Authors	Abstract title	Format	Session details
Oliver Baerenbold, Quique Bassat, John Bradley, Justina M. Bramugy, Mabvuto Chimenya, John A. Crump, Edward Green, Kevin Kain, Sham Lal, **Manophab Luangraj,** David C. W. Mabey, Ioana D. Olaru, Molly Sibanda, Shunmay Yeung, Christopher C. Moore, Heidi Hopkins	Predicting mortality in febrile adult patients: a prospective validation of the MEWS, qSOFA and UVA scores in four health care settings in Africa and South-East Asia	**Talk** Session 84:	**Clinical Tropical Medicine: Diagnostics and COVID** Sat 20 Nov 8:00 - 9:45 am US EST
Justina Bramugy, Marta Valente, Sham Lal, Sara Ajanovic, Oliver Baerenbold, Heidi Hopkins, David Mabey, Quique Bassat	Fighting adult mortality through etiology of fever studies: Description of high mortality in an adult inpatient population in Mozambique	**Poster**	**Poster Session B** Fri 19 Nov 12.00 – 1.30 US EST
Manophab Luangraj, Vilayouth Phimolnsarnnousith, Somvai Singhaxaiyaseng, Khamfong Kanlaya, Vilada Chansamouth, Audrey Dubot-Pérès, Andrew Simpson, Manivanh Vongsouvath, Viengmon Davong, Sham Lal, Chrissy H. Roberts, Heidi Hopkins, David Mabey, Paul N. Newton, Elizabeth A. Ashley, Mayfong Mayxay	The main pathogens causing febrile illness and implications for fever management in Laos; results from the FIEBRE study	**Poster** No 781	**Poster Session B** Fri Nov 19 12.00 – 1.30 US EST
Eleanor E MacPherson, Joanna Reynolds, Chimwemwe Phiri, John Mankhomwa, Justin Dixon, Clare I.R. Chandler	Understanding antimicrobial resistance through the lens of antibiotic vulnerabilities in primary health care in rural Malawi	**Poster** No 77	**Poster Session A** Thurs 18 Nov 11 am – 12:30 pm US EST
Salome Manyau, Justin Dixon, Norest Mutukwa, Faith Kandiye, Clare Chandler	Sex Work, Antibiotic Use and the Management of Sexually Transmitted Infections in Harare, Zimbabwe: An Ethnographic Study	**Poster** No 952	**Poster Session C** Sat 20 Nov 11 am – 12:30 pm US EST
Tegwen Marlais, Becca L Handley, Elizabeth Ashley, Chris Drakeley, Yoel Lubell, David Mabey, Paul Newton, Manophab Luangraj, Mayfong Mayxay, Heidi Hopkins, Chrissy H Roberts.	Development and performance evaluation of a low-cost, high throughput, multiplex immunoassay of 13 fever severity and aetiology markers	**Talk** Session 84:	Clinical Tropical Medicine: Diagnostics and COVID Sat 20 Nov 8:00 - 9:45 am US EST
Ioana D Olaru, Marta Valente, Sara Ajanovic, Justina M Bramugy, Sham Lal, Mabvuto Chimenya, Edward W Green, Nicholas A Feasey, David Mabey, Quique Bassat, Katharina Kranzer, Heidi Hopkins	High mortality in adult patients with HIV admitted with fever to hospitals in Malawi, Mozambique and Zimbabwe - results from the FIEBRE study	**Poster** No 336	**Poster Session A** Thurs 18 Nov 11 am-12:30 pm US EST
Yuzana Khine Zaw, Ja Seng Bawk, Coll de Lima Hutchison	Negotiating Myanmar's Law and (Dis)Order amidst Antimicrobial Resistance Policy Implementation	**Poster**	**Poster Session A** Thurs 18 Nov 11 am-12:30 pm US EST

Predicting mortality in febrile adult patients: a prospective validation of the MEWS, qSOFA and UVA scores in four health care settings in Africa and South-East Asia

Oliver Baerenbold, Quique Bassat, John Bradley, Justina M. Bramugy, Mabvuto Chimenya, John A. Crump, Edward Green, Kevin Kain, Sham Lal, Manophab Luangraj, David C. W. Mabey, Ioana D. Olaru, Molly Sibanda, Shunmay Yeung, Christopher C. Moore, Heidi Hopkins

