Southern Cross Tropical Medicine & Travel Medicine Conference 2023

Conference abstracts

ORAL PRESENTATIONS

FRIDAY - 1ST SEPTEMBER 2023

FREE COMMUNICATIONS ON NTDS

Benefits of snowball sampling for lymphatic filariasis surveillance in Samoa

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Background: Optimising lymphatic filariasis (LF) surveillance methods to more efficiently locate infected individuals is a key challenge for the Global Program to Eliminate Lymphatic Filariasis. Clustering of infections at village and household levels means that targeted sampling methods are potentially more efficient than random sampling for locating residual infections. This study aims to compare antigen (Ag) and microfilaria (Mf) prevalence in a targeted snowball sample of households against a random sample of households in Samoa.

Methods: Six villages were selected based on LF Ag prevalence from a 2019 community-based survey, comprising two each with high (13-19%), medium (6-8%) and low (2-4%) Ag prevalence. In 2023, we sampled 15-16 randomly selected houses in each village. In these same villages, 10-22 households per village were selected for snowball sampling based on being located within 200m of a household where an Ag positive participant lived in 2019.

Results: Ag prevalence (adjusted for age and sex) was twice as high in the snowball sample (16.5%, 95% CI 12.7-20.3%, n=408 participants) compared to the random sample (7.1%, 95% CI 5.0-9.2%, n=494 participants). Mf prevalence was almost twice as high in the snowball sample (6.2%, 95% CI 3.6-8.7% vs 3.2%, 95% CI 1.7-4.8%).

Conclusion: Results demonstrate the efficiency of snowball sampling for locating LF infections, and their value in informing targeted survey designs to support LF elimination efforts in Samoa.

Community and stakeholder perspectives on scabies and the acceptability of mass drug administration for scabies control in Fiji

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Background: Scabies is endemic in Fiji and is a significant cause of morbidity. Qualitative research can provide in-depth insights into the social dynamics and process underlying effective implementation of and adherence to mass drug administration (MDA) programs. However, there has so far been little qualitative research of this kind related to scabies in Fiji or the wider Pacific region.

Methods: This presentation draws on findings from qualitative research conducted in 2019 and 2023 in the Northern and Central Divisions of Fiji. Semi-structured interviews were conducted to better understand community beliefs and practices that affect the occurrence of scabies and assess community and stakeholder perceptions of the appropriateness of MDA for scabies control in Fiji.

Results: Our findings highlight a range of social, cultural and service-based factors that shape knowledge, practices and experiences of scabies, and acceptability and participation in MDA programs. This includes misconceptions around disease causation and transmission, preference for traditional remedies over biomedicines, familiarity with MDA as a treatment approach in Fiji, desire to treat current scabies cases and prevent future infestation, and concern over medication side effects.

Conclusion: Findings illustrate the importance of community-centred responses for the success of control efforts in Fiji. This includes community-based health promotion messaging on the social dynamics of scabies transmission, and campaigns of education and community engagement prior to MDA.

Nearing Elimination of Trachoma as a Public Health Problem in Australia

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Background: Trachoma is an infectious eye disease caused by the Chlamydia trachomatis bacteria and is the world's leading infectious cause of preventable blindness. Australia is the only high-income country with endemic trachoma, found in First Nation populations in remote communities in central/northern Australia. The National Trachoma Management Program, initiated in 2006 follows national guidelines based on the WHO SAFE strategy with components being surgery for trichiasis, antibiotic treatment for trachoma, promotion of facial cleanliness and implementation of environmental improvements.

Methods: First Nation children in remote communities identified as at risk of trachoma are screened for clinical signs of trachoma, facial cleanliness, and treatment uptake. Data regarding trichiasis screening and surgery, and implementation of health promotion activities are also collected from PHU. These data are collated annually through programmatic reporting analysed to guide progress towards elimination as a public health problem.

Results: Since 2007, the number of remote communities at risk of trachoma decreased from 229 to 84. The overall prevalence of trachoma in children aged 5-9 decreased from 14.3% to 2.2%. Jurisdictions reported trachoma prevalence between 0% and 3.1%, under elimination targets for the first year. Endemic levels remain in 30/84 of the at-risk communities.

Conclusions: With all jurisdictions now recording trachoma prevalence below the WHO target of 5%, Australia must maintain these levels for 2 more years to be formally designated as having achieved elimination as a public health problem. Further, we need a plan to ensure trachoma prevalence continues to decrease and elimination levels are sustained.

FREE COMMUNICATIONS ON MALARIA

Evidence based optimal dosing of intravenous artesunate in children with severe falciparum malaria

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Background and aims: The majority of deaths from malaria are in young African children. Parenteral artesunate is the first-line treatment for severe falciparum malaria. Since 2015 the World Health Organization has recommended individual doses of 3 mg/kg for children weighing less than 20 kg. Recently, the US Food and Drug Administration (FDA) has challenged this recommendation, based on a simulated paediatric population, and argued for a lower dose in younger children (2.4 mg/kg). In this study, we performed population pharmacokinetic modelling of plasma concentration data from 80 children with severe P. falciparum malaria in the Democratic Republic of Congo who were given 2.4 mg/kg of artesunate intravenously.

Methods: Bayesian hierarchical modelling and a two-compartment parent drug-metabolite pharmacokinetic model with zero-order absorption for artesunate were used to describe the population pharmacokinetics of artesunate and its main biologically active metabolite dihydroartemisinin. We then generated a virtual population representative of the target population in which the drug is used using data from >25,000 children enrolled in the Severe Malaria in Africa Children (SMAC) network and then simulated the total first-dose exposures.

Results and Conclusions: The majority of younger children given the lower 2.4 mg/kg dose of intravenous artesunate do not reach the same drug exposures as older children above 20 kg. The study supports the withdrawal of the FDA's lower artesunate dose recommendation for children as parenteral artesunate is an extremely safe and well-tolerated life-saving drug, and there is potential for harm from underdosing in this rapidly lethal infection.

Efficacy, safety and tolerability of primaquine radical cure for *Plasmodium vivax* in paediatric patients: an individual patient data meta-analysis

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Background: Plasmodium vivax malaria causes significant morbidity in children and requires treatment with 8-aminoquinolines to prevent relapsing infections (radical cure). Primaquine is the most widely used antimalarial to prevent relapse. We investigated the efficacy, tolerability and safety of primaquine by dose in children and adults.

Methods: Efficacy studies of uncomplicated P. vivax published between January 2000 and February 2021 were identified and individual patient data from eligible studies pooled. The effect of primaquine dose on recurrence on days 7-180 was determined using Cox regression. Haematological safety was defined as a fall in haemoglobin ≥25% to <7g/dl. Gastrointestinal intolerance was defined as the presence of vomiting, diarrhoea, or anorexia on days 5-7.

Results: The efficacy analysis included 2,892 children and 3,790 adults from 19 studies. In children treated with ≥5mg/kg total dose the rate of recurrence between day 7-180 was almost half that in children treated with 2-<5mg/kg; Adjusted Hazard Ratio (AHR) 0.56 (95%CI 0.38,0.83). This effect was not observed in adults; AHR 0.80 (0.53,1.22). Haemoglobin falls ≥25% to <7g/dL were observed in 9/1,925 (0.5%) children and 3/2,717 (0.1%) adults. After controlling for confounders, primaquine dose had no impact on haemoglobin change between day 0 and days 2-3 or 5-7 in children or adults. Gastrointestinal intolerance in children was greater with primaquine treatment than without at any daily dose, but in adults was only increased at a high daily dose relative to treatment without primaquine.

Conclusions: A higher primaquine dose may substantially decrease recurrence risk in children without major safety concerns.

Appropriate Use of Tafenoquine for Malaria Chemoprophylaxis in Travel Medicine?

