishment, TB retreatment, HIV co-infection, and young age were predictors of unfavorable MDRTB treatment outcomes. Increasing patients' awareness, mainly among the youngest, heightens treatment adherence and HIV monitoring can reduce adverse treatment outcomes in Sierra Leone and other Sub-Saharan African countries.

Prevalence and risk factors of needle stick and sharps injuries among healthcare workers, Tonkolili District, Sierra Leone, 2022

Authors: Ellie Edward ¹, Kassim Kamara ², Leonard Hakizimana ³, Elduma Adel ², Sheriff Amara ², Gebrekrstos Gebru ⁴

Background: Healthcare workers (HCWs) are at increased risk of blood-borne pathogens from needle stick and sharps injuries (NSI). About 90% of global NSIs occur in Africa. Since there are limited epidemiological studies on NSIs in Tonkolili District, Sierra Leone FETP trainees and graduates conducted a cross-sectional survey in a major hospital to estimate the prevalence and identify 22 associated factors of NSIs among HCWs.

Methods: We conducted a hospital-based cross-sectional survey among HCWs in a major hospital in Tonkolili District, Sierra Leone. A structured questionnaire was administered to HCWs from April 13 through 14, 2022, to collect demographic characteristics, history of NSIs, training on infection prevention and control (IPC), knowledge on NSIs policies, and reporting of NSIs from 2017 to 2021. NSIs are wounds caused by needles or sharp objects that accidentally punctured the skin. Descriptive and logistic regression analyses were performed to identify independent risk factors for NSIs.

Results: Eighty-eight percent (53/60) HCWs completed the questionnaire. Of these, 45% (24/53) had NSIs, 75.5% (40/53) trained on IPC. Among those who experienced NSIs, 25% (6/24) received post-exposure prophylaxis, 54% (13/24) reported NSI to authorities, 79% (19/24) reported one to two injuries and 13% (3/24) reported more than four injuries. Injection needle pricks caused 38% (9/24) of the NSIs and 42% (10/24) occurred during recapping of needles or administering an injection. Although there was no significant variation among professional cadres, males had a reduced chance of having NSI compared to females (POR 0.63; 95%CI: 0.27-1.00). Being aware of the hospital NSI policy reduced the prevalence of NSIs (POR 0.34; 95%CI: 0.07-0.61).

Conclusion: The prevalence of NSIs among HCWs was high but was significantly reduced among HCWs who were aware of NSI policy. Extensive IPC training programs, focusing on the sharps disposal process are urgently needed to prevent NSIs among HCW in Sierra Leone and similar settings.

Estimating Excess Mortality During COVID-19 Pandemic, Sierra Leone, 2020 – 2021

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Background: To assess the impact of COVID-19 on mortality, public health decisions makers need to know the true burden of mortality especially those exacerbated by COVID-19. However, Sierra Leone has no population-based mortality surveillance to measure mortality in real-time for decision making and to inform policy. Therefore, the Ministry of Health and Sanitation started a Rapid Mortality Surveillance (RMS) project as a pilot to estimate Excess Mortality (EM) during the COVID-19 pandemic.

Methods: We implemented RMS in four purposively selected districts in Sierra Leone. We collected retrospective mortality data for the period of January 2017 to October 2020 and prospectively from November 2020 to December 2021 by reviewing health facility records, mortuary, and community death registers. Excess mortality was determined using an excess mortality calculator which computes weekly average number of deaths. EM was calculated by comparing the observed number of deaths during COVID-19 (2020–2021) with the expected average (2017– 2019). EM was observed when deaths during the COVID-19 period exceeded the threshold of expected average.

Results: Expected mortality average was 2,572 while absolute mortality for 2020 and 2021 were 5,671 and 4,611 respectively. After adjusting for errors and negative values all-cause excess mortality in 2020 and 2021 when compared to expected averages were +1,585 (35%) and +691 (18%) respectively. Compared to males, females experienced a +40 and +4 percentage point increase excess deaths in 2020 and 2021 respectively. Community excess deaths (deaths that occurred in the community) were +475 (336%) in 2020 and +452 (323%) in 2021 while health facility excess deaths were +1,104 (24%) in 2020 and +367 (10%) in 2021.

Conclusion: There is excess mortality during COVID-19 pandemic. RMS provided essential outputs for decision-making regarding the indirect impact of the COVID-19 pandemic on total mortality in Sierra Leone. Readiness assessment plans for institutionalization and scale-up have been developed and await implementation.

Birth and death rates, and causes of deaths among general population, Kono District, Sierra Leone, 2020-2021

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Background: **Fertility**, mortality, and migration are major determinants of population growth. They are used to project population size between census years. Population size is key in allocating resources for health care planning. We aimed to estimate the crude birth and death rates and causes of death among the general population in Kono District, Sierra Leone to provide more accurate inter-census population estimates.

Methods: We conducted a retrospective secondary data analysis of the National Civil Registration Authority (NCRA) data. Health professionals in chiefdoms and healthcare facilities collect and send occurrences of births and deaths to the NCRA platform. The study was conducted in Kono District from January to March 2022. We calculated crude birth and death rates using the estimated Kono District population, July 2021 (per 1000 population). We calculated the proportion of death by cause. In Sierra Leone, facility-based cause of death is determined by physicians, and community death is determined through verbal autopsy, cause of death is documented through the NCRA system.

Results: There were 16,684 births and 415 deaths from January 2020 to December 2021. The birth rate increased from 14.1 in 2020 to 16.2 in 2021 per 1000. However, the death rate decreased from 12.7 in 2020 to 7.5 per 1000 inhabitants in 2021. The median age of mothers was 25 years (range 19-52 years) and death was 62 years (range 1 day to 120 years). The major causes of death were malaria (24%), cardiac respiratory failure (23%), and liver cirrhosis (16%).

Conclusion: Malaria, cardiac respiratory failure, and liver cirrhosis were prominent reasons for mortality in the Kono District, likely owing to inadequate sanitation and mining fumes and dust. Underreporting of deaths in remote villages lowers the district's mortality rate. Kono District health authorities to intensify environmental cleaning and occupational health and safety to safeguard the public from fumes and dust

The magnitude of Maternal deaths during COVID-19 pandemic, Tonkolili District, Sierra Leone, 2020-2021

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Background: Maternal Death (MD) is a major public health problem in developing countries. Anecdotal evidence suggests COVID-19 influenced healthcare services in Sierra Leone. We aimed to determine the magnitude of maternal deaths and the related causes in Tonkolili District, Sierra Leone during the COVID-19 era.

Methods: We used secondary data from the Tonkolili District MD Surveillance and Response (MDSR) system database from January 2020 to December 2021. MD is a death of a woman while pregnant or within 42 days of delivery or termination of pregnancy, regardless of duration and place. The study was conducted from January to March 2022. We calculated death rates using the estimated district pregnant women population in 2020 and 2021 (per 1000 live births) and used the Sierra Leone Reproductive and Child Health (RCH) documented guideline to categorize the cause of MD.

Results: Tonkolili reported 79 MD, 45 in 2020, and 34 in 2021. The median age: 30 (range: 18-40 years). The MD rate was 2/1000 live births in 2020 and 1/1000 live births in 2021. Sixty-four (82%) fatalities occurred in hospitals, and 53 (73%) occurred after delivery. Twenty-six to thirty (26-30) year-olds had the highest MD 24 (30%), followed by 21-25-year-olds (19%). The MD was high among 26-30 years, 24 (30%), followed by 21-25 years, 19 (24%). Obstructed labor 11 (14%), postpartum haemorrhage 23 (29%), and Eclampsia 13 (16%) were the leading causes of MD in the Tonkolili District. 22 (28%) of 79 MDs had at least four antenatal clinics (ANC) visits, while 16 (20%) did not.

Conclusion: Tonkolili District had higher MD. The majority of COVID-19 MDs happened in healthcare settings owing to delayed healthcare-seeking. Eclampsia, PPH, and puerperal sepsis are the main causes of death. We urge the Tonkolili District health authorities to sensitize communities on early health-seeking behavior and improve the quality of health facility-based maternal delivery services.

The effect of COVID-19 pandemic on Routine immunization- Measles Outbreak, Kambia District, Sierra Leone, October 2021

Authors: Abass Kamara^{1, 2}, Joel F. Mansaray^{1, 2} Philip Gevao^{1, 2}, Binta Bah^{1,2} E. Adel^{1, 3}, Mohamed Vandj², G. Gebru^{1, 3}

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Background: Measles, a vaccine-preventable disease, is one of the fourth leading causes of death among children under five in Africa. Studies showed that COVID-19 has affected routine health services including essential immunization services in Sierra Leone. The measles coverage in 2019 was 95% and drops to 87% in 2020. On October 19, 2021, three children with possible measles were reported to the Kambia District Surveillance unit. We investigated to confirm the diagnosis, identify the source, and mode of transmission, and instituted control and prevention measures.

Methods: We defined a case as any resident of Magbema chiefdom, Kambia district with fever and rash, cough, runny nose, or conjunctivitis from 1st October to 30th November 2021. We interviewed caregivers and community people to find the source of infection. We checked vaccination and vitamin A status inpatient register, under-5 cards. Using the case investigation form, we collected patient demographic, clinical, travel, and contact data. We conducted active case search in communities and health facilities. We collected blood samples to test for measles antibodies and isolated case patients to prevent further transmission.

Results: A total of 60 measles cases were reported. Five were laboratory confirmed and fifty-five by epidemiological link. The median age was 4 years (range: 4 months – 23 years). Females made up 67% of the cases. No travel history was reported. Bamoi Luma's Measles-Rubella vaccination coverage was 28%. In the past 6 months, only 20 patients (12%) received measles vaccination and vitamin A supplementation.

Conclusion: A measles outbreak was confirmed and more cases were found in the community, indicating that community transmission was ongoing. Factors contributing to this measles outbreak include low vaccination coverage, the implication of COVID-19 pandemic impact on routine health services, and home contact with measles cases. We recommend routine measles vaccination, delivering vitamin A supplementation, and intensifying community sensitization on measles prevention.

Prevalence and risk factors of needle stick and sharps injuries among Koidu government hospital workers, Kono district, Sierra Leone

Authors: Abu Gbondo, Eric Ikoona, Sara Demas, Gildo Okure, Gebrekrstos Gebru, Uzoma Ogonna, Leonard Hakizimana, Mohamed Alex Vand, Marta Guerra

Background: Over 50% of healthcare workers (HCWs) in Africa are exposed to needle stick and sharps injuries (NSIs) with potential risk of transmitting blood-borne pathogens. Although NSIs were a potential determinant of Ebola Virus Disease (EVD) spread among HCWs during the 2014-2016 EVD outbreak in Sierra Leone, no assessments on implementation and outcomes of Infection and Control (IPC) practices have been undertaken. We aimed to identify risk factors for NSIs among HCWs at Koidu government hospital (KGH).

Methods: A cross-sectional survey was conducted among 104/186 (56%) HCWs from February to April 2019. Data on demographic characteristics, history of NSIs, hospital department assignment, training on IPC and NSIs policies, and reporting practices were collected. Descriptive and chi-square analyses were performed to identify risk factors for NSIs.

Results: Although 69/104 (66%) HCWs reported experiencing NSIs, only 31/69 (45%) reported them to hospital authorities. Among those who experienced NSIs in the past year, 45/69 (65%) reported one to two injuries and 13/69 (9%) reported more than four injuries. The rate of NSIs was higher among female HCWs 42/55 (76%) than males 16/27 (59%). Injection needle pricks caused 45/69 (65%) of the NSIs and 23/69 (33%) of all NSIs occurred during sharps disposal in bio-safety containers. Although there was no significant variation among the different professional cadres, those who worked in “high-risk departments (surgery, maternity)” were more likely to report NSIs than those in “low-risk departments” (PR 2.8; 95% CI 1.1-7.09). Receiving training on IPC training reduced the likelihood of NSIs (PR 0.31; 95% CI 0.09-0.98).

Conclusion: The prevalence of NSIs among HCWs in KGH is high, but was significantly reduced through training on IPC. Implementation and continued support of IPC training programs focusing on sharps disposal process and targeting “high-risk departments,” is urgently needed to prevent potential transmission of blood borne pathogens, including EVD.