Identifying patients with the highest risk of mortality from easily measurable variables can improve prioritization and thus resource allocation of potentially life-saving interventions. The modified early warning score (MEWS), the quick Sequential (Sepsis-Related) Organ Failure Assessment (qSOFA), and the Universal Vital Assessment (UVA) score were developed as risk-stratification tools but need external validation in new patient groups and settings. We included in the analysis in- and outpatients aged ≥16 years presenting with fever at four sites in Laos, Malawi, Mozambique, and Zimbabwe as part of a prospective study of infectious causes of fever (Febrile Illness Evaluation in a Broad Range of Endemicities - FIEBRE). We determined mortality at a follow-up visit after at least 26 days. We evaluated predictive capacity based on the area under the receiver operating curve (AUC), as well as sensitivity at a cut-off which gives 90% specificity. We enrolled 4,023 patients; 1,715 (43%) inpatients, 2,336 (58%) female, median (IQR) age 33 (24 – 45) years, and 782 (19%) HIV-infected. Of the total, 1,182 (29%) were in Laos, 807 (20%) in Malawi, 998 (25%) in Mozambique, and 1036 (26%) in Zimbabwe. Complete outcome information was available for 3,432 (85%); 210 (6.1%) died, including 187 (13.2%) inpatients and 23 (1.1%) outpatients. The UVA had an AUC of 0.77 (95% CI 0.74 – 0.81), outperforming both MEWS with AUC 0.65 (95% CI 0.61 – 0.69) and qSOFA with AUC 0.68 (95% CI 0.65 – 0.72). The relative performance of the scores remained the same on sensitivity analysis assuming patients with missing outcome data either all lived, or all died. The observed AUC of UVA was higher than MEWS and qSOFA in each site, varying from 0.88 (95% CI 0.79 – 0.99) in Malawi to 0.75 (95% CI 0.69 – 0.81) in Laos. At a set specificity of 90%, UVA sensitivity (95% CI) was 46.5% (39.9% – 53.0%) compared to 18.6% (10.9% - 27.5%) for qSOFA, and 22.9% (17.5% - 28.8%) for MEWS. Our findings suggest that of the scores assessed, UVA best predicts mortality in febrile adults across a range of health care settings in Africa and south-east Asia, and may be well-suited for clinical use in similar contexts.

Fighting adult mortality through etiology of fever studies: Description of high mortality in an adult inpatient population in Mozambique

Justina Bramugy, Marta Valente, Sham Lal, Sara Ajanovic, Oliver Baerenbold, Heidi Hopkins, David Mabey, Quique Bassat

Fever is a common symptom leading to health care seeking and hospital admission in Africa. Mortality rates in febrile adult inpatients in Mozambique are high, and are associated with high underlying prevalence of co-morbidities like HIV and cardiovascular diseases, and delays in care-seeking. Better characterization of febrile teenage and adult patients in terms of clinical presentation, diagnostic laboratory findings, and outcomes may be important for a more evidence-based evaluation of current clinical management algorithms, with the aim of decreasing preventable mortality.

The observational study "FIEBRE: Febrile illness evaluation in a broad range of endemicities" recruited febrile patients in Mozambique, Zimbabwe, Malawi and Lao PDR to identify infectious causes of fever and antimicrobial susceptibility of bacterial pathogens. Here we present mortality data from Mozambican adults enrolled from Jan 2019 to Feb 2021. Demographic, clinical and outcome data at enrolment and ≥26 days later were collected, and laboratory tests (blood culture, mycobacterial blood culture, urine dipstick and culture, malaria and HIV testing, serum cryptococcal antigen (CrAg) and urine lipoarabinomannan (uLAM)) were conducted on site. Samples were sent for centralized reference laboratory testing for other specific infectious pathogens.

We enrolled 469 outpatient and 300 inpatient adults, with median age 33 years and majority female 529 (68.8%). Among inpatients 53 (17.7%) died within 28 days of enrolment, of which 36 (68%) were HIV-infected. Among HIV-infected inpatients 10% tested positive for uLAM and 7% were positive for CrAg. We will present the diagnostic profile of these patients, in comparison to survivors, with detailed characterization of co-morbidities and socio-demographic factors associated with deaths.