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Background: In 2018 tafenoquine was approved for malaria chemoprophylaxis in both Australia and the USA. Since then, largely due to the COVID pandemic induced dearth of international travelers, very little tafenoquine has been employed.

Methods: Tafenoquine use requires testing for glucose-6-phosphate dehydrogenase deficiency which is often a dis-incentive to those quickly leaving for an endemic area. Tafenoquine's standout advantage is its long half-life allowing infrequent dosing and thus improved compliance.

Results: Compliance is the weakest link in successful malaria chemoprophylaxis. This is especially true in long-term travelers / residents of highly malaria endemic areas. In the military the usual preference is for daily doxycycline in low malaria risk areas to cover for additional pathogens that might be encountered during jungle warfare training and weekly tafenoquine in the areas of highest malaria risk such as Papua New Guinea and sub-Saharan Africa. Preliminary data from Asian military groups indicate that monthly dosing (600-800mg) may be a future regimen in addition to the currently approved 200mg weekly. The civilian equivalent may be fly-in, fly-out miners deployed in isolated areas of Africa and Asia.

Conclusions: Travellers are individuals, and the art of travel medicine is matching medication to the person and their risk profile. Given the resumption of travel to exotic destinations and the continuing need for humanitarian and other interventions in conflict zones across the world, I suggest that tafenoquine can be an especially useful choice when going to high risk areas.

FREE COMMUNICATIONS ON VECTOR-BORNE DISEASES

Citizen science as a tool for enhancing arboviral vector surveillance in a resourced-constrained setting: results of a study in Honiara, Solomon Islands, 2019-2023

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Background and aims: Recent arboviral outbreaks across the Pacific islands highlight the value understanding the spread of disease-carrying *Aedes* mosquitoes across spatial-temporal scales can provide. Traditional surveillance tools are limited by workforce constraints, logistics, and cost—factors that in low-/middle-income countries undermine health protection efforts. To overcome these, we undertook a study in the Solomon Islands to explore if citizen science provides a feasible strategy to enhance arboviral vector surveillance.

Methods**:** We equipped high-school students to set basic ovitraps in their school environment. Traps were geocoded, eggs harvested, reared, and identified to species level by environmental health students supervised by an entomologist. Data were descriptively analysed and spatially presented. Data on volunteers' experiences were collected and thematically analysed.

Results**:** Fifty traps were set in nine schools in Honiara, collecting 2,064 eggs, of which 790 were successfully reared for identification. The per-school Positive Ovitrap Index (POI) ranged from 16.7% to 80%. Traps at seven schools were positive for both *A.albopictus* and *A.aegypti*. *A.albopictus* was the most prolific species identified, accounting for 73.7% of the sample. The project's practical nature, its relevance for participants, and the frequency of engagement with project staff were factors influencing success.

Conclusions**:** A high POI and spatial distribution of *Aedes* mosquitoes in Honiara suggest the risk of arboviral disease outbreaks is high. While there are challenges to address, our findings suggest that citizen science offers a feasible opportunity to engage the community in science and expand arboviral vector surveillance in human resource-constrained settings.

Efficient Designs for Molecular Xenomonitoring Surveys

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Background and aims: Molecular xenomonitoring (MX) is increasingly used for surveillance of vector-borne diseases, estimate vector infection prevalence, and evaluate interventions. Vectors are typically collected using a cluster survey design, then tested in pools of one or more individuals. Most MX surveys use the largest pool size known to maintain high test sensitivity, however this may not be optimal for balancing cost and information gained.

Methods: We developed a theoretical framework (based on Fisher Information) and a software tool that enables users to calculate minimum sample sizes and identify sampling designs that are most cost-effective given survey aims and cost structures.

Results: Cheaper tests, higher prevalence, greater between-site variability, and surveys for prevalence estimation generally favor the use of smaller pools. For instance, if infection prevalence is 1%, intra-cluster correlation is 0.1, and the marginal cost per sample site and cost per pool are 40 and 4 times the costs per vector, then the optimal

design for detection is a single pool of ≥25 vectors per sample site, while the optimal design for estimation of prevalence is 4 pools of 4 vectors per sample site.

Conclusions: Using the maximum pool size known to maintain test sensitivity may be appropriate for surveys for detecting infection, but smaller pools and more sampling sites would often substantially improve the cost-effectiveness of surveys for estimating prevalence. Efficient survey designs will better inform decision makers on the effectiveness of interventions, and when to action interventions that are appropriate only if prevalence is above a threshold.

The Epidemiology of Dengue in Australia, 2012-2022

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Introduction: Dengue is an important global arboviral infection that poses public health concerns in Australia, where imported infections have historically sparked local outbreaks in areas of North Queensland with competent mosquito vectors.

Objective: To describe Australian dengue notification trends over time.

Methods: Retrospective analysis of dengue notifications to the National Notifiable Disease Surveillance System from 1/1/2012 - 30/6/2022.

Results: Among 12,902 dengue cases notified during the study period, 12,142 (94%) were imported (overseas-acquired) and 5,577 (43%) had serotyping results. Males comprised 51% of cases; 41% were aged 20-39 years. From 2012-2019, between 917 and 2,203 imported dengue cases were reported annually (peak incidence 22/100,000 traveller movements in 2016). Following international border closures, imported cases dropped to 191 in 2020 and 10 in 2021. Top regions of imported case acquisition were Southeast Asia (n=9,124; 75%), Southern and Central Asia (n=1,346; 11%) and Oceania (n=1339, 11%); Indonesia (n=5,656; 47%) was the top source country. Almost all (560/584) locally-acquired dengue cases were reported from Queensland. Locally-acquired cases declined steadily from 236 in 2013 to 2 in 2020, coinciding with deployment of Wolbachia mosquitoes in north Queensland. No locally-acquired cases were notified in 2021-2022. Most imported cases were serotype 2 (2,126/5,064; 42%) or serotype 1 (1,502/5,064; 30%), whereas most locally-acquired cases (392/459; 85%) were serotype 1.

Conclusion: Imported dengue cases in Australia reflect travel patterns and the endemic dengue situation in popular destinations, especially Southeast Asia. The introduction of Wolbachia mosquito deployments in North Queensland contributed to the decline in locally-acquired dengue cases.

FREE COMMUNICATIONS ON VECTOR-BORNE DISEASES

Travel vaccine comes home to roost: The distribution and safety of Japanese encephalitis vaccination in Victoria, Australia

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Background**:** Japanese encephalitis (JE) vaccination in Australia swung from being an expensive option for intrepid international travelers to a government-funded domestic disease prevention strategy targeting people who live or work in the newly endemic JE-affected areas of South-eastern Australia.

Aim: Describe the distribution and safety of JE vaccination in Victoria.

Methods: Adverse events following immunisation (AEFI) with a JE vaccine reported to Victoria's vaccine safety service, SAEFVIC were described and calculated as reporting rates (RR) per 100,000 doses recorded in the Australian Immunisation Register (AIR) by brand, vaccinee demographics and vaccination program type, defined as travel (2016-2021) or domestic (2022-May 2023).

Results: JE vaccination quadrupled from an average 528 doses-per-month as an exotic travel vaccine (13,945 doses) to 2,234 doses-per-month as a domestic vaccine (37,982 doses) with Imojev® the dominant brand (90%). Fifteen AEFI reports were received (RR=28.9): two travel, 13 domestic; 12 Imojev® (RR=28.2) and three JEspect® (RR=35.3). One report was of anaphylaxis with JEspect® and seven reports were for vaccination errors including five of Imojev® administered in contraindication to immunocompromised persons. No detrimental or ongoing sequalae, admissions or deaths were reported.