Investigation of Monkeypox cases in Pujehun and Kailahun Districts, Sierra Leone, 2018 – 2019

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Background: Monkeypox is an emerging zoonotic viral disease clinically similar to smallpox with case fatality rates from 1-10%. In Sierra Leone, three cases were confirmed from 1970 to 2017. From 12th December 2018 to 2nd March 2019, Field Epidemiology Training Program trainees responded to notifications from the District Health Management Teams and investigated the suspected cases in Pujehun and Kailahun districts to confirm the diagnosis, identify possible risk factors and additional cases, and institute control measures.

Methods: Case-patients and families were interviewed, medical records were reviewed, and samples from lesions and blood were obtained and analysed at US Centers for Disease Control and Prevention. A case was defined as any person from the respective communities who presented with fever ≥ 38.5 , generalized vesicopustular rash and lymphadenopathy, and having history of contact with animals or persons with similar symptoms. Information was collected on demographics and travel history. We conducted active case finding, contact tracing and risk communication among the communities.

Results: Patients were a six-year old male from Pujehun district and a 38-year old female from Kailahun district. Both presented with generalized vesiculopustular rash, and lymphadenopathy preceded by a two-day history of fever. Sera from both tested positive for orthopox IgM and IgG, and lesion samples were positive by RT-PCR. One patient reported a contact with rodents and primates, and the other had history of contact with a sheep and a person exhibiting similar symptoms. The patients recovered, no additional cases were found, and none of 54 identified contacts developed symptoms during the 21-day follow-up.

Conclusion: This investigation identified a second case of monkeypox in Pujehun district within two years and the first case in Kailahun district. Because of evidence of widening distribution of monkeypox, its clinical similarity to varicella, and increasing proportion of the population not vaccinated for smallpox and, therefore, not protected against monkeypox, we recommend the following measures: 1) enhanced national surveillance for monkeypox by public health staff; 2) increased sensitization for clinical staff to include monkeypox in the differential diagnosis for rash illness; and 3) educational campaigns targeting the community to reduce the risk of animal-to-human transmission of monkey pox.

Lassa fever case investigation - Kenema district, Sierra Leone, February-March, 2019

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Background: Lassa fever (LF), an acute viral hemorrhagic illness of 2-21 days' duration, is endemic in Sierra Leone. It is transmitted to humans via direct or indirect contact with rodent urine or feces. Overall, case fatality rate (CFR) is 1%, increasing to 15% for severe cases. FETP investigated two suspected LF cases in Kenema district to confirm diagnosis, identify sources and provide appropriate control measures.

Methods: History and blood samples were obtained for the 2 case-patients. Active case finding was conducted, and 18 contacts were identified and followed up for 21 days. An environmental assessment was conducted to identify risk factors for LF transmission.

Results: An 8-year old male, with onset of fever ($>39.5^{\circ}\text{C}$), and sore throat on 2/10/2019, was admitted to the hospital on 2/18/2019 and treated for malaria and pneumonia. LF was suspected when bleeding was noted from orifices. The patient died on 2/20/19 when the diagnosis was confirmed via PCR. The second case-patient, a 5-year old female, followed a similar course with onset of symptoms on 2/15/2019, hospital admission on 2/21/2019 and LF suspected on 2/26/2019 when bleeding from orifices was noted. LF was lab-confirmed by PCR on 3/2/2019 and she died the same day. No contacts developed LF. Assessment of the case-patients' residences showed nearby dumping sites with unsanitary conditions, foods stored in open containers, and presence of rodent droppings. Tissue and blood from 1/3 trapped rodents were positive for LF by PCR.

Conclusions: The case-patients were most likely exposed to LF because of unsanitary household environments. Contributing factors for death were delays in seeking medical care by family and lack of suspicion of LF by hospital staff. Public health actions include review of LF case definition and case management, implementation of LF training for clinicians, hospital staff, and community healthcare workers, and community education.

Assessing Sensitivity of Acute Flaccid Paralysis Surveillance in Sierra Leone (2012-2016)

Authors: Abdul Sesay, Binta Bako, Tushar Singh, Gildo Okure, Daniel Sokoya, Michael Ndolie, Kuti George

Background: Since 1988 Global Polio Eradication Initiative, poliomyelitis cases have been drastically decreasing worldwide. National AFP (acute flaccid paralysis) surveillance is the gold standard for detecting cases of poliomyelitis. AFP surveillance was adopted in Sierra Leone in 1998; AFP case-based surveillance was initiated in 2004 using syndromic approach to detect poliomyelitis cases and respond rapidly. Last case of Wild Poliovirus in Sierra Leone was in February 2010. To ensure adequate sensitivity of the AFP surveillance system, we reviewed poliomyelitis performance indicators against the WHO standardized indicators.

Methods: We conducted retrospective analysis of AFP surveillance in Sierra Leone from 2012 to 2016 using the national AFP database. We characterized AFP cases and evaluated the sensitivity of the AFP surveillance system using major indicators recommended by WHO.

Results: Overall, the surveillance system detected 511 AFP cases from 2012-2016; median age was 3 years; range 0.3-14 years. Surveillance system was most sensitive in 2012 and 2013, with national annualized AFP detection rate of 6.7/100,000 and 6.9/100,000 respectively; surpassing the WHO targets (2.0/100,000 for <15 year population). The AFP detection rate decreased in 2014 (1.6/100,000), 2015 (2.6/100,000), and 2016 (2.2/100,000). WHO target of $\geq 80\%$ for stool adequacy was met in 2013, 2014, and 2016. As there were no confirmed or compatible poliomyelitis cases, AFP detection rates and Non-Polio AFP rates were the same.

Conclusions: AFP surveillance during the pre-Ebola epidemic years demonstrated high level of sensitivity; however, it was affected by diversion of surveillance resources to control the Ebola epidemic. The AFP detection rate in 2016 was above the WHO target, but was still below the rates in 2012-2013. There is need for Sierra Leone Ministry of Health and Sanitation, WHO, and other stakeholders to strengthen AFP surveillance that can be relied upon to timely detect poliomyelitis cases, and is necessary for poliomyelitis certifications.

Rubella Outbreak Investigation in Jaiama Bongor Chiefdom, Bo District, Sierra Leone, November, 2016

Authors: Mr. Gbessay Saffa, Dr. Daniel Sokoya, Dr. Binta Bako, Mr. Gildo Okure, Dr. Tushar Singh

Background: Rubella is moderately contagious, generally mild viral infection clinically similar to measles that occurs mostly in children. Susceptible pregnant women who get infected by rubella in early pregnancy are at risk for giving birth to new-borns with congenital rubella syndrome. In Sierra Leone, rubella vaccine is not included in the routine immunization schedule, and rubella is not under surveillance. On October 16, 2016, the Bo district surveillance unit was notified of 8 suspected measles cases from a health facility in Jaiama Bongor Chiefdom (JBC). We initiated an investigation to confirm the outbreak, determine its magnitude, and institute prevention and control measures.

Methods: To identify rubella cases, we investigated suspected measles cases, defined as any resident of JBC with fever and generalized rash and coryza, cough, or conjunctivitis between October 1 and November 16, 2016. We reviewed the health facility records. We conducted interviews and active case searches to identify suspected cases. Blood samples were collected and sent to laboratory for confirmatory testing. The cases were line listed and described by age and sex.

Results: A total of 13 suspected measles cases were identified on October 16-17 from a single community in JBC. Of the 13 suspected cases, none were positive for measles. However, 12 cases were rubella IgM positive. Median age of the cases was 6.5 years (range 5-13 years). Seven males and 5 females were affected. All cases attended the same school. None had received rubella vaccination.

Conclusion: Rubella outbreak was confirmed in JBC in Bo district. The infection may have been acquired in school or in the community because of close contact. Introduction of rubella vaccine into the routine immunization schedule in Sierra Leone could prevent future outbreaks and congenital rubella syndrome.

Investigation of Lassa Fever Outbreak in Lower Bambara Chiefdom, Kenema District, Sierra Leone, December 2016

Authors: Koi Alpha, Daniel Sokoya, Binta Bako, Gildo Okure, Mohamed Vandi, Tushar Singh

Background: Lassa fever is an acute viral hemorrhagic fever endemic in parts of West Africa. Lassa fever virus is spread to humans through food or household items contaminated with excreta of infected rats. On November 10, 2016, Kenema district surveillance unit was notified of a case-patient of Lassa fever who died in Kenema Government Hospital. We investigated to identify the source, initiated contact tracing to identify secondary infections, and instituted control and prevention measures.

Methods: We reviewed the case-patient's medical records to establish the date of symptoms onset. Household and hospital contacts were interviewed to determine exposure to the case-patient. Contacts were listed and monitored twice daily for Lassa fever symptoms. Those who experienced symptoms were isolated and tested for Lassa fever. Environmental assessment of case-patient's residence was conducted.

Results: The first case-patient was 11-months old male who presented with fever and weakness on November 2, 2016. He was confirmed to have Lassa fever on November 10 and died the same day. Forty-four household and hospital contacts were identified and monitored for 21-days. One primary contact, the twin brother of the case-patient, was admitted to the hospital with fever on November 16, but tested negative for Lassa fever. He subsequently tested positive for Lassa fever on November 21 and died the same day. Another 23 household and hospital contacts were identified and monitored for the next 21-days. There were no additional cases. Inspection of case-patients' house showed that they lived close to a dump site in unsanitary conditions, food was stored in open containers, and rats were seen in the house.

Conclusion: Lassa fever outbreak was confirmed in Kenema District. Poor environmental conditions could have led to the outbreak. Increasing health education and sensitization of communities on good hygiene and better environmental practices can help prevent and control future outbreaks.

Neonatal Tetanus Investigation in Kholifa Rowala Chiefdom, Tonkolili District, Sierra Leone, November, 2016

Authors: Kassim Kamara, Gildo Okure, Tushar Singh, Binta Bako, Daniel Sokoya

Background: Neonatal tetanus (NNT) has decreased considerably in countries with improved maternal immunization rates and sterile cord care practices during delivery. As a result, it is targeted for elimination in many African countries. On November 28, 2016, Tonkolili district surveillance unit was notified of two suspected cases of NNT. We investigated to confirm the cases, identify the source, and provide recommendations to prevent future cases.

Methods: We used the suspected case definition (any new born with normal ability to suck and cry during the first two days of life, and who, between the 3rd and 28th day of age, cannot suck normally, and becomes stiff or has convulsions), and clinician's assessment to confirm NNT cases. Mothers of the case-patients were interviewed to assess cord care practices and tetanus toxoid (TT) vaccination status. TT vaccination status of pregnant women and women of child bearing age in households surrounding case-patients was assessed through self-report and health records.

Results: Two NNT case-patients were identified: 4-day old male and 6-day old female. Both presented with convulsions and stiffness and were unable to suck on their 3rd day of life. The mother of the 4-day old case-patient had received only one dose of TT vaccine, while the TT vaccination status for the mother of 6-day old case-patient could not be verified. Both case-patients were delivered at home and their umbilical cords were treated with traditional herbs mixed with soil. In the same neighbourhood, two pregnant women and several women of childbearing age were referred to nearest health facility to complete their TT vaccination.

Conclusion: Incomplete immunization of the mothers, home delivery, and unclean cord care practices could have predisposed the neonates to infection. We recommend improving maternity care with emphasis on clean deliveries and increasing TT immunization coverage of women of childbearing age, especially pregnant women.



ABSTRACTS PRESENTED AT AFENET SCIENTIFIC CONFERENCES

Causes and trends of Stillbirth Deliveries, Aberdeen Women's Centre, Freetown, Sierra Leone, 2017-2020: A case study of health facility

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Introduction: In 2014, the World Health Assembly endorsed a target of below 12 stillbirths per 1000 total births in every country by 2030. In Sierra Leone, stillbirth rate is 32.6 per 1000 live birth in 2020. Despite the frequent occurrence of stillbirth, little information is available on the causes of stillbirth. We analysed secondary data to assess stillbirth deliveries, causes and trends at Aberdeen Women's Centre, Freetown, Sierra Leone.

Methods: Descriptive secondary data analysis was conducted. Data extracted on deliveries at the Aberdeen Women's Centre (AWC) from January 2017 to December 2020. We reviewed delivery registers and maternal clinical charts. We collected data on age of mothers, gravidity, gestational age, fetal sex and possible causes of stillbirth. We cleaned, analyzed data by person, place, time and calculated proportions, ratio and rate.

