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AMEBIASIS AND TUMOR PROCESSES

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Introduction: The role of Amebiasis in the etiology of tumors, and the long term effects of the presence of cysts and mobile trophozoites-erythrophage have not been studied extensively since it is still believed that there are asymptomatic forms of E. histolytica.
Aim: To examine the association between amebiasis and tumor growth, develop a simplified diagnostic method, prevention and treatment of amebiasis that leads to full recovery of a patient**.**
Method: A total of 6970 patients from the population of Cape verde, Central Africa, West Africa, Southern Africa, and Tver, Russia, aged 1-90 from the period of 2007-2018 were examined for the presence of cyst and mobile trophozoites of E.histolytica in stool, urine, sperm, vaginal and cervical walls by microscopic analysis and followed for related clinical manifestations. Damage in the organism was estimated by the number of cysts and mobile trophozoites in 10 fields of views, denoted in pluses; 1-10 = +. 10-20 =++, 30 > = +++. Other methods: Blood analysis, Endoscopy, pathological-anatomical examination of ameboma of organs.
Results: In 77.7% of 5374 patients in Africa and 26.6% of 450 in Tver, cysts and mobile trophozoites were observed. Presence of chronic Amebiasis in 98 patients of Tver; + in 71.5%, ++ in 20.4%, +++ in 8.2%, whereas in Africa, of 3924, + in 34.4%, ++ in 38.9%, +++ in 26.8%. Of 22 in Tver, 36.4% had GIT complaints, others had unspecific. Of 1139 in Africa, 39.5% had no complaints, 33.9% had unspecific complaints, 26.6 % (303) had fairly clear picture of chronic amebiasis. Of this 303, 68.0% had amoebic colitis, 8.6%-liver abscess, 5.0%-skin lesions with erythema and itching to furuncle, 2.0%-ameboma of uterus, 1.4%-eye lesions, 2.4%-amoebic prostatitis, and 0.4%-amoebic brain abscess. The administration of Tinidazole (2 grams per day), 5-15 days in all cases gave a positive result.
Conclusions: Tissue damage by trophozoite-erythrophage triggers abnormal division of smooth muscles, changing the trajectory of growth from longitudinal to sickle-ring, forming conglomerate-ameboma. Eventually, large thick-walled deformed vessels develop and gradually transforms benign ameboma into carcinoma. There is no asymptomatic form but rather pseudo-form. Early detection and treatment of amebiasis is recommended for all patients.

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ULTRASOUND AND INTESTINAL LESIONS IN *SCHISTOSOMA MANSONI* INFECTION: A CASE-CONTROL PILOT STUDY OUTSIDE ENDEMIC AREAS

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Introduction: Infection with *Schistosoma mansoni* is a major cause of morbidity and mortality in endemic areas and is increasingly diagnosed in migrants and travellers outside transmission areas. Markers for the assessment of morbidity and impact of control programs in endemic areas and for the management of patients in the clinical setting are scant, especially for intestinal involvement. Ultrasonography is well established to evaluate hepatosplenic pathology; on the contrary, ultrasound evaluation of intestinal schistosomiasis is virtually unexplored.
Aim: In this pilot study, we aimed to describe and evaluate the accuracy of unenhanced intestinal ultrasound for morbidity due to intestinal *S.mansoni* infection.
Methods: We performed a blind case-control study of unenhanced intestinal ultrasound on 107 adults with exposure risk for *S.mansoni* infection accessing the outpatient clinic of the Centre for Tropical Diseases between January-July 2018 as part of a screening for tropical diseases in migrants and travellers. The maximum wall thickness of sigma, proximal ascending colon, and terminal ileum were measured. Clinical and laboratory data, including anti-*Schistosoma* serology (ELISA and ICT) and urine and faecal parasitology, were obtained from clinical records. Individuals with parasitologically confirmed *S mansoni* infection were considered cases; patients with confirmed *S haematobium* infection, with just serological schistosomiasis, and individuals with no sign of schistosomiasis, were controls. Intestinal ultrasound was repeated one month after praziquantel treatment in patients with *S.mansoni* infection.
Results: We could not find pathological thickness of the gut wall of the investigated segments, in patients with *S.mansoni* infection (n=17), *S.haematobium* infection (n=7), positive anti-*Schistosoma* serology (n=31), and uninfected individuals (n=52), with no difference among groups. No polyps or other intestinal abnormalities were visualized. There was no significant change in gut wall thickness one month after treatment with praziquantel in patients with *S.mansoni* infection (n=11).
Conclusion: Our preliminary results suggest that intestinal ultrasound might not be sensitive for detecting minor intestinal morbidity due to schistosomiasis. Further studies comparing colonoscopy and

ultrasonography are warranted. In endemic areas, further studies are needed to describe and assess the usefulness of intestinal ultrasound in patients stratified by infection intensity and compared with markers such as calprotectin and fecal occult blood.

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PHASE II RCT FOR NEEM AND COCONUT OIL FOR TUNGIASIS IN KILIFI COUNTY, KENYA

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Background: Tungiasis is a neglected tropical skin disease caused by female sand fleas (*Tunga penetrans*) which burrow into the skin causing immense pain, itching and debilitation as they grow. There is currently no simple, effective, safe and affordable method of treatment available in Kenya.
Aim: To determine the efficacy of a mixture of neem and coconut oil for treatment of tungiasis.
Methods: Ninety-six school children aged 6-14 years with at least one viable, embedded flea at Fortaleza stage 3 were enrolled. They were randomized to be treated with either the study product, a blend of 20% virgin neem (*Azadirachta indica*) seed oil in virgin coconut (*Cocos nucifera*) oil or with the current standard of potassium permanganate ($KMnO_4$) followed by vaseline. All embedded fleas were treated. Up to two viable fleas were selected for each participant and monitored every other day for 7 days after treatment using a digital handheld microscope for signs of viability and abnormal development. Acute pathology was assessed on all areas of the feet. The children were asked to assess their level of pain and itching using visual analogue scales. The trial was approved by KEMRI-SERU, PPB-ECCT.
Results: The study product only left 22% of the fleas fully viable by Day 7, compared to 48% of the fleas treated with $KMnO_4$ (OR 0.29, 95% CI=0.10-0.88, p=0.029) and a significantly higher proportion of fleas (62%) were rapidly aged by day 7, than those treated with $KMnO_4$ (26%, OR 4.7, 95% CI: 1.6-13.9, p=0.005). The neem and coconut oil also significantly reduced acute pathology ($p<0.005$), and there was a higher probability of children reporting NO pain or itching (pain OR 2.2, p=0.05, itching OR2.15, p=0.007). The acute pathology of children treated with $KMnO_4$ did not decrease and there was a significantly higher probability that children reported increased pain and itching on Day 7 (OR 3.6 more pain and OR 2.6 more itching).
Conclusions: The 20% neem in coconut oil is a promising treatment for tungiasis. Further trials are needed to assess what dosage will kill all embedded fleas within 7 days.

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THE ACCEPTABILITY AND UTILITY OF DIFFERENT DIAGNOSTIC METHODS AND SAMPLE TYPES FOR THE SURVEILLANCE OF TRACHOMA IN THE BIAJGOS ISLANDS, GUINEA BISSAU

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Introduction: Trachoma is the leading infectious cause of blindness worldwide and until recently was hyperendemic in the Bijagos Islands, a remote archipelago of islands off the coast of Guinea Bissau. Once elimination of trachoma has been achieved in the Bijagos Islands it is imperative that a successful surveillance programme is in place. The aim of this study was to determine the acceptability and utility of different diagnostic tests and sample types that could be used for trachoma surveillance.
Aim: The aim of this study is to determine the acceptability and utility of different diagnostic tests and sample types that could be used for trachoma surveillance in the Bijagos Islands of Guinea Bissau.
Methods: Semi-structured interviews of community members and key stakeholders, followed by focus group discussions, explored views on: experiences with trachoma, examining the eye for clinical signs, taking a conjunctival sample with a cotton bud, taking a blood sample, laboratory testing, health preferences within the community, and the challenges that may be faced by surveillance programmes.
Results: Community members expressed dissatisfaction with their health care experiences in relation to trachoma and in some cases were keen for different procedures that would be more acceptable and useful. In general, community members and stakeholders indicated a preference for the collection of samples which can be tested in the laboratory to detect trachoma infection. Despite this, stakeholders articulated their contentment with best current practice with a trend amongst community members to ultimately be happy with whichever intervention would give them good health.
Conclusions: In this setting, diagnostic tests and sample types used for trachoma surveillance are accepted by communities to a degree. Appropriate sensitisation of communities prior to the implementation of a trachoma programme is crucial.

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EFFECT OF WATER, SANITATION AND HYGIENE INTERVENTIONS ALONE AND COMBINED WITH NUTRITION INTERVENTIONS ON CHILD GROWTH: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Growing evidences suggest that there may be effect of water, sanitation and hygiene (WASH) interventions alone and combined with nutrition on child growth. However, there has been little evidence.
Aim: To evaluate the effect of WASH interventions alone and combined with nutrition on child growth among children $<$ 5 years of age.
Methods: PubMed, MEDLINE, EMBASE, Scopus, Cochrane Library, Web of Science, and Science Direct were searched from May 08 to 30, 2018. We conducted study-level meta-analysis and used both fixed and random effect models to estimate pooled effect and calculated mean difference (MD) with 95% CI. Heterogeneity was assessed using Cochrane Q-test and quantified by I^2 statistics. A total of 17 studies from low and middle-income countries were included in this review; 12 were cluster-randomized (RCTs) and 5 were none randomized (non-RCTs).
Results: Interventions duration ranged from 6 to 60 months. Due to nature of study, masking of interventions from participants was impossible. There was an effect of WASH interventions alone on height growth from non-RCTs (MD = 0.14; 95% CI: 0.08 to 0.21), however, RCTs showed no effect (MD = 0.01; 95% CI: -0.03 to 0.05). WASH interventions alone implemented for 18 to 60 months (MD = 0.05; 95% CI: 0.02 to 0.09) improved height growth and for subgroup analysis by age group $\leq$ 2 years (MD = 0.07; 95% CI: 0.01 to 0.13). Combined WASH components improved height growth (MD= 0.07; 95% CI: 0.01 to 0.13) and more

benefit has been indicated by combined WASH with nutrition interventions (MD = 0.12; 95% CI: 0.07 to 0.17). WASH interventions alone did not improve weight growth, however, combined WASH with nutrition showed effect (MD= 0.08; 95% CI: 0.03 to 0.13). WASH interventions alone and combined with nutrition did not improve weight-for-height.
Conclusion: WASH interventions alone showed an effect on height growth for intervention duration ranged 18 to 60 months and children $\leq$ 2 years of age. Combined WASH with nutrition interventions indicated strong effect on height growth. Integrated WASH with nutrition interventions would be considered to tackle child growth failure in the first 1000 days of child's life.

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SERUM IL-10 LEVELS AND ITS RELATIONSHIP WITH THE PARASITAEMIA IN CHRONIC CHAGAS DISEASE PATIENTS

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Introduction: It is known that the immunoregulatory networks in human Chagas disease play a key role in the parasitaemia control during the acute phase. However, little is known regarding the control of the parasitaemia during the chronic phase.
Aim: The aim of the study was to describe the serum cytokine profile of *T. cruzi* chronically infected patients, and to evaluate its relationship with the presence or absence of parasitaemia through detection of *T. cruzi* DNA by PCR in peripheral blood.
Methods: Prospective observational study where adult Chagas disease patients were included. Patients previously treated for Chagas disease, pregnant women and immunosuppressed patients were excluded. Demographic and clinical information was collected and *T. cruzi* RT-PCR and serum cytokine profile were determined in peripheral blood.
Results: Forty-five patients were included, 34 (75.6%) were female with a median age was 36 (22-55) years. Most of them were born in Bolivia (43 patients, 95.6%), 11 (24.4%) patients had cardiac involvement, and 9 (20%) had digestive involvement. *T. cruzi* RT-PCR in peripheral blood resulted positive in 19 (42.2%) patients. No differences in the serum cytokine profile were found depending on cardiac or digestive involvement. However, patients with positive *T. cruzi* RT-PCR had higher median concentration of IL-10 and IL-1beta, and lower median concentration of IL-8 than those with negative *T. cruzi* PCR (see Table).
Conclusions: These results support the idea of the key role that plays the IL-10 anti-inflammatory cytokine in the parasitaemia control. Further studies are needed to confirm and deepen in this immunoregulatory control.

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FEVER CLEARANCE IN THE EFFICACY AND SAFETY STUDY OF ARTESUNATE + AMODIAQUINE, ARTEMETHER + LUMEFANTRINE, DIHYDROARTEMISININE+ PIPERAQUINE-PHOSPHATE ON THE DAY 1 OF ENROLEMENT IN THE TREATMENT OF UNCOMPLICATED PLASMODIUM FALCIPARUM MALARIA IN UNDER FIVE CHILDREN IN DR CONGO

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Introduction: A randomized clinical trial assessing the efficacy and safety of artemisinin-based therapeutic combinations (ACT) "Artesunate-amodiaquine (AS-AQ), Artemether-Lumefantrine (AL), Dihydroartemisinin-Piperaquine phosphate (DHAPQP)," was conducted

Table P147

Cytokines (fg/mL)	Positive *T. cruzi* PCR (n=19)	Negative *T. cruzi* PCR (n=26)	*P* value
IL-17A	1225.50 (892.13 – 1914.10)	11185.58 (890.79 - 2020.61)	0.783
IL-2	0 (0 – 0)	0 (0 - 6807.51)	0.221
IL-5	391.02 (0 – 5736.50)	0 (0 – 2119.64)	0.206
IL-12p70	1767.59 (0 – 3709.10)	1237.91 (0 – 5966.8)	0.059
IFN-gamma	514.68 (0 – 1532.52)	242.40 (0 – 2789.69)	0.070
IL-10	**1622.06 (197.16 – 4961.17)**	**515.05 (0 – 3096.84)**	**0.010**
IL-1beta	**1195.22 (0 – 2230.71)**	**682.21 (0 – 7275.95)**	**0.022**
IL-4	0 (0 – 1277.84)	0 (0 – 1372.68)	0.412
IL-8	**622.70 (126.50 – 6647.20)**	**1960.96 (193.60 – 35384.60)**	**<0.001**

Data are reported as median value and range.

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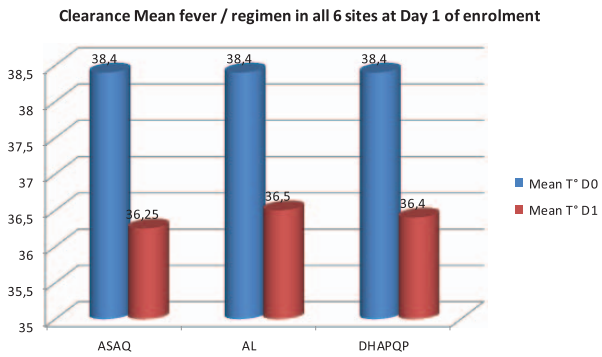

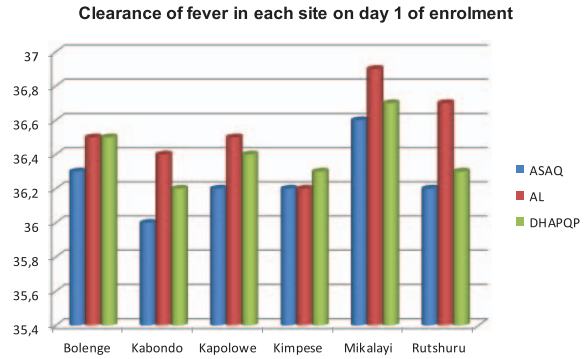

in children aged from 6 to 59 months with uncomplicated Plasmodium falciparum malaria (Pf) between March 2017 to January 2018 in the Democratic Republic of Congo (DRC).
Purpose: This study aims to determine the regimen with the best fever clearance on day 1 (D1) of enrolment.
Methods: In an open-label randomized trial to 3 regimens including AS-AQ, AL and DHAPQP, 1,622 children aged 6 to 59 months with uncomplicated Falciparum malaria were enrolled for 42 days of monitoring at 6 malaria monitoring sites in DRC.ASAQ regimen had 540 children, AL regimen had 535 children and finally DHPQP had 547 children. Fever with a T° $\geq$ 37.5° C was the main entrance door. Paracetamol was routinely administered on day zero (D0) to all children enrolled in addition to an oral regimen of 3 days of the ACT. T° was measured at each appointment (D0, D1, D2, D3, D7, D14, D21, D28, D35, D42) using a calibrated electronic thermometer "Thermoval Basic".
Results: The mean T° at D0 of enrolment was of 38.4°C for all 3 regimens. At D1, the mean T° was of 36.25°C for ASAQ, 36.4°C for DHA PQP and 36.45°C for AL.
Conclusion: This study has shown a substantial, decrease of temperature in children aged from 6 to 59 months regardless of type of the regimen at D1. Children under ASAQ had a better clearance of fever at D1 of enrolment followed by those under DHAPQP.

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AN ANTIGEN DETECTION RAPID DIAGNOSTIC TEST (RDT) TO ACCELERATE CONTROL AND ELIMINATION OF VISCERAL LEISHMANIASIS

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Introduction: Visceral leishmaniasis (VL) is a major neglected tropical disease (NTD) and one of the main parasitic killers in the world. The control of VL requires prompt diagnosis and treatment of cases. Early diagnosis and treatment of VL patients improves prognosis and reduces the risk of transmission to other people. WHO aims at eliminating VL in the Indian subcontinent and controlling it in other endemic regions such as eastern Africa by 2020. While current antibody detection rapid diagnostic tests (RDT) have significantly improved the management of VL patients in endemic regions, more sensitive and specific RDTs are required to accelerate and sustain VL elimination and control in endemic regions.
Aim: Demonstrate that a *Leishmania* antigen detection RDT will overcome the limitations of current antibody detection RDT and it will be key to reach the goals set by WHO.
Methods: We have reviewed the limitations of the current diagnostic methods for VL, the results of existing antigen detection tests for VL and the use cases for an antigen detection RDT in different epidemiological contexts. We have analysed the impact of this new test in patient management and disease control in the near- and post-VL-elimination era in India, Nepal and Bangladesh.
Results: Antibody detection tests performance is suboptimal in eastern Africa, do not work well for VL diagnosis in critical groups such as HIV co-infected patients and will have a limited use in the context of near and post-elimination in the Indian subcontinent. Detection of *Leishmania* antigens is more specific and can these can be detected earlier than antibodies in VL patients. Laboratory-based antigen detection tests developed for VL have shown good results. However, in their current formats and with the associated sample processing requirements, they are unsuitable for use in routine diagnosis of VL. An RDT to detect *Leishmania* antigens would allow implementing test-and-treat strategies in different epidemiologic contexts and in the Indian subcontinent in particular.
Conclusion: An antigen detection RDT for diagnosis VL should be developed and evaluated urgently as, coupled to new drugs and vector control tools, it will be key in the VL elimination and control efforts worldwide.

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IMPORTED LEPROSY IN A PROVINCE OF SPAIN

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Introduction: Although incidence of leprosy in Spain has steadily declined over the years, the increased immigration during last years has been linked to an increment in the number of registered cases. More of them are patients coming to Spain from countries where leprosy is endemic.
Aim: The aim of this study is to describe the clinical, epidemiologic, dermatologic, microbiologic, and therapeutic characteristics of imported cases of leprosy in our department during the last 10 years.

Material and methods: During a period of 10 years (2007-2017) 3 patients were diagnosed. Clinical, bacteriological and therapeutical results were collected and analyzed.
Results: 3 patients with leprosy (2 men and 1 woman; age range, 16-43 years) were diagnosed; 1 pure neural leprosy with type II reaction (recurrence),1 borderline tuberculoid leprosy with type I reaction, and 1 indeterminate leprosy. All patients acquired the disease in South American but were residing in Spain at the time of diagnosis. Only one case of borderline tuberculoid leprosy has demonstrated the presence of bacterium by Ziehl-Neelsen stain. All patients began the therapy according to the OMS recommendations.1 finished healing;1 is finishing asymptomatic and 1 patient left the follow up at 3 months.
Conclusion: The influence zone of our department (Albacete, Castilla-La Mancha, Spain) is characterized for a very low presence of inmigration. Despite this, 3 patients were diagnosed. Nevertheless, leprosy should be considered among the differential diagnosis in patients presenting at the Spanish Health System centres with suspected cutaneous and neurological signs and symptoms, especially if they are from Brazil, Paraguay, Bolivia or other areas where leprosy is prevalent.