Conclusions: Early insight into JE vaccine safety was hampered by infrequent administration; optional and unfunded recording in AIR and low AEFI reporting, noting any AEFI experienced overseas would be unreported. The domestic JE vaccination program was well tolerated with no safety signals detected. Ensuring immunisers receive education on brand-specific contraindications and undertake adequate patient questioning will minimise avoidable risks in an otherwise safe vaccination program.

Spatial Predictive Mapping of COVID-19 immunity using socioeconomic and environmental factors in the Dominican Republic

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Background: COVID-19 has spread rapidly across the Dominican Republic (DR) since the first confirmed case on 1 March 2020. Previous studies examined national- and regional-level risk factors for higher prevalence of SARS-CoV-2 spike (anti-S) antibody (Ab). This study aims to produce predictive maps of anti-S Ab seroprevalence in the DR based on associations with sociodemographic and environmental factors at the individual level.

Methods: Using data from a cross-sectional national household survey in the DR from June-October 2021, a Bayesian geostatistical model was developed to predict anti-S Ab seroprevalence using sociodemographic and environmental factors.

Results: The odds ratios (ORs) of anti-S Ab positivity increased with the number of doses of COVID-19 vaccine received (one dose, OR:3.16 (95% CrI: 2.05–5.05), two doses, OR:19.1(95% CrI: 11.11–35.30) and three doses (OR:86.92 (95% CrI: 13.22–1,713.00)) compared to unvaccinated individuals. Higher odds of anti-S Ab positivity were observed among participants aged 14-65 years (OR: 3.07, 95% CrI: 2.16–4.43) and ≥65 years (OR: 2.73, 95% CrI: 1.53–4.81) compared to those aged 5-14 years. The odds of anti-S Ab positive were 1.08 (95% CrI: 1.03–1.13) and 1.16 (95% CrI: 1.01–1.31) for each km distance to water bodies and for one primary care unit increase per population, respectively. The odds of anti-S Ab positivity were 0.98 (95% CrI: 0.98–0.99) for each 1% increase in tree cover.

Conclusions: Sociodemographic and environmental factors could be used to map predicted anti-S Ab seroprevalence. These findings may facilitate targeting of interventions and vaccination campaigns.

A Bayesian network model for estimating risk of long COVID

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Background: On May 5th the WHO declared COVID-19 no longer represents a global health emergency. However, long COVID continues to be a serious health issue, affecting ~11% of adults who have ever suffered from COVID-19 with 200 symptoms across 10 organ systems. Despite this, it remains overlooked in public discourse and when making important public health decisions.

Methods: To assess continued risk of long-term adverse COVID-19 outcomes, we developed a Bayesian network (BN) that calculates outcome probabilities under different scenarios of vaccine coverage and effectiveness, sex, age, comorbidities, number of previous SARS-CoV-2 infections, and drug treatments administered during acute infection. This BN will form the next iteration of the COVID-19 Risk Calculator, an online tool enabling scenario-analysis based on user-inputs.

Results: The resulting BN may be used to estimate both individual and population-level risk of developing long COVID symptoms affecting each organ system. Calculated outcomes show incomplete vaccination, missed drug treatment during acute infection, and repeat infections to be the greatest controllable influencers increasing risk of long COVID development. The tool can be used by health managers and individuals alone or in conjunction

with clinicians for shared decision making on vaccination, continuing infection-avoidant behaviors such as masking and social distancing, and pursuing early treatment during acute infection.

Conclusion: The model is easily updated to include emerging best evidence. Moving beyond the pandemic, the model can function as proof-of-concept for the use of BNs as risk-benefit analysis tools in other healthcare contexts to prevent, prepare for and manage vaccine-preventable diseases into the future.

POSTERS

TRAVEL MEDICINE AND VACCINE-PREVENTABLE DISEASES

TV1: Sexually transmitted infections and blood-borne viruses among international travellers: A systematic review

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Background and aims: Sexually transmissible infections (STIs) or blood-borne viruses (BBVs) impose a major health and economic burden globally. International travellers can facilitate the spread of infectious diseases, including STIs or BBVs. Thus, this systematic review assessed the proportion of travellers with STIs or BBVs and predictors of STIs.

Methods: Six databases were searched from inception to November 2022 for published analytical observational studies reporting the proportion and/or predictors of STIs among different group of international travellers (i.e., general, immigrants, backpackers, truck drivers, and men who have sex with men [MSM]). The selection of articles, data extraction, and risk of bias assessment were conducted in duplicate. Due to heterogeneity of the studies a narrative data synthesis was carried out.

Results: Thirty-one studies (n=383,739 travellers) were included. The proportion of general travellers with an STI and BBVs was low (<5%), but higher proportions were diagnosed among some subgroups of travellers- immigrant (HIV 0.1-5.1%], hepatitis B virus (HBV) 0.7-12.2%, hepatitis C virus (HCV) 0.7-5.1%, syphilis 0.7-3.7%), backpackers (chlamydia 3.5%-7.0%), and MSM (HIV 26.0%, HBV 25.0%). Short duration of trip (< 1 month), visiting friends or relatives, not having pre-travel consultation, Southeast Asia as travel destination, and unvaccinated for HBV were identified risk factors for STIs or BBVs.

Conclusions: Overall the proportion of STIs is low among travellers but could be high in specific group of travellers (e.g., backpackers, and MSM travellers). As a result, prevention strategies (i.e., pre-travel consultation) should be tailored and prioritise in high-risk group of travellers.

TV2: Enter stage right: Establishing the Australian Childhood Travel Outcomes Registry (ACTOR)

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Background: Vaccinations support the health of childhood travelers, especially when visiting friends and relatives (VFRs) in high-risk destinations. However, informing risk-benefit, especially for out-of-schedule or less frequently used vaccines, is challenging due to lack of data. Establishing the Australian Childhood Travel Outcomes Registry (ACTOR) collecting comprehensive pre- and post-travel vaccination and health outcomes data will inform evidence-based guidelines for travel vaccination in children.

Aims: Evaluate feasibility and acceptability of using travel vaccination clinic and traveler-directed questionnaires to systematically gather data on childhood international travel vaccination outcomes.

Methods: Establish a prospective observational study combining travel clinic vaccination advice and uptake data with family-centric pre- and post-travel questionnaires recording the travel plans, preventive measures and health outcomes of children traveling internationally, Three travel clinics will recruit international travelling families with children aged 0-17 years by sending SMS links to questionnaires pre-clinic visit and scheduled post-travel follow-up. Data will be held in REDCap and analysed using descriptive and Chi-squared statistics. This study is approved by Monash Health Ethics (RES-20-0000-068L-60469).

Results: Ascertain acceptability and feasibility through travel clinician post-study interview and measures of participation, data completeness, data quality and estimated time/cost for data collection, stratified by participant demographics after the first 100 SMS sent and at 12 months.

Conclusion: Travel clinicians and families with children VFRs should have access to readily available detailed information about vaccination risk-benefits relevant to their destination, timing, duration and/or style of travel for informed consultation and protection of the health of international traveling children.

TV3: Stranded abroad during a pandemic: Examining the impact of COVID-19 related border restrictions.

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Background and aims: In response to the threat of importing novel coronavirus disease (COVID-19), most countries implemented border restrictions. These measures had unintended consequences, leaving some unable to return to their country of residence and in need of government support. This body of research aimed to explore the impact of these restrictions on individuals stranded abroad and the government support available.

Methods: Firstly, a content analysis was conducted on government COVID-19 assistance-related data of 11 countries. Secondly, we conducted 2 surveys from June-December 2021, of 2417 individuals [citizens stranded abroad (1), temporary visa holders (2) those separated from their partners/family (2)]. Each survey assessed the financial and travel specific impacts and psychological distress (DASS-21 score). A final analysis was conducted on the information behaviours of these groups.