Results: Out of 10,730 deliveries, 167 (1.6%) were stillbirths (15.6 per 1000 births). The median age of mothers who delivered stillbirths was 28 years (range: 15 - 42 years). Of the 167 stillbirths, 96 (57%) were male fetus, 142 (85%) were intrauterine and 100 (60%) were macerated. Late Stillbirths accounted for 98 (59%). Of the total stillbirths, 115 (69%) were vaginal deliveries, 153 (91%) were cephalic presentation and birth defects were ten (5.9%). The causes of stillbirth were pre-eclampsia 27 (16.2%), placental abruption 22 (13.2%), ruptured uterus 19 (11.4%), antepartum hemorrhage 12 (7.2%) and Placenta Previa 6 (3.6%). The yearly trend of stillbirth rate was 14.7, 17.0, 18.7 and 11.9 per 1000 birth from 2017 to 2020, respectively.

Conclusion: Stillbirth rates at AWC is lower than the national rate. The majority of stillbirths were caused by preventable or treatable conditions. We recommended good practices of this facility to be replicated in other maternal health facilities in the country. Also, early detection and management of these preventable causes may reduce stillbirths.

High fatality of Lassa fever outbreak, Bo District, Sierra Leone, February 2023

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Background: Lassa fever (LF) is endemic in West Africa, with an estimated 100,000 to 300,000 infections and 5,000 deaths annually. On February 1, 2023, the Bo District Surveillance Team received a notification from a community about deaths suspected of LF. The Field Epidemiology Training Program trainees were deployed to confirm the diagnosis, assess the magnitude, and identify possible transmission routes of the infection.

Methods: We adapt the LF surveillance case definition and collected demographic, clinical and exposure data through interviews and review of clinical records. Blood samples were collected and sent for laboratory confirmation of LF. We conducted environmental assessments, active case search in the affected community and eight health facilities. Thirty contacts were line listed and monitored for 21 days.

Results: From January 1 to February 10, 2023, two probable and six suspected cases of LF were recorded. The two probable cases, aged 10 months and 24 years old, died unreported on January 25 and 26 respectively. All six suspected cases were investigated, two cases tested positive for LF antigen. On January 28, 2023, a 21-year-old female (case-patient 1), presented with fever, cough, and chest pain. On January 29, 2023, she was treated for malaria and later started bleeding. She died on January 31, 2023. On January 29, 2023, a 57-year-old female, mother of case-patient 1, developed fever, cough, and headache. On February 2, 2023, she presented to a hospital with bleeding and died on arrival. All cases (confirmed and probable) lived in the same house. The case fatality rate (CFR) was 100%. No additional cases were identified and none of the contacts developed LF symptoms. Rodent droppings found in case-patients' residences

Conclusion: A Lassa fever outbreak was confirmed with a high CFR in Bo District. We sensitized clinicians on LF early diagnosis and conducted awareness among affected communities to keep homes clean, and store meals in rodent-proof containers.

Evaluation of Multi-Drug Resistance Tuberculosis Surveillance System: Sierra Leone, January 2021 – December 2022

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Introduction: Multi-drug resistant Tuberculosis (MDR-TB) is a complex infectious disease and is a threat to global health. Globally it is estimated that about 630,000 tuberculosis patients have multi-drug tuberculosis and require treatment. Sierra Leone is among the world's 30 most affected countries accounting for 87% of the global infection rate. The Tuberculosis surveillance system is part of the general framework of the Integrated Disease Surveillance and Response and we therefore evaluating the system to determine its performance, assess key attributes and make appropriate recommendation to improve the system.

Method: The study was a mixed (qualitative and quantitative) cross sectional study carried out in 4 purposely selected sentinel sites using GeneXpert to test multi-Drug Resistant Tuberculosis. The updated guidelines for evaluating surveillance systems was used as a to assess the system attributes. We interviewed 7 clinicians, 2 national and 16 district stakeholders. MDR-TB notification and laboratory registers were reviewed, content analysis performed on completeness, timeliness and data quality.

Results: The system was found to be simple and flexible (97.5% and 94.5%) respectively but had a low case detection rate of 24% (299/1255). The average time taken to confirm a suspected case was 48-72hrs and registration for treatment was done same day after confirmation. The standard case definition was easy to use and 76% showed willingness to continue with the system. 95% of the reported data were completely and correctly filled but timeliness was 92.5%. Quarterly supervisions are conducted from the national level. The program is 100% donor dependent and private facilities are not involved in multi-drug resistant tuberculosis surveillance activities.

Conclusion: The multi-drug resistant Tuberculosis surveillance system is useful and partly meeting its objectives, however it is not meeting the yearly case target and been donor dependent poses threats to the stability of the system.

Epidemiological analysis of the national acute flaccid paralysis surveillance data, Sierra Leone, 2018 to 2022. A descriptive secondary data analysis

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Introduction: In Sierra Leone, the last case of wild poliovirus (WPV) was reported in 2010. A circulating vaccine-derived poliovirus type 2 (cVDPV2) outbreak was occurred in 2020. Although poliovirus routine vaccination coverage is above 90%, the country remains vulnerable to poliovirus circulation. We analysed AFP surveillance data to describe AFP cases feature and trend.

Methods: We conducted a descriptive analysis of the national AFP surveillance data collected from 2018 through 2022. Data were extracted from the national AFP surveillance database in Microsoft Excel and imported into Epi Info 7 for analysis. AFP surveillance indicators were used to assess the system performance. These indicators include non-polio AFP rate, case notification rate, stool sample condition and adequacy, and case investigation rate.

Results: There were 669 AFP cases reported from 2018 to 2022, 55% (368/669) were males and 78 % (521/669) were below five years. A total of 121 AFP cases reported in 2018, 123 in 2019, 114 in 2020, 170 in 2021, and 134 in 2022. Of the total 2% (15/669) were confirmed as cVDPV with zero WPV. The average annual non-polio AFP rate was four per 100,000 populations. Ninety-four percent of the cases presented with fever, 96% (554/577) with flaccid sudden paralysis and 55% (301/535) were asymmetrical. The proportion of cases notified with seven days of symptoms onset was 70% (471/669), and 90% (601/669) of the cases investigated within 48 hours. Stool adequacy was 88% (517/585), with 7 % (38/585) of samples arrived at the national laboratory within three days after collection. Ninety-one percent (609/669) of cases, including confirmed cVDPV, received three or more doses of the oral poliovirus vaccine.

Conclusion: Sierra Leone scored above the WHO threshold for most of the AFP surveillance indicators. We observed delays in sample transportation from districts to the laboratory. We recommend Ministry of Health and Sanitation to strengthen the sample referral system.

Evaluation of an Electronic Case-based Disease Surveillance (eCBDS) System in Karene District, Sierra Leone, 2022

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Introduction: Timely data collection and reporting is a major public health challenge in many low-income countries, including Sierra Leone. In 2019, the Government of Sierra Leone introduced an electronic Case-based Disease Surveillance System (eCBDS) to enhance prompt data collection, analysis, and dissemination; for outbreak detection. Since its introduction, there is limited information on its performance. Here, we described the operation and assessed the surveillance system attributes in Karene district, to determine if the system is meeting its objective.

Methods: We administered a semi-structured questionnaire to describe the operation and assessed: usefulness, simplicity, stability, flexibility, representativeness, and acceptability. We reviewed hospital registers and the Electronic Disease Surveillance System to assess: data quality, sensitivity, positive predictive value, and timeliness. We use predefined evaluation criteria to rank the attributes, as poor (≤ 3), average (3-7), and good (> 7).

Results: A total of 15 health facility and district-level stakeholders were interviewed. The majority of the stakeholders interviewed were female, 66.7% (10/15), with a median age of 35 years (range: 28–60 years). The system functions as both an active and passive surveillance system, with data reporting done immediately via mobile devices and supervision done quarterly by supervisors. Of the ten attributes, simplicity was average, with 66% of respondents stating the system was easy to operate. Additionally, flexibility, sensitivity, stability, and representative were average, with scores of 48%, 69%, 65.3%, and 64.5% respectively. Acceptability, predictive value positive, and data quality were good with scores of 85%, 83%, and 98% respectively. Also, usefulness was average, with 67% of respondents saying the system's data was used to detect outbreaks.

Conclusion: The eCBDS system was useful in meeting its objective, as the data generated through the system was used to detect outbreaks. To maintain a well-functioning surveillance system, we recommend regular supportive supervision and feedback; and staff to be trained on data analysis through the eCBDS.

Evaluation of HIV Surveillance System within the Prevention of Mother-to-Child Transmission Program, Western Area Urban District, Sierra Leone, 2022

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Background: By end of 2019, approximately 18% of new HIV infections among children in Sierra Leone, were acquired from their mothers. In 2015, an HIV surveillance system was established within the Prevention of Mother-to-Child Transmission Program (PMTCT), to monitor the epidemiological trend and pattern of HIV. Since its establishment, no study has been conducted to determine its performance. Here, we described the operation and assessed the surveillance system attributes of the HIV surveillance system within the PMTCT program in Western Area Urban District.

Method: We purposively selected 18 healthcare workers working within the PMTCT program and interviewed them using a semi-structured questionnaire to describe the operation and assessed qualitative system attributes: simplicity, flexibility, representativeness, acceptability, stability, and usefulness. We reviewed health facility registers and district health information system to assess: timeliness, data quality, and sensitivity. We used a predefined evaluation criteria scale from 0-10, with poor (1-3), average (4-6), and good (7-10) to rank attributes.

Result: The HIV surveillance system within the PMTCT program operates as a passive surveillance system. The data reporting is done monthly using a monthly summary form by health facility staff, and feedback and supervision are done quarterly by supervisors from the district or national level. For surveillance system attributes, simplicity was good, with 69% of respondents saying the system was simple to use. Flexibility and acceptability were good, with scores of 78% and 79% respectively. Additionally, sensitivity, stability, timeliness, and representativeness were good, with scores of 90%, 73%, 89%, and 73% respectively. The usefulness and data quality were average, with scores of 57% and 60% respectively.

Conclusion: The HIV Surveillance System was useful in meeting its objective. However, the surveillance system's average data quality suggests that the system is producing data that might be limited in guiding appropriate decision-making. We recommend training for healthcare workers on data recording, analysis, and dissemination.

Epidemiological investigation of food poisoning outbreak, Kenema District, Sierra Leone, 2022

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Introduction: Food safety remains a public health challenge in resource-limited countries including Sierra Leone. On July 27, 2022, the National Surveillance Program received a notification about a cluster of suspected food poisoning cases from the Kenema District. We investigated to verify the diagnosis, determine the magnitude, and possible source of the outbreak.

Methods: We employed unmatched case-control study (1:1 ratio); enrolled 97 cases and 97 controls. A case was any person residing in Kenema City and presenting with generalized body weakness, vomiting, or nausea from July 25 to 31, 2022. A control was any person residing in Kenema City at the specified time without symptoms suggestive of food poisoning. We interviewed respondents, and reviewed clinical records to collect demographics, clinical, exposure, and epidemiological variables. We calculated attack rates for each food item and adjusted Odds Ratio (aOR) with 95% confidence interval (CI) to assess factors independently associated with food poisoning.

Results: From July 27 to 28, 2022, 105 cases were recorded of which a 14-month-old baby died. Sixty-nine percent (72/105) were females. The median age was 12 years (range :1 - 65 years). Fifty-eight percent (61/105) of the cases were school pupils. Of the total cases, 61% developed generalized body weakness, 51% vomiting, and 43% nausea. Cake had the highest attack rate (AR = 3.1) followed by ginger beer (AR = 2.9). The odds of exposure were 4 times higher among cases than controls (cOR=4; 95% CI: 1.89, 8.58). At multivariate level, eating graduation cake was significantly associated with food poisoning (aOR =7.3; 95% CI 3.68,14.33).

Conclusion: This investigation established an epidemiological link to the cake prepared for graduation as a likely source of the food poisoning outbreak. Food laboratory analysis would help to identify the causative agent. We sensitized affected communities on food safety, and recommended building laboratory capacity for food analysis.

Has COVID-19 pandemic affected the control of tuberculosis in Sierra Leone? - Retrospective secondary data analysis 2019 – 2022

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Introduction: Globally, tuberculosis remains the leading cause of death by a single infectious disease. Sierra Leone was making progress in tuberculosis reduction before the COVID-19 pandemic. However, the government prioritized COVID-19 response over other health priorities including tuberculosis which may have affected the tuberculosis control measures. We aimed to assess the impact of the COVID-19 pandemic on the control of tuberculosis in Sierra Leone.