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DENGUE AND CHIKUNGUNYA AMONG FEBRILE OUTPATIENTS IN KINSHASA, DEMOCRATIC REPUBLIC OF CONGO: A CROSS-SECTIONAL STUDY

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Background: Pathogens causing acute fever, with the exception of malaria, remain largely unidentified in sub-Saharan Africa, given the local unavailability of diagnostic tests and the broad differential diagnosis.
Aim: To describe the importance of viral diseases, with focus on the arboviruses, among patients consulting with an acute febrile illness.
Methods: We conducted a cross-sectional study including outpatient acute febrile syndromes in both children and adults, between November 2015 and June 2016 in Kinshasa, Democratic Republic of Congo. Serological and molecular diagnostic tests for arboviral infections were performed on blood, including PCR, NS1-RDT and IgM ELISA and indirect immunofluorescent test (IIFT) for acute, and IgG ELISA and IIFT for past infections.
Results: Among 342 patients, aged 2 to 68 years (mean age of 21 years), 45.3% tested positive on malaria Rapid Diagnostic Test. However, 87.7% received antimalarial and 64.3% antibacterial treatment. Further investigation on the undifferentiated fever cases (without a clear source of infection) revealed 19 (8.1%) acute dengue – caused by DENV-1 and/or DENV-2 - and 1 (0.4%) acute chikungunya infection among 235 cases. Besides these acute cases, we evidenced an important proportion of participants having been exposed to flaviviridae (possibly dengue) and alphaviridae (possibly chikungunya) in the past, namely 30.2 % and 26.4% respectively. We found no evidence of exposure to Zika nor yellow fever virus.
Conclusions: Chikungunya outbreaks have been reported in the study area in the past, so the high seroprevalence is not surprising. However, scarce evidence exists on dengue transmission in Kinshasa and based on our data, circulation is more important than previously reported. Furthermore, our study shows that the prescription of antibiotics, both antibacterial and antimalarial drugs, is rampant. Studies like this one, illuminating the causes of acute fever, may lead to a more considerate and rigorous use of antibiotics. This will not only stem the ever-increasing problem of antimicrobial resistance but will – ultimately and hopefully – improve the clinical care of outpatients in low-resource settings.

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ADDRESSING THE ORIGINAL 'SEVEN YEAR ITCH' - IMPROVING RECOGNITION OF SCABIES, A NEW WHO NEGLECTED TROPICAL DISEASE

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Scabies is an intensely itchy skin condition, transmitted by mites. It can lead to significant secondary complications including bacterial infections and renal complications. A disease of poverty, it is highly stigmatised as being "dirty". WHO estimates that 130 million people are infected globally at any point in time, with up to 71% prevalence in crowded or institutional settings. Annually 0.2% of global disability-adjusted life years (DALYs) are attributed to scabies, a greater burden than leprosy, schistosomiasis, or dengue.
However, there is a global lack of high-quality prevalence data, significant misdiagnosis, under-reporting and inappropriate prescribing. In 2017, the WHO deplored the global paucity of evidence, designated scabies as a category-A NTD, and recommended prevalence studies to gain insight into actual burden of disease.
In Ghana, scabies is classified in reporting systems as 'skin infection' (along with many other conditions such as impetigo or mycology infections), and the evidence base is thin, neglected and out of date. The Ghana Health Service has noted the lack of dermatological expertise across the country.
We are now piloting a study to address recognition and accurate clinical diagnosis via training mechanisms such as the 2018 Delphi Consensus criteria. This project will run across spring and summer 2019. Ghanaian dermatologists will train nurses or physician assistants from clinics in Greater Accra, and also the Volta Region (in eastern Ghana, near the Togo border) to recognise scabies presentation in their local context and be able to distinguish the presentation from other similar skin conditions. Where they are confident of a scabies diagnosis, this will be included in the consulting room register monthly reports. There will be epidemiological analysis of the submitted data in order to gain insight into local burden and patient experience. We will present our provisional results at ECTMIH 2019.
Funding for the study is from the University of Southampton.

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IVERMECTIN TREATMENT RESPONSE IN ONCHOCERCIASIS-INFECTED PERSONS WITH EPILEPSY AND CHILDREN IN THE DEMOCRATIC REPUBLIC OF CONGO

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Introduction: Despite community directed distribution of ivermectin (CDTI), onchocerciasis transmission remains high in the Democratic Republic of Congo (DRC), leading to a high prevalence of onchocerciasis-associated epilepsy (OAE)[1].
Aim: To investigate the effect of ivermectin on *Onchocerca volvulus* microfilariae (mf) density and risk factors for positive follow-up samples in *O. volvulus* infected persons with epilepsy (PWE) and children without epilepsy in the DRC.
Methods: 87 *O. volvulus* infected PWE and 141 children 7-10 years old from the Aketi health zone, Bas-Uélé province (annual CDTI since 14 years) and 102 *O. volvulus* infected PWE from the Logo health zone, Ituri province (no CDTI) were enrolled. Skin snips were obtained at baseline and 3 (Aketi) or 4 months (Logo) after ivermectin intake (150µg/kg, directly observed). A modified poison regression was used to estimate the relative risk (RR) for detectable mf after treatment.
Results: In Aketi, mf load on average decreased by 74.5% in PWE and by 76% in the children after ivermectin, but in respectively 22.2% and 27% of skin snips mf remained detectable. Of those, 38.9% PWE and 46.2% children had an mf load > 20% of the baseline load. In PWE, the risk of a positive skin snip increased with a higher baseline mf load (RR=1.03; p=0.003), a higher baseline seizure frequency (RR=1.13; p=0.001) and having received >1 previous ivermectin dose (RR=1.40; p=0.036). In Logo, mf load on average decreased by 66% after ivermectin and 43.1% of skin snips remained positive. Of those, 47.7% had an mf load >20% of the baseline load. A higher baseline mf load (RR=1.03; p=0.001) and increased baseline seizure frequency (RR=1.02; p=0.017) increased the risk for a positive skin snip.
Conclusion: Ivermectin response in this study was similar to other onchocerciasis endemic regions. A high mf load at baseline was a risk factor for remaining skin snip positive. Given that 27% of children were skin snip positive 3 months after ivermectin intake, it is possible that children who receive only one dose of ivermectin per year, remain at risk for developing OAE.

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OPISTHORCHIS VIVERRINI IN CENTRAL VIETNAM: PREVALENCE IN HUMAN HOSTS AND CORRELATION BETWEEN EPG AND NUMBER OF *O. VIVERRINI* WORMS RECOVERED AFTER PRAZIQUANTEL TREATMENT

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Introduction: Opisthorchiasis caused by *Opisthorchis viverrini*, a carcinogenic fishborne fluke, is endemic in parts of Southeast Asia, including Central Vietnam. Praziquantel is the drug of choice for treating opisthorchiasis patients.
Aim: To investigate the prevalence and intensity of *O. viverrini infection* in human hosts in an opisthorchiasis endemic area in Central Vietnam and to identify the correlation between faecal egg counts and the number of *O. viverrini* worms recovered from stools following praziquantel treatment.
Methods: A cross sectional survey in humans was conducted in 2016 in My Tho Commune, Phu My District, Binh Dinh Province, Central Vietnam. Individuals found with *O. viverrini*-like eggs by the Kato-Katz thick smear method were treated with praziquantel 400 mg (Distocide®, Seoul, Korea) and adult worms were expelled with Mg_2SO_4 (Ethical clearance of the study No 441/IMPE-IRB).
Results: A total of 11.4 % (29/254) of the examined population was found shedding *O. viverrini*-like eggs; the egg counts ranged from 96 to 720 EPG (Average of 30.5 for the entire population). From the 29 individuals shedding *O. viverrini*-like eggs, 11 consented to enroll in the treatment and expulsion group. Adult *O. viverrini* were recovered from the stools of all 11 treated individuals. The number of recovered worms by expulsion ranged from 2 – 44, averaging 14.5 worms per expulsion case. The number of recovered worms was positively correlated with the EPG (R_2=0.806).
Conclusion: This study demonstrated the possibility to collect adult *O. viverrini* from patients by expulsion. The number of adult *O. viverrini* recovered was positively correlated to EPG. This is an important finding because it suggests that EPG is a good proxy for intensity of infection. Also, the praziquantel treatment and purgation is an interesting approach for differentiating *O. viverrini* infection from infections caused by other small liver and intestinal flukes, given the fact that eggs are not easy to differentiate.

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DETECTION AND QUANTIFICATION OF *SCHISTOSOMA MANSONI* DNA USING REAL-TIME PCR IN HUMAN BLOOD SAMPLES PRE AND POST TREATMENT

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Introduction: Assessing the true effectiveness of schistosomiasis treatment regimens requires an accurate and precise diagnosis of infection. A limited number of surviving parasites can continue the life cycle, spread rapidly and may negate the success of control programs. Therefore, more sensitive detection methods are needed in clinical settings and for epidemiological studies, especially in the phase of disease eradication.
Aim: The main objective of the study was to observe the amount of *S. mansoni* specific DNA in human blood samples before and after treatment and to compare the performance of this molecular detection method with classical methods.
Methods: Blood, urine and stool samples were collected from adults before treatment, 5-7 days after treatment and 3 months after treatment in a fishing community near the southern shore of Lake Victoria in north-western Tanzania. Urine, stool and blood samples were analysed by POC-CCA test, Kato-Katz or real-time PCR, respectively. All three sample types from all examinations were available from 36 patients.
Results: Before treatment with praziquantel, 27/36 (75%) *S. mansoni* positive samples could be detected by real-time PCR, 23/36 (64%) pos-

itive samples by POC-CCA and 12/36 (33%) by KK method. 5-7 days after treatment, an increase in the amount of DNA could be measured. Three months after treatment, 58% *S. mansoni* positive samples could be detected by serum real-time PCR, 33% using POC-CCA test and 0% using KK. The amount of DNA decreased compared to the first round of examination.

Conclusion: Detection of schistosome specific DNA using PCR seems to be more sensitive than the two classical methods used. The real-time PCR method also allows a quantitative determination of the amount of DNA in the starting material. We assume that as a consequence of treatment schistosomes are killed and the level of circulating schistosome specific DNA increases temporarily, peaking a few days after treatment. It cannot be clarified by the PCR method used whether the PCR-positive samples, 3 months after treatment, are caused by infections that persist despite a single dose of praziquantel treatment, re-infections or circulating DNA of killed worms.

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PROPOSED IMPROVEMENTS OF THE WHO ULTRASOUND PROTOCOL TO ASSESS SCHISTOSOMIASIS ASSOCIATED MORBIDITY

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The WHO has published standardized ultrasound protocols for the assessment of schistosomaisis in 1993, and 2000 (1,2). To improve the WHO ultrasound protocols for schistosomiasis all relevant publications had been reviewed (3,4) and analyzed for their practicabilty and reliability. The following improvements are proposed:

Schistosoma (S.) haematobium:

1. to provide height adjusted minimal urinary bladder fillings. 2. to state whether or not the bladder contains blood clots, sediment, sludge or calculi. 3. to simplify and improve the urinary bladder findings scoring. 4. to provide a more fine-grained urinary tract obstruction (UTO) scoring. Optional investigations: "fibrosis of the renal pelvis" should be omitted. Presence of ureteric lesions, of calcifications, of prostatic echogenic lesions, of hydrocele or any other possible sign of genital involvement should be added. In pregnant women fetal growth parameters should be specifically compared with gestation time and placenta should be scanned.

Portal hepatic and gallbladder fibrosis due to *S. mansoni:*

1. to omit all measurements except for the portal stem.
2. to obtain a more fine-grained grading also covering "in-between"-findings and to reduce intra- and inter-observer variance the ultrasonographist should have a second image pattern (IP) choice and a gradual grading scale. 3. risk scoring for gastrointestinal bleeding should be simplified. 4. gallbladder changes including external echogenic wall protuberances, sludge, calculi as well as the result of a ultrasonographic Murphy manoevre should be part of the standard protocol.

Interseptal and portal fibrosis due to *S. japonicum* or *S. mekongi*:

1. ultrasound pictures should be compared to standard image patterns (IP) covering both, interseptal fibrosis ("network patterns") and portal fibrosis. 2. combined network- and portal fibrosis patterns are proposed. 3. network patterns should be sub-devided into two classes with predominant mesh size <2.5 and $>2,5$ cm.

All reports on hepatic abnormalities must state how many patients have been screened for HBV, HCV, HDV and in Asia for concomitant liver fluke co-infections. If available, platelet count should also be taken into account in the assessment of gastrointestinal bleeding risk.

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LEISHMANIASIS AND TUMOR NECROSIS FACTOR ALPHA ANTAGONISTS IN SPAIN. A SWITCH IN CLINICAL EXPRESSION

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Introduction: Tumor necrosis factor alpha (TNF-α) antagonists which are widely used in numerous autoimmune conditions are recognized as a risk factor for reactivation of granulomatous infections. Leishmaniasis, which is endemic in the Mediterranean basin, has been associated with the use of these drugs, although few cases have been reported.

Aim: To analyze the clinical presentation, therapeutic approach and outcomes of patients with leishmaniasis acquired in Spain using TNF-α antagonists.

Methods: We performed a retrospective observational study including patients with parasitologically proven leishmaniasis acquired in Spain using TNF-α antagonists. Patients diagnosed in our hospital from 2008 to 2018 were added to published cases in the literature.

Results: Thirty-one patients were analyzed including our nine cases. Twenty cases were male (64,5%) and median age was 55 years. Fifteen patients (48,4%) were under infliximab treatment, 13 (41,9%) were receiving adalimumab, 1 etanercept, 1 golimumab and 1 a non-specified TNF-α antagonist. Regarding clinical presentation, 23 (74,2%) presented as cutaneous leishmaniasis (CL), including 3 with multifocal lesions, 5 (16,1%) as visceral leishmaniasis (VL) and 3 (9,7%) as mucocutaneous leishmaniasis (MCL). All VL and MCL patients were treated with systemic treatments including 5 patients treated with liposomal amphotericine B, 2 with parenteral antimonials and 1 with miltefosine. Among CL patients, 9 (39,1%) were treated with a systemic drug (8 received liposomal amphotericine B, and 1 miltefosine) while 13 patients (56,4%) were given local treatment (12 treated with pentavalent antimonials, 1 with excisional surgery). Only one patient did not receive any treatment. TNF-α antagonists were interrupted in 18 patients (58,1%). After treatment 4 patients (12,9%) diagnosed as CL relapsed, 3 initially treated with local medication maintaining TNF-α antagonist and 1 treated with miltefosine.

Conclusion: Our data supports the assumption that the blockage of TNF-α increases the risk of clinically relevant leishmaniasis in endemic population. Moreover, anti-TNF could be at fault of modulating the expression of the disease and worsening the clinical outcome. According to the cases reported, the best treatment strategy would be a systemic drug and the discontinuation of the anti TNF-α therapy until clinical resolution.

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DEVELOPMENT OF CONVENTIONAL MULTIPLEX PCR FOR SIMULTANEOUS DETECTION OF SOIL-TRANSMITTED HELMINTHS (STHS)

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Introduction: Nowadays, molecular-based techniques such as real-time PCR and multiplex real-time PCR were developed to diagnose STHs with high sensitivity and specificity. However, it is not suitable for developing countries due to a requirement of expensive reagents and instruments.
Aim: The aim of this study is to develop a conventional multiplex PCR for simultaneous rapid detection of *Ascaris lumbricoides*, *Necator americanus*, and *Strongyloides stercoralis*.
Methods: Ninety-four fecal samples were collected from patients presenting with gastrointestinal symptoms in King Chulalongkorn Memorial Hospital, Thailand. Direct wet smear of simple and concentration techniques were performed within 2 hours after the sample collection. Each fecal sample was examined by a trained microscopist and then was frozen in -20 °C. The frozen samples were processed for DNA isolation and multiplex-PCR.
Results: Multiplex PCR reaction was able to detect all STHs species at a low concentration of control DNA (0.75 ng) and no cross-amplification. Among 94 fecal samples examined by concentration technique and multiplex PCR, concentration technique detected single infection 47 (50%), double infection 3 (3.2%) and negative 44 (46.8%) while multiplex PCR detected single infection 55 (58.5%), double infections 9 (9.6%), triple infections 2 (2.1%) and negative 28 (29.8%). Detection rate between multiplex PCR and concentration technique were statistically significantly different ($P \leq 0.05$; χ^2 test) with three times greater detection by multiplex PCR than concentration technique. One-third of microscopic negative samples were positive in multiplex PCR. Furthermore, multiplex PCR was almost four times greater than concentration technique in the detection of multiple infections.
Conclusion: This multiplex PCR had a potential alternative method with a rapid, reliable, cost-effective technique for simultaneous detection of STHs infections.

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ANALYSIS OF LYMPHATIC FILARIOSIS MORBIDITY IN DISTRICTS THAT ARE STILL ENDEMIC IN BURKINA FASO

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Introduction: One of the major strategies advocated by the Global Program to Eliminate Lymphatic Filariasis (GPELF) launched in 2000, is the intensification of managing cases suffering from complications of the disease. However, after 17 years of implementation in Burkina Faso, the situation of the people concerned remains worrying, especially in the health districts of regions, still endemic. The physical, psychological and social sufferings experienced by patients are likely to aggravate their already precarious living conditions. Social exclusion is sometime noticeable.
Aim: To analyze the situation of people suffering from chronic complications of LF in areas still endemic in 2018.
Methods: Cross-sectional study of 33 people with chronic LF complications, from 7 subgroups of villages in the health region of South-West Burkina Faso. The direct interview was done using a semi-structured questionnaire.
Results: The average age was 57 years and divorced or widowed women were the most numerous (84.62%). The average duration of the chronic phase of the disease was estimated at 14 years and the use of traditional care practices was common (2/3 of the cases). A statistically significant relationship was found between the sex of the respondents, their marital status and the feeling of being stigmatized in the community. Those with a good knowledge of the origin of the disease, showed 3.45 times more interest in medical care compared to others. Because of the disease, women with elephantiasis in 65% of cases were likely to live out of wedlock (divorced or widowed).
Conclusion: LF is the preserve of particularly poor social strata in hostile environments. In order to hope for a totally liberated world of LF and its burden, it is imperative now that the national health authorities add to the existing public health policies, special programs aimed at supporting those affected by this disease.

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SCHISTOSOMIASIS MANSONI IN LA HISPANIOLA: REVISITING A NEGLECTED TROPICAL DISEASE IN THE CARIBBEAN

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Introduction: Schistosoma species are well established as parasite in many tropical countries. Schistosoma mansoni seems to be introduced to Las Americas during the slavery trade from Africa. Identification of schistosomiasis has evolved over time due to the expansion of the Biomphalaria species, the intermediate host of the parasite in the Caribbean. The migration of the parasite and its intermediate host affects the incidence of schistosomiasis, which should be evident in recent literature.
Aim: The aim of this study is to review the distribution of reported cases of schistosomiasis in the island of The Hispaniola in current literature.
Methods: Following the Cochrane review methodology we use searches in PubMed, Google Scholar, and MedicLatina using the keywords: "Schistosoma mansoni" AND "Schistosomiasis" AND "Bilharziasis" each linked with "Dominican Republic" AND "Haiti" AND "Hispaniola Island" in the English and Spanish languages. Those describing these words were included in the analysis.
Results: A total of 65 articles were identified, among them 10 met the inclusion criteria. After eliminating duplicates only 4 articles which described the report of new cases of Schistosomiasis in the Hispaniola Island were included in the study. Articles published between 1952 and

1990 where reported cases of Schistosomiasis occurred in 7 provinces of the Dominican Republic.
Conclusion: The potential for B. glabrata distribution in the Dominican Republic has been described in the entire country while the physical presence has only been reported in 1/6 of the nation and in the northern province of Haiti. Distribution of cases of Schistosomiasis in the island of the Hispaniola have changed over time with the first cases occurring in the rural, easternmost regions of the island, and the most recent cases occurring in eastern and northern regions, and in addition to those rural areas, in more urban regions as well, with the last conducted study published in 1990. More recent studies need to be performed and published in order to validate to the WHO the status of "low-transmission of infection" that was declared in 2013 but has yet to be confirmed.