Mortality among adult Mozambican inpatients with febrile illness is high, due in part to preventable and treatable opportunistic infections in the context of underlying HIV infection. Comprehensive strategies to address HIV infection at all stages (prevention, diagnosis and treatment) are needed to decrease mortality.

The main pathogens causing febrile illness and implications for fever management in Laos; results from the FIEBRE study

Manophab Luangraj, Vilayouth Phimolnsarnnousith, Somvai Singhaxaiyaseng, Khamfong Kanlaya, Vilada Chansamouth, Audrey Dubot-Pérès, Andrew Simpson, Manivanh Vongsouvath, Viengmon Davong, Sham Lal, Chrissy H. Roberts, Heidi Hopkins, David Mabey, Paul N. Newton, Elizabeth A. Ashley, Mayfong Mayxay

Management of febrile illness in Laos typically relies on clinical assessment and empiric treatment, as laboratory confirmation is often not available, except malaria and dengue rapid tests. The standard empiric treatment of inpatients with sepsis or febrile illness in Laos is parenteral ceftriaxone. Vientiane Provincial Hospital in northern Laos was one site of the multicentre FIEBRE (Febrile Illness in a Broad Range of Endemicities) study which performed a comprehensive evaluation of the causes of febrile illness in inpatients and outpatients of all ages. We aimed to describe the leading pathogens diagnosed from FIEBRE patients recruited in Laos. Between October 2018 and October 2020, 1972 patients were enrolled.

Laboratory testing included blood culture, malaria microscopy, molecular or serological testing for histoplasma-antigen, PCR and serology for dengue, Zika, chikungungya, and JEV, PCR for respiratory pathogens, plus Leptospira and rickettsial serology (results awaited). Among 1972 patients, 135 (6.8%) had positive blood cultures. Of these, 17 (12.6%) grew Burkholderia pseudomallei, 8 (5.9%) Escherichia coli (4).

ESBL positive), 7 (5.2%) Staphylococcus aureus (2 MRSA), 3 (2.2%) Klebsiella pneumoniae, 2 (1.5%) Talaromyces marneffei, and 2 (1.5%) Streptococcus pneumoniae. None of our patients tested positive for malaria. From the first batch of testing, 5/382 (1.3%) samples were positive for Histoplasma-Ag. From 605 samples, 24 (3.9%) were positive for dengue. Of 669 pharyngeal samples, 218 (32.6%) tested positive for respiratory viruses. 1207 (61.4%) patients received antibiotics, of which 799 (66.2%) were cephalosporins. Our results reveal the leading infectious causes of febrile illness in rural Vientiane. Results to date show viruses accounted for most diagnoses, particularly respiratory viruses and dengue. Despite this, antimicrobial prescribing rates were high. While the diagnostic yield from blood cultures was low. We demonstrated melioidosis and ESBL-producing Enterobacterales are prevalent in this part of Laos, with important implications for empiric prescribing in severely ill patients with sepsis.

Understanding antimicrobial resistance through the lens of antibiotic vulnerabilities in primary health care in rural Malawi

Eleanor E MacPherson, Joanna Reynolds, Chimwemwe Phiri, John Mankhomwa, Justin Dixon, Clare Chandler

The diminishing effectiveness of antimicrobials raises serious concerns for human health. While policy makers grapple to reduce the overuse of antimicrobial medicines to stem the rise of antimicrobial resistance, insufficient attention has been paid to how this applies to low-income rural contexts. We provide an in-depth understanding of antimicrobial prescribing at primary health care level in rural Chikwawa District, Malawi.

Fieldwork took place over 18 months (2018-2020). We surveyed all 22 health facilities in the district, observed 1348 health worker-patient consultations, and carried out 45 in-depth interviews with staff and patients. Care was centred around provision of an antimicrobial. Amid chronic lack of essential medicines and other resources, clinic interactions were tightly scripted, providing patients little time to question or negotiate their treatment. We develop the concept of antibiotic vulnerabilities to reveal the multiple ways in which provision of antimicrobials in rural Malawi impacts people living in extreme scarcity.