Results: The findings revealed significant gaps, inconsistencies, and potential inequities in the available government support systems and information quality. Results of the initial survey found more than 60% of participants reporting financial distress and moderate to extremely severe levels of depression. Participants described homelessness, significant financial strain, and minimal support from their national governments. We found the second survey subgroups reported higher levels of financial stress and moderate-to-extremely severe depression.

Conclusion: These four studies highlight the substantial human cost of international travel restrictions and identify psychologically vulnerable populations in need of targeted support and intervention. The research underscores the need for enhanced support mechanisms and improving preparedness to mitigate the negative consequences on individuals during future pandemics of emergencies requiring border closures.

TV4: Absence of transmission of mpox infection on long international flights

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Background: There is a risk of disease transmission during commercial air travel. In the context of the global mpox outbreak, national guidelines in Australia took a precautionary approach to the designation and monitoring of flight contacts of infectious cases.

Methods: All cases of mpox notified in Victoria were contact traced. Contact tracing of flights was undertaken for cases with overseas acquired infection, who were symptomatic in-flight. Passengers within two rows of the case were classified as medium to high-risk contacts, given public health advice, and actively monitored for symptoms. Case and flight contact records related to all imported cases to Victoria, from 19 May to 2 October 2022, were reviewed for evidence of secondary cases acquired on flights.

Results: There were no secondary cases of mpox notified among the flight contacts of 15 infectious returned travellers to Australia on long haul flights. The flight duration for contact traced flights ranged from 5.5 hours to 13.5 hours.

Conclusions: These findings indicate a low-risk of mpox transmission on international flights despite the long duration of potential exposure. This evidence may inform proportionate public health recommendations regarding the management of flight contacts.

TV5: Using sero-epidemiology of SARS-CoV-2 anti-S antibodies in the Dominican Republic to inform regional public health response

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Background: High COVID-19 incidence has been associated with urban settings, high population density, and household crowding. To better understand local variations in population immunity, we assessed SARS-CoV-2 seroprevalence at regional and cluster levels in the Dominican Republic (DR) and investigated sociodemographic factors that influence immunity.

Methods: A cross-sectional national serosurvey was conducted in the DR from June-October 2021. Seroprevalence of SARS-CoV-2 spike protein (anti-S) antibodies was estimated (adjusted for selection probability, age, sex). The effect of covariates on anti-S seroprevalence and correlates of 80% protection against symptomatic infection (PT80) for ancestral and Delta strains was investigated by multilevel logistic regression.

Results: The study included 6,683 participants from 134 clusters in 10 regions. Adjusted anti-S prevalence ranged from 80.5% (95%CI 78.1-82.9) to 89.8% (88.8-93.8) between regions and 25.7% (24.3-27.1) to 100% (91.2-100.0) between clusters. At the national level, Enriquillo and El Valle had the highest odds ratios (OR) of anti-S positivity (OR 1.9 for both, 1.2-2.8 and 1.1-3.1, respectively). Compared to unvaccinated, three doses of COVID-19 vaccine were associated with anti-S positivity (OR 121.6, 16.9-876.6), PT80 for ancestral (OR 15.8, 10.1-24.3) and PT80 for Delta strains (OR 19.6, 14.2-27.0). Although the influence of covariates varied across regions, vaccination was consistently associated with the highest odds of seropositivity and PT80.

Conclusions: By quantifying the variation of the relative influence of covariates across regions and identifying areas that might be more susceptible to outbreaks, our results can help inform regional-level public health responses such as strategies to increase vaccination coverage.

TV6: Use of machine learning for assessing adverse event in concomitant administration of vaccines

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Introduction: There are benefits of concomitant administration of two or more vaccines as part of immunisation programs and travel medicine. However, there are concerns about increased risk and severity of adverse events following immunisation (AEFI). Standard epidemiological methods are not suited for evaluating hundreds of different vaccine combinations. Machine learning (ML) has the capability to learn from data to predict the future events thus we aimed to develop a ML classification model to predict the risk of AEFIs with vaccine combinations.

Methods: Data from SmartVax (an active vaccine safety surveillance system) from May 2015 to December 2020 were used, and all patients who received Japanese encephalitis vaccine were included in the study. ML classification methods (e.g., k-NN, support vector machine, random forest) were used to predict the probability of AEFIs based on patients' demographic characteristics and type of vaccines received. The best ML model was selected based on discriminative ability.

Results: Data from 5389 patients (ages 1-83) were analysed, 6.4% reported at least one AEFI. The random forest algorithm achieved the best performance (high accuracy, 92.06%) and excellent capacity to predict AEFIs (AUC=0.973). Age group, vaccine (e.g. typhoid, DPT, rabies), and number of concomitant vaccines were important predictors of AEFIs in the random forest model.

Conclusions: A ML classification model with high accuracy was trained and will be integrated in an online tool. Clinicians will be able to use this tool to predict AEFI with concomitant vaccines, and make evidence-based decisions regarding vaccine schedules to reduce the risk of AEFIs.

TV7: Dengvaxia in Australian Travellers: A Case Series

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Background: Dengvaxia is the only approved dengue vaccine in Australia, and three doses are indicated in travellers aged 9-45 years who have had previous dengue infection, and are intending to reside in highly dengue-endemic regions for extended period of time. In this case series, we report our experience in using Dengvaxia in the Australian travel medicine setting.

Method: Data from travellers who attended a travel medicine clinic in Brisbane from November 2017 to June 2019, and received Dengvaxia were included. Demographic characteristics, prior dengue infection, reason for recommending Dengvaxia, and adverse events following immunisation (AEFI) were summarised.

Results: Seven dengue seropositive adult travellers (57% males, aged 31-67 years), who received 3 doses (5 travellers) and 2 doses (2 travellers) of Dengvaxia were included. Four had dengue infection <10years ago, two were infected >10 years, one did not recall the date of prior infection. All planned to spend >3months in dengue endemic areas for work (57.1%), tourism (28.6%), or relocation (14.3%).

Two (28.6%) travellers reported AEFI, and these were mild to moderate and did not impact their normal daily activities. One reported headache (which required aspirin), and erythema and pruritus at the injection site (after 1st dose), and swollen cervical lymph nodes (after 3rd dose). Another traveller reported pain and redness at the injection site and metallic taste (after 2nd dose).

Conclusion: Dengvaxia is rarely used in Australia. In our case series of seven travellers, Dengvaxia was safe and well tolerated by travellers.

TV8: Lack of measles transmission to susceptible contacts from a childcare worker with secondary vaccine failure

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Background and aims: This paper will discuss the diagnosis of measles in a fully vaccinated person, and demonstration of no transmission in a childcare facility, despite a series of large exposure events and a significant number of susceptible close contacts.

Methods: A single case investigation of a childcare worker diagnosed with measles through measles serology, having initial serology on an admission to Emergency Department for fever, malaise and a rash, with urine and throat PCR results confirming the diagnosis. Serology results were suggestive of secondary vaccine failure due to avid IgG positive and IgM equivocal result, with a documented history of receiving 2 doses of measles-mumps-rubella vaccine.

Results: The childcare worker was intimately associated with the childcare cenrte working a total of 6 days while infectious with 72 susceptible close contacts, with no transmission. A total of 393 close contacts were identified with 372 childcare contacts. From the 372 childcare contacts 72 were considered susceptible close contacts, 214 were considered non-susceptible close contacts, and susceptibility was unknown for 86 close contacts. Two pop-up testing clinics were held testing 59 people, both symptomatic and asymptomatic susceptible close contacts with no positive results.

Conclusions: This case of measles secondary vaccine failure with no onwards transmission is unique because the case had exposed a large population of susceptible children, throughout 6 days of working while infectious. The importance of this investigation is the unique finding that being infected with measles despite pre-existing vaccine-derived immunity may not result in onwards transmission.