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SEROPREVALENCE OF STRONGYLOIDIASIS IN MIGRANTS: A MULTICENTER HOSPITAL-BASED STUDY

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Background: Screening and treatment for strongyloidiasis in migrants from endemic countries is supported by indirect evidence but few studies have evaluated its prevalence in migrants and most of them were based on stool tests.
Aim: This study aimed to evaluate the seroprevalence of strongyloidiasis at hospital level in asymptomatic migrants or long-travelers (backpacker or residents for more than one year) from any endemic country, being attended at the outpatient or inpatient units of six Spanish hospitals.
Methods: Cross-sectional study conducted in 6 referent Spanish hospitals (Hospital Clinic, Hospital del Mar, Hospital-Universitari Bellvitge, Hospital Sant Pau and Hospital Vall d'Hebron located in Barcelona and Hospital de Poniente in Almeria). Eligible individuals were systematically offered being screened for *Strongyloides stercoralis* based on a serological test (Strongyloidiasis ELISA Kit based on IVD *Strongyloides* antigen) as part of a broader screening program. All positive patients were treated with ivermectin and followed-up appropriately.
Results: 1948 attended were screened for strongyloidiasis with a serological test, of which 176 tested positive, representing an overall seroprevalence of 9.04 (CI95% 7.76-10.31). The prevalence varied significantly among the centers from 6.57% (13/198) to 29.69% (19/64), ($p<0.001$). Women had a higher seropositive rate (10.77%) compared with men (6.96%). ($p=0.005$) The seroprevalence in individuals originating from African countries was 9.35(CI95% 7.01-11.69), being in Sub Saharan Africa countries higher 10.89 (8.03-12.75) compared with North Africa countries (4.29, 0.8-7.69), ($p= 0.019$). The Latin America prevalence was 9.22% (7.5-10.93), whereas in Asia the prevalence was only 2.9% (CI95%:0.3-6.2), being the number of screened people much lower and all positive cases (3) were coming from Philippines. The seropositive rate in potentially immunosuppressed units (HIV, Autoimmune diseases, Rheumatology, transplant, Hematology or Oncology units) was significantly lower (5.64%) compared with the positive rate in other units of the hospitals (10.2%) or Tropical Diseases Units (13.33%) ($p<0.001$). HIV and transplants units showed the lowest prevalence rates (4.51% and 2% respectively).
Conclusion: We report a hospital-based systematic screening of *Strongyloides* with a seroprevalence of almost 10% in migrant population from endemic areas which evidences the need of implementing strongyloidiasis screening strategies in migrants, particularly if they are immunosuppressed or at risk of immunosuppression.

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CHAGAS DISEASE HOSPITALIZATION IN SPAIN: ANALYSIS OF THE SPANISH NATIONAL HOSPITAL DISCHARGE DATABASE FROM 1997 TO 2015

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Introduction: Chagas disease (CD) is a systemic chronic parasitic infection that affects 6–7 million humans worldwide and it's considered a neglected tropical disease. In Spain there are around 65.000 estimated affected individuals.
Aim: Describe the incidence of CD diagnosis among hospitalized patients in Spain (1997–2015) and reasons for admission.
Methods: Retrospective study using the Spanish national hospital discharge database from year 1997 to 2015. We selected all hospital admissions that had the ICD-9-CM code: 086 for CD in any diagnosis position. We analyzed incidence, socio-demographic and clinical characteristics.
Results: 3524 admissions have been registered with the diagnosis of CD. This represents a rate of 1.5 cases of CD per 100,000 hospital admissions. Of all the cases admitted with CD: 2949 (83.7%) were without organ complication, 488 (13.8%) CD with heart complication, 99 (2.8%) CD with complication of another organ and 88 (2.5%) infection by *Trypanosoma*. In 9.2% of the cases, CD was the main diagnosis. The mean age of patients was 38.1 years (SD: 14.0), 77.1% (n = 2717) were women. The number of admissions increased from 8 cases in 1997 to 49 in 2005, followed by 399 in 2010 and 476 in 2015. The four Spanish Autonomous Communities with the highest number of CD admissions were Catalonia (35.6%), Madrid (16.4%), Valencian Community (15.6%) and Murcia (7.2%). The main admission services for patients with CD were: obstetrics and gynecology (43.6%), internal medicine-infectious diseases (12.3%) and cardiology (12.1%). The first Diagnosis-Related Group (DRG) code of admission was DRG-560 [Normal delivery] with 25.8%, followed by code DRG-540 [C-section] with 11.0%, DRG-724 [other parasitic infections] with 3.7%, DRG-171 [Permanent cardiac pacemaker implantation without AMI] with 3.7% and DRG-194 [heart failure] with 2.7%. Ten cases (0.3%) were admitted with DRG 002 [heart transplant]. Thirty-five patients (1.1%) died.

Conclusions The number of CD admissions has increased exponentially over the years, the main reason for admission were women who required obstetric care (delivery and cesarean section). Admission of CD with heart damage accounts for less than 15% Catalonia was the Spanish region with the highest number of admissions.

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REVIEWING THE CURRENT PRACTICE OF THE MANAGEMENT OF SUSPECTED SCHISTOSOMIASIS IN THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE AND ROYAL LIVERPOOL UNIVERSITY HOSPITAL

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Introduction: Schistosomiasis is the second most common parasitic disease worldwide occurring mainly in residents of endemic countries. However, many cases are reported in travellers. In endemic areas microscopy of urine and stool remain the 'gold-standard' diagnostic techniques, but in low endemicity areas serology is widely used. Many test combinations have been proposed for low endemicity areas, but there is no existing national guidance. We performed a review of current practice at the Liverpool School of Tropical Medicine and used this alongside current literature to inform development of a diagnostic algorithm.
Aim: To assess current management of schistosomiasis in patients whose samples are referred to the Liverpool School of Tropical Medicine.
Methods: Patients investigated for schistosomiasis from January 2017 to December 2018, as identified by record of a laboratory request of a urine filtrate microscopy and/or a schistosomal antibody assay, were retrospectively reviewed. Clinical data were collected from clinical records as per a predefined data collection tool.
Results: In total 231 patients were investigated for schistosomiasis. Of these, 206/231 (89%) had medical records available for review. UK born individuals accounted for 129/206 (63%) and 120/206 (58%) were male. Schistosomal antibody assay was performed in 182/195 (93%) of those who had not previously been tested. Of the 206 patients, 97 (47%) were asymptomatic and 109 (53%) had symptoms consistent with possible chronic schistosomiasis infection.104/206 (50%) provided stool samples for microscopy, and 119/206 (58%) provided urine collection for microscopy.
Overall 50/206 (24%) patients tested positive from one or more tests, and 46/50 (92%) were treated appropriately. No documentation about treatment was available for 2/50 (4%) and 2/50 (4%) were lost to follow up before treatment.
Conclusion: Most patients with positive schistosome tests are being treated appropriately with praziquantel. However, fewer patients are being assessed for intensity of infection and evidence of end organ damage from schistosomiasis. The study only took into account the number of samples processed, but not the number of samples requested by clinicians. The results of the study were informative in creating a new management algorithm for suspected schistosomiasis and highlighting pathways to enable ease of sampling and referral.

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SWABBING MULTIPLE LESIONS TO IMPROVE THE DIAGNOSTIC YIELD IN YAWS

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Introduction: Yaws is a neglected tropical disease caused by *Treponema pallidum* subspecies *pertenue* that is targeted for eradication by 2020. As the prevalence of the disease decreases, molecular tools are needed to accurately identify remaining cases. Polymerase chain reaction (PCR) of swabs from yaws-like lesions has been developed for this purpose, yet many individuals with clinical, epidemiological and serological evidence of yaws test negative by this method.
Aim: This study explores if taking swabs from multiple lesions on such individuals increases the diagnostic yield of PCR.
Methods: A cross-sectional study was performed in an endemic district of Ghana to identify children between the ages of 4 and 18 with yaws-like lesions and serologically confirmed yaws. Eligible participants had up to 5 lesions swabbed before treatment. PCR was performed on all swabs to identify *T.pallidum*. The primary outcomes were the diagnostic yield of one swab taken from the biggest lesion alone, and the yield of taking swabs from up to 5 lesions. Samples were also tested for *Haemophilus ducreyi*, a common cause of cutaneous ulcers in yaws-endemic areas.
Results: During the study, 112 swabs were collected from 55 participants. 7 (12.7%) individuals had evidence of yaws by PCR; 6 (10.9%) of these were diagnosed from the biggest lesion. There was a 14.3% (95% confidence interval [CI] 0.4-57.9) increase in the diagnostic yield by swabbing additional lesions. 11 (20.0%) participants tested positive for *H.ducreyi*. There was an 18.2% (95% CI 2.3-51.8) increase in the diagnostic yield by swabbing additional lesions for the diagnosis of lesions caused by *H.ducreyi*.
Conclusion: Despite the small sample size, this study suggests that taking additional swabs from individuals with multiple sores may improve the diagnostic yield for yaws. This could have implications for eradication policies as molecular tools become more important as the prevalence of yaws approaches zero. *H.ducreyi* continues to be an important cause of cutaneous ulcers in Ghana.

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TUBERCULOSIS IN PATIENTS CO-INFECTED WITH VISCERAL LEISHMANIASIS AND HIV – A NEW DIAGNOSTIC AND MANAGEMENT CHALLENGE

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Background: Between 6-10% of adults with Visceral Leishmaniasis (VL) are co-infected with HIV in Bihar, India. VL-HIV patients commonly present with advanced HIV disease, however minimal evidence exists on prevalence of tuberculosis in this group, and no evidence on how best to diagnose and manage this triad.
Methods: 150 patients with parasitologically confirmed VL and serologically confirmed HIV were enrolled in a randomized trial investigating AmBisome therapy alone and a combination of AmBisome and Miltefosine for the treatment of VL. All patients were screened for TB through a combination of CXR, Cartridge Based Nucleic Acid Amplification Testing (CBNAAT) and abdominal US. Patients were treated initially for VL, then commenced on ATT (if not already on) between day 7-14 depending on the clinical condition, followed by ART two weeks after ATT.

Results: 21% (n=31) of all patients were diagnosed with TB. All but 4 were confirmed by CBNAAT, with one identified DRTB. 5/31 patients were receiving TB treatment at enrolment; while 21/29 were diagnosed in the first 29 days, of whom 13 (32%) were identified immediately prior to initiating VL treatment. 27 cases were PTB, and 4 cases EPTB.
8/31 of cases involved immune reconstitution inflammatory syndrome (IRIS); over half (n=5) unmasking TB. Incidence of IRIS reduced with increasing the gap between ATT and ART initiation from two to three weeks for those who were ART naïve, and improved early diagnosis. CFR of TB-VL-HIV patients was 16.1%(n=5), compared to 0.8% (n=1) in VL-HIV patients (p<0.01).
Mean CD4 change (95% CI) from VL treatment initiation to day 29 was +114 (91,137) cells/µl, +101 (82,120) cells/µl and -13 (-68, 42) cells/µl in those already on ART at time of presentation (n=68), those starting on day 14 (n=71) and those starting on day 29 (n=7) post initiation of VL treatment respectively.
Conclusions: Improved tools are required to screen TB in advanced HIV; meanwhile CBNAAT should be used for VL-HIV patients. The results suggest that VL treatment results in substantial immune reconstitution that may require delayed initiation of ART, while severe IRIS associated TB remains a major risk in this cohort of patients.

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ONCHOCERCIASIS-ASSOCIATED EPILEPSY DISABILITY CORRELATES WITH ONCHOCERCA VOLVULUS MICROFILARIAL DENSITY

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Introduction: A very high prevalence of epilepsy (overall: 4.4%, range: 3.5 – 11.9%) was documented in onchocerciasis-endemic villages in the Maridi County, South Sudan. The 11.9% prevalence was observed in Kazana II, the village closest to the Maridi dam, a blackfly breeding site with high ongoing onchocerciasis transmission (1).
Aim: To investigate whether epilepsy in the Maridi area is associated with onchocerciasis and whether there is an association between skin microfilarial (mf) density, and severity of epilepsy-related symptoms and disabilities.
Methods: In 2018, a case-control study was conducted in Maridi. 319 persons with epilepsy (PWE) of which 51.1% were male, and 34 non-epileptic controls (23.5% male) living in Maridi were skin snipped for *Onchocerca volvulus* detection. Two skin snips were obtained, one from each posterior iliac crest of the participants using the Holt-type punch. Information on seizures and disabilities of PWE were obtained. Participants' characteristics were compared based on onchocerciasis status.
Results: 271 (85%) PWE and 17 (50%) controls were skin snip positive for microfilariae (mf); $p < 0.001$. The median mf density among PWE was 22.0 (IQR: 9.3 – 45.0) and among controls 3.5 (IQR: 0.0 – 19.0); Mann Whitney test p = 0.0002. Among the PWE, seizure frequency correlated with mf density (Spearman-rho = 0.16; p = 0.005). In addition, after adjusting for gender and age, increased mf density was associated with lower age of epilepsy onset (RR = 0.98, 95% CI: 0.97 – 0.99, $p < 0.001$), presence of nodding seizures (RR = 1.34, 95% CI: 1.26 – 1.42, $p < 0.001$), more frequent subcutaneous nodules (RR = 1.43, 95% CI: 1.29 – 1.58, $p < 0.001$), higher seizure frequency (RR = 1.0011, 95% CI: 1.0007 – 1.0015, $p < 0.001$), and increased Rankin disability scores (RR = 1.04, 95% CI: 1.00 – 1.07, p = 0.01).
Conclusion: Epilepsy in Maridi is associated with onchocerciasis. Mf density was associated with earlier onset of seizures and more serious epilepsy-related symptoms and disability.

Reference:
1. Colebunders R, Carter JY, Olore PC, et al. High prevalence of onchocerciasis-associated epilepsy in villages in Maridi County, Republic of South Sudan: a community-based survey. Seizures 2018 Dec;63: 93-101.

P169

DIAGNOSTIC IMPLICATIONS DERIVED FROM TWO CASES OF *MADURELLA PSEUDOMYCETOMATIS* IN MEXICO

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At the dermatology service of the general hospital of Mexico two patients, father and son, with black-grain mycetoma were seen. The grains were isolated and cultured. The causative agent was identified provisionally as *Madurella mycetomatis*. After isolating DNA from the isolates and performing the *M. mycetomatis* specific PCR, amplicons of a different size than that of the *M. mycetomatis* control were obtained. The internally transcribed spacer region was therefore sequenced and the isolate was identified as *Madurella pseudomycetomatis*. The amplicon in the *M. mycetomatis* specific PCR was also amplified and a species specific PCR was designed for *M. pseudomycetomatis*. Since the isolates were from father and son, we typed their isolates together with the typed strain, an isolate from Venezuela and CBS isolates with AFLP to determine if the two isolates from mexico were identical. Using 8 different markers and *M. mycetomatis* as an outlier it was demonstrated that the Mexican isolates clustered together with the isolate from Venezuela but were not identical. The two isolates were very susceptible towards itraconazole and posaconazole (MICs of 0.03 µg/ml) and voriconazole (MIC 0.125 µg/ml), less susceptibible towards fluconazole (MIC 16 µg/ml) and had an MIC of 0.5 µg/ml for amphotericin B. They were not susceptible towards the echinocandins or 5-flucytosine.

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POTENTIAL RE-EMERGENCE OF PATHOGENIC TSETSE–TRANSMITTED TRYPANOSOMES IN THE NEIGHBORHOODS OF AKAGERA NATIONAL PARK, RWANDA

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Introduction: The tsetse flies (*Glossina*) are the only biological vectors of the trypanosomes affecting humans and livestock. The Akagera National

Park is the lone remaining home to tsetse flies in Rwanda. The wild game-livestock interface plays an important role in the epidemiology, being the reservoirs of the disease. The study was carried out in Eastern province of Rwanda; in the six sectors neighbouring the park and making the Game/People/Livestock Interface.
Aim: The aim was to determine the current distribution of tsetse flies and the trypanosomes infection rates in field-captured tsetse flies.
Methods: Tsetse flies were collected from 3 districts surrounding the park between June and October 2018. Tsetse flies were trapped from different locations and were counted, sex-determined. Live flies were dissected to find the trypanosomes in their predilection sites in the tsetse fly. The mouthparts, salivary glands and mid-guts were microscopically examined for the presence and identification of trypanosomes according to the distinct differential morphology.
Results: 2131 tsetse flies were collected from six sectors of the districts surrounding the park, among which 1169 were *Glossina pallidipes* and 962 were *Glossina morsitans*. Tsetse flies were found to be more abundant in the district of Nyagatare (78%) compared to other two districts. 315 flies were dissected (203 *Glossina pallidipes* and 112 *Glossina morsitans*). The study revealed an overall infection rate of 9%. T*rypanosoma congolense* is more prevalent, followed by *Trypanosoma brucei*, *Trypanosoma vivax* and the mixed infections of *T. congolense* and *T. vivax*.
Conclusion: Both *G. pallidipes* and *G. morsitans* are potential efficient vectors of trypanosomes infection to livestock and humans but *G. pallidipes* appears to be the most important due to its high density. The study confirmed the presence of trypanosome infected tsetse flies and livestock infective trypanosomes. There is need for more accurate DNA based diagnosis to identify the blood meal sources and definitely differentiate the species and the sub-species or detect the new species to characterize even the human infective trypanosomes as we found the *T. brucei*-like species. There is also dire need to take human blood samples from the local communities to elucidate the tryapanosomes infection status.

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PRESENCE OF PROTOZOAN HUMAN PARASITES IN ANIMAL FAECAL SAMPLES FROM CENTRAL PARK (NEW YORK, USA)

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Environmental contamination with zoonotic pathogens can have significant health and environmental implications, especially in urban environments because of large/increasing human populations and urbanisation. *Cryptosporidium* spp. and *Giardia intestinalis*, zoonotic protozoan emerging human parasites, have been related to serious outbreaks involving significant costs, *e.g.* €19 million calculated expenditure to respond to a recent waterborne outbreak of *Cryptosporidium hominis* in Ireland. *Despite the need to understand the zoonotic role of these parasites in* "urban" animals to inform development and implementation of appropriate public health interventions to decontaminate the environment and prevent future outbreaks, little is known about their presence in the urban environment in large cities such as New York City (USA). Ten animal faecal samples were collected from Central Park, one of the most frequently visited parks in the city, between 4th and 9th January 2019, to perform a preliminary investigation of the presence of *Cryptosporidium parvum* and *G. intestinalis*. Animal species were identified by a veterinarian as: 7 dog, 1 pigeon, 1 squirrel/rabbit and 1 horse. Detection of these human pathogens was performed *in situ* using immunocards (Thermo Scientific™ Xpect™) for these two protozoa. None of these samples were positive for *C. parvum* or *G. intestinalis*, with a potential result being invalid for one dog stool sample that would need to be repeated. However, to confirm limited presence of *C. parvum* and *G. intestinalis* in animal faeces in Central Park, further monitoring would be required, using more faecal samples, including water samples, as a recent study has reported the presence of *G. intestinalis* in 10 out of 60 domestic dog samples collected in Manhattan[1]. Routine environmental monitoring of these and other zoonotic protozoan parasites in frequently visited parks in highly populated cities should be implemented as they could have severe implications for the population, particularly children and the elderly, who spend significant time in urban parks as well as immunocompromised individuals, who will be more sensitive to environmental contamination by opportunistic pathogens. Moreover, environmental monitoring studies will identify risks from these pathogens in the urban samples and will provide crucial information to tackle applicable interventions to minimise their infections.

Reference:
1. Munoz J and Mayer DC. *Toxoplasma gondii* and *Giardia duodenalis* infections in domestic dogs in New York City public parks. Vet J 2016; 211:97-9.

P172

EVALUATION OF IMMUNOCYTOCHEMICAL ASSAY ON THIN BLOOD SMEARS FOR DETECTION OF DENGUE VIRUS ANTIGEN

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Introduction: The clinical manifestations of dengue infection vary greatly from mild dengue fever (DF) to severe infection characterized by severe plasma leakage along with bleeding manifestations named dengue shock syndrome (DSS). Early diagnosis of dengue infection helps in the appropriate management of the patients. Detection of dengue virus antigen on thin blood smears using immunocytochemical streptavidin-biotin-peroxidase complex (ISBPC) assay is an alternative method for early dengue diagnosis.
Aim: To evaluate the diagnostic performance of ISBPC on thin blood smears for confirming dengue infection compared to RT-PCR.
Methods: A total of 91 blood samples were collected from acute febrile illness patients who presented with the history of fever within 7 days and referred for laboratory examination in Panembahan Senopati Hospital, Bantul District, Yogyakarta. The ISBPC assay using monoclonal antibody DSSC7 produced by Dengue Team of Universitas Gadjah Mada was applied on thin blood smears to detect Dengue virus antigen. RT-PCR was used as a gold standard.
Results: The ISBPC could detect dengue antigen on thin blood smears from patients with fever on day 2 to day 7. This method gave a sensitivity of 65,6% and specificity of 94,9%. The positive and negative predictive values were 87.5% and 83.6% respectively.
Conclusion: The ISBPC assay on thin blood smears has high specificity but low sensitivity for dengue antigen detection. It can be used easily in poorly equipped laboratories for the diagnosis of dengue infection in the early stage of the disease.