Methods: We extracted data from the National Tuberculosis Control Program from January 2019 to 2022. We calculated the treatment success rate (target: 90%), case notification rate (target: 90%), death due to tuberculosis (31 per 100,000%), and the notification of Multi Drug Resistance-Tuberculosis cases (estimated 640 per year).

Results: The incidence of tuberculosis per 100000 was 295 in 2019. However, the rate increased, during the peak of the pandemic, to 298 and 289 in 2020. In 2022, as the pandemic declined, the rate dropped to 286 per 100000. The case detection rate decreased from 76% in 2019 to 65% in 2020. However, the rate increased to 80% in 2022 after the peak of the pandemic dropped. Cases. The treatment success rate decreased from 89% in 201 to 87% in 2020. But, in 2020 it increased to 91%. Loss to follow-up increased from 3% (2019) to 4% (2021). Tuberculosis associated deaths increased from 4% (2019), to 5% (2021). Tuberculosis case notification decreased from 78% (2019) to 65% (2020). However, the rate increased to 80% in 2022.

Conclusion: The COVID-19 pandemic had a negative impact on the main indicators of tuberculosis in Sierra Leone. We observed a decline in the success rate of tuberculosis treatment, the rate of cases notification and an increase in lost to follow-up. We recommend the National Tuberculosis Programme to enhance tuberculosis control measures and develop strategies to mitigate the impact of future large-scale outbreaks on tuberculosis control interventions.

Sierra Leone reducing Maternal Mortality in the last five years, 2016 – 2021

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Introduction: Globally, Sierra Leone is ranked the third worst country with a high maternal mortality ratio (MMR) of 717 per 100,000 livebirths. This remains a major public health concern. Limited information exists on the trend, pattern, and underlying factors contributing to maternal deaths. This study aimed to describe the trends, distributions, and causes of maternal mortality in Sierra Leone.

Methods: A retrospective descriptive analysis was conducted using data extracted from the National Maternal Death Surveillance and Response System, which was collected from 2016 to 2021. We analyzed key variables including age, place and time of death, gravidity, and cause of death. We calculated frequencies, proportions, and ratios using micro-soft excel 2016.

Results: Overall, 3,491 maternal deaths were recorded out of 1,312,951 live births during the study period. The average MMR during the period under review was 266 deaths per 100,000 live births ranging from 319 per 100,000 live births in 2016 to 255 per 100,000 live births in 2021. Of the total 3,491 maternal deaths, 84% (2948) were investigated and reviewed, and 90% (2465) were notified within 24 hours after death. The median age of decedent mothers was 27 years (range: 12 to 50 years), and the age group 25-34 years accounted for almost half, 45% (1552/3491), of the deaths. The deaths were more common in multigravida women with 41% (1353/3491) of the total deaths. Of the total maternal deaths, 79% (2,767/3491) occurred at health facilities, of which 75% (2,065/2767) were from referral hospitals. Haemorrhage was the leading cause of maternal deaths with 43% (1,489/3491).

Conclusions: There was a decline in maternal death from 2016 to 2021. Haemorrhage was the leading cause of maternal death. We recommend the Ministry of Health and Sanitation to implement targeted strategies on haemorrhage prevention and control for further reduction of maternal mortality in Sierra Leone.

Comparative analysis of measles in border and non-border districts of Sierra Leone, 2018-2021: Retrospective secondary data analysis

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Introduction: In recent years, Sierra Leone had recorded multiple outbreaks of measles, and the last three outbreaks (2018, 2021, 2022) were reported from point-of-entry communities. Despite the continued occurrence of measles, there is limited information on measles in border districts. This study aimed to describe the epidemiological trend, pattern, vaccination status, and incidence of measles in border and non-border districts of Sierra Leone.

Method: We conducted a descriptive secondary data analysis on measles case-based surveillance (from 2018 to 2021). Data was extracted from the national line list and district health information system database. We use the measles standard case definition to classify cases across border districts (8) and non-border districts (8); and analysed frequencies, proportions, and rates.

Result: Nationally, a total of 3,054 suspected cases of measles were recorded, of which 216 (7%) were IgM positive, 1,907 (62%) were negative and 931 (31%) were probable cases. Among the positive cases, border districts accounted for 73% (158/216) whilst non-border districts were 27% (58/216). Among the cases recorded in border districts, 59% (93/158) were males; the median age was 9 years (range: 0.5-37 years). Regarding vaccination status, 38% (60/158) of children in the border districts and 62% (37/58) in the non-border district were vaccinated against measles. The average incidence was 86 per100,000 populations in border districts, whilst it was 20 per100,000 populations in the non-border districts. The measles incidence in border districts decreased from 150 in 2018 to 56 per 100,000 populations in 2021, whilst in the non-border districts, it increased from 13 in 2018 to 19 per 100,000 populations in 2021.

Conclusion: A high incidence of measles cases was recorded in border districts with low vaccination status, indicating the majority of persons residing in these districts were at higher risk of contracting measles. We suggest supplemental immunization activities be implemented targeting border districts.

Delivery Outcome among women who delivered in Regional Hospitals, In Sierra Leone, 2021-2022: Secondary data analysis

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Background: Childbirth, though a normal physiological process, has been associated with risks, which sometimes lead to loss of life. Even though delivery outcomes have improved in developed nations, it still remains a challenge in developing countries. Sierra Leone mostly underperforms in pregnancy and childbirth indicators. This study aimed to determine the outcome of deliveries among women who delivered in the four regional hospitals in Sierra Leone.

Methods: We conducted a descriptive secondary data analysis (from January 2021 to December 2022) using the maternal and perinatal deaths surveillance line list. We collected variables including: outcome of delivery, mode of delivery, birth weight, neonatal and maternal death in four regional hospitals (Ola during children's and Princess Christian Maternity Hospital (PCMH), Bo, Kenema, and Makeni).

Results: A total of 31,809 babies were delivered during the 2 years' period. Of the total babies delivered, 48.5% (15,413) were in 2021. Among the four hospitals, PCMH had the highest number of deliveries with 49% (14,448/31,809) babies. A total of 1,987 stillbirths were recorded, of which 49.4% (981) were reported in 2021; 64% (1,277) were macerated. The stillbirth rate was 62.5 per 1,000 births. Normal vaginal delivery accounted for the majority with 63% (19,349/30,757) and caesarean section; with 34% (10,466/30,757). Of the live births (29,822), 13% (3,798) were pre-terms and with 14.5% (4,314) were low birth. Neonatal deaths accounted for 3% (915/29,822); 90% (820) of these deaths were reported during the first week of life. A total of 344 maternal deaths were recorded; Bo regional hospital accounted for 40% (136). The maternal mortality ratio was 1154 per 100,000 livebirths.

Conclusion: Delivery outcomes still remain poor in Sierra Leone, with high stillbirths, neonatal deaths and maternal mortality. We recommended early detection and management of these preventable causes may reduce stillbirths, and neonatal and maternal death.

Assessing the Impact of Africa Field Epidemiology Network training on Intermediate data analysis and weekly surveillance bulletin, Sierra Leone, 2023: Mixed method study

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Background: Timely data analysis and weekly surveillance bulletin production, is major public health challenges in many low and middle-income countries, including Sierra Leone. In December 2022, the Africa Field Epidemiology Network (AFENET) trained district-level surveillance officers on data analysis and weekly surveillance bulletin production for priority diseases and conditions. Here, we investigated to determine the number of weekly bulletins produced, explore the frequency of weekly bulletins production, and frequency of data analysis by district surveillance officers in Sierra Leone.

Method: We review surveillance records (from December 2022 to March 2023) extracted from the AFENET SharePoint database to determine the number of weekly bulletins produced. We purposively selected 6 stakeholders within the Ministry of Health and Sanitation; and interviewed them using a checklist to explore the level of information sharing and data analysis. We define a weekly surveillance bulletin as a document that provides weekly updates to health stakeholders on disease conditions or events.

Result: Overall, a total of 84 weekly bulletins were produced. Bombali district accounted for the majority with 14% (12/84) followed by Karene and Kailahun districts with 12% (10/84) each. From the semi-structured interview, the majority of the stakeholders affirmed that the surveillance officers were analyzing surveillance data and developing weekly surveillance bulletins and disseminating findings. They further stated that surveillance data analysis posters are displayed at the districts and national surveillance offices, after the training. From personal observation of the lead author, the training has impacted surveillance officers' data analysis skills and weekly production of bulletins, as most of the districts are now reporting on time.

Conclusion: Production of the weekly surveillance bulletins and data analysis have improved across all districts. The trained district surveillance officers were conducting data analysis and sharing their findings with relevant stakeholders for action. We recommend regular supportive supervision and mentorship for district surveillance officers on data analysis and bulletin production.

Analysis of Lassa fever surveillance data in Sierra Leone: A Descriptive cross-sectional study, 2018 to 2022

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Introduction: Lassa fever is a zoonotic haemorrhagic disease that is endemic in West Africa, with subsequent outbreaks in Sierra Leone. However, there has been limited information on its epidemiological trend and distribution. We analyzed the Lassa fever national data to describe the burden, distribution, and epidemiological trends in Sierra Leone.

Methods: A descriptive cross-sectional study was employed to analyze national Lassa fever in Sierra Leone, 2018-2022. We extracted data from the district health information system software and analyzed including: incidence and case fatality rates (CFR) sex, age group, district, and trend by years. We summarized the results into frequencies, proportions, and rates.

Results: A total of 1,127 suspected and 63 confirmed cases of Lassa fever with 40 deaths (CFR-63%) were reported. Of the confirmed cases, the median age was 26 years (range: 1 to 90 years); female accounted for 57% (36/63), and the majority of the cases 40% (25/63) were between 0-9 years. The confirmed Lassa fever cases in each were 2018 (13), 2019 (12), 2020 (8), 2021 (16), and 2022 (14) cases respectively, giving the cumulative incidence rate of 2 per 1,000,000 population. Kenema district accounted for 81% (51/63), followed by Tonkolili and Bo Districts with 10% (6/63) and 5% (3/63) respectively. There were more cases between January and June. The majority of cases, 25% (16/63) were recorded in 2021, while the least 13% (8/63) were recorded in 2020.

Conclusion: Kenema District reported the highest number of cases. We recommend the Kenema Ministry of Health and Sanitation to enhance syndromic surveillance for Lassa fever. Additionally, the Kenema District health authorities to increase community sensitization on early health seeking behaviour.

High maternal death due to low index of suspicion among healthcare workers in recognizing danger signs of pregnancy in Falaba District, Sierra Leone: Secondary data analysis

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Background: In 2019, Sierra Leone was ranked as one of the three countries out of 186, with the highest maternal mortality ratio at 717 per 100,000 live births. In Falaba district, there is a paucity of information on maternal mortality. Here, we reported the epidemiological trend, distribution, and causes of maternal deaths in Falaba district.

Method: We used retrospective secondary data, from 2018 to 2022, extracted from the district maternal deaths surveillance review line list. We obtained variables including age (years), gravida, parity, number of Antenatal Care (ANC) visits, place of delivery, and mode of delivery, among others.

Result: A total of 51 maternal deaths were recorded, of which 53% (27) were farmers, and median age was 27 years (range: 13 - 41 years). For the period under study, the death rate decreased from 14 per 100,000 live births in 2018 to 7 per 100,000 live births in 2022. The peak of deaths was during the second year of the COVID-19 pandemic (2021) at 33% (17/51). More than half of the deaths occurred in the community with 55% (28/51); 29% (15/51) did not attend ANC, and 71% (36/51) attended at least one ANC. Women with gravida one to three accounted for 35% (18/51) followed by gravida one to two at 31% (16/51). The leading cause of death was Postpartum haemorrhage with 37% (19/51), followed by antepartum haemorrhage with 33% (17/51).

Conclusion: Although there was a decrease in the maternal mortality ratio by half, however, maternal death was high, particularly among women who did home delivery. Postpartum hemorrhage was the leading cause of maternal deaths, likely due to the low index of suspicion in recognizing danger signs in pregnancy. We recommend the Ministry of Health and Sanitation train healthcare workers on early warning signs and prompt referral of pregnant women with dangers to a neighbouring district hospital.

Needle-stick and sharps-related injuries among healthcare workers at King Harman Road Hospital, Sierra Leone, 2023

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Background: Healthcare workers are at high risk of exposure to pathogen infection from needle-stick and sharps-related injuries. Limited information exists on needle-stick and sharps-related injuries among healthcare workers in Sierra Leone. We aimed to determine prevalence and risk factor associated with needle-stick and sharp-related injuries among healthcare workers.