TV9: Ni-Vanuatu health workers knowledge, beliefs, and practices regarding antibiotic prescribing and awareness of antibiotic resistance and the impact of COVID-19, 2018 and 2022: a mixed methods study.

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Background and aims: Global evidence suggests that antibiotics were over prescribed during the early waves of the COVID-19 pandemic, particularly in some low- and middle-income countries. Whilst this may have been unavoidable, increased use of antibiotics exacerbates the emergence and spread of antibiotic resistance (ABR). This study aimed to examine the impact of COVID-19 on Ni-Vanuatu health worker knowledge, beliefs, and practices (KBP) regarding antibiotic prescribing and awareness of ABR.

Methods: A mixed methods study was conducted using surveys and in-depth interviews in 2018 and 2022. Question types included: open-ended; multiple choice; dichotomous; and scaled. Quantitative results were

analysed using non-parametric tests and the constant comparative method was used to analyse the qualitative results.

Results: A total of 49 respondents completed both baseline (2018) and follow-up (2022) surveys. Prescribing knowledge assessed using five clinical scenarios improved, although health workers were less confident in performing some prescribing activities during the pandemic. Participants highlighted the need for continuing professional development (CPD) activities. Respondents identified resource limitations to optimal hand hygiene performance. More than three-quarters of respondents reported that COVID-19 influenced their prescribing practice and heightened their awareness of ABR: “more careful”, “more aware”, “stricter” and “need more community awareness”.

Conclusions: The following recommendations are suggested: provide ongoing CPD activities to improve knowledge; enhance skills; maintain competency in antibiotic prescribing; formalise antibiotic stewardship and infection control (IPC) programs to optimise prescribing and IPC practices; strengthen relationships between prescribers and patients; and raise community awareness about ABR to support more effective use of medications.

NEGLECTED TROPICAL DISEASES

NTD1: Field comparison of STANDARD^{TM} Q Filariasis Antigen Test (QFAT) with Bioline Filariasis Test Strip (FTS) in Samoa

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Background: Reliable, user-friendly rapid antigen detection tests are essential for field surveys to assess *Wucheria bancrofti* antigen (Ag) prevalence and monitor the progress of lymphatic filariasis (LF) programmes. Here, we compared the performance of the new Standard Q Filariasis Antigen test (QFAT) with the Bioline Filariasis Test Strip (FTS) under field conditions.

Methods: During an LF survey in Samoa in March 2023, using heparinised finger-prick blood samples, 344 were selected for FTS and QFAT testing. Up to three independent and blinded readers evaluated the test results. Discordance between the readers was resolved by reporting the dominant result. Tests with discordance between two observers were classified as indeterminant, while those with no sample flow or no control line were deemed invalid. Microfilariae (Mf) status of Ag-positive samples on stained blood slides was also determined.

Results: Of the 344 samples tested, 29% (n=100) were Ag-positive by FTS and 30% (n=104) by QFAT. The concordance between the two tests was 94% (Cohen’s Kappa = 0.85). No QFAT and 4% FTS were deemed invalid. Discordance between the readers was 4% for both tests, most were resolvable, but 0.9% of FTS were indeterminate. All 40 Mf-positive participants were Ag-positive by FTS and QFAT. The field laboratory team preferred QFAT over FTS due to the smaller blood volume required, faster sample processing, better usability, and readability.

Conclusion: QFAT showed promising performance compared to FTS under field conditions for assessing LF Ag prevalence.

NTD2: Persistence of circulating filarial antigen and microfilaria after triple drug treatment (ivermectin, diethycarbamazine and albendazole) – findings from a community survey in Samoa

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Background: In 2018, Samoa delivered the first round of triple-drug (ivermectin, diethycarbamazine and albendazole – IDA) mass drug administration as part its lymphatic filariasis (LF) elimination program. In 2019, 14 individuals who remained microfilariae (Mf)-positive were treated with IDA. A community survey of 2594 people in 2019 identified 190 LF antigen (Ag)-positive individuals, of whom 40 were Mf-positive. This study aims to determine if Mf clearance was sustained in participants treated in 2019; and describe changes in Ag/Mf status over time in Ag-positive and Mf-positive participants and their household members.

Methods: In 2023, we followed up Mf-positive and Ag-positive (index) participants from 2019 and their household members. Consenting participants completed an electronic questionnaire and had blood samples tested for LF Ag and the presence of Mf (if Ag positive). Descriptive statistical analyses were conducted.

Results: A total of 99 of 206 index participants and 336 of their household members were recruited. Eight were individuals who participated in the 2019 observed treatment study; of these, six (75%) remained Ag-positive and five were Mf-positive. Of the 17 untreated index participants who were Ag-positive/Mf-positive in 2019, all remained Ag-positive and 65% were Mf-positive. Of the 74 who were Ag-positive/Mf-negative in 2019, 80% remained Ag-positive and 28% were Mf-positive. In household members of index participants, Ag and Mf prevalence ranged from 15-28% and 4-12%, respectively.

Conclusions: Persistent high Ag and Mf prevalence in index participants and their household members indicate the importance of follow up testing of these groups.

NTD3: Serological surveillance of lymphatic filariasis in Samoa: the epidemiology and sensitivity of anti-filarial antigen compared to antibody

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Background: Recent evidence suggest that anti-filarial antibodies (Abs) may be more sensitive than antigen (Ag) for lymphatic filariasis (LF) surveillance. This study aimed to compare the epidemiology of LF Ag and Abs in Samoa, and their sensitivity for detecting seropositive persons.

Methods: A community-based sero-survey of participants ≥5-years-old was conducted in 2018 in 35 primary sampling units (PSUs) (30 randomly-selected, and five purposively-selected 'suspected hotspots'). Ag-positivity was detected using Alere Filariasis Test Strips, and Ab-seropositivity (Bm14, Wb123, Bm33) were measured using multiplex bead assays. Prevalence was adjusted for study design and standardised for age and gender.

Results: Of 3795 participants (mean age: 20.7 [SD:19.1]; 51.2% female), 117 (3.1%) were Ag-positive, 1889 (49.8%) seropositive for at least one Ab, and 1892 (49.9%) Ag- and/or Ab-seropositive. Adjusted prevalence for Ag, Bm14, Wb123, and Bm33 were 3.7%, 20.3%, 32.2%, and 51.0%, respectively. Significant risk-factors for seropositivity were male gender (adjusted-odds-ratios [aOR]: Ag=1.82, Bm14=1.91, Bm33=1.34, Wb123=1.75), 40-59-year-olds vs 5-9-year-olds (aOR: Ag=6.13, Bm14=6.84, Bm33=4.58, Wb123=4.03), and purposive PSUs (aOR: Ag=3.27, Bm14=2.16, Bm33=1.95, Wb123=1.81). Clustering of seropositive persons was significantly higher in households (Intraclass correlation [ICC]: Ag=0.45, Bm14=0.32, Bm33=0.31, Wb123=0.29) vs PSUs or regions. Of 3678 Ag-negative participants, 1775 (adjusted proportion: 56.5%) tested seropositive for at least one Ab, 1548 (49.5%) for Bm33, 882 (29.9%) for Wb123, and 479 (17.7%) for Bm14.

Conclusions: Higher odds of Ag- and Ab-seropositivity were found among older males in suspected hotspots. A high proportion of Ag-negative persons were Ab-seropositive, suggesting that Abs have higher sensitivity for detecting seropositive persons.

NTD4: JICA Project for Elimination of Lymphatic Filariasis in the Pacific Region ~ Progress on Elimination of Lymphatic Filariasis in Papua New Guinea~

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Abstract

Japan International Cooperation Agency (JICA) has supported lymphatic filariasis (LF) control in the Pacific since 1976, even before establishing the Pacific Programme to Eliminate Lymphatic Filariasis in 1999. From 2018 to 2023, JICA implemented a five-year project to strengthen and institutionalise measures against LF in the

Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Papua New Guinea (PNG), Samoa, and Tuvalu. This report focuses on the progress of LF control in PNG.