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FIRST DETECTION OF PRESENCE OF EMERGING HUMAN MICROSPORIDIAN PARASITES IN URBAN SOILS IN ALCALÁ DE HENARES, SPAIN

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Introduction: Microsporidia are intracellular opportunistic parasites considered to be ubiquitous in the environment. However, the presence of emerging human-related microsporidia, *i.e. Enterocytozoon bieneusi* and *Encephalitozoon* spp. (*E. intestinalis, E. hellem* and *E. cuniculi*), in soils has been little studied, despite the potential threat that their presence could have in humans. Thus, the population could be potentially exposed to microsporidia spores when playing or spending time in urban parks and recreational areas. In a pilot study performed in Alcalá de Henares (Spain) in June 2016, we detected spores of *Enterocytozoon bieneusi* and *Encephalitozoon* spp. in 15 out of 28 topsoil samples collected in five central urban parks using molecular analysis, however these results were inconclusive due to the number of the samples and small area monitored.
Aim: The aims of this study were: a) to confirm the presence, and b) to study the potential distribution of these microsporidian species in urban/industrial areas in Alcalá de Henares, one of the most densely populated cities in the Comunidad de Madrid.
Methods: 227 topsoil samples were collected in July 2017 across 12 different urban and industrial areas in Alcalá. We have initially processed five samples per area, *i.e.* 60 topsoil samples; DNA was extracted from concentrated pellet by disrupting the spores using Fast-Prep for Soil®. SYBR Green real-time polymerase chain reaction technique was used for simultaneous detection of microsporidia species.
Results: Real-time amplification with MsRTf1/MsRTr1 primer set and differential melt curve analysis have confirmed presence of *Encephalitozoon* spp., specifically *E. intestinalis/hellem* in two soil samples collected in urban areas; and *E. cuniculi* in an industrial and urban area. Contrarily to our pilot study, no positive results were found for *E. bieneusi* in the 60 samples monitored.
Conclusions: Although we need to process all the samples collected, our results so far would indicate a low prevalence and negligible distribution of human-related microsporidia in Alcalá de Henares, which would be in disagreement with the high prevalence detected in the pilot study performed in June 2016. A better understanding of the circulation of microsporidia in urban soils is necessary to implement interventions to protect the public.

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PREVALENCE OF ONCHOCERCIASIS AND ASSOCIATED EPILEPSY IN SIX VILLAGES ENDEMIC FOR ONCHOCERCIASIS IN MAHENGE, TANZANIA

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Introduction: The Mahenge Mountains in the Ulanga district of Tanzania is an area endemic for both onchocerciasis and epilepsy. Onchocerciasis is earmarked for elimination using community directed treatment with ivermectin and it has been implemented in Mahenge area since 1997.
Aims: To describe the prevalence of onchocerciasis, clinical manifestations of epilepsy and accessibility to anti-epileptic treatment in Mahenge in Tanzania, an onchocerciasis endemic area with a high prevalence of epilepsy.
Methods: A door to door epilepsy prevalence survey was conducted in 4 rural and 2 sub-urban villages. Trained community workers used 5 screening questions to identify persons suspected to have epilepsy. Such individuals were interviewed and examined by a neurologist or a medical doctor with training in epilepsy. Children aged 6-11 years and epilepsy suspected individuals were tested for *Onchocerca volvulus* antibodies.
Results: A total of 221 out of 8062 (2.74%) surveyed individuals were confirmed to have epilepsy. The overall prevalence of Onchocerciasis in children (5-11y) was 18.4% and was increasing with distance from the Mahenge Township. The median age of seizure onset was 12 years (interquartile range 7-16). Tonic-clonic seizures (142 individuals, 64.2%) were the most common seizure type. Nodding seizures were reported in 12.7% of PWE; the majority of them living in rural villages. Persons with nodding seizures reported more frequent seizures, presented more psychiatric symptoms and had more often onchocerciasis antibodies than those with other forms of seizure types. Eighty-three people with epilepsy (37.6%) were not taking any anti-epileptic medication.
Conclusion: The high prevalence of epilepsy in rural villages in Mahenge most likely is related to the high prevalence of onchocerciasis associated epilepsy (OAE). To prevent children to develop OAE, strengthening the onchocerciasis elimination programme in Mahenge is urgently needed. Moreover a decentralised epilepsy treatment programme is needed to provide uninterrupted access to affordable anti-epileptic drugs to the many PWE living in rural villages in the Mahenge area.

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TREPONEMA PALLIDUM PERTENUE CLEARANCE FROM LESION SAMPLES FOLLOWING SINGLE DOSE AZITHROMYCIN TREATMENT OF YAWS

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Introduction: Yaws, caused by *T. pallidum pertenue* and listed as one of the Neglected Tropical Diseases by the WHO, is still a problem in parts of Ghana. *H. ducreyi* can cause similar yaws-like lesions and is often misdiagnosed clinically as yaws.
Aim: The aim of the study was to see how long yaws and *H. ducreyi* lesions are PCR positive for bacteria after treatment with single-dose oral azithromycin.
Methods: Schoolchildren ages 4-17 were screened for skin lesions at primary schools and in communities in the Eastern Region of Ghana. If yaws-like lesions were found by the field team, a point-of-care syphilis test and dual immunoassay for treponemal and non-treponemal antibodies were taken. Lesions of seropositive participants were swabbed at baseline, 8h, 24h, 32h, and 48h post-treatment with azithromycin to measure treatment response.
Results: Of 55 participants, 16% (9/55) had at least one lesion at baseline which was PCR positive for *T. pallidum*. Just one participant was still

positive at the first follow up, and that patient took until the fourth follow up swab to become negative. 18% (10/55) had at least one *H. ducreyi* PCR positive lesion. 19% (3/16) of the swabs that were positive at baseline were still positive at the first follow up swab. One patient was dual positive for *H. ducreyi* and *T. pallidum.*

Conclusion: This study highlights the difficulty of diagnosing yaws even with serology. More frequent swabs at earlier time points are most likely needed to find more exactly how long lesions are contagious after azithromycin treatment. Most lesions that tested positive at baseline for either *H. ducreyi* or *T. pallidum,* were negative by the first follow up, meaning that they are contagious less than 8 hours. This means that yaws and *H. ducreyi* transmission can be interrupted quite quickly after antibiotic treatment even though lesions can take weeks to heal completely. All swabs except for one in the *H. ducreyi* group were negative by the fourth follow up. The conclusions found are probably most useful for test of cure for future yaws and *H. ducreyi* studies.

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IMPAVIDO™ (MILTEFOSINE) FOR ANNERGIC DIFFUSE CUTANEOUS LEISHMANIASIS, A RARE AND INTRACTABLE DISEASE

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Introduction: Diffuse cutaneous (DCL) or annergic leishmaniasis is a rare chronic disease. No treatments are recognized as effective to induce complete remission and frequent reactivations are present. Miltefosine, an off-label option for treatment in Brazil, has been shown to be efficient for visceral (VL) and cutaneous (CL) leishmaniasis, but less experimented in DCL and not evaluated in Brazil.

Aim: Report a DCL case, diagnosed 25 years ago, unresponsive to treatments and good temporary response to miltefosine.

Methods: Case report. Patient with 21 years of follow-up. Prospective treatment and report.

Results: Male, 43 yo, first visit in 1997, reporting previous diagnosis and treatment for 4 years. The initial lesion was at external ear, not responsive to Glucantime® with dissemination on plaques and nodules, and ulcerovegetantes lesions. The diagnosis of DCL was based on clinical, massive presence of parasites and negative intradermic test. Later identified Leishmania amazonenses. In years of follow-up, he received antimonial, with limited improvement and reactivation; pentamidine series, better response, but frequent reactivations; amphotericin B deoxycholate and liposomal, no response to both and worsening renal function. He remained poorly controlled with pentamidine. By 2015 the disease was out of control. A miltefosine scheme was possible by donation. Done 150mg/day (2.03mg/kg), in 3 doses/day, 28 days. On the 7th day, improvement of the lesions; thoracic pain and epigastralgia as adverse events, controlled with symptomatic. On day 21, progressive improvement and controlled adverse events. At the end, 80% improvement and negative parasitological examination. No worsening of renal function. The progressive improvement was sustained for 6 months but lesions reactivated. Prescribed new cycle of miltefosine, similar dosage and satisfactory but slower response. On the third cycle there was not a good response.

Conclusion: There is no effective treatment for DCL. Miltefosine showed to be an alternative, maybe the only one to provoke the remission of lesions in these cases. But alternatives, a drug or combination drugs, should be thought to sustain the response. It is little, but better than nothing achieved with other treatments. Neglected diseases like DCL needs more efforts to find the options.

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EVALUATION OF RECOMBINASE POLYMERASE AMPLIFICATION ASSAY IN THE XENODIAGNOSIS OF POST KALA AZAR DERMAL LEISHMANIASIS

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Introduction: Post kala-azar dermal leishmaniasis (PKDL) is a skin disorder that often appears after treatment of visceral leishmaniasis (VL) patients. Persistence of some PKDL cases may act as a reservoir for Leishmania donovani (LD) parasites and is sufficient to initiate a new epidemic of anthroponotic VL. We have previously used xenodiagnosis by microscopy and real time (RT) PCR to establish that PKDL patients are potential reservoir of LD parasite.

Aim: In this study, we aim to evaluate a field applicable single molecular tool for xenodiagnosis.

Methods: An isothermal molecular assay based on recombinase polymerase amplification (RPA) for detecting LD was evaluated in direct xenodiagnosis of 47 PKDL patients and compared with microscopy and real time RT PCR, while non-fed vector served as control.

Results: Respective molecular assays were carried out using DNA extracted by a modified spin column method from microscopy positive slides (n=30) prepared with blood fed single sand-fly specimens, which corresponded to 22 PKDL patients. This resulted in 100% sensitivity and specificity for RT PCR and RPA assays considering microscopy as gold standard. Furthermore, in microscopy negative pools of sand fly corresponding to each of 47 PKDL patients revealed that RPA could detect LD parasites in 24/47 (51.06%) sand-fly pools, while RT PCR could detect in only 19/47 (40.42%). Overall, RPA was found to have better performance (28/47; 59.57%) over RT PCR (26/47; 55.32%) and microscopy (22/47; 46.80%) in direct xenodiagnosis. With regards to sensitivity, the difference between microscopy and RPA was found to be statistically significant (p=0.04). Specificity was 100% for all the methods.

Conclusion: Considering sensitivity, cost, feasibility, accuracy, detection time and field applicability, RPA assay can be considered as a promising single molecular detection tool for xenodiagnosis, while it can also be useful in reconfirmation of microscopy negatives samples in xenodiagnosis applications.

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EVALUATING THE BURDEN OF SCABIES IN THE CHACHI POPULATION OF THE CAYAPAS RIVER, ECUADOR

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Background: The Asociación Amigos del Cayapas (AAC), also known as *Cayapa pi chulla kumani* in the local language, is a medical non-

governmental organization founded in 2011 to support the health of the Chachi indigenous communities of the Cayapas river, in Esmeraldas province, Ecuador.
In 1991 a mass drug administration (MDA) program with ivermectin was started in the area to combat parasitic foci of *Onchocerca volvulus*. The intervention ceased in 2009 and onchocerciasis was declared eliminated by WHO in 2012. Preliminary data from 2011-2013 suggested a high number of cases of scabies, a Neglected Tropical Disease, among the Chachi population. This may represent an unintended consequence of the cessation of ivermectin MDA.
Aim: We aimed to assess the burden of scabies in patients attending mobile primary care clinics along the Cayapas River during 2014-17.
Methods: AAC organised biannual mobile primary care clinics to serve the communities along the Cayapas River from 2011 to 2017.
A new health information system was designed by AAC to collect data directly in the field using tablets from 2014 to 2017. We analyzed retrospectively cases coded in our database as "scabies" or documented as free text "cutaneous parasitosis". Estimates of the population size for each community were derived from a household census conducted in 2017.
Results: 141 cases, 2.63% of all patients seen in the mobile clinics, were coded as having scabies. They were distributed in 22/36 communities. Patients with scabies had a median age of 2.25 (IC 0.9-5.1). 78 (54.9%) were female. The highest estimated burden in a single community was 15.7% of the population seeking medical care for scabies during this three year period.
Conclusion: We found high rates of scabies in patients seeking medical care in communities on the Cayapas River. This is likely to be an underestimate the true burden of disease. Formal prevalence and impact studies of scabies in this population are needed to assess the need for appropriate public health interventions. We aspire to limit the transmission of *Sarcoptes scabei*, in these communities, especially in the paediatric population, through partnership with local health authorities and services.

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THE USE OF EQUINE BLOOD TO PREPARE A CULTURE MEDIUM FOR *LEISHMANIA*: AN OPERATIONAL STRATEGY IMPROVEMENT

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Introduction: Leishmaniasis is an infectious, non-contagious disease caused by a protozoan of the genus *Leishmania*, endemic in Brazil. In addition to the clinical-epidemiological diagnosis, is necessary to visualize or isolate the etiological agent by collecting tissue from the ulcer edges. These techniques allows the direct or indirect visualization of the protozoan, in addition to culturing it in a biological culture medium of modified blood agar-Neal, Novy and Nicole and Liver Infusion tripose with biological substrate of rabbit blood. The collected materials are deposited through aspirate or cutaneous fragments and mucous membranes. Blood agar is mandatory to prepare solid phase, but the use of rabbit blood is a limiting condition; it requires raising animals in research laboratories not always accessible to clinical laboratories. As horse blood is commercially and readily available in these labs, it was decided test this alternative.
Aim: Test the equine biological substrate and compare with rabbit substrate in 34 samples in order to prove similar efficacy and evidence it as an alternative in the cultivation of *Leishmania* in vitro.
Methods: During the routine collection for *Leishmania* (scraping, aspirating, imprint and culture) in our service, we cultured the material both in rabbit and horse blood in 34 samples of patients with leishmaniasis suspicious diagnosis. Afterwards, we selected the valid samples (33), discarding one with contamination and compared the results.
Results: Nineteen positive results were demonstrated, of these 100% in rabbit blood (19) and 89,47% (17) in horse blood. Regarding the negative results, a total of 16, 87,5% (14) in rabbit blood and 100% (16) in horse blood were added. Four samples were discordant, 3 positive only in rabbit blood and one positive only in horse blood.
Conclusion: The use of culture medium in equine blood had positivity for *Leishmania* similar to rabbit blood in our study. Additional studies are necessary, but it rises as an option with better availability, becoming an alternative as a culture medium for *Leishmania*. Validation in other scenarios is recommended.

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AMERICAN TEGUMENTARY LEISHMANIASIS: CLINICAL AND EPIDEMIOLOGICAL ASPECTS OF PATIENTS FROM A CLINICAL RESEARCH CENTRE, IN TWO DIFFERENT PERIODS, MATO GROSSO, BRAZIL

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Introduction: American Cutaneous Leishmaniasis (ACL), is endemic in Brazil and in Mato Grosso, but with a single outpatient referral service for the entire state. The patients followed in the service result in a sample with reference bias, as well observed in the high frequency of mucosal leishmaniasis (ML), but with representantion regarding the geografic distribution. A previous study showed that 50% of the patients in the reference centre, came from areas defined as Legal Amazon; in fact, this region has 70% of the cases reported in Sinan.
Aim: Describe the clinical-epidemiological aspects of cutaneous leishmaniasis (CL) cases from 1993 to 1995 and from 2008 to 2017 and to compare the two data series (1993-1995 and 2008-2017).
Methods: A descriptive and comparative analysis of the epidemiological profile was made, considering first the clinical study that occurred in this research centre between 1993 and 1995, here called "study 1", and the notification data for the years 2008 to 2017 (SINAN-NVEH-HUJM). The total number of patients analysed in study 1 was 260, while the current data totalled 1301 cases.
Results: In study 1, 89% of the cases occurred in males and in the current 79,25%. The most affected age group in study 1 was from 21 to 40

years old, whereas in the current age group it was predominant in the population between 30 and 59 years old. In study 1, CL represented 68,9% and ML 25,9%; in the present study, CL accounted for 73,2% of cases and ML 26,98%. The diagnosis in study 1 occurred by laboratory methods in 51,54% and by other methods in 48,46%, whereas in the cases of current notification, clinical and laboratory methods accounted for 91,16% of the diagnoses.
Conclusion: The clinical-epidemiological profile of the patients in study 1 in relation to the most recent data are similar, but some changes are noteworthy, such as the age increasing and evident improvement in the rate of laboratory confirmation of the diagnoses. The prevalence in male patients is still evident, but not as in the past years, perhaps by slow and progressive changes in the epidemiological transmission patterns.

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RETROSPECTIVE ANALYSIS OF LEISHMANIASIS-HIV COINFECTION CASES IN A BRAZILIAN CLINICAL RESEARCH CENTER

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Introduction: Although visceral leishmaniasis has long been recognized as an opportunistic disease in AIDS, little is known about its relationship with American cutaneous leishmaniasis (ATL), which in Brazil is a disease of wild and rural areas, rarely occupying the periphery of cities. HIV infection, once restricted to urban populations, has spread to small cities and even to rural areas, which has resulted in increased *Leishmania* / HIV coinfection. HIV infection may alter the ATL picture, but this relationship is not well described and there is no specific clinical picture of coinfection.
Aim: To report 37 cases of leishmaniasis/HIV coinfection, its clinical and laboratory aspects, and therapeutic response.
Methods: Revision of medical records in a reference center for research and assistance for ATL and AVL, and search of data in the official notification system.
Results: From 1993 to 2018, 37 patients were diagnosed for coinfection, from 19 to 65 years (mean = 34.3); 34 (91.9%) were male. Of all, 11 (29.7%) had cutaneous, 9 (24.3%) mucous, 10 (27.0%) cutaneous and mucous, 4 (10.8%) disseminated cutaneous forms, 2 (5.4%), disseminated cutaneous mucosa and 1 visceral form (2.7%). In 23 (62.1%), leishmaniasis was diagnosed prior to HIV diagnosis, when patients were tested for this condition, sometimes due to previous treatment and not good response, as well as dissemination of lesions, but also in of patients without suspected clinical conditions. Considering the immunological conditions at the moment of the diagnosis, 25 (67.5%) had a detectable viral load; 26 (70.3%) had CD4 lymphocytes values lower than 350 cells, 7 (18.9%) 350 and more, but 4 (10.8%) were not analized. Pentavalent antimonial (Glucantime^{TM}) was the first treatment in 28 (75.7%) and amphotericin in 9 (24.3%). For the majority was necessary a second or more treatments.
Conclusion: There was the predominance of the cases in adult males, with low CD4 count and high viral load. We observed that immunosuppression probably contributes to the worse prognosis of the ATL, but additional studies and more data are necessary.

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LEPROSY CASES NOTIFIED IN A REFERENCE HOSPITAL OF MATO GROSSO, BRAZIL: LESSONS FROM AN EPIDEMIC

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Introduction: Leprosy, one of oldest infectious diseases, is an important public health problem today. Disabling sequelae due late diagnosis and lack of clinical examination, especially in the evaluation of peripheral nerves maintain the transmission and incredible detection rates, especially in Brazil, the second in the world in reported cases. The national public policies invest in basic care as generators of new diagnoses, but data from national epidemiological bulletin show that 45.7% of the cases are diagnosed in specialized services.
Aim: Describe the epidemiological profile of leprosy cases attend in a reference hospital in Mato Grosso, Brazil.
Methods: A descriptive study of leprosy cases reported by the Center for Epidemiological Surveillance in a reference hospital from 2008 to 2017.
Results: At all, 566 cases were reported (m= 56.6/year). Male were 59.4% (n = 336) and female 40.6% (230). The most affected age group was 35 to 49 yo (28.3%), followed by 50 to 64 years (27%) and 20 to 34 years (21%). Black patients were 75.1%, with education level mainly between 5th and 8th grades (20.7%), but in an overall analysis, 51.2% had an incomplete fundamental level. Considering operational classification, 79.9% were multibacillary and 20.1% paucibacillary. Regarding clinical forms, 62.5% were dimorphic, 16.4% virchowian, 15% tuberculoid and 4.8% undetermined. The treatment of choice was multibacillary polychemotherapy (MDT-MB) in 76.9% of cases and paucibacillary in 19.6%. After diagnosis, 34.3% were referred to the primary care of the city of Cuiabá, 31.4% to other municipalities where they probably lived and 29.2% were probably followed up until cure in the outpatient clinic. It is concluded that leprosy diagnoses in the last 10 years in a reference outpatient clinic occurred predominantly in men, adults, blacks with multibacillary operational classification, dimorphic clinical form and treatment with MDT-MB for 12 months.
Conclusion: In spite of the significant number of diagnosed cases, according to the Global Strategy for Leprosy 2016-2020 (WHO), that appoints reference services as the main diagnosticians, in scenarios of high prevalence additional measures are necessary to screen the cases to earlier diagnosis.

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LEPROSY IN THE PRISON SYSTEM OF MATO GROSSO – BRAZIL

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Introduction: Leprosy is a disabling infectious disease caused by *Mycobacterium Leprae*, which is directly related to precarious conditions of life, a situation found in the Brazilian prison system that makes the incarcerated population vulnerable. Among the factors favoring the high incidence and spread of the pathogen among inmates are unhealthy conditions, overcrowded and continuous physical contact. It´s transmission occurs through the secretion of the airways of bacilliferous patients and It´s related to the intimate and prolonged conviviality.
Aim: To report a descriptive and cross - sectional study in a joint effort to detect leprosy in a male prison in Mato Grosso state in February 2018.
Methods: An educational lecture was held about leprosy for elected health promoters from each sector. They organized a nominal list, on spontaneous demand, of individuals who presented symptoms and had an interest in being examined.
Results: A total of 100 patients from the 2,400 institutionalized detainees were treated for anamnesis and a simplified dermatological-neurological

exam. Of these, 12 patients presented thermal, painful or tactile alterations of neural lesion and / or thickening with or without neuritis were selected. After free and informed consent, their biopsies were collected. The material was stored in 4% paraformaldehyde and submitted to hematoxylin and eosin staining for histopathological analysis, and Fite-Faraco for BAAR analysis. The group consisted of individuals with a mean age of 34 years, 91% were black, with an average of 4 lesions, and 3-8 thickened peripheral nerves. All had altered sensitivity and lesions like hypochromic papules and were classified as multibacillary, 40%. The results of histological analysis 10 were positive. All samples presented infiltrate and granuloma, 80% of positivity for M. leprae, 20% of Unna and 20% of reactivity. Upon return to the prison, multibacillary polychemotherapy treatment was instituted for the diagnosed patients.
Conclusion: The prison system facilitates the transmission of these diseases to the general population through conjugal visits and the release of multibacillary prisoners. In order to reduce the incidence of leprosy for this population, it is important to reinforce implementations of therapeutic programs, specific preventive and educational measures.