Methods: We conducted a cross-sectional survey among healthcare workers, from 10 to 13 of January 2023, at Kingharman Road Hospital in Freetown, Sierra Leone. A pre-tested structured questionnaire was used to collect data on needle-stick and sharp-related injuries from healthcare workers. Multiple logistic regression was used to report adjusted Odd Ratio (aOR) and 95% Confidence Interval (CI) to identify factors associated with needle-stick and sharp-related injuries.

Result: A total of 82 healthcare workers were interviewed, with median age 31 (range:25 - 50). Fifty-four percent (44/82) experienced sharps-related injuries, 82% (67/82) were needle-stick injuries, and 18% (15/82) were other sharps-related injuries. Majority of the respondents, 77% (34/44) reported more than one injury. Fifty-two percent, (23/44) of needle-stick injuries occurred during recapping; and 25% (11/44) took post-exposure prophylaxis. Although we did not observe statistical association, females were more likely to exposed needle-stick and sharp injuries (aOR=1.4, CI: 0.44, 4.39). Health care workers with more than three years working time were 3 times likely to experienced stick and sharp-related injuries (aOR=3.3, CI: 0.93, 11.66). Training on using safety devices reduced the exposure to needle-stick and sharp injuries (aOR=0.4, CI: 0.11, 1.44).

Conclusion: Prevalence of Needle-stick Injuries was high among healthcare workers. We sensitized healthcare workers on standard biosafety precaution. We recommend healthcare authorities to intensify infection, prevention and control measures in health facilities.

Clinico-epidemiological characteristics of Road Traffic injuries presenting at the Trauma Centre of Connaught Teaching Hospital, Sierra Leone, 2020-2022

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Introduction: Road traffic accidents account for a significant proportion of unintentional injuries in the world and greatest cause of morbidities, disabilities and mortalities. In Sierra Leone, a total of 2,763 accidents were reported of which 770 had serious injuries whilst 31% deaths were recorded in 2020. The aim of the study was to describe the clinico-epidemiological characteristics of road traffic injuries seen at the accident centre at Connaught Teaching Hospital, Freetown.

Methods: We conducted hospital-based secondary data analysis of road traffic injuries attendees at the Connaught Teaching Hospital. Medical records were extracted using a checklist of all patients who sustained injuries from road traffic accidents and treated at the hospital from January 1, 2020, to December 31, 2022. Data was entered, cleaned, analysed and findings presented in frequencies and percentages.

Results: A total of 336 cases were registered, of which 68.8% (210) were between the age group 20 – 41 year and 78.6% (264) were males. Students accounted for 17.3% of all admitted cases, followed by traders, bike riders, and drivers with 14.1%, 14.0% and 6.8% respectively. Of the total, residents of West-end of Freetown accounted the majority of cases with 25% (84) followed by Central Freetown 20.4% (69), Eastern 19.3% and western area rural 18.5%. The most common type of injuries was lacerations which accounted for 47% (158), fractures 41% (138), abrasions 29% (97) and swellings 26% (87). The most common injured part of the body were the lower Limbs 51%, head 43% and upper limbs 24%. Fractures of the tibia (15.5%), fibula (11.7%) and femur accounted for 8% of all lower limb injuries while the most common injuries of the head were lacerations and fractures of which basal skull 6.3%, mandibular (2.4%) and clavicular fractures 4% were the most fractured bones of the head and upper limbs respectively. Majority of the accidents occurred between 16.00hrs and 8.00hrs, 86% usually presented on the same day and 43.7% of the vehicle types were Motorbikes and Tricycles.

Conclusion: Road Traffic accidents especially motorbike related, are a significant cause of injuries in Sierra Leone therefore practices of strict road safety measures and appropriate use of roads should be strengthened.

Tuberculosis treatment outcome and associated factors among patients at Moyamba District, Sierra Leone, 2023: A retrospective study

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Introduction: Tuberculosis (TB) remains one of the oldest debilitating infectious diseases globally but disproportionately affect the world's poor. Globally, TB is the leading cause of death from a single infectious agent. Sierra Leone is one of the countries with a very high burden of tuberculosis with an estimated prevalence of 289 per 100,000 populations. Treatment success rates and enhanced case detection are critical indicators for evaluating the TB control program performance in Sierra Leone. We analysed TB surveillance data from 2020-2022 at Moyamba District to determine the burden, trends, distribution, and treatment success rates.

Methods: We conducted a descriptive observational analysis of all TB cases registered from 2020 - 2022 in all 12 DOT facilities within Moyamba District. We extracted data from the monthly TB monthly reports, District Health Information system 2 (DHIS2), district laboratory and treatment registers. Data collected included: disease status, age, sex, sub-district, and treatment status. Analysis was done to determine frequencies, proportions, percentages and rates.

Results: A total of 1,481 TB cases were registered during the period, of these 8.2% (122/1481) were diagnosed with extra-pulmonary tuberculosis whilst 91.8% (1360/1481) had pulmonary tuberculosis. 53% (789/1481) were males and the most affected age group was between 25-44 years of age and a median age of 29 years. The incidence per 100,000 populations were: 97.9, 85.1 and 147.4 for 2020, 2021 and 2022. The prevalence of HIV positive TB cases among new and relapsed cases was 36.4% (494/1355) whilst TB positive cases on ART treatment was 10% (136/1355). Of the 923 who had a documented treatment outcome, 86.8% had successful treatment rate, 0.6% treatment failure, 4.2% died and 1% were lost to follow up.

Conclusion: The trend of incidence is increasing showing an increase in case detection rate but the case fatality rate is high. We recommend increase sensitization and counselling among cases.

Sero-prevalence of transfusion-transmissible infections among blood donors in Port Loko District Government Hospital, Sierra Leone: 2020-2021

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Introduction: The Prevention of blood transfusion-transmitted infections includes the routine screening of blood donors and donated blood products. Hepatitis B Virus (HBV), hepatitis C virus(HCV), human immunodeficiency virus (HIV), and Syphilis are among the greatest threats to blood safety for recipients. They are also the leading causes of death and chronic and life-threatening abnormalities. Blood transfusion accounts for 5–10% of HIV infections in sub-Saharan Africa. The study aims to determine the seroprevalence of HBV, HCV, HIV, and syphilis and associated factors among blood donors in Port Loko District Sierra Leone.

Method: A retrospective observational study of apparently healthy blood donors from January to December 2020-2021 was reviewed. Seroprevalence of hepatitis B, hepatitis C, human immunodeficiency viruses and syphilis were determined in whole blood donations collected at Port Loko District Hospital, using Elisa kits following standard protocols. Statistical analysis was performed using epi info.

Results: A total of 2845 blood donations were conducted during the period of which 79% (2249/2845) donors were males and 21% (574/2845) were females. The median age was 28 years and the highest blood donations age category was between 20 to 29 years 42.1% (1198/2845) followed by 30 to 39 years of age, 36% (1025/2845). The most common occupation of the donors was farming 30% (866/2845). The overall seroprevalence of HBV, HIV, HCV, and syphilis infections were 36%, 0.17%, 0.07%, and 0.07% respectively. None of the donors had multiple infections. Blood group “O positive” was the most common with 57% followed by “B positive” at 22%. Risk factors identified include married donors (OR:0.44, 95% CI=0.25-0.76; P-Value<0.0028) and replacement donor type (OR:0.03,95% CI=0.01-0.24; P-Value<0.0001).

Conclusion: The findings showed that a substantial percentage of blood donors are infected with either HBV or HIV; therefore, the need for proper screening of blood before transfusion and increase in community sensitization.

Investigation of a cluster of dog bites in Waterloo community, Western Area, Sierra Leone, October, 2016

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Introduction: Dog bites contribute to ~99% of all rabies transmissions to humans. In Sierra Leone, 40% of those bitten by suspected rabid animals are children <15. On October 30, 2016, a cluster of dog bites was reported by Waterloo community health center. We investigated to identify all persons bitten by a dog, assess administration of rabies post-exposure prophylaxis, and offer recommendations.

Methods: We reviewed health center registers for dog-bite cases from November 1 to December 6, 2016 and interviewed clinical staff and family members of cases. A case was defined as any Waterloo resident bitten by a dog from November 1 to December 6, 2016 who visited the health center. We assessed whether rabies post-exposure prophylaxis administration adhered to WHO guidelines. We followed-up all cases for 3-months for development of rabies.

Results: Two case-patients, a 12-year old girl and an 8-year old boy were bitten by an unprovoked, stray dog. Bites were superficial and on different body parts. An additional case was identified of a 10-year old boy from another neighbourhood who was bitten on his buttock by a known community dog with recent behaviour change. Wounds were cleaned with soap and water, and antibiotic ointment was applied. Anti-rabies vaccination was started within 24-hours, but all received four doses (days 0, 3, 14, 40), instead of WHO-recommended five doses (days 0, 3, 7, 14, 30). The 10-year old boy developed clinical rabies after 45 days and died, but the others remained asymptomatic. All patients paid out-of-pocket for anti-rabies vaccinations.

Conclusion: Failure in post-exposure prophylaxis in the 10-year old may have been due to suboptimal dosage. Collaborative public health intervention with veterinary unit to curb human rabies deaths through vaccination of dogs in Waterloo community, subsidized post-exposure prophylaxis access, and training of healthcare providers on rabies post-exposure treatment protocols is recommended.

Evaluation of the animal and human rabies surveillance systems in Bombali district, Sierra Leone, 2017

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Introduction: Rabies, a zoonotic viral disease, causes approximately 59,000 human deaths each year, globally. Endemic in Sierra Leone, canine-associated rabies reportedly causes on average 97 human deaths annually. Effective control of rabies is contingent on functional animal and human surveillance systems to detect rabid dogs and human cases quickly for prompt action. However, the performance of the two systems in Sierra Leone remains unknown. We evaluated the two systems to determine collaboration between them and establish if they met control objectives.

Methods: We purposively selected and interviewed 28 animal health staff, 36 human health staff, and 20 community members in Bombali district, using a semi-structured questionnaire developed based on the CDC surveillance system evaluation guidelines. The interviewees rated acceptability, simplicity, flexibility, and stability of the systems on a ten-point Likert scale. We reviewed the 2016-2017 human and animal surveillance data to determine representativeness, data-quality, timeliness, sensitivity, and positive predictive value (PPV). We performed a descriptive analysis and calculated sensitivity using district estimates.

Results: The rabies surveillance systems scored eight-to-ten for humans and three-to-four for animals, on acceptability, simplicity, flexibility, stability, and timeliness. The animal system did not detect rabid dogs confirmed by the human system and information was not shared between them. Sensitivity was 6/16 (37.5%) and 0/22 (0%) for the human and the animal systems, respectively. The PPV was 6/18 (33%) for the human system, but data were unavailable for the animal system. District data were representative for the human system, but data were unavailable in the animal system.

Conclusion: Given that the animal rabies surveillance system is non-functional and the human system's performance, particularly, on sensitivity and PPV is suboptimal, currently the two systems cannot meet rabies control objectives. Their capacities will need to be developed through collaboration on sharing of surveillance data and rabies case investigations.

Evaluation of human immunodeficiency virus viral load surveillance system – Sierra Leone, 2017

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Introduction: In November 2016, Sierra Leone, launched a human immunodeficiency virus (HIV) viral load surveillance system (VLSS) for viral load (VL) measurements to monitor antiretroviral treatment (ART) outcomes. We evaluated the effectiveness of the VLSS in directing HIV control measures, as no such assessment has been done previously, despite 8586 VL tests conducted to date.

Methods: We solicited and rated the perceptions of eight national- and 68 HIV clinic-based stakeholders on the simplicity, acceptability, flexibility, and stability of the VLSS using a five-point Likert semi-structured questionnaire, developed based on the updated CDC guidelines for surveillance system evaluation. We assessed data completeness, timeliness, and representativeness of the VLSS by examining the VL data set at the national reference laboratory in Freetown and records at 18 high-volume ART clinics across the country.

Results: The stakeholders scored simplicity, acceptability, flexibility, and stability of the VLSS from 15% to 35% mentioning the lengthy VL testing pathway starting with clinicians requesting for a test, collecting and transport of sample to a hub laboratory, transport to the central VL laboratory, testing and result report to the clinician, as the reasons for their low scores. Data completeness is 97% and the average turnaround time between sample collection and receipt of the result is 37 days (range 7-62) with 23% of the results meeting the 14-day standard. The VLSS covers 39% of the ART clinics country-wide and is 96% donor-funded. Test results are not used for medicine quantification, enhanced adherence counselling, and regimen substitution for patients with un-suppressed VL.