The project covered 3 out of the 22 provinces of PNG, namely New Ireland Province (NIP), East New Britain Province (ENBP), and West New Britain Province (WNBP). In NIP, the 4th Mass Drug Administration (MDA) using Ivermectin, Diethylcarbamazine and Albendazole (IDA) and the 1st Transmission Assessment Survey (TAS) were conducted, while in ENBP, the 1st MDA and 2nd MDA using IDA were implemented. In WNBP, preparations for the 1st MDA were carried out along with Morbidity Management and Disability Prevention training.

In NIP, MDA was completed, and the 1st TAS was implemented, achieving 0.17% prevalence. In ENBP, 2nd MDA was completed surpassing the target with a coverage rate of 68%.

Significant progress has been made towards filariasis control in PNG through the completion of TAS in NIP and two rounds of MDA in ENBP. In Phase 2, which started in April 2023, the project will continue in WNBP, NIP and ENBP and expand to include East Sepik Province, West Sepik Province, Manus Province, and Autonomous Region of Bougainville as target provinces.

NTD5: Towards global elimination of Lymphatic Filariasis – A Systematic Review of the Application of Spatial Epidemiology Methods to Understand Disease Burden and the Impact of Intervention Strategies

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Background: In the last three decades, spatial epidemiology has increasingly been used to study neglected tropical diseases (NTDs). This approach is particularly relevant when transmission is driven partially by sociodemographic and environmental factors, resulting in higher prevalence in some areas compared to others. We use lymphatic filariasis (LF) – a globally significant mosquito-borne disease - as a case study to explore the contributions of spatial epidemiology to enhance NTDs surveillance.

Methods: We conducted a systematic literature search of spatial studies of LF published in English across four academic databases, before 15 November 2022. Later, additional papers were identified from experts' suggestions. The protocol for this systematic review was prospectively registered with PROSPERO (CRD42022333804). Studies that employed spatial analytical methods were included, but those that applied only visualisation tools were excluded.

Results: We identified 61 eligible studies, published between 1997 and 2023. Thirty-one (50.8%) studies used spatial statistical modelling, with model-based geostatistics being the most common method. Spatial autocorrelation and hotspot analysis were applied in 30 studies (49.2%). The most frequent model outputs were prevalence maps (17 studies, 27.9%), followed by risk maps based on environmental suitability (7 studies) and maps of the odds of seroprevalence being above a predetermined threshold (7 studies, 11.5%).

Conclusions: By exposing the applicability of spatial methods for identifying LF clusters and investigating risk factors, we demonstrated that operational research and elimination programmes could benefit from spatial epidemiology. This is especially true in low-prevalence settings, where spatial analysis can improve hotspot detection and enhance post-elimination surveillance.

NTD6: Lymphatic filariasis prevalence in human surveys five-years post mass drug administration in Samoa

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Background: Mass drug administration (MDA) is a key strategy used by the Global Program for Elimination of Lymphatic Filariasis. Samoa has conducted multiple MDA rounds, most recently a triple-drug MDA in 2018 using ivermectin, diethylcarbamazine and albendazole (IDA). The second round of IDA was scheduled for 2019, however due to outbreaks of measles and COVID-19 it has been delayed to mid-2023. This study aims to report on changes in antigen (Ag) and microfilaria (Mf) prevalence in eight primary sampling units (PSUs) five-years after one round of IDA.

Methods: The eight primary sampling units (PSUs) sampled in 2023 were selected based on LF antigen (Ag) prevalence observed in the 2019 survey; two each of high (13-19%), medium (6-8 %), low (2-4%) and zero prevalence. In each PSU, we sampled residents ³5 years-old from 15 to 18 randomly selected houses.

Results: in 2023, no Ag-positive participants were identified in the two PSUs with zero prevalence in 2019. Despite the 2018 round of IDA, Ag-positive residents were identified in all of the other six PSUs, with adjusted Ag prevalence ranging from 2.6% (95% CI 0.0-5.9%) to 21.5% (95% CI 12.1-30.8%). Of the 39 Ag-positive participants in 2023, 41.0% (95% CI 25.4%-56.7%) were Mf-positive, compared to 31.8% (95% CI 19.7-43.8%) of the 41 Ag-positive participants identified in 2019.

Conclusion: Our results provide evidence of persistent LF transmission in Samoa after one round of IDA. Our study also demonstrates the negative impact that public health emergencies can have on disease elimination programs.

NTD7: Molecular analysis of soil-transmitted helminths in Huambo, Uige and Zaire provinces, Angola

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Background and aims: Quantitative polymerase chain reaction (qPCR) is gaining recognition in soil-transmitted helminth (STH) diagnostics, including *Strongyloides stercoralis* and hookworm species not easily distinguished by microscopy. However, fixative choice and DNA extraction methods may influence qPCR performance. We assessed prevalence and burden of STH species using qPCR in Huambo, Uige and Zaire provinces, Angola, and compared its performance with Kato-Katz.

Methods: Stool samples from 3,063 schoolchildren across 219 schools were analysed by qPCR and Kato-Katz. DNA extraction was repeated on 191 samples initially qPCR negative but Kato-Katz positive. Cluster-adjusted prevalence and infection intensity estimates were calculated for each STH species by qPCR and Kato-Katz, converting cycle threshold to eggs per gram for qPCR. Cohen's Kappa statistic evaluated agreement between qPCR and Kato-Katz.

Results: Similar prevalence for *Ascaris lumbricoides* (37.5% vs 34.6%) and *Trichuris trichiura* (6.5% vs 6.1%) was reported by qPCR and Kato-Katz, respectively; while qPCR detected a higher prevalence of hookworm than Kato-Katz (11.9% vs 2.9%). There were 112/119 (58.6%) re-extracted samples subsequently found qPCR positive. Prevalence of *S. stercoralis* was 4.7% (municipality range 0–14.3%) and no *Ancylostoma ceylanicum* was detected. Prevalence of moderate or high intensity infections was higher by Kato-Katz than qPCR. Agreement between qPCR and Kato-Katz was very good for *A. lumbricoides*, moderate for *T. trichiura* and fair for hookworm.

Conclusions: Most municipalities were low risk for strongyloidiasis and no zoonotic hookworm was detected. qPCR performance in this setting prompts further evaluations on fixatives and DNA extraction to optimise qPCR for field studies.

NTD8: Utilising molecular diagnostics to support trachoma survey and control programs in Choiseul, Solomon Islands.

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Background: Trachoma is the leading infectious cause of blindness, caused by the Chlamydia trachomatis (CT) bacterium. WHO's simplified trachoma grading criteria are used to diagnose individual cases of trachomatous inflammation—follicular (TF) in field assessments of trachoma prevalence. Some reports in the Pacific region of high TF in the absence of trachomatous trichiasis suggest that TF may be caused by processes other than CT infection. Molecular diagnostic tools could be valuable for confirmation of CT infection to monitor progress of elimination of trachoma as a public health problem.

An unexpected trachoma prevalence result of 10.6% was reported in 2019 during a surveillance survey, after Choiseul had undertaken antibiotic MDA for trachoma then, in 2016, reported a TF prevalence of 2.2%.

Aim: Our aim was to estimate prevalence of TF, CT and anti-CT antibodies.

Methods: Consenting children aged 1-9 years in 15 villages in Choiseul were screened for TF and asked to provide a ocular swab and a dried blood spot (DBS). PCR assessed current infection and DBS were tested by ELISA to assess past exposure.

Results: Prevalences of TF, CT and anti-CT-antibodies in children aged 1-9 years were 18%, 8.5% and 18.7% respectively. Only 2.2% of households had access to improved sanitation, and 30% had access to improved water for washing.