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THE MAGNITUDE AND ASSOCIATED RISK FACTORS OF *SCHISTOSOMA MANSONI* AND ITS ABSENCE OF CO-INFECTION WITH *SALMONELLA TYPHI* AND/OR *SALMONELLA PARATYPHI* AMONG SEBATAMIT PRIMARY SCHOOL CHILDREN, RURAL BAHIR DAR, NORTHWEST ETHIOPIA: A CROSS-SECTIONAL STUDY

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Introduction: Schistosomiasis is one of the most prevalent neglected tropical diseases and considered as a major public health problem. The magnitude and impact of schistosomiasis is high in Ethiopia although several control methods have been conducted. *Salmonella typhi* and *Salmonella paratyphi* are rod-shaped gram-negative bacilli and causes typhoid fever and paratyphoid fever, respectively. When individuals are coinfected with Schistosoma *mansoni* and *Salmonella typhi* and/or *Salmonella paratyphi*, there is biological interaction between tegument surface of *Schistosoma mansoni* and piliof *Salmonella typhi* and/or *Salmonella paratyphi*.
Aim: The aim of this study was to determine the magnitude and associated risk factors of *Schistosoma mansoni* and its absence of co-infection with *Salmonella typhi* and/or *Salmonella paratyphi*.
Methods: A school-based cross-sectional study was conducted at Sebatamit primary school from April to May, 2018. A total of 422 school children were selected by systematic random sampling technique. A total of three gram of stool sample was collected from each school children. Then, 2 gram of stool sample was transported to Bahir Dar University Microbiology and Parasitology Laboratory to conduct Kato-Katz technique. The remaining 1gram of stool samples was transported by Carry-Blair transport media to Amhara public Health Institute for stool culture. At Amhara public Health Institute, the stool samples were enriched with Selenite F- broth and incubated for 24 hours. The data were analyzed by Statistical Package for Social Science version 23. Any statistical values with $p<0.05$ were considered as statistically significant.
Results: Of 422 school children, 223 (52.8%) and 199 (47.2%) were males and females, respectively. The overall prevalence of *Schistosoma mansoni* infection was 105/422 (24.9%). Seventy five out of 422 (71.4%) of the infected individuals showed light infections. Age (p=0.013), swimming habit (p=0.001), participating in irrigational activities (p=0.03) and washing clothes in the river (p=0.039) were factors associated with *Schistosoma mansoni* infection. Finally, the absence of co-infections of *Schistosoma mansoni* and *Salmonella typhi* and/or *Salmonella paratyphi* was observed in this study.
Conclusion: In this study, the overall prevalence of *Schistosoma mansoni* was 105/422 (24.9%). Majority of infections were light infections. Absence of co-infections of *Schistosoma mansoni* and *Salmonella typhi* and/or *Salmonella paratyphi* was observed.

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RANDOMISED, OPEN LABEL MULTICENTRE, NON-INFERIORITY CLINICAL TRIAL FOR NEW TREAT MODALITIES FOR CUTANEOUS LEISHMANIASIS CAUSED BY *LEISHMANIA TROPICA*

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Introduction: Cutaneous leishmaniasis (CL) is a neglected tropical skin disease, caused by the protozoan *Leishmania*. Although not a fatal disease, skin lesions often develop into ulcerating, disfiguring wounds and scars causing psychosocial suffering due to stigmatisation. In Pakistan, CL is highly endemic and *L. tropica* is the predominant species in Balochistan and Khyber Pakhtunkhwa provinces. Since decades, the mainstay treatment for CL is with pentavalent antimonial injections. This consists of a long course of painful daily or bi-weekly injections, with potential severe toxicity. Treatment is hardly available in Pakistan public hospitals, and there are important financial and gender barriers to access treatment. There are no evidence-based safer and shorter treatment options for *L.tropica*. Topical thermotherapy by radiofrequency and oral miltefosine are effective in several *Leishmania* species, but with limited evidence on effectiveness in *L.tropica*. Thermotherapy requires a single treatment session. Miltefosine is an oral treatment and can be provided at primary health care level. The combination of these two treatments could shorten the treatment duration and have an additive effect from their different modes of action.
Aim: To evaluate the effectiveness and safety of the thermotherapy (ThermoMed™) and miltefosine (Impavido®), and the combination of the two treatments, in two areas with high prevalence of CL caused by *L. tropica*. We aim to find a treatment similar or better than the standard of care with antimonial injections (Glucantime®).
Method: We will perform a randomised, open label, multicentre, non-inferiority clinical trial (RCT), evaluating the efficacy and safety of three new treatments: 1) topical thermotherapy (50°C for 30 seconds, one session); 2) miltefosine (2.5 mg/kg, 28 days), and 3) the combination of thermotherapy (one session) and miltefosine (21 days). These will be compared to a fourth arm with the standard of care with eight intralesional injections with meglumine antimoniate. We will recruit 832 patients with parasitologically confirmed CL (104 per study arm) in MSF clinics in Quetta and Peshawar.
Result: We hope to identify an affordable, safe and effective treatment for CL caused by *L. tropica*. If successful, it can be implemented in primary healthcare facilities and increase improved treatment accessibility for CL patients.

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TEST-AND-TREAT WITH DOXYCYCLINE AS AN ALTERNATIVE STRATEGY FOR THE ACCELERATION OF ONCHOCERCIASIS

ELIMINATION IN A LOIASIS CO-ENDEMIC REGION OF SOUTH-WEST CAMEROON

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Annual Community Directed Treatment with ivermectin (CDTi), the cornerstone of onchocerciasis control, has reached elimination targets in some areas but high infection levels persist despite long-term ivermectin distribution in other foci, including in South-West Cameroon. Challenges include program coverage, adherence to and acceptability of ivermectin in an area of *Loa loa* co-endemicity. Loaisis patients harbouring heavy infections are at risk of potentially fatal serious adverse events (SAEs) following CDTi. Alternative strategies are therefore needed to achieve onchocerciasis elimination where CDTi effectiveness is suboptimal.

The CouNTDown consortium has implemented two WHO-endorsed alternative strategies for the elimination of onchocerciasis in the Meme River basin, South-West Cameroon, where 15 rounds of CDTi MDA has not delivered expected impact on skin infection prevalence. Alternative strategies consist of testing and treating *O. volvulus* cases with doxycycline (DOX T&T), an anti-*Wolbachia* macrofilaricide, either alone or in combination with ground larviciding vector contro l (temephos).

A community-based before-after treatment cohort study is being conducted among the general population of the Meme River Basin, South-West Cameroon. Participants were diagnosed using skin snipping. *O. volvulus* patients enrolled in the DOX T&T study were treated daily with 100mg of Doxycycline for five weeks. Structured questionnaires were used to collect data on demographics, completion of treatment and onchocerciasis-related clinical signs. Focus-group discussions and in-depth interviews were used to investigate the acceptability of CDTi and DOX T&T strategy.

Logistic (prevalence) and negative binomial (infection intensity) mixed regression models will be used to assess the association between adherence to CDTi and infection levels, onchocercal skin disease or severe itching as well as the impact of DOX T&T on *O. volvulus* infection levels.

Here, we present (i) results of the baseline survey, including infection levels, prevalence of onchocercal skin disease and severe itching as well as their association with reported participation in CDTi, (ii) the perceptions and attitudes towards CDTi, (iii) completion and acceptability of the DOX T&T strategy, and (iv) the impact of DOX T&T on *O. volvulus* infection levels.

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MORBIDITY AND MORTALITY AMONG PATIENTS OF VISCERAL LEISHMANIASIS TREATED WITH SODIUM STIBOGLUCANATE AND PARAMOMYCIN IN GADARIF HOSPITAL, EASTERN SUDAN

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Introduction: Although visceral leishmaniasis (VL) has been reported as major health problem in Eastern Sudan still the burden represented by the disease is widely under estimated.

Aim: To investigate the morbidity and mortality associated with visceral leishmaniasis in Gadarif hospital, eastern Sudan.

Methods: This was a cross sectional, hospital-based study conducted from 1st February 2018 to 31st December 2018 in Gadarif hospital, eastern Sudan.

Results: During the study period there were 116 confirmed cases of VL. The most common clinical presentations were fever (116, 100%),splenomegaly(100, 86%), pallor (73, 62.9%), hepatomegaly (52, 44.8%), lymphadenopathy (4, 3.5%), cough (18, 15.5%), weight loss (11, 9.4%),diarrhoea (3, 1.8%) and epstaxis (3, 1.8%).

Fever disappeared in 3 -7 days in the majority of cases 83(71.6%). 95(81.8%) improved without complications, while 9 (7.8%,) 5 (4.3%), 1 (0.86%), 1 (0.86%), 1 (0.86%) and 1 (2.1%) developed acute kidney injury ,liver impairment ,bleeding ,deafness and gluteus abscess respectively. 6(5.2%) patients died during hospital stay.

Haemoglobin level less than 6gm was found in 34(29.3) patients and 6 to 10gm in 67(57.8%) patients.

Using logistic regression analyses there was significant association between rural residence

(CI = 1.5–24, OR = 19.1, P = 0.023), male gender (CI = 6.6–18.7, OR = 6.4, P = 0.001) and VL.

Conclusion: Visceral leishmaniasis is still a major health problem in Gadarif eastern Sudan, so interventions in the term of early case detection and management associated with health education will reduce associated morbidity and mortality.

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ARE THREE ROUNDS OF MASS DRUG ADMINISTRATION (MDA) WITH AZITHROMYCIN ENOUGH TO REDUCE THE PREVALENCE OF TRACHOMA TO BELOW 5% IN 1-9 YEAR OLD CHILDREN IN TRACHOMA ENDEMIC COUNTRIES WHERE BASELINE PREVALENCE IS GREATER THAN 10%?

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Introduction: Trachoma is caused by Chlamydia trachomitis. It is one of the World's leading causes of blindness with high levels of disability, despite being easily treatable. This is an update of a previous Cochrane review, 'Antibiotics in Trachoma' (2010) that showed that MDA with azithromycin was useful in decreasing prevalence of trachoma. In a bid to eradicate trachoma by 2020, the World Health organisation (WHO) 2010 guidance suggests three rounds of community MDA of a one off dose of 20mg/kg azithromycin, if follicular trachoma (TF) prevalence in 1-9 year old children is >10%. The aim is to achieve low levels of trachoma in the community (TF<5%).

Aim: To evaluate the evidence supporting the WHO strategy by assessing whether three rounds of MDA with azithromycin reduces prevalence of TF<5%.

Methods: Systematic review of the literature was carried out. Searches of PubMed (January 1966-March 2018), Global health (January 1966-March 2018), EMBASE (January 1947-March 2018), Cochrane Library (January 1999-March 2018), reference lists of articles and the WHO website were performed. Databases were last searched on 16 March 2018. Data were extracted and evaluated using the Cochrane Collaboration Data Collection Form-'Intervention review-Randomised trials and non-randomised trials.

Results: 3 cluster randomised trials with a total of 8029 children were eligible for inclusion in this review. Cessation versus 3 years of MDA showed a prevalence ratio of 1.087 for active trachoma and 0.2 for ocular

chlamydia. All included studies were standalone trials from the PRET trial based in 3 different countries. The PRET trial combined the studies after harmonising protocols, data collection and analysis; however, there was marked heterogeneity between the studies. Each country and its practices were different i.e. definition of household resident, variance in participant mobility within communities and inconsistencies with baseline prevalence of trachoma. No studies reported allocation concealment or incomplete data outcome analysis though masking outcome was addressed.
Conclusion: The review suggests that stopping MDA prior to three rounds of MDA with azithromycin for trachoma is unlikely to be effective to reduce Trachoma prevalence to <5% to achieve eradication. The evidence is limited to moderate quality data from heterogeneous cluster randomised trials.

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DEVELOPMENT OF AZITHROMYCIN RESISTANCE IN *STREPTOCOCCUS PNEUMONIAE* IN THE SETTING OF TRACHOMA MASS DRUG ADMINISTRATION: A SYSTEMATIC REVIEW

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Introduction: Trachoma is a blinding eye disease caused by the bacterium *Chlamydia trachomatis*. It is commonly found in areas with poor resources, sanitation, and hygiene. The World Health Organization began a global elimination of trachoma initiative that includes the use of mass drug distribution with azithromycin in areas with the follicular trachoma prevalence > 10% in children aged 1-9 years. However, there have been increasing concerns regarding the development of azithromycin resistance in *Streptococcus pneumoniae* in the setting of mass azithromycin distribution, with varying data across different studies.
Aim: This review aims to investigate whether mass drug distribution for trachoma leads to the development of azithromycin resistance in *S pneumoniae*.
Methods: Six databases were searched for articles relevant to the study question. Based on pre-specified inclusion and exclusion criteria, studies were screened and findings recorded using the PRISMA flow diagram and the Cochrane data collection checklist. Two risk of bias tools were used for quality appraisal.
Results: After reviewing all studies, four were included in the final analysis. Studies included one randomized control trial, two cluster-randomized trials, and one quasi-experimental study with cohort design. The intervention group in all studies received weight-based azithromycin for the purposes of trachoma while the control did not receive any treatment during the study period. However, there was variation in the frequency of azithromycin administration and time at follow up. Due to significant heterogeneity among the included studies, a meta-analysis could not be performed. Findings showed decreased *S pneumoniae* prevalence and increased azithromycin resistant isolates following mass drug administration. Follow up time from treatment ranged from 14 days to two years.
Conclusion: This review shows that mass drug administration with azithromycin for trachoma can lead to the development of azithromycin resistance in *S pneumoniae* while also transiently decreasing the carriage rate of the bacterium. This pattern is seen in all the included studies despite the variations in the azithromycin dosing frequency and time between treatment and follow up. This macrolide resistance may be short-lived; therefore, the considerations for the risks and benefits of continued treatment with azithromycin need to be weighed.

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EVALUATION OF THE ACTIVITY OF ERYTHROSINE ESTER DERIVATIVES INCORPORATED IN PLURONIC® P-123 AGAINST PROMASTIGOTAS OF *Leishmania braziliensis* IN PHOTODYNAMIC THERAPY

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Introduction: The leishmaniasis treatment presents many limitations, such as the high toxicity and parasite resistance to drugs, causing low adhesion to the therapeutic scheme of those affected by this disease. The development of new therapies for leishmaniasis is necessary, in this way photodynamic therapy (PDT) has been researched, and the results are promising. The PDT usually use photosensitive substances (PS) incorporated into triblock copolymers, such as Pluronics® P-123, which releases PS into the target tissue quickly without causing damage to other tissues.
Aim: This study aimed to evaluate the activity of erythrosin butyl ester (ERYBUT) and decyl ester (ERYDEC) incorporated in P-123 on *Leishmania braziliensis* promastigote forms in PDT.
Methods: *L. braziliensis* promastigotes were cultivated until log phase of growth in RPMI 1640 medium. The culture of *L. braziliensis* in a concentration of $4x10^7$ cells/mL and different concentrations of ERYBUT and ERYDEC incorporated in P-123 ($3.0x10^{-5}$ mol/L to $1.9x10^{-6}$ mol/L) were added in 96 well microplates. After 3 hours of incubation, one microplate remained in the dark, and another was irradiated with light emitting diode (λ= 575 nm/1.66 mW/cm^{-2}) for 30 minutes. The parasite viability was determined by the XTT colorimetric method (500 mg/mL) activated with PMS, phenazine methosulfate (50 mg/mL). The inhibition percentage was estimated by comparison to non-treated cell culture, and the mitochondrial activity of *L. braziliensis* was measured at a 450/650 nm wavelength using a VersaMax microplate reader.
Results: The ERYBUT and ERYDEC incorporated in P-123 significantly inhibited the survival rate of *L. braziliensis* promastigotes. The highest percentage of inhibition was 72.33% for ERYBUT and 84.46% for ERYDEC into P-123 in the presence of light. In the absence of light, the results were similar.
Conclusion: The high activity of ERYBUT and ERYDEC into Pluronic® of P-123 may not be a result of PSs since the results in presence and absence of light are similar and these substances are well known by their photodynamic activity. Thereby, these activities against promastigotes of *L. braziliensis* suggests activity only of Pluronic® P-123 and further studies with this nanocarrier alone are necessary to corroborate this hypothesis.

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INVESTIGATION OF THE ERYTHROSINE ESTER DERIVATIVES POTENTIAL INCORPORATED IN PLURONIC® P-123 AGAINST PROMASTIGOTE FORMS OF *Leishmania amazonensis* IN PHOTODYNAMIC THERAPY

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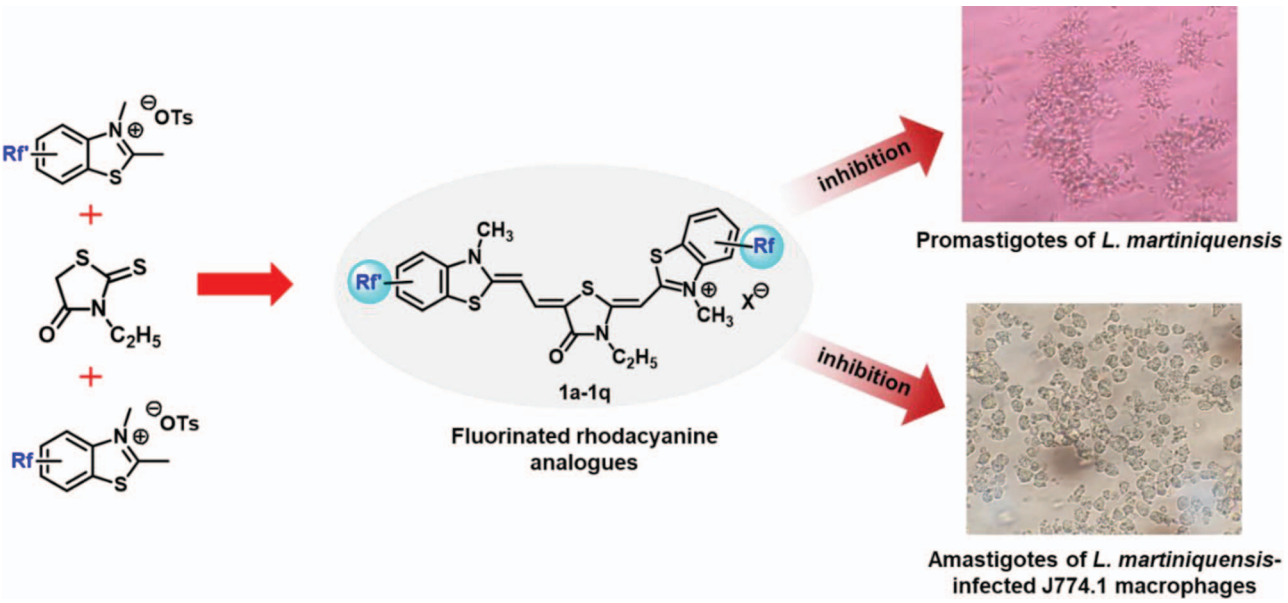

Scheme 1. The overviews of fluorinated rhodacyanine analogues (**1a**-**1g**) and their inhibition activities against *L. martiniquensis*.