Conclusion: The VLSS is not effective in directing HIV control measures as its results do not inform program- and patient-management decisions. Due to its complexity-related inefficiencies, we recommend introducing simplified point of care VL testing technologies to improve use, efficiency, and access to VL testing.

Maternal death surveillance system evaluation - Western Area Urban District, Sierra Leone, 2016-2017

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Introduction: Estimated at 1,165 deaths per 100,000 live births, Sierra Leone has the highest maternal mortality ratio worldwide. Although Sierra Leone established maternal death surveillance and response system in 2015 to count and review maternal deaths, in order to identify causes and contributing factors, and to inform interventions to prevent future deaths, its effectiveness is unknown. We evaluated the surveillance system to assess if it is effective in meeting its set objectives.

Method: We interviewed 10 stakeholders at district level and 62 clinicians from 12 purposively selected health facilities, using semi-structured questionnaire developed based on the CDC guidelines for evaluating surveillance systems, to assess usefulness, simplicity, acceptability, and representativeness. We reviewed maternal death notifications and investigation forms, verbal autopsy reports, and analyzed 2016-2017 data to determine timeliness, completeness, and data quality.

Result: Five (41.6%) of the visited health facilities used data generated from the surveillance system to monitor trends, and eight (66.6%) had maternal death review committees. All (62) respondents were willing to participate in the evaluation, and 78% gave the correct definition of maternal death. Twenty (32.3%) of the stakeholders mentioned that the community- and health-workers were reluctant to report maternal deaths, concerned that it could be used to negatively gauge their performance. Completeness of notification forms was 97%. However, data discrepancy between health facility records and district surveillance database was 21%. Of the 146 women that died at health facilities, 142 (97.3%) were notified to the district within 24 hours. Of the 25 women that died in the community, 20 (80%) were notified to the district within 48 hours.

Conclusion: The system is partially useful and acceptable; however, difficulty in getting community information, and high data discrepancy may limit in meeting its objectives. Data quality audits and community- and health-workers' engagement are recommended to improve system effectiveness.

Acute flaccid paralysis surveillance system evaluation – Sierra Leone, 2016-2017

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Introduction: Acute flaccid paralysis (AFP) is a clinical syndrome serving as proxy for poliomyelitis, which has been targeted for eradication since 1988. The eradication of poliomyelitis depends on a robust AFP surveillance system to detect poliovirus or verify its absence. Evaluation of AFP surveillance system is especially critical in countries not reporting cases of poliomyelitis. The AFP surveillance system in Sierra Leone, where the last case of polio was reported in 2010, has not been evaluated. We evaluated the system to assess its effectiveness towards poliomyelitis eradication.

Method: We interviewed six stakeholders at national level and 30 clinicians from 19 health facilities selected across three purposively selected districts. We used semi-structured questionnaires developed based on the CDC and WHO guidelines for evaluating surveillance systems to assess the system's usefulness, simplicity, and representativeness. We reviewed the 2016-2017 national AFP case-based data to determine timeliness, sensitivity, and completeness. We compared the system's performance on non-polio AFP rate, non-polio enterovirus isolation rate, 60-days follow-up, and stool adequacy rate, with WHO targets.

Results: Twenty-nine of thirty-six (80.6%) stakeholders mentioned making data-driven decisions; 30 (83.3%) felt the system was useful and representative. Proportion of cases investigated within 48 hours of report was 80.8% (target $\geq 80\%$). Proportion of samples that arrived at the national reference laboratory within 72 hours of collection was 53.8% (target $\geq 80\%$). The non-polio AFP detection rate was 2.5/100,000 of ≤ 15 years age population (target $\geq 2/100,000$). Non-polio enterovirus isolation rate was 9% (target $\geq 10\%$). Stool adequacy rate was 75.6% (target $\geq 80\%$). Sixty-day follow-up was 35% (target $\geq 80\%$).

Conclusion: The AFP surveillance system is not effective in its contribution towards poliomyelitis eradication, as it did not meet majority of the WHO targets. Strengthening sample referral, including reverse cold chain, and 60-days follow-up to the system's ability to detect poliovirus and classify AFP cases is highly recommended.

Lassa fever case investigation, Bo district, Sierra Leone, February 2018

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Introduction: Lassa fever (LF) is an acute viral haemorrhagic disease causing approximately 5,000 human deaths globally, yearly. In Sierra Leone, although LF is endemic in Kenema district, on February 12, 2018, the Bo district surveillance team was notified of a suspected case of LF at Bo hospital. We investigated to confirm the diagnosis, identify potential transmission routes, and institute control measures.

Methods: On February 12, 2018, we interviewed the patient and clinicians, reviewed medical records, and collected information on demographics, clinical symptoms, and risk factors from hospital and community contacts. A blood sample was sent for laboratory confirmation of LF. We conducted active case finding, environmental assessment, and risk communication.

Result: A 26-year-old pregnant woman in labour was admitted to Bo hospital on February 7, 2018, and delivered normally on February 8, 2018. She started complaining of fever, back and joint pains, and vaginal bleeding on February 9, 2018. She was empirically treated for malaria for four days without improvement before suspecting LF on February 13, 2018 the day she died. A blood sample taken the same day tested positive for Lassa virus (LV) antigen. She had not travelled to an endemic LF area in the last three months. On February 17, her newborn developed fever and died the same day. A blood sample from the newborn tested positive for LV antigen. None of the 69 identified contacts developed symptoms of LF during 21-day follow-up. We found poor food storage practices and captured rodents in the patient's home. Laboratory confirmation for LV from the rodents is pending.

Conclusion: We confirmed LF diagnosis, but not the source of infection for the mother. We recommend intensified surveillance for LF cases, mobilizing communities to keep homes clean, storing food in rodent-proof containers, and providing on-the-job training for clinicians on the diagnosis and management of LF.

High mortality rates of Lassa fever in Sierra Leone 2014-2017: A descriptive study

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Introduction: Lassa fever (LF), an acute viral hemorrhagic disease caused by Lassa virus is commonly transmitted to humans through aerosol or direct contact with excreta of infected rodents of the genus *Mastomys*. LF is endemic in most West African countries and in Kenema district in Sierra Leone, and has mortality rate of 1% in the general population and 15% in hospitalized patients. Prompted by four out of six LF cases that died at a hospital in Kenema in April 2017, we analyzed LF surveillance data for 2014-2017 to assess the mortality, and morbidity rates of LF in Kenema district, Sierra Leone.

Methods: We extracted LF data for 2014-2017 collected using passive and active surveillance systems, from the national database. Data were checked for accuracy, completeness, and consistency. We calculated incidence rates, case fatality rates (CFR) and compared by age group, sex, and chiefdom cumulatively and for each year.

Results: During 2014-2017, 941 suspected LF cases were detected, of which 120 (12.8%) were laboratory confirmed. Of the 120 confirmed case-patients, 73 (60.8 %) were females and the median age was 20 (range 0.2–83) years. Compared to an overall incidence rate of 4.8/100,000/year, age-group 15–24 years had the highest incidence of 6.5/100,000/year, while 5-14 years had the lowest (3.2/100,000/year). Females had higher incidence rate of 5.8/100,000/year compared to males (3.9/100,000/year). Two of the 16 chiefdoms had the highest incidence rates; Dodo 22.1/100,000/year and Lower Bambara 16.1/100,000/year. Incidence rate was 5.0/100,000 in 2014, 5.4/100,000 in 2015, 5.0/100,000 in 2016, and 4.1/100,000 in 2017. The average CFR for the period under review was 38.9%.

Conclusions: There were high mortality and morbidity rates of LF in Kenema. We recommended further investigations on risk factors of LF in Kenema, particularly in the two chiefdoms and among females for effective prevention and control measures.

Lassa fever sentinel surveillance system evaluation - Kenema district, Sierra Leone, October 2016-September, 2017

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Introduction: Lassa fever (LF) is an acute viral hemorrhagic infection, endemic in West Africa. In Sierra Leone, LF is endemic in Kenema district with ~100 cases reported yearly. Although the control of LF is dependent on the presence of robust surveillance systems to detect and confirm the diagnosis before instituting treatment, since its introduction in the 1970s, the Kenema-based LF sentinel surveillance system (LFSSS) has never been evaluated to determine its effectiveness. We assessed the effectiveness of the LFSSS to direct control efforts.

Methods: We evaluated LFSSS for the period of October 2016 to September 2017. We interviewed 21 key informants (three district surveillance officers, three LF-based laboratories, six clinicians, and nine community members) using semi-structured questionnaires developed based on CDC guidelines for surveillance system evaluations. We performed content analysis of their responses to determine simplicity, acceptability, stability, sensitivity, and usefulness of LFSSS. We determined the predictive value positive (PVP), timeliness, and data quality of LFSSS by reviewing case investigation forms, weekly surveillance reports, and the district-based LF surveillance database.

Results: Eighteen (86%) respondents thought that the LFSSS was simple, acceptable, and stable, but not useful reasoning that the case definition detected cases too late to save lives. PVP was 9.5% (23 of the 243 suspected cases were confirmed by the laboratory). The median time between the dates of onset of symptoms and diagnosis was six days (range 1-22 days) against within seven days' standard. Data discrepancy between the health- and district-based records was 72%.

Conclusion: Low sensitivity of the LF case definition, low PVP, and high data discrepancy render the LFSSS ineffective as LF cases are not detected or detected too late to institute effective prevention, control, and treatment interventions to save lives. We recommend processes to improve data quality and modifying the LF case definition to increase its sensitivity.

Evaluation of influenza sentinel surveillance system - Western Area Urban, Sierra Leone, 2017

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Introduction: Influenza is an acute viral respiratory disease that has caused four pandemics in the last 100 years, mainly due to influenza A virus. Without a strong surveillance system, it is predicted that influenza pandemic can kill up to 62 million people, 96% of them in developing countries. Influenza sentinel surveillance system (ISSS) has not been evaluated since it was piloted in four sites in Sierra Leone in 2011. The objective of this study was to evaluate ISSS performance.

Methods: The study was conducted at the four sentinel sites in Western Area Urban district in Sierra Leone in 2017, using CDC framework for evaluating surveillance systems. Key informant interviews (KII) with stakeholders from the national, district, and sentinel sites were conducted to assess the system's usefulness, simplicity, stability and flexibility. We conducted retrospective record review of ISSS data from 2016-2017 to assess data quality, positive value predictive (PVP), timeliness, acceptability and representativeness of ISSS. Data from KII were summarized into themes. Quantitative attributes were summarized using frequencies, proportions, median and range.

Results: ISSS has not been used for decision-making. ISSS requires multiple data transmission steps and laboratory requirements. Surveillance activities are limited to 4 sites. Data transmission is frequently interrupted by breakdown of motorcycles. Timeliness of weekly reporting was 50% (n=52). The median (range) intervals between the date of onset and sample collection, sample collection and arrival at the laboratory, arrival at the laboratory and laboratory analysis were 2 (1-13), 2 (1-48), and 9 (2-243) days. Form completion rate was 100%, completeness of weekly reporting was 57% (n=46). The PVP was 0%. The system relies on donor funding.

Conclusion: ISSS performed poorly in all its attributes and therefore, cannot meet its objectives. Expanding the reporting sites with electronic data reporting are recommended to improve system's performance.

Evaluation of measles surveillance system – Moyamba district, Sierra Leone, 2017

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Introduction: Measles is one of the leading causes of childhood mortality globally, despite the availability of a cost-effective vaccine. In Sierra Leone, protracted measles epidemics occurred between 2015 and 2017, and Moyamba district was amongst the most affected. We evaluated the attributes of measles surveillance system (MSS) in Moyamba district to assess its effectiveness in informing prevention and control strategies.

Methods: We used CDC guidelines on surveillance system evaluation to assess MSS attributes. We conducted key informant interviews with surveillance personnel in Moyamba district, four health facilities and their surrounding community to assess usefulness, simplicity, stability and flexibility. MSS records and data from the four health facilities from 2016-2017, were reviewed to assess data quality, timeliness, and acceptability. To assess acceptability, the proportion of cases in the health facility (HF) register captured in the surveillance database, timeliness and completeness of weekly reporting were calculated. Timelines of MSS was determined by calculating the median time interval between key steps involved.