Antibiotics are central and essential to primary care. As targets for optimal antimicrobial prescribing take a more central role in global policy, we must track the ramifications of this for the delivery of care to ensure that efforts to stem resistance do not undermine the goal of improved health for all.

Sex Work, Antibiotic Use and the Management of Sexually Transmitted Infections in Harare, Zimbabwe: An Ethnographic Study

Salome Manyau, Justin Dixon, Norest Mutukwa, Faith Kandiye, Clare Chandler

A key global health challenge of our time is the dramatic increase in infections that are resistant to available antibiotics, including sexually transmitted infections (STIs) such as gonorrhoea and syphilis. Antimicrobial resistance (AMR) is driven by overuse of antibiotics both within and beyond formal healthcare settings, yet little is known about the how and why people come to rely on these substances, particularly in low and middle-income countries (LMICs). An especially under-researched group is sex workers, who are at heightened risk of contracting and spreading STIs, often have poor access to healthcare and have been shown in previous studies to use antibiotics regularly. This paper presents ethnographic research (participant-observation and in-depth interviews) conducted with 20 sex workers in Harare, Zimbabwe between 2018-2020, which aimed to understand patterns of antibiotic use among sex workers and reasons for this use. We present three key findings: (1) Sex workers were intimately familiar with and regularly used antibiotics such as metronidazole, doxycycline, ceftriaxone, and ciprofloxacin, which enabled them to continue working despite regular occupational exposure to STIs. (2) These antibiotics were largely prescribed by a northern-funded NGO clinic devoted to sex workers, towards which they felt considerable belonging in contrast to stigmatising experiences at public clinics. (3) Many women who were not sex workers and thus not eligible to attend the NGO were unable to access needed antibiotics for STIs (often contracted via partners paying for sex) because of prohibitive costs and stigmatising treatment. We conclude from these findings that attention to individual behaviour risks overlooking the limitations of the ways in which STIs have been managed through vertical programmes for STIs as a way circumventing integration challenges in health systems. Our research draws attention to issues both within and beyond these programmes that emerge from the perspective of those affected by STIs. In addressing AMR, further effort needs to be made to reconsider integrated services, recognising the legacies that shape the challenges of integration.

Development and performance evaluation of a low-cost, high throughput, multiplex immunoassay of 13 fever severity and aetiology markers

Tegwen Marlais, Becca L. Handley, Elizabeth Ashley, Chris Drakeley, Yoel Lubell, David Mabey, Paul Newton, Manophab Luangraj, Mayfong Mayxay, Heidi Hopkins, Chrissy H Roberts

Fever is among the most commonly reported symptoms globally. Commercial kits are available that facilitate multiplexed screening of blood markers of diseases, but these may not be tailored to the purpose of investigating fever and/or may be time consuming and costly to perform at scale. We developed a bead-based multiplex immunoassay that estimates the levels of 13 fever-relevant immune response markers in dried blood spot (DBS) specimens. The markers, together or in various combinations, were selected for their known utility, both in the identification of bacterial infection, as well as being prognosticators. The markers were angiopoietins 1 & 2, azurocidin, C-reactive protein, chitinase 3-like 1, interleukins 6, 8 & 10, interferon γ-induced protein 10 kDa, myxovirus resistance protein A, soluble triggering receptor expressed on myeloid cells 1, soluble tumor necrosis factor receptor 1 and tumor necrosis factor-related apoptosis-inducing ligand. All reagents were sourced commercially. Cross-reactivity assessments revealed minimal non-specific interaction between either the antibody pairs, or antibodies and recombinant proteins. The 13 assays worked over a wide range of concentrations including those expected in health and febrile disease of different etiologies. The average within-plate and between-plate coefficients of variation (CVs) were 5.3% and 3.9%, respectively. The fully optimised 13-plex assay cost is around £3.30/$4.60 per sample. The full protocol will be published as an open resource. We tested 720 DBS samples from adult and paediatric inpatient and outpatient fever cases and community controls collected during a prospective study of febrile illness in Lao PDR. Several markers in the panel could differentiate between fever cases and healthy controls, with 4 in particular contributing to this. This assay facilitates large-scale screening of DBS samples from population-based studies to investigate relationships between levels of immune response markers, data from infectious diseases diagnostics and severity of illness in different clinical contexts.