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Introduction: Cutaneous leishmaniasis is an infectious disease caused by *Leishmania* protozoan. The conventional treatment is onerous and aggressive. Photodynamic therapy (PDT) has emerged as a promising alternative treatment, which allows local administration with fewer side effects. Photosensitizing substances (PS) such as erythrosine derivatives butyl (ERYBUT) and decyl esters (ERYDEC) are hydrophobic and aggregated in aqueous solution, an undesirable process in PDT. The incorporation of PS in nanocarriers systems, such as triblock copolymers like Pluronics® P-123 can avoid this aggregation.
Aim: This study aimed to evaluate the mitochondrial activity of *Leishmania amazonensis* promastigotes following treatment with ERYBUT and ERYDEC into P-123.
Methods: Different concentrations ($3.0x10^{-5}$ mol/L to $1.9x10^{-6}$ mol/L) of ERYBUT and ERYDEC incorporated in P-123 (100 µL) were distributed in 96-well microplates and added 100 µL from a suspension of *L. amazonensis* ($4x10^7$ parasites/mL). After 3 hours, one microplate was illuminated with the light emitting diode (λ= 575 nm/1.66 mW/cm^{-2}) for 30 minutes and the other not. After 24 hours at 25°C, the microplates were centrifuged at 2500 rpm for 10 minutes, and 100 µl of the supernatant from each well was removed, adding 100 µL of XTT, 2,3-bis[2-methyloxy-4-nitro-5-sulfophenyl]-2H-tetrazolium-5-carboxanilide (500 mg/mL), activated with PMS, phenazine methosulfate (50 mg/mL), followed by incubation for 3 hours at 37°C. The mitochondrial activity of *L. amazonensis* was determined at 450/620 nm, and the inhibition percentage of this activity was estimated by comparison with untreated control cultures.
Results: The ERYBUT and ERYDEC incorporated in P-123 did not interfere in the mitochondrial activity of *L. amazonensis* at any of the tested concentrations. In the absence of light, the results were similar.
Conclusion: It is concluded that ERYBUT and ERYDEC incorporated in P-123 do not penetrate or are not incorporated into the parasites, which may explain the absence of impact on the mitochondrial activity of *L. amazonensis in vitro*, suggesting that these compounds have no potential for the treatment of cutaneous leishmaniasis by PDT.

P198

DEVELOPMENT OF FLUORINATED RHODACYANINE ANALOGUES FOR ANTI-LEISHMANIASIS

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Introduction: Recently, fluorinated rhodacyanine has been disclosed as a highly effective agent against *Leishmania donovani*; it was shown that replacement of hydrogen with a fluorine atom on a benzothiazole unit significantly enhanced the anti-leishmanial activity and selectivity.[1] However, the role of the fluorine substituent in this analogue has not yet been clarified and mechanism of actions remains unclear.
Aim: In this research, we synthesized a series of fluorine-containing rhodacyanine analogues to study their structure-activity relationship (SAR) especially for the effect of the type and position of fluorine-containing groups on the anti-leishmanial activity.
Methods: The fluorine-containing rhodacyanine analogues were synthesized starting from fluorinated or perfluoroalkylated benzothiazolium tosylates. These intermediates were prepared from the corresponding anilines through an acetylation, thionation and cyclization reaction sequence to give the desired products. Finally, fluorine-containing rhodacyanine analogues could be achieved by the reaction of 3-ethylrhodanine, *N,N*-diphenylformamidine and the benzothiazolium salts. These compounds were tested for their *in vitro* anti-leishmanial

activity against promastigotes of *L. martiniquensis,* the indigenous *Leishmania* species of Thailand,[2] using colorimetric assay.[3]

Results: The fifteen novel and three known compounds, **1a**-**1g**, were finally synthesized in good to excellent yields. From the biological activity evaluation, it was shown that the most active compounds with more than 75 %inhibition were **1c**, **1c'**, **1g**, and **1l** at the concentration of 0.1 μM. The SAR study of this series revealed that the introduction of fluorine atoms at different positions on the benzothiazole units led to enhanced activities; however, the -CF_3 and -OCF_3 led to a dramatic decrease in the bioactivity.

Conclusion: The placement of fluoro/perfluoroalkyl groups on rhodacyanines significantly affects their anti-leishmanial activities. Herein, we clarified that the introduction of 5-F on the rhodacyanine analogues gave the maximum biological activity.

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P200

LACK OF ASSOCIATION BETWEEN ASTHMA, ATOPY AND HELMINTHIC INFECTION IN SCHOOL-AGE CHILDREN IN THE PROVINCE OF BENGO, ANGOLA

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Introduction: Epidemiological studies conducted in several countries of the world and in some African countries have shown that there is controversy in the relationship between asthma, atopy and helminthic infection. There are no studies on this relationship in the Angolan population.

Aim: The aim of this study is to evaluate the relationship between asthma, atopy and helminths infection in children aged 5 to 14 years living in the province of Bengo, Angola.

Methods: Cross-sectional study using the methodology of the International study of Asthma and Allergies in Childhood, conducted from September to November 2017. From a total of 33 schools, five schools (15%), three in urban areas and two in rural areas were randomly selected. Asthma, rhinitis and eczema were defined based on symptoms in the previous 12 months; Atopy was defined by skin tests and positive inhalant phadiatop and helminthic infection in the presence of helminths in the faeces.

Results: The sample consisted of 1023 children, 48% female, 58% between 10 and 14 years and 61% living in urban areas. About 9% of the children had asthma, 22% had rhinitis, 16% had eczema, 8% were sensitizing to any of the aeroallergens tested and 36% were infected by any of the helminths tested, and the helminth more frequent was *Ascaris lumbricoides* In 23% of the children, followed by *Hymenolepsis nana* in 6% and *Trichuris trichiuria* in 4% of the children.

Conclusion: The prevalence of helminthic infection did not reveal any relationship between the higher or lower prevalence of allergic diseases or allergic sensitizing in children who participated in the study. We conclude that the data from our study did not show any relationship between the prevalence of asthma, atopy and helminths infection. More comprehensive studies with a greater number of participants will be needed to clarify these aspects.

P201

TESTING THE DLP-BASED NIR SPECTROMETER FOR THE DIAGNOSIS AND CHARACTERISATION OF TROPICAL LYMPHOEDEMA IN WESTERN ETHIOPIA; A PILOT STUDY

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Introduction: In tropical settings, lymphoedema may be caused by podoconiosis, lymphatic filariasis, leprosy or other systemic diseases. The two major causes of tropical lymphoedema are podoconiosis and lymphatic filariasis. Accurate diagnosis and characterisation of these conditions is essential to treat the patient in a timely way with effective therapy to prevent progression of disease. Diagnosis is also vital for research into natural history of the disease, drug discovery, patient care and clinical trials[1].

Aim: The aim of the study was to evaluate the DLP spectrometer for the diagnosis and characterisation of tropical lymphoedema.

Methods: The study was conducted in Konchi Clinic, Wayu Tuka *Woreda*, Western Ethiopia. A two-gate study design was used. Thirty people participated in the study, twenty podoconiosis cases and 10 healthy controls. All cases and controls were scanned at ten different sites on both lower legs and feet using the DLP spectrometer by two independent raters and each rater took duplicate measurements.

Results: Principal component analysis showed that the scanner can clearly differentiate between cases and controls. The device sensitivity and specificity were 90.6% and 82.1% respectively. The area under the curve was 0.94. Mid-foot and anterior lower third of the leg seemed the best sites at which to distinguish patients from controls. Differentiation of cases from controls was clearest for the advanced disease stage.

Conclusion: The scanner was able to differentiate between cases and controls. Gender and age did not impact the spectrum, unlike clinical stage. The mid-foot was the best site from which to gather data. There

was no significant inter-rater or intra-rater variation. We recommend further validation of the device using larger population.

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P202

IDENTIFICATION OF ENDEMIC PLANTS WITH POTENTIAL FOR LYMPHOEDEMA TREATMENT

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Introduction: Lymphoedema is a chronic progressive swelling of one or more parts of the body due to an imbalance between lymph formation and absorption into lymphatic vessels. The two prominent sources of limb lymphoedema in Ethiopia are lymphatic filariasis (LF) and podoconiosis. The former is caused by parasitic nematode infection while the latter is caused by exposure to irritant clay soils. Care of lymphoedema in Ethiopia at present consists of foot hygiene, skin care, compression bandaging, exercise and antibiotic therapy for 'acute episodes' (recurrent acute adenolymphangitis). However, most lymphoedema patients in Ethiopia rely on traditional herbal medicine to manage their condition. A range of endemic plant extracts have been used for their larvicidal, anti-pain, anti-infective and diuretic activities in the care of wounds and limb swelling in Ethiopia.
Aim: To identify effective and safe endemic plant extracts against infection and inflammation from previous studies carried out in animal models.
Methods: A literature review was conducted to identify plants with topical anti-infective, anti-inflammatory, analgesic or wound-healing activities. The comprehensive review included journal articles, books and thesis/dissertation to extract relevant information. Ethnobotanical literature reports and books were used as a reference for traditional use and local names.
Results: A total of 54 plants with topical anti-infective, analgesic and anti-inflammatory activities were identified. Ten of these were selected for *in-vitro* screening tests based on indigenous knowledge, efficacy and safety evidence, abundance and accessibility.
Conclusion: Scientific evidence from the literature and traditional practice in Ethiopia suggests that the 10 plants selected are promising candidates for lymphoedema management. Further test is required to evaluate antimicrobial and antifungal efficacy of the extracts of these medicinal plants.

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KNOWLEDGE ON CHAGAS DISEASE AMONG LATIN AMERICAN MIGRANTS ATTENDING A COMMUNITY-BASED SCREENING CAMPAIGN IN SPAIN

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Introduction: Chagas Disease (CD) is endemic in Latin America. Due to migratory movements, Spain is the European country that hosts more imported cases.
Aim: To assess the level of knowledge on CD among Latin-American migrants attending a community-based screening campaign in the province of Alicante, Spain.
Methods: A screening campaign was performed in three municipalities of Alicante where blood was drawn for *Trypanosoma cruzi* and *Strongyloides spp* serology. During the event, participants were given a questionnaire about CD. After fulfilling it, they were given an informative talk about CD. An informed consent was signed.
Results: 369 people attended the event; 64 minors and 11 Spaniards were excluded for this study. Median age was 40 years and 175 participants (59.5%) were women. Most frequent nationalities were: Bolivian (n=135), Ecuadorian (n=110) and Colombian (n=28). Only 17.7% admitted having received prior information about CD, 11.6% had previously undergone serology and seven participants had already been diagnosed. Up to 68.4% knew the vectorial way of transmission, but only 29.9% knew the insect's name. Vertical transmission was known by 36.4%. Almost half (49.7%) answered correctly about heart involvement but only 26.5% knew that CD can affect the digestive tract and 26.9% that the disease can go silent. Up to 59.5% were aware that it is a severe illness; 33% of the participants thought it has a cure.
Bolivian migrants seemed to have better information about CD than participants from other nationalities: average percentages of correct answers were 3.7 vs. 2.6, with a higher knowledge of the vectorial transmission mechanism and cardiac involvement (p=0.001).

When comparing the results according to the educational level (elementary, secondary and higher education, the average percentages of correct answers about ways of transmission were 2.2, 3.2 and 4.1 respectively ($p<0.001$), and about heart involvement were 0.7, 1.1 and 1.7 ($p=0,001$).

Conclusions: Knowledge about CD among Latin-American migrants was poor, especially regarding vertical transmission of CD, which is the most relevant mechanism of transmission in Europe.

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STABILIZATION OF SmMIT-LAMP REAGENTS FOR APPLICATION IN POINT-OF-CARE DIAGNOSTIC OF SCHISTOSOMIASIS

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Introduction: Human schistosomiasis is one of the most important NTDs. A LAMP method for the detection of *S. mansoni* DNA (SmMIT-LAMP) was established by our group to perform early diagnosis of schistosomiasis in a murine model. Recently, the SmMIT-LAMP was successfully tested in human stool samples, snails and in human urine samples. LAMP technology has been proposed as the ideal tool for a molecular POC diagnosis. However, one of the drawbacks is to maintain the cold chain to preserve reagents for application in low-resources endemic areas.

Aim: The goal is to develop a LAMP kit in a ready-to-use format with dried reagents useful for easy application in resources limited settings of schistosomiasis.

Methods: Both concentration and desiccation procedures, based on the use of trehalose, were studied to stabilize SmMIT-LAMP reaction mixes over. These procedures were applied to reaction mixes used in real-time LAMP assays (using a portable device) or in end-point conventional colorimetric detection (using a thermoblock) adding different dyes pre- (malachite green/calcein) or post-amplification (SYBR Green I). Reaction volumes ranging 5-25 µL were also tested. Desiccated mixes were stored up to 3 months both at RT and 4°C to evaluate. DNA from *S. mansoni* was also included from the beginning of the desiccation procedure as positive control. The rehydration of the mixtures and subsequent LAMP reactions were performed at different times post-desiccation.

Results: The SmMIT-LAMP reactions gave positive results with desiccated mixes after 1 month stored at RT and 3 months stored at 4°C. A notable delay in amplification time (30 to 60 min) was observed in stabilized mixes in comparison to fresh liquid ones, although not significant reduction in final amplification levels took place. We find out differences in color turns between fresh and desiccated LAMP mixes for the same pre-amplification dyes concentration. We also obtained functional LAMP reactions with reaction mix volumes down to 15 µL.

Conclusion: We established a simple 30 min one-step desiccation procedure to stabilize SmMIT-LAMP reaction mixes for potential ready-to-use application. This procedure is adaptable to different LAMP assays to a POCT set-up for many NTDs.

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P206

AN UNUSUAL CASE OF RELAPSING VISCERAL AND CUTANEOUS LEISHMANIASIS IN AN IMMUNOCOMPROMISED PATIENT

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Introduction: We present the case of a 43-year-old man with refractory visceral leishmaniasis.

Background: This gentleman of Portugese origin had a background of treated hepatitis C infection and of HIV-1 infection diagnosed over 20 years ago, with intermittent anti-retroviral therapy adherence leading to development of resistance mutations. He initially presented in 2012 in Portugal with visceral leishmaniasis diagnosed on bone marrow morphology. He required three consecutive courses of treatment with ambisome due to persistently abnormal bone marrow morphology on repeat sampling. He represented in March 2018 with symptoms of fever and weight loss and was given a further course of ambisome treatment.

His latest presentation was in August 2018 with suspicious skin lesions and incidental mild pancytopenia. His CD4 was <100 at the time due to continued non-adherence to HIV therapy. Amastigotes were seen in the skin biopsy, and in a subsequent bone marrow biopsy. Bone marrow PCR was positive for Leishmania donovanii. He was treated with a full course of ambisome as well as concurrent miltefosine, followed by 3 weekly prophylactic pentamidine due to multiple relapses. He also re-engaged with HIV services with satisfactory viral load suppression.

Discussion: Literature suggests that unusual manifestations of visceral leishmaniasis are more common in HIV co-infected patients, as is the incidence of relapses or refractory leishmaniasis. Predictive factors are poorly known, although low CD4 count and absence of secondary prophylaxis against visceral leishmaniasis contribute to a higher relapse rate. Diagnostics are more difficult as serology sensitivity is much lower; indeed, diagnosis was made first on bone marrow biopsy and finally on skin biopsy in the above case.

This presents a reminder in clinical practice that HIV and visceral leishmaniasis coinfection is on the increase, with 5-7% of cases occurring in southern European countries and can present with atypical symptoms. The relapse rate is higher in HIV co-infected individuals, and this is compounded by low CD4 count and lack of secondary prophylaxis post treatment. Finally, cutaneous leishmaniasis in an immunosuppressed patient should always prompt investigation for visceral leishmaniasis even in the absence of typical clinical symptoms. Serology often has low sensitivity in these patients.

P207

VALIDATION OF A PORTABLE THREE-DIMENSIONAL IMAGING SYSTEM FOR MEASURING LOWER LIMB VOLUME OF PODOCONIOSIS PATIENTS; A PILOT STUDY

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Introduction: Podoconiosis is a non-infectious geochemical disease arising in barefoot subsistence farmers who are in long-term contact with irritant red clay soil of volcanic origins. The disease causes progressive bilateral swelling of the lower legs. Measuring lower limb volume can be useful tool in early diagnoses, establishing the disease severity and staging of lymphoedema and to measure treatment and self-management outcomes over time. However, there is no fully validated reliable method for quantifying lower limb lymphoedema volume in podoconiosis patients[1,2].
Aim: The aim of this was to validate the LymphaTech scanner, a lymphedema measuring and monitoring tool that uses a 3D infrared depth sensor integrated into a computer tablet with custom software, for measuring lower limb volume of podoconiosis patients.
Method: A prospective observational study was conducted in Konchi Clinic, Wayu Tuka *Woreda*, Western Ethiopia. Twenty-four podoconiosis patients of different clinical stages attending the clinic were assessed their lower limb volume by the 3D imaging system (index test) and the gold standard water displacement method by two independent raters, with each rater performing duplicate measurements.
Result: Volumes of patients measured ranged from 1046 ml to 7884 ml. The correlation coefficient between the scanner and water displacement measurements was 0.98. A Bland Altman analysis of volume differences indicated a bias of 269 ml, in which the scanner underestimated the limb volume compared to water displacement, but with a high degree of consistency thus resulting in a strong correlation coefficient. More importantly the scanner allows for much faster measurements, does not require access to water, is much more portable than a large water displacement tank and does not present with the hygiene issues associated with using water displacement.
Conclusion: Results suggest the LymphaTech scanner is a promising tool for measuring limb volume of podoconiosis patients.
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ACCESS TO SCHISTOSOMIASIS DIAGNOSIS AND TREATMENT: A MULTICENTER COHORT STUDY

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Introduction: Barriers to access to care, jeopardized diagnostic strategies, and physicians' low awareness remain oppressive issues in the fight against schistosomiasis in migrants. In this sense, in 2018, ECDC released guidelines focusing on early and active screening in non endemic countries.
Aim: Examine the different screening programmes, diagnostic workflows, treatments, and retention in care in migrants with schistosomiasis attending large tertiary hospitals in Italy, in order to call for a comprehensive and harmonized approach in this fragile population.
Methods: A retrospective, observational study was carried out between January,1 2016 and December,31 2017 in five large Infectious Diseases Departments in Italy. We included patients from endemic countries that have at least one laboratory test positive for schistosomiasis. We differentiated among cases identified by i) early screening ("migrant screening"), ii)"late screenings" in patients followed in our clinics because of different infection and iii) patients tested because of a suggestive clinical presentation. Demographic and clinical data, travel history, diagnostic findings, therapies and follow up were recorded.
Results: 149 patients were included, 137 (91.9%) were male and 70% of them came from Sub-Saharan Africa. Fifteen (10%) were diagnosed by "migrant screening", whereas 23 (15.4%) patients were late screenings and 111 (74.5%) presented with signs/symptoms.
The median diagnostic delay was 31 months (IQR 10-146) from arrival in Italy, longer among "migrant screening" group (119 months, IQR 33-215) and "late screenings" (110 months, IQR 23-165). Among the 66 patients already followed in our clinics, 23 (34.8%) were identified by screening, whereas 65.2% because symptoms appearance. 53.7% of the diagnoses was based on positive serology alone whereas 49 (32.8%) patients had confirmed diagnosis (ova detection by microscopy), the remaining cases thanks to urine CCA. 37.8% patients presented eadiologic abnormalities. 147/149 patients received praziquantel as treatment (70.1% 3 days dose, 29.9 % single day dose). 51.7% were lost to follow-up.
Conclusion: Well-defined strategies are needed to avoid advanced complications of schistosomiasis.
In our multicenter cohort patients were screened late after arrival and most of diagnoses were based on clinical sign or advanced disease. Implementation of recent guidelines is required to improve early diagnosis and to overcome heterogeneity of practice.

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EPIDEMIOLOGY OF INFLUENZA VIRUS INFECTION AMONG UNDERGRADUATE STUDENTS OF A UNIVERSITY IN THAILAND

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Introduction: Influenza caused by a virus has worldwide spread and continued to increase. Suranaree University of Technology (SUT) located in Northeast of Thailand and approximately 11000-16000 undergraduate students are in SUT campus. Students are affected by influenza virus every year.
Aim: The objective of this study is to describe the characteristics of influenza infection among undergraduate students of SUT during 2014-2018.
Methods: A descriptive study was conducted among all undergraduate students who were laboratory-confirmed influenza infection during 2014-2018. Data were retrieved from medical records of SUT hospital. Variables were comprised of sex, age, BMI, symptoms, types of influenza viruses. Descriptive statistics was used to describe the characteristics of influenza cases. Chi-square test and ROC curve analysis were applied to analyze associated factors and correlation between body temperature and influenza infection.
Results: A total of 1115 influenza cases were identified during 2014-2018 (18, 95, 209, 670 and 123 cases in year 2014, 2015, 2016, 2017 and 2018 respectively). Ratio of males to females was 1:1.2. The mean age was 20.7 years old. (SD 1.8, min 17.6-max 29.7). BMI of cases were classified as underweight (20.9%), normal (48.2%), overweight and

obesity (30.8%). Out of 1115 cases, 789 (70.8%) were influenza type A and 326 (29.2%) were type B. The influenza A/B were widespread all the year with type A predominant and epidemic was occurred in 2017. Most common symptoms were influenza-like illness. Onset of illness before arriving hospital was 2-3 days in average. Most of cases were treated as outpatient and only 223 (9.0%) were admitted but no complication and no dead. Chi-square test found that sex and age group were significantly associated with influenza A/B infection (p-value <0.005). The correlation between body temperature and influenza A/B infection by ROC curve analysis found that area under the ROC curve was 0.67 (p-value <0.001).
Conclusion: Influenza virus still be incident among young age group with type A predominant. This finding could raise awareness for authorize person of SUT and students to prevent getting infection. Surveillance of influenza virus infection should be continued for early detection of an epidemic, investigation and control measures.