Results: Between 2015 and 2017, MSS detected measles and rubella outbreaks and consequently, prevention and control measures were instituted. According to staff interviewed, MSS is simple largely due to the simplicity of the case definition and laboratory investigation procedures. Timeliness and completeness of weekly reports were above 95% (48/52). All surveillance forms had some missing information. The reporting rate of measles cases by three of the health facilities were: Yoyema 100% (n=22), Falaba 88% (n=8) and Sebemhun 45% (n=11). Data was unavailable to calculate district turnaround time for laboratory results, however, staff interviewed reported delays and at times no feedback on laboratory results.

Conclusion: Despite being useful, simple, and acceptable; MSS data quality attribute and timeliness of laboratory results need improvement. We recommend regular data quality audits, and interventions to improve sharing of laboratory results for effective decision-making.

Turnaround time for laboratory testing of measles samples – Sierra Leone, 2015 – 2017

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Introduction: In Sierra Leone, laboratory performance during the 2015-2017 prolonged measles epidemic is not well understood. We conducted a study to determine the turnaround time (TAT) for measles samples testing in order to evaluate laboratory performance during 2015-2017.

Methods: We used secondary data on 1,154 measles samples tested at the central public health reference laboratory (CPHRL) during 2015-2017 to calculate the median and interquartile range (IQR) of TAT from sample collection to result dispatch. We compared the calculated TATs with the recommended integrated disease surveillance and response (IDSR) TAT from sample collection to sample reception at CPHRL (surveillance TAT) of 3 days, TAT from sample reception to result dispatch (laboratory TAT) of 7 days, and TAT from sample collection to result dispatch (sample TAT) of 10 days.

Results: Eighty-four percent (832/996) of the samples arrived at CPHRL within 3 days of collection; 59% (532/885) of the laboratory results were released within 7 days of sample receipt at CPHRL and 45% (467/1033) of results were released within 10 days of the sample collection. Denominators vary due to missing data. The median surveillance TAT for 2015, 2016, and 2017 were: 4 (IQR, 2-8), 5 (IQR, 3-9) and 2 (IQR, 1-3) days, respectively. The median laboratory TAT for 2015, 2016, and 2017 were: 35 (IQR, 24-65), 14 (IQR, 9-34) and 7 (IQR, 5-9) days, respectively. The median sample TAT for 2015, 2016, and 2017 were: 35 (IQR, 24-65), 14 (IQR, 9-34) and 7 (IQR, 5-9) days, respectively.

Conclusion: The laboratory and sample TAT were below the recommended IDSR standards, especially in 2015 and 2016, and this could have been due to more focus on Ebola epidemic response. We recommend investigation of the causes of delays at CPHRL and setting up regional public health laboratories to minimize delays.

Defaulters from antiretroviral treatment in 34 Military hospital, Sierra Leone, 2017

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Introduction: Defaulting from antiretroviral treatment (ART) is a challenge in the control of human immunodeficiency virus (HIV) pandemic. Studies have shown that most ART programs retain only 60% of their patients on treatment at the end of 2 years. In Sierra Leone, limited information exists on ART defaulting. We determined the prevalence of and identified reasons for ART defaulting in 34 Military hospital (MH) to inform strategies for improving ART program in Sierra Leone.

Methods: We conducted a cross-sectional study in 34 MH among ART clients and collected data from patient records using structured questionnaires. A defaulter was defined as any ART client who had missed at least 2 consecutive monthly clinic appointments between January and December 2017. We made telephone calls and home visits to identify reasons for defaulting. We performed descriptive analysis and used chi-square test to assess significant differences between defaulters and non-defaulters.

Results: Of 737 clients who were on ART in 2017 at 34 MH, 311 (42.2%) had defaulted from ART. The median age of ART defaulters was 40.0 (range, 21-74) years. Of the defaulters, 169 (54%) were females, 223 (72%) were 35 years and above, 200 (64%) were married, 88 (28%) were soldiers, and 222 (71%) were enrolled through clinical diagnosis. Chi-square analysis showed that ART defaulters and non-defaulters differed significantly by age-group (P -value=0.007), WHO staging at enrollment (P -value=0.017), tuberculosis and HIV co-infection (P -value<0.001) and duration on ART (P -value>0.001). Eighty (26%) defaulters mentioned seeking traditional medicine as reason for defaulting, 42 (14%) noted fear of disclosing status to spouse, 41 (13%) noted fear of stigmatization and 32 (10%) noted side effects of drugs.

Conclusions: We found a high prevalence of ART defaulters in 34 MH, and therefore recommend adherence counselling efforts to address reasons given for defaulting and further research on causes of ART defaulting.

Rubella Outbreak Investigation in Kholifa Rowala Chiefdom, Tonkolili District, Sierra Leone, February 2017

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Introduction: Rubella is a febrile rash illness, clinically similar to measles. Although it is a mild illness in children, about 90% of pregnant women who get infected during the first trimester give birth to infants with congenital rubella syndrome. On January 23, 2017, Tonkolili District Surveillance Unit was alerted by one of the health facilities in Kholifa Rowala Chiefdom (KRC) about a suspected measles case, later confirmed to be rubella. We investigated to confirm an outbreak of rubella, determine its magnitude, and implement control and preventive measures.

Methods: Active case finding in KRC was done to identify other cases. A suspect case was defined as any resident of KRC with generalized rash and fever, plus one or more of cough, coryza, and conjunctivitis after January 1, 2017. Blood samples from suspected cases were collected for laboratory testing, medical records reviewed, and household members interviewed.

Results: From the investigations done during January 23–February 16, 2017, nine suspected cases were identified; 6 were confirmed. Among confirmed cases, three were female; ages ranged from 2–6 years. Neither the case-patients nor their mothers had received rubella vaccine. The index case was a 2-year old female with illness onset January 21, 2017. All 5 secondary cases occurred within 2 incubation periods, indicating propagated transmission. None of the mothers of confirmed cases was pregnant. Mothers of 5 confirmed cases, including index case, work in the same market and move along with children. Case-patients were managed symptomatically and social distancing was advised for at least 4 days after rash onset to prevent spread.

Conclusion: An outbreak of rubella in KRC was confirmed. Infection among 5 confirmed cases might have spread in the market. We recommend introduction of rubella vaccine into routine immunization schedule to prevent future outbreaks.

Investigation of a cluster of deaths in Matetie community, Mambolo chiefdom, Kambia district, Sierra Leone, 2016

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Introduction: On 7 November 2016, Kambia District Health Management Team was notified of unexplained deaths of persons from the same household in Matetie village. Rapid response team was dispatched to establish the cause of deaths, institute control measures, and provide recommendations.

Methods: A case was defined as any Matetie resident with unexplained death or sudden onset of gastrointestinal or neurological symptoms from any cause from November 7-12, 2016. Health facility records were reviewed. The health facility staff, community, and family members were interviewed to understand the history, clinical presentation, and to find any additional cases.

Results: Three cases were identified in the same family and household in a rural farming community; all males aged 5, 30, and 73 years. All cases had ingested a traditional concoction, and developed profuse diarrhoea within 1-2 hours. The 5-year old and 73-year old cases also developed neurological symptoms (convulsions and confusion); both died within 2-3 hours after symptom onset. The concoction was prepared using an unidentified powdery substance by the 73-year old male, who was a traditional healer, for his 5-year old grandson to relieve constipation. All three had ingested the concoction, but the 30-year old survivor had consumed the least amount, and only developed diarrhoea. All efforts to retrieve sample for toxicological testing failed because of community resistance. No other cases were identified during active case search. Rat poisons, pesticides, and traditional medications without any labelling were found in community shops. Mass social mobilization was conducted to educate the community about dangers of ingesting unidentified compounds.

Conclusions: Two cases died and one survived. The symptoms were suggestive of acute poisoning; however, the poison could not be identified. Educating farming communities on safe handling of unidentified compounds, which could be harmful to humans is essential and may prevent accidental poisonings.

ABSTRACTS PRESENTED AT INTERNATIONAL CLASSIFICATION of DISEASES (ICD) SCIENTIFIC CONFERENCES

Lassa fever outbreak investigations in Kenema district, Sierra Leone, February-March - 2019

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Background: Lassa fever is a viral haemorrhagic disease endemic in the Eastern part of Sierra Leone, spread to humans through contacts with food or items contaminated with excreta of rodent *Mastomys Natalensis*. It is most times misdiagnosed and missed because clinicians most times associate it with other febrile illness. From the 20th of February, 2019, through March 20, 2019 the Kenema district surveillance unit was notified of suspected LF cases from Panguma and Kenema hospitals. We investigated these cases to confirm the outbreak of LF, identify the source, determine the magnitude, and implement control and preventive measures.

Methods: We filled out case investigation forms and collected blood samples from suspected cases for laboratory diagnosis of LF. We interviewed case-patients' caregivers and healthcare workers and reviewed patients' medical records to collect detailed information on the cases. We conducted active case finding in the community and health facilities to identify additional cases and line-listed them. We developed a case of LF as any person with fever and one or more of the symptoms: headache, sore throat, cough, nausea and vomiting, contact with excreta of and /or LF case between 20th February to March 31st, 2019 in the Lower Bambara and Nongowa chiefdoms. We line-listed 30 contacts for the three cases to be monitored for 21 days.

Results: So far for the period under review, 12 suspected cases with 3 confirmed for LF with 2 deaths CFR 67% and one discharged have been identified. The cases identified were an 8-year old male and the second 5-year-old female and third 4 year with dates of onset February 10, 2019 and February 15, 2019 and March 9 respectively. The third case was an unidentified contact of case one. The first case was admitted in Panguma hospital on February 18, 2019 and treated for malaria and Pneumonia. On February 20, 2019, LF was suspected and confirmed positive, patient died same day. Similarly, the second case was admitted on February 21, 2019 in Kenema Government hospital suspected and confirmed for LF on March 2, 2019 and died same day; however, the third was suspected and confirmed on the 20th March, after been admitted in Panguma for more than three days. Has been treated for the normal specify period and discharged home. One of the contact case three met LF case definition within the 21 days' follow-up. Rodents caught at residence of case-patients tested positive for LF virus.

Conclusion: LF outbreak was confirmed in Kenema district and late detection of cases may have contributed to the death of the two cases. We recommend sensitization of clinicians on early LF case detection, and increasing community awareness on early case recognition and environmental sanitation so as to decrease the case fatality and prevent future outbreaks



ABSTRACTS PRESENTED AT LIBERIA FETP SCIENTIFIC CONFERENCES

Lassa fever Outbreak Investigation, Tonkolili District, Sierra Leone, March 2022

Authors: Mohamed S Bah¹, Jean Leonard Hakizimana², Adel Hussein Abdallah ², Amara Alhaji Sheriff ², Kassim Kamara ², Gebrekrstos Negash Gebru²

Background: Lassa fever (LF) is a severe acute viral hemorrhagic illness caused by a virus. The virus is spread to humans through food or household items contaminated with excreta of infected rats. On 3rd March 2022, the district surveillance unit was notified of a suspected LF case-patient in Masanga Hospital (MH). We investigated to identify the source, identify secondary infections, and to institute control and prevention measures.

Methods: We reviewed the case-patient's medical records to establish the date of symptoms onset. Household and hospital contacts were interviewed to determine exposure to the case patient. Contacts were line listed and monitored twice daily for Lassa fever symptoms for LF. High-risk contacts were isolated and tested for LF. We conducted environmental assessments of the patient's residence.

Results: The first case-patient was a 5-year-old male who presented with fever and weakness on February 25, 2022. He was admitted at the MH on March 1, 2022, died on March 3, 2022, swab sample confirmed for LF on March 5, 2022. One primary contact, the elder sister of the first case was admitted with fever at MH hospital on March 01, 2022. Blood sample confirmed for LF on March 5, 2022. The case was referred to Kenema Government Hospital for treatment on March 6, 2020 but died in transit on the same date. Twenty-nine contacts from the community and hospital were identified and followed up for 21 days, no additional cases reported. The patient's house showed that they live in a grassland environment, with poor waste management, food was stored in open containers, rats were not seen in the house.

Conclusion: Lassa fever outbreak was confirmed in Tonkolili District. Poor environmental conditions could have led to the outbreak. Increasing health education and sensitization of communities on better environmental practices can help prevent and control future outbreaks.