Conclusion: TF prevalence is above the 5% elimination threshold. We agree with the growing supposition that molecular diagnostics are important for monitoring the trachoma elimination process.

NTD9: Acceptability of integrated neglected tropical diseases surveys and mass drug administration in Tafea, Vanuatu

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Background: Soil-transmitted helminths, scabies and yaws are neglected tropical diseases (NTDs) endemic in Vanuatu. To control and eliminate these diseases, the Vanuatu Ministry of Health implemented an innovative integrated control programs including mass drug administration (MDA) with albendazole, azithromycin and ivermectin. We aimed to assess community acceptability of integrated MDA along with the barriers and facilitators.

Methods: In February 2023, we conducted a mixed method study including surveys and FGDs with community people, and in-depth interviews with community leaders in Tafea province.

Results: In the survey, 88% (35/40) of respondents mentioned receiving MDA. Having intestinal worms or skin lesions in the past or preventing these diseases in the future were the dominant factors that contributed to receiving the medicine. Absenteeism and forgetfulness were the main reasons for not taking the medicine. 86% (29/35) of the respondents were happy about the number of medicines they took and 71% (25/35) liked the taste. 79% (30/38) preferred a single visit (integrated MDA) to receiving all medicines. Qualitative findings showed that the communities had been suffering from multiple NTDs and the distribution of the medicines reduced NTDs incidence in the community. The participants thought sharing results of sero-surveillance and stool samples with the community people would have improved the MDA acceptability.

Conclusions: The integrated surveys and MDA was acceptable to the community. Absenteeism was a barrier to medicine intake. Interventions that target strategies to improve villagers' presence during the MDA and sharing study results among villagers to increase awareness may improve the MDA acceptability in the future.

NTD10: Utilising integrated neglected tropical diseases (NTDs) surveys to monitor and evaluate mass drug administration (MDA) in Vanuatu

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Background: Soil transmitted helminths (STH), scabies, and yaws are neglected tropical diseases (NTDs) endemic to Vanuatu. To combat these diseases, the Vanuatu Ministry of Health, in collaboration with the World Health Organisation and Bridges to Development, is implementing large-scale integrated control programs. This includes two rounds of mass drug administration (MDA) using albendazole, azithromycin, and ivermectin, along with active surveillance for yaws and leprosy.

Methods: Cross-sectional parasitological surveys will be conducted before and after MDA to assess its impact. At the time of writing, baseline prevalence surveys were carried out in 132 villages across three provinces: Tafea,

Sanma, and Shefa between 2021-2023. The aim was to perform skin examinations on 100 residents and collect 50 stool samples per village.

Results: A total of 8,552 individuals participated in the survey. Stool sample analysis (N = 1,794) by sodium nitrate flotation technique revealed prevalence of any STH across the three provinces to be 28.3%, which included Ascaris lumbricoides (16.7%), Trichuris trichuria (11.4%), and hookworm (12.1%) prevalences. Skin examinations found scabies prevalence of 14.0% in Tafea, 2.6% in Sanma, and 4.1% in Shefa. Active surveillance identified 17 confirmed yaws cases and 8 suspected leprosy cases.

Conclusions: Our study indicates high prevalence of STH and skin diseases among the Vanuatu population. The implementation of surveys integrated with MDA is a novel approach that allows more cost-efficient collection of data that is necessary to monitor and evaluate impact of the MDA.

NTD11: Interactive Dashboard for Elimination and Surveillance (IDEAS): A dashboard for visualization of lymphatic filariasis surveillance data in American Samoa

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Background and aims: Interactive mapping tools allow the rapid visualization and interpretation of data, and are valuable for targeted geographic planning for disease control or elimination programs. We developed the Interactive Dashboard for Elimination and Surveillance (IDEAS) with the aim to visualise and compare the geographical distribution of different lymphatic filariasis (LF) infection markers (antigen; and Wb123, Bm14 and Bm33 antibodies) in American Samoa over time, and to facilitate the identification of any residual hotspots of transmission.

Methods: IDEAS integrates data collected in school-based transmission assessment surveys (TAS) (conducted in 2011, 2015 and 2016) and community surveys (in 2010, 2014 and 2016) in American Samoa to help visualise LF surveillance data using various visual elements (maps, tables and charts) and spatial levels. The platform has been developed using Microsoft Power BI software, with a 'data engine' that stores and feeds data into the system for visualisation, interactive mapping, filtering and analyses.

Results: The IDEAS platform structure consists of different tabs (or pages) that compile data from the TAS and each community survey. Filters were developed to prompt dynamically linked maps, graphs and tables to display the selected data. These features allow flexibility in comparing LF infection markers over time, by subgroups (age, sex, socio-demographics) and geographic locations.

Conclusion: We developed IDEAS, a versatile dashboard that allows rapid and interactive visualisation of LF surveillance data over time. This interactive mapping tool can be adapted for use in other countries to facilitate planning of targeted interventions for LF elimination.

NTD12: Serological surveillance and risk-factors of arboviruses, neglected tropical diseases, and vaccine-preventable diseases in Samoa

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Background: Serological multiplex bead assays (MBA) can simultaneously detect antibody responses to multiple antigens. This study aimed to assess seroprevalence and risk-factors for several arboviruses, neglected tropical diseases (NTDs), and vaccine-preventable diseases (VPDs) in Samoa.

Methods: A community-based sero-survey of 3851 participants ≥5-years-old was conducted in 2018, one year prior to a measles outbreak resulting in >5700 cases and 83 deaths. Seroprevalence (adjusted for study design, standardised for age and gender) was calculated for dengue, Zika, Chikungunya, lymphatic filariasis [LF], trachoma, yaws, tetanus, diphtheria, rubella, and measles.

Results: Seroprevalence for 1) arboviruses were 90.3% for dengue, 85.7% for Zika, 57.0% for Chikungunya; 2) NTDs were 57.8% for any LF-antibody (individual antibody-seroprevalence: Bm33=50.8%, Wb123=32.0%, Bm14=20.3%), 38.0% for trachoma (Pgp3+Ct694), 3.0% for yaws; and 3) VPDs were 91.0% for tetanus, 83.5% for diphtheria, 79.0% for rubella, 43.6% for measles. Participants ≥10-years-old had significantly higher adjusted odds-ratios (aOR) for antibody-positivity to all diseases compared to 5-9-year-olds, except for Chikungunya and rubella. Antibody-positivity for diphtheria was not associated with age. Males had significantly higher odds for LF antibody-positivity, whilst females had higher odds for trachoma, diphtheria, and measles antibody-positivity. Clustering was significantly different between regions, communities, and households for all antibodies (except yaws [P-value=0.336]) and was highest at household-level. The strongest clustering was found for LF (Intraclass correlation [household]: 0.30).

Conclusions: MBA enable concurrent analysis of the prevalence and geographic distribution of multiple infectious diseases of national importance, and can help governments develop evidence-based national or localised control interventions, elimination strategies, and vaccination campaigns.

NTD14: Integrated serological surveillance using dried blood spot analysis to determine prevalence of multiple infectious diseases in Vanuatu

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Background: Vanuatu faces a significant risk of infectious diseases, including neglected tropical diseases (NTDs) and vaccine-preventable diseases (VPDs), due to factors including low vaccine coverage, geographical remoteness, and limited access to water and sanitation.

Serological surveys that measure prevalence of antibodies (seroprevalence) are a strategy for monitoring current or past exposure to infectious pathogens. Integrated serosurveillance using novel multi-bead assays capable of detecting ~100 different disease-specific antibodies from a dried blood spot (DBS) can potentially establish nationally representative programs.