P210

INTEGRATED MANAGEMENT OF SKIN NTDS: AN NGO PERSPECTIVE

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Introduction: Since 1964, Damien Foundation (DF), a Belgian Medical Development NGO, makes a difference in the global fight against leprosy, tuberculosis (TB), and other neglected poverty diseases such as leishmaniasis. Recently, the WHO is actively promoting an integrated strategy for skin-related (neglected tropical disease) NTDs that require active detection, management and control, and is harnessing the experience of many experts involved in skin diseases to provide guidance to implement the integrated strategy in countries where skin related NTDs are a major burden[1]. Such an integrated management of skin NTDs, however, forces organizations as DF to step out of its comfort zone to evolve from a historic vertical-oriented, disease-specific approach to an integrated approach whereby strategic partnerships, collaborations and synergies are key to success.
Aim: To discuss the challenges, opportunities and perspectives of an integrated management of skin NTDs from a NGO perspective.
Methods: Literature review, experts' discussions and lessons learned from pilot projects.
Results and conclusion: Global findings: during the last NTD NGO Network (NNN) Conference (2018) in Addis Ababa, Ethiopia, the main learning point was that the integration of skin diseases provides an opportunity to build the capacity of primary health care workers to detect and treat a number of diseases using the same resources. Furthermore, the NNN conference identified as main key action points (i) enhancement of advocacy for integration at national and international levels and (ii) flexibility of funding from donor's perspective needed to allow integration to succeed.
DF findings: we provide insights in the internal kitchen of a NGO to respond to this international call to action. We will discuss the potential impact on (i) the internal organizational model of DF; (ii) capacity building of HR (e.g., training) and infrastructure (e.g., sensibilization support, diagnosis and treatment); (iii) funding challenges and opportunities; (iv) research (cost-effectiveness of integration); (v) communication and advocacy; as well as (vi) local and international partnerships. Moreover, we present our pilot projects in DRC and discuss how the Global Partnership for Zero Leprosy (GPZL) could play a catalysing role in the integrated approach to control skin NTDs.

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THE PROJECT "GARANTIZANDO DERECHOS": A RETROSPECTIVE STUDY ON TEN YEARS OF SCREENING ACTIVITIES FOR CHAGAS DISEASE AND STRONGYLOIDOSIS IN A LATINO-AMERICAN COMMUNITY LIVING IN NORTHERN ITALY

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Introduction/Aim: This study aims at describing the results of the project: "Garantizando derechos". Originating from the health needs of the Bolivian community present in Bergamo area (Northern Italy), various information/education activities followed by the offer of free screening tests for two Neglected Tropical Diseases (NTDs) to Latino-American migrants have been implemented. The project was originally designed to include only Chagas Disease (CD) and it has been extended throughout the years also to Strongyloidiasis (S) when it became clear that the two conditions were often coexisting.
Methods: This retrospective study describes the prevalence of two NTDs in a population of 2943 Latino-Americans enrolled from 2009 to end 2018 (no age limit). A questionnaire was administered before blood test, concerning demographic data and individual history. Data analysis focused mainly on Bolivians (n=2674, 91.3%). Seroprevalence rates were presented through a geographical representation comparing different Bolivian departments. Moreover, our study assessed the main predictive factors for CD by uni- and multivariate analysis.
Results: The overall prevalence of CD in the whole population was 20.5% (n=602), 21.7%(n=594) in the Bolivians. *T.cruzi* seroprevalence appears to increase moving closer to South-Eastern Bolivia, corresponding to the Gran Chaco upland. 12.3% (n=307) of the entire population and 12.6% (n=294) of Bolivians tested positive for S. A positive link between the two conditions has been found (OR=1.9 IC 95% 1.12-3.08). Predictive factors for CD were: coming from Gran Chaco area (OR=2.0 IC 95% 1.24-3.14), having lived in mud houses (OR=2.0 IC 95% 1.23-3.24), having received transfusions in Bolivia (OR=2.8 IC 95% 1.5-5.1) and age (Median 43 years IQR 35-50).
Conclusion: Our study confirmed CD and S as major health problems in Latino-American, and particularly Bolivian, population. Collected data suggest the usefulness for a combined screening for these conditions in at risk populations, even in non-endemic countries. The community-based approach of our project and the focus on the presence of multiple NTDs (and other non-infectious comorbidities, not shown) could be considered the most suitable strategy for the control of such diseases in non-endemic areas and furthermore an adequate support for fulfilling health-care needs of the most disadvantaged populations.

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THE USE OF CIRCULATING CATHODIC ANTIGEN RAPID TEST FOR EARLY DIAGNOSIS OF *SCHISTOSOMA MANSONI* INFECTION

IN MIGRANTS COMING FROM ENDEMIC AREAS: A 17-MONTH STUDY

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Background: Most cases of schistosomiasis occur without symptoms for many years, leading indolently to permanent hepatic and urinary impairment. Early diagnosis is fundamental, especially in non-endemic countries where diagnostic suspicion is lower.
Objective: To achieve early diagnosis of schistosomiasis in migrants coming from endemic areas, with limited access to health care system, we assessed the diagnostic accuracy of Circulating Cathodic Antigen rapid test (CCA-test) in a voluntary primary health care center (Opera San Francesco Outpatient Clinic, OSFOC), during a period of 17 months.
Methods: From October 1st, 2017 to February 28th, 2019, all migrants coming from or travelling to endemic areas, or referring risk exposure or suggestive symptoms, who were admitted to OSFOC underwent a CCA-test. Positive subjects went to our Infectious Diseases Department (San Raffaele Hospital, Milan, Italy) to perform in-depth analysis and receive treatment. Furthermore, as of September 2018 faecal parasitological exam was performed thanks to our Parasitology Laboratory (L. Sacco Hospital, Milan, Italy). Patients treated with praziquantel were retested with CCA-test after two months to evaluate treatment efficacy.
Results: Overall, 152 migrants were evaluated: 132 (86.8%) males, 20 (13.2%) females, with a median age of 38 years (ranging from 18 to 70), 144 (94.7%) coming from Egypt, 2 (1.3%) each from Morocco and Pakistan, 1 (0.7%) each from Burkina Faso, Senegal, Algeria, and Iran. 40 subjects (26.3%) were positive at CCA-test (95% from Egypt, 2.5% from Morocco and 2.5% from Pakistan). 21 CCA-test positive subjects were further evaluated at the Infectious Diseases Departments for risk factors, symptoms and previous treatments. In 13 patients, blood tests, stool microscopy and urine analysis were performed: 8 patients had positive Schistosoma serology, none had positive stool microscopy. 16 of 21 positive CCA-test subjects were treated with praziquantel; only 4 came back to OSFOC and resulted negative at CCA-test two months after treatment.
Conclusions: CCA-test seems to be a rapid and easy-to-use tool for early diagnosis of schistosomiasis, especially in migrants with limited healthcare access in low incidence countries. After lengthening our monitoring from 4 to 17 months, the rate of positive CCA-tests in migrants decreased from 38.2% (data previously showed) to 26.3%.

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DMU E-PARASITOLOGY: A TOOL TO TEACH CELL AND PARASITE CULTURE

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Introduction: Emerging and re-emerging human parasites have become global health threats due to factors including globalisation, climate and vector ecology changes, highlighting the necessity to train future health care professionals in human parasitology. However, a significant erosion in parasitology teaching coupled with a reduction of the number of parasitology departments across European universities is evident. To maintain and strengthen parasitology teaching, De Montfort University (DMU, Leicester, UK) leads an innovative international project developing a complete on-line package for teaching and learning parasitology - *DMU e-Parasitology*. This package, publicly available on the DMU website (http://parasitology.dmu.ac.uk/) in late 2019, will contain various modules including a Virtual Laboratory equipped with explanatory videos illustrating cell and parasite practical work enhancing the overall user experience by promoting self-learning and overcoming barriers including time and resources.
Aim: To test the Human Parasite and Cell Culture e-learning units from *DMU e-Parasitology* with bioscience students to assess delivery of the corresponding learning objectives, *i.e.* key skills for working in a cell culture unit and managing human cell and parasite cultures.
Methods: A blended learning approach was evaluated using the *DMU e-Parasitology* practical modules and a focus group of second year BSc Biomedical Science students at DMU attending a 3-hour training session on cell culture (suspension and adherent human cancer cells lines, assessment of viable vs. dead cells). Following completion of the relevant units and formative activities in *DMU e-Parasitology*, students were invited to complete a validated feedback-questionnaire at the end of the practical session.
Results: The majority of participants indicated that the overall unit design was suitable, interactive [81.3% (56.3% agreed, 25% strongly agreed] and highlighted the value of the embedded diagrams/videos in facilitating learning. Most students noted they had acquired some basic practical skills using *DMU e-Parasitology*, enabling them to work effectively in a cell culture facility (37.5% agreed, 43.8% strongly agreed).
Conclusions: The e-learning units covering cell and parasite culture in *DMU e-Parasitology* used in a blended learning strategy enhances the understanding and acquisition of practical techniques by bioscience students and is a model for the development of other courses, quizzes or CPD training.

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IMPACT OF PERIODIC SELECTIVE PZQ TREATMENT ON *SCHISTOSOMA MANSONI* INFECTION AS MONITORED BY KATO-KATZ AND POC-CCA IN A SCHISTOSOMIASIS ENDEMIC COMMUNITY IN THE DEMOCRATIC REPUBLIC OF CONGO

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Introduction: The urine point-of-care circulating cathodic antigen test (POC-CCA) has been proposed as a diagnostic alternative for the Kato-Katz technique (KK) to detect *Schistosoma mansoni* infections. It is sensitive and field-applicable and has already shown its value as a rapid tool for disease mapping. However, only few studies have evaluated its suitability for monitoring drug efficacy and re-infection.
Aim: To compare POC-CCA with KK for assessing the impact of periodic selective treatment of *S. mansoni* infection in a rural schistosomiasis endemic community in DRCongo.
Methods: In a schistosomiasis endemic community, we followed up a cohort of 299 individuals (1-80 years), at three-week intervals for 6

months. At baseline and for each follow-up, two stool samples and at least one urine sample were collected and subjected to duplicate KK smears and urine filtration (UF) for the microscopic detection of *S. mansoni* and *S. haematobium* eggs, respectively. In addition, an aliquot of urine was tested for *S. mansoni* infection by POC-CCA. At each timepoint, those who were positive for schistosome eggs (based on microscopy), received a single dose of 40 mg/kg praziquantel.

Results: At baseline, 62.5% of the participants were *S. mansoni* positive by KK and 68.2% by POC-CCA; 61.2% were *S. haematobium* positive. After the first round of treatment, 94.7% of all individuals who were KK positive at baseline were cured and after the second round, this was 100%. Starting from all individuals who were POC-CCA positive at baseline and treated, only 59.9% were cured after the first round of treatment. After the third round of treatment, the cure rate increased to 98.1%. Based on UF, cumulative cure rates increased from 65.4% after the first round to 94.3% after three rounds of treatment.

Conclusion: Our results indicate that periodic selective treatment with praziquantel is effective in reducing the number of schistosome infections in an endemic community in DRCongo. Based on KK, 2 rounds of treatment are sufficient to obtain a CCR of 100% while based on POC-CCA and UF, at least 4 rounds are needed. These findings have important implications as to what diagnostic and treatment strategies should be implemented when proceeding towards elimination.

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HIGHLY EFFICIENT, SHORT-COURSE THERAPY OF BURULI ULCER: FROM LABORATORY STUDIES TO CLINICAL TESTING

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Buruli ulcer (BU), is a neglected tropical disease causing skin lesions with debilitating sequelae such as wounds, contractures and scars. With no vaccine available and an unknown transmission cycle, rapid diagnosis and efficient antimicrobial drug treatment are the main tools for BU disease control. Antimicrobial treatment for BU treatment has come a long way from surgery, to an 8-week-regimen with rifampin (RIF) and streptomycin (STR). Now, STR is being replaced with oral clarithromycin (CLR). A drug regimen with more efficient antimicrobials that can treat BU in a shorter duration is highly desirable; some evidence already suggests that patients with small lesions who default from the standard RIF plus STR or CLR still experience healing. With the aim to identify and test an improved BU antimicrobial regimen, we conducted pre-clinical studies in the mouse footpad infection model of BU. These encompassed testing higher doses of RIF, which are being evaluated for treatment for TB and have been shown to be safe, as well as the application of newer anti-mycobacterial agents. In a first dose-ranging study in BALB/c mice (n=110), we tested RIF 5, 10, 20, 40 mg/kg as well as rifapentine (RPT) 5, 10 and 20 mg/kg, both in combination with CLR. We observed dose-dependent efficacy of both rifamycins; 40 mg/kg RIF and all RPT regimens delivered culture-free lesions after only 4 weeks of treatment. Secondly, we conducted a confirmatory study with both microbiological outcome and also relapse assessment. In the second study, BALB/c mice (n=176) were treated with 10-30 mg/kg of RIF in combination with CLR, or with azithromycin (AZI). AZI has less drug-drug interactions with RIF and is therefore hypothesized to be more efficacious in this combination regimen. While the 4 week 30 mg/kg RIF+CLR regimen was highly efficient, AZI appeared to be even more favorable than CLR. Furthermore, there are several new therapeutic options to treat BU, such as diarylquinolines (notably Bedaquiline) or Q203. These agents are in use and development for *M. tuberculosis* infection and exhibit high antimicrobial effects against the phylogenetically related *M. ulcerans*, the causative agent of BU. It was demonstrated that high-dose RIF and new anti-mycobacterial agents can improve and shorten BU treatment in mice. Flowingly these results we present a strategy and protocol for clinical studies with the aim to implement a highly-efficient, short-course antimicrobial regimen for BU.

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METABOLOMIC PROFILING AND IN VIVO TOXICITY OF ESSENTIAL OILS AS PROMISING HITS AND AFFORDABLE BIOACTIVE AGENTS AGAINST Madurella mycetomatis

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There is an increasing demand to develop antifungal agents to combat *Madurella mycetomatis*; the major causative agent of mycetoma. This infection is currently treated by triazoles, antifungal agents with limited efficacy and thereby high morbidity rates [1]. Hence, there is an urgent need to identify novel and affordable fungicidal agents with fewer side effects. A dozen of essential oils (EOs) of taxonomically diverse aromatic medicinal plants were extracted by hydrodistillation followed by GC/MS analysis. EOs were screened for antifungal activity *in vitro* and for toxicity *in vivo* on *Galleria mellonella* larvae model [2]. The biological and chemical data generated were subsequently subjected to chemometric analysis.

Seven fungal cultures from diverse geographical origin were exposed to various concentrations of essential oils ranging from 0.25-0.0039%v/v employing resazurin viability assay [3]. Itraconazole was used as positive control.

Ten out of twelve tested oils exhibited remarkable *in vitro* antifungal activity (MIC 0.125- 0.0078%v/v) with no toxicity at 0.5-1%v/v. GC/MS analysis identified diverse monoterpenes and sesquiterpenes associated with antifungal activity. Chemometric analysis revealed that the most active essential oil, *Croton zambezicus*, was clearly separated by chemical data as well as *Xylopia aethiopica* and *Boswellia papyrifera*. Some of the identified pure compounds (*B*-caryophyl, *p*-cymene, sabinene, 1,8-cineole, linalool, thymol and borneol) previously exhibited varying degrees of antimycetomal activity as single compounds. Chemometric analysis of the EOs constituents identified by GC/MS coupled with the antimycetomal activity revealed that the following monoterpenes, terpinen-4-ol, *n*-octyl acetate, *p*-cymene, 1,8-cineole, α-terpineoland linalool are most likely the active compounds against *M. mycetomatis*.

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INTRANASAL ARTESUNATE THERMOSENSITIVE CHITOSAN GEL FOR THE TREATMENT OF SEVERE AND CEREBRAL MALARIA IN RURAL AREAS

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Introduction: Parenteral artesunate is used as first line treatment for severe and cerebral malaria. These therapies require hospital admission and the skills of medical personnel. This is a major shortcoming as most endemic areas come under the under developed or developing countries of the world where prompt access to health-care facilities and workers can be challenging in remote areas. Moreover, early treatment is key to preventing brain injuries or other complications associated with cerebral malaria. Intranasal drug delivery has been found to provide direct access to the central nervous system bringing about a safe, rapid and satisfactory alternative to parenteral administration of drugs, while avoiding the blood brain barrier unlike the oral route.
Aim: The goal of this study was to design chitosan based thermosentive gels of artesunate for intranasal administration to be used as an alternative to parenteral route of administration for the treatment cerebral and severe malaria in rural areas.
Methods: Chitosan thermosensitve gels containing 5% artesunate were formulated using appropriate quantities of 25% cross-linking agent (α, β-glycerophosphate calcium), 1% poly (ethylene) glycol and 5% sodium bicarbonate. Gelling temperatures and gelling times of formulations at body temperature (37°C) were determined for each batch. Morphological investigations as well as *in vitro* release and permeation studies were carried out on all batches of thermosensitive gels. The results obtained from *in vitro* release analysis were fitted into mathematical models.
Results: Artesunate formulations (GA1 and GA2) gelled at temperatures above room temperature (28.0 ± 0.8 and 29.0 ± 1.4°C) with gelling times of 0.8 ± 0.08 and 5.0 ± 0.07 minutes respectively. Scanning electron microscope images of gels showed firmer crosslinking with the addition of α, β-glycerophosphate calcium than with 1% poly (ethylene) glycol alone. Addition of sodium bicarbonate resulted in porous gel networks which exhibited faster rate of drug release. GA2 released 99.8% of drug in 5 hours and both GA1 and GA2 had higher drug permeation compared to pure artesunate.
Conclusion: Artesunate-thermosensitive chitosan gels were successfully formulated and demonstrated rapid gelation at body temperature. Higher drug permeation was achieved with gels compared to pure drug samples.

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SEVERE MALARIA IS THE LEADING CAUSE OF HOSPITAL ADMISSIONS AMONG UNDER-FIVE CHILDREN IN A POST-EBOLA COMMUNITY IN RURAL NORTHERN SIERRA LEONE: A 3- YEAR REVIEW

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Introduction: Severe malaria remains a leading cause of morbidity and mortality in under-five year old African children. Recent global reports indicated that progress in malaria control has stalled, necessitating renewed efforts in the fight against malaria. The Kambia Government Hospital (KGH), is a 100-bedded facility that serves a population of approximately 350,000 people in rural northern Sierra Leone. Kambia District was one of the affected communities in Sierra Leone during the 2014-16 Ebola outbreak. An IMI2-funded project (EBOVAC1) started in Kambia during the outbreak, with the objectives of evaluating the immunogenicity and safety of a prophylactic Ebola vaccine regimen: Ad26.ZEBOV and MVA-BN-Filo. The trial is sponsored by Janssen Vaccines & Prevention B.V.
Aim: We conducted a retrospective review of paediatric admissions over a three-year period at KGH to identify the causes of hospitalisation with a view to understand the adverse events recorded in the study children participating in the ongoing Ebola vaccine trial and gain insights into child health priorities in a post-Ebola setting.
Methods: We examined hospital registers of children admitted to KGH from January 2016 to December 2018. Data on causes of admissions were collated and descriptive analysis was performed.
Results: A total of 3728 admissions were recorded in the paediatric ward of KGH over the 3-year period. Severe malaria was the leading cause of admissions, accounting for approximately 68.1% (999/1466) of all paediatric admissions in 2016, 63.7% (846/1327) in 2017 and 59.9% (560/935) in 2018. The highest number of cases occurred from July to September. The contribution of severe malaria to paediatric admissions at KGH decreased by 8.2% from 2016 to 2018, but was not statistically significant [R^2=0.97, p=0.1102, 95% CI: -707.3 to 268.3]. Other major causes of admissions included pneumonia (14.2%) and severe acute malnutrition (12.1%).
Conclusions: Severe malaria remains a leading indication for hospital admissions for children presenting to KGH. Implementation of seasonal malaria chemoprevention (SMC) may be effective in reducing cases of severe malaria during the peak period. Further priority actions should focus on strengthening the health system and providing conducive platforms for evaluation and implementation of newer interventions against malaria.