Evaluation of Diarrhea with severe dehydration in children under-five years, Western Area Urban, Sierra Leone, 2022

Authors: Dauda Kamara¹, Jean Leonard Hakizimana², Adel Hussein Abdallah², Amara Alhaji Sheriff², Kassim Kamara², Gebrekrstos Negash Gebru²

Introduction: Diarrhoea is the second leading cause of deaths among children under five years. Limited information is available on performance of the diarrhoea with severe dehydration surveillance system (DSDSS) among children under-five years. We evaluated the DSDSS among under-five children under-five surveillance system to assess its usefulness, and performance of its system attributes based on its set objectives.

Methods: We conducted a descriptive cross-sectional study using the updated CDC guidelines for evaluating public health surveillance systems. We assessed the system from January through December 2021. We interviewed health workers, stakeholders, and partners using the semi-structured questionnaire. We reviewed records including; weekly reporting forms, health facility morbidity registers, and DHIS2 database. Quantitative attributes were presented using proportions and qualitative attributes were described.

Results: In all, 1,530 cases including 19 (1.2%) deaths were reported for the period. All the 30 respondents interviewed understood the case definition for diarrhoea with severe dehydration, and data was only reported to the District Health Management Team (DHMT). Eighteen (90%) of health facilities have functional mobile devices for electronic reporting. Twenty-eight (93.3%) of the respondents reported power outages five times in a week, unstable internet connectivity, and breakdowns of the District Health Information System (DHIS2) platform for three months or more. Timeliness and completeness of reporting for the 20 facilities was 100%, and blank variables were found in 98 (98%) of the 100 health facility registers reviewed.

Conclusion: The DSDSS surveillance system is useful and acceptable but partially meets its set objectives due to its poor data quality, inability to detect outbreaks, interrupted electricity, unstable internet connectivity, and downtime with DHIS2. We recommend training and supportive supervision to improve data quality, and provision of stable electricity in health facilities.

Measles Outbreak Investigation, Kono District, Sierra Leone, February 2022

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Background: Measles is a highly contagious viral disease. It remains an important cause of death among young children globally, despite the availability of a safe and effective vaccine. From 20 January – 09 February 2022, the Kono District Surveillance team was notified of nine suspected measles cases from three chiefdoms. We investigated the outbreak to confirm the diagnosis and describe the extent of the outbreak in order to implement control measures.

Methods: We reviewed the clinical and vaccination records of suspected cases and conducted active case search using the case definition: resident of Kono district with fever ($\geq 38.0^{\circ}\text{C}$) and maculopapular rash, cough, coryza or conjunctivitis fever and rash with red eyes or coryza from 15 January to 15 March 2022. We interviewed the patients and caregivers, and we collected blood samples for laboratory confirmation.

Results: a total of nine suspected cases were reported. Of these, 77.8% (7) tested positive for measles. The median age of the positive cases was 2 years, range 1-19 years. Of the seven positive cases, 71.4% (5) are females, 57.1% (4) not vaccinated, and 42.9% (3) had travel history from Guinea. Gbense chiefdom was the most affected chiefdom with 57.1% (4) of the cases. Patients were isolated, treated, and discharged. No death was reported.

Conclusion: Measles outbreak was confirmed in Kono district. The source could be from unvaccinated patients who travelled from Guinea. We informed authorities in Guinea about the outbreak for necessary action. We recommended an assessment of vaccination services, including vaccine transportation and storage.

Trend, Distribution and Causes of Maternal Deaths, Karene District, 2016 to 2021

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Background: Globally, everyday approximately 830 women die from preventable causes related to pregnancy and childbirth while developing countries account for 99% of all maternal deaths. Karene District reported 48 maternal deaths for the period 2016-2021. We aimed to describe the trend of maternal deaths, distribution and contribution of each cause to maternal.

Methods: We conducted descriptive analysis of all maternal deaths reported in Karene District through weekly Integrated Disease Surveillance and Response (IDSR) weekly reports and maternal death line listing in 2016 to 2021. Data analysis was done using Epi Info version 7.2 and MS Excel 2013.

Results: Total of 48 maternal deaths reported from 2016 to 2021. Of all deaths, 22.9% (11) were reported in and 29.2% (14) in 2021. The median age was 27 (15 – 41 years). The age group 15-29 years contributed for 62.5%. The median gravidity was 16.5 (4 – 36). About 46% (22) of all the maternal deaths occurred in hospital, 27.1% (13) each in community health centers and the community. Direct causes contributed 89.6% (43) and the most prevalent was postpartum hemorrhage (PPH) secondary to retained placenta 18.7% (9) and postpartum hemorrhage secondary to uterine atony 14.5% (7). Indirect causes contributed to 10.4% (5) where the most prevalent were malaria 6.2% (3) and anemia 4.2 % (2).

Conclusion: The majority of the maternal deaths in Karene District were through direct causes which are avoidable, those aged 15-29 years were the most affected, and PPH secondary to retained placenta was the leading cause of death. The Ministry of Health and Sanitation through the DHMT target interventions especially on direct causes, younger women, and PPH secondary to retained placenta to reduce maternal deaths in Karene District.

Evaluation Surgical sites surveillance system, Western Area Urban, Freetown, Sierra Leone, March 2022

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Introduction: The surgical site infection (SSI) surveillance in Sierra Leone was initiated to aid the implementation of the World Health Organization (WHO) international guidelines for the prevention of SSIs. The performance of the SSI surveillance system in Western Area Urban has not been assessed since its implementation. We assessed the SSI surveillance system to assess its usefulness and performance of its attributes in meeting its set objectives.

Methods: We conducted a descriptive cross-sectional study in four hospitals and the national infection prevention and control IPC using the CDC 2001 updated guidelines for evaluating public health surveillance systems. We reviewed SSI surveillance system records, observed with a checklist and interviewed 12 stakeholders using semi-structured questionnaire. We calculated frequencies, means and proportion.

Results: A total of 30 suspected SSI cases were reported. All the 30 respondents understand the SSI case definition, reported that reporting forms are easy to complete. Weekly SSI data is only reported to the IPC program. Timeliness of reporting was 79% (38/48). Of the 30 suspected SSI cases, 20 were confirmed to have SSI. Of the 31 randomly selected case reporting forms assessed, 65% (20) were completely filled. The SSI system is not integrated with other surveillance systems and is largely paper based. The system is 100% funded by partners.

Conclusion: The SSI surveillance system is useful, acceptable, sensitive, and simple, however it is flexible, and has poor data quality. The SSI surveillance system is partially meeting its set objectives. We recommend the integration of the system, supervision and training of surveillance providers in data collection to assure quality of data.



ABSTRACTS PRESENTED AT AFRICAN EMERGING INFECTIOUS DISEASES AND BIOSECURITY SCIENTIFIC CONFERENCES

Evaluation of malaria surveillance system – Moyamba district, Sierra Leone, 2017

Authors: Doris Bah, Gildo Okure, Gebrekrstos Gebru, Eric. Ikoona, Tushar. Singh

Introduction: WHO reported that 90% of Sub-Saharan population developed malaria (2015). In Sierra Leone, malaria is one of the leading causes of morbidity and mortality among patients admitted to the hospital (38% in 2015). Moyamba district reported high incidence of malaria (29,117/100,000 population). Effective surveillance system is needed to reduce incidence of malaria and enhance malaria surveillance system in Moyamba District.

Methods: We conducted an evaluation of malaria surveillance system in Moyamba district using 2001 CDC guidelines on surveillance system evaluation to assess malaria surveillance system attributes. We evaluated 9 attributes through key informant interviews with 10 community stakeholders from the district health management team and 5 IDSR focal persons in selected health facilities in Moyamba. We used 2017 surveillance data to calculate positive value predictive (PVP) and to evaluate timeliness, acceptability and representativeness of the surveillance system. We reviewed 15 surveillance records (IDSR forms, hospital registration and

Results: Usefulness; We found the system is useful in monitoring trends and malaria incidence. Simplicity Case definition is clear and easy to understand, diagnosis using rapid diagnostic testing is simple to perform. Unstable telecommunication network in some facilities affected timely reporting. Acceptability; The system is fully accepted by all stakeholders and facility levels since timeliness and completeness met 80% WHO standard. Timeliness; Median interval between date of symptom onset and date of health facility visit is 1 day, ranging from less than 1 day to 7 days. Flexibility; Surveillance system adapted changes well. For example: new patient community referral system and reporting using new electronic system. Data quality: Incomplete filling patient's information into hospital record system. Delayed data entry at the Government hospital (lots of forms piled up at the desk of the data clerk). Challenges found in laboratory reporting system. Patient records do not always have laboratory result. This situation creates underreporting of laboratory results. Double patient records existed due to the same patient registered more than once at different health facilities. Representativeness. The surveillance system captured information from all health facilities through the IDSR system. Stability: The malaria surveillance system is quite stable but still needs improvement. Predictive value positive (PVP): Three health facilities had PVP above 70%. Two health facilities had PVP below 70%.

Conclusion: Results obtained from the analysis of attributes indicate that the overall performance of malaria surveillance system is generally at good level. The surveillance system is stable and acceptable with good flexibility, timeliness and completeness. The system is simple, useful with good representativeness. Data quality has some challenges that will need to be addressed by Moyamba district health management team and the Directorate of Health security and emergencies.

Evaluation of Tuberculosis Surveillance System – Western Area Urban District, Sierra Leone, 2017

Authors: Henry S. Bangura, Gildo. Okure, Gebrekrstos. Gebru, Eric. Ikoona, Tushar. Singh

Introduction: Globally, tuberculosis (TB) is ranked ninth amongst the leading causes of death from a single infectious agent. In 2016, WHO estimated that about 10.4 million cases were reported globally. TB is the leading cause of death amongst people living with HIV/AIDS, accounting for 40 % of the deaths. Sierra Leone is among the thirty countries in the world that carry the highest burden of TB. Early case detection, through effective TB surveillance system and prompt treatment can prevent most TB deaths. In Western Area Urban district, little is known about the effectiveness of TB surveillance system in meeting its implementation objectives.

Methods: We evaluated TB surveillance system in Western Area Urban district using the updated 2001 CDC guidelines on surveillance system evaluation. We assessed nine of the eleven surveillance system attributes. We conducted in-depth interviews with 15 stakeholders from three main TB treatment facilities in Western Area Urban district and three staff from the national TB control program to assess usefulness, simplicity, flexibility and stability attributes. We reviewed 2016-2017 TB surveillance data to calculate positive value predictive and to assess data quality and representativeness of the surveillance system. We calculated the proportion of cases reported by health facilities, and timeliness and completeness of reporting by health facility to evaluate acceptability attribute. We evaluated the timeliness of the surveillance system by calculating the median turnaround time between sample collection and release of laboratory results.

Results: TB surveillance system attributes: Usefulness; The system was useful in detecting cases and guiding treatment strategies. Simplicity; The case definitions and steps involved in surveillance are simple to implement. Chest X-rays are paid for by patients and GeneXpert (Rapid diagnosis test for TB disease and drug resistance) can only be accessed in Western Area Patients delay to bring back their laboratory results to the health facility. Data is not collated and analyzed by health facility staff Flexibility. The TB surveillance system easily adapts to changes, such as the incorporation of HIV data into the treatment registers in 2012 and the introduction of GeneXpert as one of the diagnostic methods in 2015. Acceptability; The system is highly acceptable as demonstrated by the timelines and completeness of monthly reporting (October, 2016 – September, 2017) consistently above 90% compared to WHO target of 80%. Timeliness; The median turnaround time between sample collection and release of laboratory results is 24 hours, with interquartile range of 24-72 hours. Data quality: There were no discrepancies between the health facility and the district surveillance system data. Timeliness and completeness of reporting were above the WHO and national targets of 80% and 90%, respectively. Stability: The TB surveillance system is quite stable in its operation Power shortages and poor internet connectivity makes the system sometimes unreliable. Predictive value positive (PVP): The PVP in the 3 health facilities where evaluations were conducted was: 34 Military hospital: 76.9%, Connaught Hospital Chest Clinic: 30.3%, Lakka Hospital: 75%

Conclusion: Overall, the performance of the TB surveillance system on most of its attributes was good. The system is very useful, simple to operate, flexible in taking up new changes and it is acceptable by stakeholders at health facility, district and national levels. Data from the TB surveillance system in Western Area Urban district is representative since all the DOTS

centers are reporting and the timeliness and completeness of reporting are above WHO and national set targets. TB surveillance system is stable for most of its operations. Data quality and timely release of laboratory results need improvement.

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