Methods: We conducted an integrated serological survey in Vanuatu to assess the prevalence of antibodies against multiple NTDs, VPDs, and other diseases. From 2021 to 2023, cross-sectional serosurveys were conducted in 132 villages across Tafea, Sanma, and Shefa provinces. Finger prick blood samples were collected from 2010 participants aged 1+ years and analysed using Luminex technology to estimate the prevalence of antibodies against the following diseases/agents: NTDs (including trachoma, yaws, lymphatic filariasis, strongyloidiasis and dengue), VPDs (measles, rubella, diphtheria, pertussis, tetanus, mumps and varicella-zoster virus), additional arbovirus (zika and chikungunya), as well as malaria, COVID-19, cryptosporidiosis, giardiasis, amoebiasis, taeniasis and cysticercosis.

Results: Results will provide a measure of effective population-level immunity or exposure to multiple infectious diseases, with the added advantage of being cost-effective, scalable, acceptable, and able to target hard-to-reach and high-risk populations. These data can complement other surveillance mechanisms, including case-based reporting and vaccine coverage estimates obtained from electronic or paper-based records and household surveys for VPDs and parasitological surveys for NTDs and other infectious diseases.

NTD14: The effect of climate on melioidosis incidence in Townsville, Australia: a dry tropical region

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Background: Townsville is in dry tropics in Northern Australia and an endemic region for melioidosis. Melioidosis is an infectious disease caused by Burkholderia pseudomallei, a soil dwelling organism. Melioidosis incidence is associated with high levels of rainfall and has been linked to multiple weather variables in other melioidosis endemic regions. In contrast to Townsville, Darwin receives 40% more rainfall. We assessed the relationship between melioidosis incidence and weather conditions in Townsville and compared the patterns to the findings in Darwin and other melioidosis endemic regions.

Method: Performing a time series analysis from 1996 to 2020, we applied a negative binomial regression model to evaluate the link between the incidence of melioidosis in Townsville and various weather variables. Akaike's information criterion was used to assess the most parsimonious model with best predictive performance. Fourier terms and lagged deviance residuals were included to control long term seasonal trends and temporal autocorrelation.

Results: Humidity is the strongest predictor for melioidosis incidence in Townsville. Furthermore, the incidence of melioidosis showed a three-times rise in the Townsville region when >200 mm of rain fell within the fortnight. Prolonged rainfall had more impact than a heavy downpour on the overall melioidosis incident rate. There was no statistically significant increase in incidence with cloud cover in the multivariable model.

Conclusion: Consistent with other reports, melioidosis incidence can be attributed to humidity and rainfall in Townsville. In contrast to Darwin, there was no strong link between melioidosis cases and cloud cover and nor single large rainfall events.

MALARIA AND OTHER VECTOR-BORNE DISEASES

MV1: *Aedes* mosquito management in the Torres Strait - what is impeding a community-based model of practice?

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Background & Aim: The Torres Strait is a unique region situated between mainland Australia and Papua New Guinea. This region has both the *Ae.albopictus* and the *Ae.aegypti* mosquito species and is at risk of *Aedes* mosquito-borne disease such as dengue fever. The *Ae Albopictus* Elimination/Control Program is currently conducted on Horn Island and Thursday Island, and the outer islands have an Environmental Health Program run by the local council. An integral part of sustainable mosquito management is engaging the local community. This study aimed to explore the community engagement strategies used in *Aedes* mosquito management in the Torres Strait and understand what influenced these strategies.
Methods: Fifteen semi-structured interviews were conducted with key informants working in *Aedes* mosquito management in the Torres Strait.
Results: This study found a range of factors influencing the community engagement strategies used including regulatory factors, attitudes/belief of vector control staff, cultural factors and resourcing issues.
Conclusions: To sustain *Aedes* mosquito management efforts in the Torres Strait a more community-based model should be piloted that considers local ownership, resources and local knowledge.

MV2: Molecular xenomonitoring (MX) as a complement to human microfilaraemia (Mf) for lymphatic filariasis surveillance in Samoa

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Background and aims: As countries work towards the elimination of lymphatic filariasis (LF) through mass drug administration (MDA), the need for effective post-MDA surveillance is critical. Molecular xenomonitoring (MX), the detection of filarial DNA in mosquitoes, may provide a sensitive and less invasive tool than infection markers in humans. Despite this, there is limited evidence on the sensitivity of MX for detecting microfilaraemic (Mf) humans.

Methods: We used data collected from a 2019 LF transmission survey conducted in Samoa to explore association between MX and Mf results at primary sampling unit (PSU) and household levels. Mosquito infection prevalence at the national and PSU level were calculated using PoolTestR software and compared to Mf prevalence. Presence or absence of infection across the two indicators was also compared by PSU.

Results: We estimated national mosquito infection prevalence to be 0.3% (95% CI: 0.1 – 0.6) in primary vector genus Aedes, 0.08% (95% CI: 0.02 – 0.1) in Culex and Mf prevalence to be 1.6% (95% CI: 0.4 – 2.7). Infection presence or absence was concordant in 40% of PSUs, with MX identifying infection in 80% of PSUs and Mf in 37%. In 51.4% of PSUs, MX was present while Mf was absent. This increased to 72.2% among low antigen prevalence villages (<2.5).

Conclusion: MX can be a useful tool for LF transmission surveillance, as a complement to infection markers in humans. Low concordance between Mf and MX provides evidence that MX may be useful at locating infections missed by human surveys in an end-game context.

MV3: Trend in malaria cases in China: New challenges following malaria elimination and the need to enhance travel medicine services

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Background: Despite the World Health Organization certifying China malaria-free in 2021, the risk of local transmission caused by imported malaria cases remains a significant public health issue. This study systematically reviewed reports of malaria in China from 2013 to 2022 to determine the current epidemiological characteristics of the disease.

Methods: Data on malaria cases (i.e., method of diagnosis, country of acquisition, Plasmodium species, province where case was diagnosed) reported in China from 2013 to 2022 were collected from publicly available records from the National Institute of Parasitic Diseases, China CDC, and summarised using descriptive statistics.

Results: 24,758 cases of malaria (>99.5% laboratory confirmed) were reported in China from 2013 to 2022, with a downward trend over the years (4,128 cases in 2013; 843 cases in 2022). Over 98% of cases were imported, and the majority of cases were diagnosed in travellers who returned from Ghana, Angola, and Myanmar. P. vivax was mainly detected in returned travellers from Myanmar; while P. falciparum and P. ovale in travellers from Sub-Saharan Africa. Most of the cases were reported in Guangxi, Yunnan, and Jiangsu provinces, where large numbers of labour workers migrate for overseas employment.

Conclusion: China has not reported local cases since 2016; however, returned travellers from high-risk countries impose significant risk of re-introduction. Currently, case detection is mainly through passive surveillance. Strengthening active surveillance systems, as well as pre- and post-travel services should be a priority to ensure that China's achievements in malaria elimination are sustained.

MV5: Impacts of changing landscapes and vector control on malaria vector behaviours and their distributions

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Background and aims: In contrast with the claims of climate change increasing malaria, the evidence suggests that malaria has been in decline over the last 100 years. Some of the reasons underlying the changing epidemiology were examined.

Methods: A selected review of the literature examined impacts of land use changes and vector control on malaria transmission. In addition, a global dataset on vector behaviours from 1985 to 2011 was analysed for changes in vector behaviours and vectorial capacity together with recent data on land use and vector distributions.

Results: Long-term changes in vectorial capacity, exemplified by changes in house entering and human feeding, began prior to selection for outdoor and early biting by insecticide-based vector control strategies. Land use changes from deforestation and associated agricultural development and urbanization are impacting the transmission of both human and simian malarias in people with evidence for increased exposure to the bites of the vectors of simian malarias in areas with fragmented landscapes.

Conclusions: Human activities including urbanisation, vector control and deforestation are affecting the behaviours and distributions of malaria vectors.