High mortality in adult patients with HIV admitted with fever to hospitals in Malawi, Mozambique and Zimbabwe - results from the FIEBRE study

Ioana D Olaru, Marta Valente, Sara Ajanovic, Justina M Bramugy, Sham Lal, Mabvuto Chimenya, Edward W Green, Nicholas A Feasey, David Mabey, Quique Bassat, Katharina Kranzer, Heidi Hopkins

Despite important advances in HIV diagnosis and roll-out of antiretroviral therapy (ART) in sub-Saharan Africa, HIV-associated conditions continue to be a major cause of hospitalisation and death. The aim of this study was tocompare mortality and causes of death among HIV-infected and uninfected adults hospitalised with febrile illnesses in Malawi, Mozambique and Zimbabwe. This is a preliminary analysis including patients aged ≥15 years who were admitted to seven hospitals in Malawi, Mozambique and Zimbabwe and enrolled into the FIEBRE (Febrile Illness Evaluation in Broad Range of Endemicities) study evaluating infectious causes of fever. Participantsprovided detailed clinical information and samples were collected for laboratory diagnosis of infections. A follow-up visit was conducted at 28 days to assess patient outcome. Causes of death were assessed by combining information from hospital records, family reports, and the FIEBRE study data. Among 940 adult patients admitted to hospital, the median age was 35 years (IQR 26-49) and 498 (53.0%) were female. HIV status was determined in 926 (98.5%); 383 (41.4%) were HIV-infected Outcome information was available for 889 patients and of those 122(13.7%) died. Mortality at 28 days was 22.4% and 7.1% ($p<0.001$) in patients with and without HIV, with 69.8% of the deaths occurring among patients with HIV. The most common causes of death among HIV-infected individualsin whom a cause of death was available (n=73) were tuberculosis in 29 (39.7%) and other conditions associated with advanced HIV infection in 37 (50.7%). In patients without HIV infection, 16 (51.6%) and 15 (48.4%) of deaths were attributed to infectious and non-infectious causes, respectively. Mortality among adult patients with HIV was three times higher than in HIV uninfected patients. Tuberculosis and other preventable and treatable conditions associated with advanced HIV represented major causes of death in our population. This highlights the need for improved HIV diagnosis, monitoring, therapy and retention in care to decrease HIV-associated mortality. Comprehensive data from all sites will be presented in November.

Negotiating Myanmar's Law and (Dis)Order amidst Antimicrobial Resistance Policy Implementation

Yuzana Khine Zaw, Ja Seng Bawk, Coll de Lima Hutchison

The WHO has declared antibiotic resistance (often referred to as antimicrobial resistance, AMR) an emergency and co-authored a Global Action Plan (GAP) to address it. Over a hundred countries have already followed the WHO's prescription and adopted their own national action plans. Myanmar, prior to the 2021 coup, was one of them and had actively promoted their NAP as the solution to the issue of AMR in Myanmar. Additionally, global health policymakers have identified Myanmar, like other countries in Asia, as a source of high drug resistance and informal pharmaceutical markets, in need of tighter state regulation. On paper, the Myanmar government appeared to be following the WHO's AMR GAP. However, in our article we show that in practice the realities are very different, this difference is further pronounced after the February 2021 military coup. We foreground historical and contemporary aspects of Myanmar and draw on extensive in-depth ethnographic research to explore how global plans for AMR, such as restricting access to antibiotics, when it merges with national action on drug regulation can end up dramatically deviating from the intentions of the WHO GAP and its values. Our paper argues that those working to promote the regulation of medicines must attend more carefully and explicitly to different modes of political governance, state sovereignty, histories of health systems and rule of law rather than uncritically and apolitically pushing state-centric programmes. Otherwise, they risk contributing to, if not intensifying, already existing health inequities and social injustices, whilst also failing to generate their intended outcomes, such as meaningful changes to antibiotic sales and reductions in resistance.