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THE WWARN CLINICAL TRIALS PUBLICATION LIBRARY: A SYSTEMATICALLY CONSTRUCTED DATABASE OF *PLASMODIUM* CLINICAL EFFICACY TRIALS

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Introduction: The WorldWide Antimalarial Resistance Network (WWARN) aims to provide innovative tools and a collaborative data sharing platform in the fight against antimalarial drug resistance. As part of this commitment, since 2011, we have been building a comprehensive library of all published antimalarial clinical efficacy trials as a resource to streamline the process of finding data and conducting systematic reviews.
Aim: This study summarises the methodologies used and the evidence contained in the current WWARN Clinical Trials Publication Library, and proposes its use as a regularly updated, open-access tool to be utilised by the wider malaria community.
Methods: Between 2011 and 2018, a series of systematic searches were conducted in PubMed, EMBASE, Web of Science Core Collection and CENTRAL databases to identify all published prospective clinical trials examining the efficacy of antimalarial drugs in uncomplicated malaria. Iterative refinements were made to the search strategy over time. Screening and data extraction were carried out by multiple reviewers, and the results were collated into a REDCap database.
Results: A total of 1,553 studies published up to July 2018 were included, which represents more than 360,000 enrolled patients. Since the first study published in 1946, the number of studies increased year on year, with 60% of studies conducted after the year 2000. 48% were in Africa, 39% in Asia and 7% in South America, and 11% were non-English studies. Among studies where data were available, 70% assessed solely *Plasmodium falciparum* and 14% solely *P.vivax*; 54% recruited children under 5 while 5% specifically recruited pregnant women. 50% of trials were randomised and only 9% were blinded. Overall, 48% of studies examined artemisinin and its derivatives, of which 74% tested one of the five WHO-recommended artemisinin-based combination therapies (ACTs).
Conclusion: In light of the ever-increasing body of literature on antimalarial efficacy, the WWARN Clinical Trials Publication Library will be a valuable resource to the wider malaria community in the process of evidence synthesis, and it also serves as a prototype that may be adapted for other infectious diseases in the future.

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DIAGNOSTIC PERFORMANCE OF THE ALERE™ ULTRA-SENSITIVE RAPID DIAGNOSTIC TEST FOR *PLASMODIUM FALCIPARUM* MALARIA INFECTIONS IN ASYMPTOMATIC PREGNANT WOMEN IN TIMIKA, INDONESIA

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Introduction: The diagnostic performance of existing malaria RDTs is inadequate for detecting low-density infections. Although "submicroscopic" infections are commonly asymptomatic, they contribute to the overall infectious reservoir, particularly in low-transmission areas. Detecting malaria infections during pregnancy poses a further challenge to diagnosis. During pregnancy P. falciparum can sequester in the placenta, reducing the number of circulating parasites, remaining undetected and untreated with potential adverse consequences for the pregnancy. There is an urgent need for sensitive diagnostics in these populations.
The new Alere™ Ultra-sensitive Malaria Ag P. falciparum RDT (uRDT) was developed to address the need for more sensitive, field-ready diagnostics.
Aim: To compare the performance of the uRDT with the currently used CareStart™ Malaria HRP2/pLDH VOM Combo RDT (csRDT) in asymptomatic pregnant women in a low-transmission setting in Indonesia.
Methods: As part of a larger malaria in pregnancy trial in Timika, West Papua (ISRCTN34010937), a subset of 270 stored red blood cell pellets and plasma samples were used in this study. These included 158 P. falciparum positive samples and 112 P. falciparum negative samples. Using a composite molecular reference standard comprising LAMP, qPCR and nPCR, we compared the diagnostic performance of both RDTs.
Results: The uRDT had a sensitivity of 19.6% (95% CI 13.9-26.8) and specificity of 95.5 % (89.4-98.3%), whilst these were 22.8% (16.7- 30.3%) and 98.2% (93.1- 99.7%) respectively with the conventional CareStart combo-RDT. Overall, the performance of the RDTs was not significantly different.
Conclusion: In these settings and populations of asymptomatic pregnant women, the uRDT offers no significant improvement in detecting low-density infections. Alternative diagnostic tests are urgently needed.

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EFFICACY AND SAFETY OF ARTEMISININ-BASED AND QUININE-BASED TREATMENTS FOR UNCOMPLICATED FALCIAPRUM MALARIA DURING PREGNANCY: A WWARN INDIVIDUAL PATIENT DATA META-ANALYSIS

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Introduction: Pregnant women are vulnerable to malaria. Even asymptomatic infection can affect both mother and fetus. Currently, quinine and artemisinin combination therapy (ACT) is recommended for first and second/third trimester women, respectively. However, the evidence to support the current guidelines is scare, as pregnant women have been rarely included in antimalarial efficacy trials.
Aim: We aim to assemble the available evidence of antimalarial efficacy in pregnancy in a uniform way of data standardisation and statistical analysis.
Methods: We conducted a systematic review and an individual patient data (IPD) meta-analysis of antimalarial efficacy studies on uncomplicated falciparum malaria in pregnancy. IPD meta-analysis was conducted using a random effects model to identify the factors associated with PCR-confirmed recrudescence.
Results: We identified 27 relevant studies. IPD of 4985 pregnant women (94% of the total targeted IPD) from 19 studies (10 in Asia and 9 in Africa) were analysed. Studied drugs included were artemether-lumefantrine (AL, n=1278), artesunate-mefloquine (ASMQ, n=1028), dihydroartemisinin-piperaquine (DP, n=874), artesunate-amodiaquine (ASAQ, n=841), quinine monotherapy (n=260), artesunate monotherapy (n=230), artesunate-sulfadoxine-pyrimethamine (n=173), artesunate-clindamycin (AC, n=142), artesunate-atovaquone-proguanil (n=92) and quinine-clindamycin (n=67). Quinine monotherapy and higher baseline parasitaemia were associated with a higher risk of failure. ASAQ, DP,

AC and ASMQ were with lower risk of failure compared to AL. Higher gravidity was associated with a lower risk of failure in moderate to high endemicity areas but not in low endemicity areas. Adverse abdominal symptoms and tinnitus were more frequently observed with quinine compared to AL.

Conclusion: Quinine monotherapy should no longer be recommended as the first-line treatment for pregnant women. Among ACTs, overall lower efficacy of AL is likely to be related to altered pharmacokinetics in pregnancy reported previously. Early screening for lower parasitaemia in asymptomatic women may reduce the risk of recurrences, protecting both mother and fetus.

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CROSS-SECTIONAL STUDY REVEALS PROMISING BIOMARKER TO DISTINGUISH MALARIA TROPICA FROM BACTERIAL BLOODSTREAM INFECTIONS

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Introduction: The correct differential diagnosis of malaria in Sub-Saharan Africa remains challenged by overlapping symptoms with viral, bacterial and other parasitic pathogens, as well as limited laboratory capacities.

Aim: Our group set out to investigate whether cytokine expression profiles of febrile children could be used to correctly distinguish between malaria and bacterial induced sickness.

Methods: We measured 55 cytokines in blood serum samples previously collected from children in rural Ghana. Of the samples available, 30 from confirmed bacteremia cases and 38 from malaria tropica cases were selected. We applied classification trees of single cytokines to preselect the most promising variables for the modeling process. To account for the high dimensionality of the data, we estimated predictive accuracy by constructing 100 random forest models with random test and training allocation of the samples, and reporting the range of accuracy among these models. To further test the loss of accuracy in smaller models, we used a backward model selection that would eliminate the least important variable of 100 random forest models and re-run the algorithm until the smallest model of one cytokine was obtained.

Results: 39 of the 55 cytokines measured, presented the required data quality. Fifteen further showed promising predictive strength and were included in the modeling process. Median predictive accuracy varied strongly between random forest models and ranged from 62% to 88% correctly classified children. The backwards model selection further revealed, that a combination of nine cytokines achieved the highest median prediction accuracy of 88%.

Conclusion: Cytokine-based models show promising predictive power in distinguishing malaria from bacteremia in children. These findings however require further validation, as the selected sample was small and accuracy varied strongly between models with different random seeds.

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CLINICAL AND DEMOGRAPHIC CHARACTERISTICS OF MALARIA INFECTIONS IN THE DOMINICAN REPUBLIC

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Introduction: Syndromic surveillance strategy is used to identify and contain malaria cases and outbreaks. Plasmodium species have established endemicity in the Dominican Republic, where the country aims to eradicate the disease.

Aim: The aim of our study is to provide clinical and demographic characteristics of Malaria cases in the Dominican Republic over the years 2012-2017.

Methods: Data of cases of Malaria were extracted from the Ministry of Health Weekly Reports (digepi.com.do). Demographic and clinical information were supplied by the Ministry of Health to supplement the Weekly Reports data.

Results: 1204 reports cases of Malaria infections were made during the years 2012-2017. 60.4% (n= 727) of the cases occurred among male patients while 39.6% (n= 477) among females. Mean age of infection was 28.5 years old (29.8 – 27.3, 95% CI) among males and 28.5 years old (30 – 26.9, 95% CI). Pregnant females accounted for 8.2% (n=39) of the infections. 2% (n= 24) of the cases occurred in 2012, 19.9% (n=240) in 2013, 13.3% (n=160) in 2014, 21.2% (n=255) in 2015, 29.6% (n=356) in

2016 and 14% (n=169) in 2017. Autochthonous infections accounted for 95.2% (n=1146) of cases while the neighbor country of Haiti was responsible for the most imported cases (n=45). Fever was the most reported symptom, reported in 96.7% (n=1164) of cases, followed by headaches (65.1%, n= 784). 77.1% (n=931) of cases required hospitalizations while death occurred in 0.6% (n=7) of the reported infections.
Conclusion: Malaria represents one of the anthropod-bourne diseases circulating in the Dominican Republic. Males account for almost double of the cases when compared to females' patients, while both have similar mean age of infections. High percentage of hospitalizations may point to underreporting of cases in ambulatory patients. Autochthonous transmission plays an important role in maintaining endemicity, further studies have to be conducted to explain patterns of this cases. This is the first study done in the Dominican Republic describing demographic and clinical characteristics of Malaria infections.

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EFFECT OF PREVIOUS MALARIA EPISODES IN SUSPECTED IMPORTED MALARIA IN A TERTIARY HOSPITAL IN SPAIN

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Introduction: Short-term semi-immunity to malaria in migrants who have recently arrived in non-endemic countries results in less-severe imported malaria. However, globalization along with new traveling and migration patterns are changing the incidence and severity of imported diseases in travelers and people from endemic origins.
Aim: Try to evaluate the adequate use of prophylaxis and compare the prevalence of malaria and severe malaria in patients with previous paludism episodes attending to a Spanish Hospital, compared to those with no previous episodes.
Methods: A retrospective study was conducted analyzing data from 336 malaria-suspected cases at Mostoles University Hospital from April 2013 to April 2018. 28 patients had no recorded data from previous malaria episodes, and were excluded from that analysis. 43 had no chemoprophylaxis data recorded and were excluded from that analysis.
Results: 195 out of 308 (63%) had previously suffered from malaria. 74 cases were diagnosed amongst this group (38%), compared to 27 out of 113 (24%) with no previous episodes (p=0,011; RR=1.55 [CI:1.08-2.23]). There were 6 cases of severe malaria in both groups (8% vs. 22%, RR=0.84 [CI:0.68-1.04]).
37% of endemic-born patients were diagnosed of malaria compared to 12.5% in autochthonous population (p<0,001). Amongst Visiting Friends & Relatives (VFR) patients diagnosed with malaria, 43% were born in endemic areas and 17% in non-endemic areas (p=0,012). All cases had travelled to endemic regions.
21 patients (7%) completed chemoprophylaxis, with no cases amongst them. All cases occurred in individuals with incomplete or no prophylaxis (6% and 94% respectively) (p<0,001). No differences regarding a correct use of chemoprophylaxis were found between patients born in endemic or non-endemic countries (4.9% vs, 11.8%; p=0.059). Absence or incomplete prophylaxis tend to increase the risk of malaria (RR 13,7 [CI 0,89-212,5], NNT 3 [CI 2,4-3,3]).
Conclusion: Patients with previous malaria episodes are 1.5 times more likely to suffer from malaria than those with no previous episodes and tend to have less chances of severe episodes. Incorrect prophylaxis doesn't protect from malaria, whereas completing chemoprophylaxis could significantly reduce the risk. In our population, 3 patients need to complete chemoprophylaxis in order to prevent one case of malaria.

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IMPORTED SEVERE MALARIA IN CHILDREN: IS IT STILL A CHALLENGE IN NON-ENDEMIC COUNTRIES?

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Introduction: Imported malaria is annually responsible for several thousand cases and substantial deaths in developed countries. *Plasmodium falciparum* is the responsible for almost all the severe malaria cases. Due to their non-immune status, children have higher risk of developing severe disease.
Aim: To determine the clinical outcomes and associated risk factors to severe malaria of paediatric cases in a non-endemic country.
Methods: Observational retrospective study of all consecutive imported malaria cases of children <15-year-old treated at Hospital Universitari Vall d'Hebron, Barcelona (Catalonia, Spain), between 2014 and 2018. Severe malaria was classified following the WHO criteria. Epidemiological, clinical, and laboratory data were collected from the patients' medical charts. Bivariable and multivariable analyses were performed to determine risk factors associated to severe malaria. Statistical analysis was carried out with Stata v13.
Results: Twenty-eight children with malaria were reported during the study-period; median [IQR] age was 7.5[4-12] years; 68% (19/28) were male; 43% (12/28) were born in Spain. Malaria was acquired in Guinea Equatorial (46.4%, 13/28), West Africa (28.6%, 8/28), Pakistan (21.4%, 6/28), and Afghanistan (3.6%, 1/28). Median [IQR] days of malaria diagnosis after returning from endemic area was 9.5[3.0-101.5] days. Most of the children (60.7%, 17/28) were admitted to the hospital (8 treated with intravenous artesunate), the rest were treated as outpatients. Median [IQR] days of fever before diagnosis was 7[6-9] days. *P. falciparum* (64.3%) was the most prevalent specie, followed by *P. vivax* (25%), *P. ovale* (7.1%), and *P. malariae* (3.6%). Severe malaria affected 39.3% (11/28) patients. Median [IQR] C-reactive protein (CRP) was 11.8[3.9-14.4]mg/dl. Bivariable analysis showed association of severity to autochthonous children OR=8.7 (95%CI: 1.1-65.5)(p=0.01), travel to/from West Africa OR= 4.25 (95%CI: 1.4-12.6)(p<0.001), and to CRP values higher than 10mg/dl at admission OR=15.75 (95CI%: 0.95-260.0)(p<0.01). In multivariable analysis travel to/from West Africa (p=0.004) and CRP higher than 10mg/dl (p=0.02) were associated to severe malaria. No deaths were reported.
Conclusion: Most of the paediatric imported malaria cases were caused by *P. falciparum* (64.3%). More than one-third of the children were classified as severe malaria. Travel to/from West Africa and elevated CRP values at admission should lead to the suspicion of severe cases of malaria.

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A SEVEN-MONTH PROSPECTIVE REVIEW OF MALARIA ADMISSIONS TO A REGIONAL INFECTIOUS DISEASE UNIT IN MANCHESTER, UK

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Introduction: North Manchester General Hospital (NMGH) is home to the tertiary Regional Infectious Diseases Unit (RIDU) in the North west of England. It is the main referral centre for the Greater Manchester area, providing specialist inpatient care for the assessment and management of Infectious diseases, in addition to outpatient clinics and providing advice to healthcare professionals in the region.
Aim: To prospectively assess the number of malaria cases admitted to the Regional Infectious Diseases Unit in Manchester.
Methods: A prospective analysis of all patients admitted to the regional Infectious Diseases Unit was undertaken over a 7-month period (1st Nov 2017 – 1st Jun 2018). Each patient who required inpatient admission was assessed for patient demographics, referral method (whether from primary or secondary care), presenting complaint and if they were assessed for a tropical infection.
Results: Of 1053 admissions to the Regional Infectious Disease Unit in Manchester, 153 were classified as "Returning Travellers with Fever" and 68 were "Returning Travellers with Other Symptoms". The majority of returning travellers were from Pakistan (29), Nigeria (28) and India (15). All patients had a malaria film carried out. Of returning travellers, 31% were classified as potential High Consequence Infectious Disease cases - 36 patients assessed for Viral Haemorrhagic Fever (VHF) and 22 assessed for Middle East Respiratory Syndrome coronavirus (MERS CoV). No individuals were confirmed as having a HCID.
27 of the potential VHF cases were diagnosed with malaria for which 81.5% had Falciparum species. Of those diagnosed with malaria, the majority had travelled from Nigeria (9), Sierra Leone (3) and the Democratic Republic of Congo (2). One patient had a parasitaemia level of 20% which required ICU admission due to the severity of their illness. This patient developed the rare complication of bilateral compartment syndrome of the forearms which required urgent bilateral fasciotomies.
Conclusion: The Regional Infectious Disease Unit at North Manchester General Hospital admits a significant number of individuals with potential travel-associated infections. A high number of assessments for Malaria were carried out due to the high number of returning travellers to the UK from malaria endemic countries with compatible exposure and symptoms.

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MANAGEMENT OF PRESUMPTIVE MALARIA IN PHARMACIES IN CAMEROON: CASE OF 30 PRIVATE PHARMACIES IN YAOUNDE

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Introduction: In Cameroon, malaria remains the leading cause of morbidity and mortality with 36% and 24% respectively as seen in 2012 data. The resistance of P. falciparum to antimalarial drugs is a real problem and malaria treatment initiated solely on the basis of fever in endemic areas has long been the cause of this phenomenon. Since 2011, WHO recommended to confirm the diagnosis of malaria with a parasitological test before considering medication. In practice, the treatment of malaria is undertaken on medical prescription, on pharmacist advice or from the decision of the patient or his relatives. The last two situations obviously violate WHO recommendations, thus we found of great interest to assess its relevance.
Aim: Assess the quality of the management of uncomplicated malaria in private pharmacies of Yaounde.
Methods: A prospective descriptive study was conducted during four months in 30 pharmacies selected randomly in Yaounde. We included patients who came for presumptive malaria. Excluded from the study were patients who had medical prescriptions and pregnant women. A malaria rapid diagnostic test (RDT) from the brand SD BIOLINE Malaria Ag P.f/Pan was performed and additional data from patients and pharmacy attendants were collected on a questionnaire.
Results: A total of 308 patients after having been counseled at the pharmacy were tested for presumptive malaria. Of the 308 patients counseled, 201 (65.2%) received antimalarials. From the 201 patients, 50.75% had negative RDT results. Of the left over 107 patients who did not receive antimalarial treatment; 91.75% had negative RDT results. The main symptoms described by patients were fever (81%), headache (71%), fatigue (59%). From all 31 pharmacy attendants who agreed to participate to the study, only 3% referred the patient to a hospital in case of suspicion of malaria, 28% gave an antipyretic with antimalarials and 69% gave only an antipyretic.
Conclusion: In Pharmacies of Yaoundé, antimalarial drugs are given more on pharmaceutical advice and self-medication without biological evidence of malaria. In order to ensure the quality of the management of malaria, it seems relevant to have a national dialogue holds on the participation of pharmacists in the response against this disease.

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FORMULATION, EVALUATION AND ANTIPLASMODIAL STUDIES OF SOLID DISPERSIONS OF BLENDS OF METHACRYLIC ACID-BASED POLYMERS AND A HYDROPHILIC CARRIER FOR IMPROVED DELIVERY OF LUMEFANTRINE

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Introduction: Lumefantrine is a potent antimalarial agent commercially available in combination with artemether for the treatment of severe multi-resistant malaria. However, the low and variable oral bioavailability owing to its poor solubility restricts its therapeutic potential.
Aim: The aim of the study was to develop a solid dispersion system of lumefantrine - a poorly water soluble drug, using blends of Eudargit® E100, RS100 and urea with a view to improving its oral bioavailability.
Method: Different batches of lumefantrine solid dispersions (SDs) were prepared by the solvent evaporation method using the Eudragits in the presence or absence of urea as hydrophilic carrier. The morphology, stability, thermal and spectral properties were investigated. The *in vivo* antimalarial study was carried out using Peter's four day curative test in mice.
Results: Results showed discrete, irregularly-shaped SDs and stable over a period of 6 months with no significant change ($p < 0.05$) in the drug content. Solid state characterization confirmed formation of amorphous lumefantrine loaded solid dispersions in the different blends with no strong drug – polymer interaction. Reduction in parasitaemia caused by the quaternary batch of the SDs was significantly higher ($p < 0.05$) and more sustained than that achieved by the plain lumefantrine and marginally higher, albeit not to a significant extent than that observed with the commercial product - Coartem®.The SDs batch (SDA3 and SDB3) showed a parasitaemia reduction of 72.3 % and 81.3 % respectively.

Conclusion: The study has shown that solid dispersion is a promising tool for the delivery of lumefantrine and should be further exploited for development of a more effective delivery of lumefantrine alone or in combination with artemisinin for treatment of malaria.

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PREVALENCE, DETERMINANTS AND EFFECTS OF MALARIA AND INTESTINAL HELMINTHS CO-INFECTION AMONG SCHOOL-AGED CHILDREN AGED 5-15 YEARS IN CALABAR

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Introduction: Co-infection of malaria and intestinal helminth are main health challenging issues predominantly among children that have attained school age in Nigeria. Nevertheless, the importance and conceivable relationship between these two infections is still inadequately understood.
Aim: The study aimed to determine the co-occurrence and association between intestinal helminths and *Plasmodium* parasites in school children living inIkot-Omin, Calabar Nigeria.
Method: Blood and stool sample were collected from 578 primary and secondary school children of 5-15years from October 2014 to March 2015. Stool samples were processed by wet preparation and brine floatation technique and microscopically examined for intestinal helminth infection. Thick and thin films were examined microscopically and were used to identify *Plasmodium* parasites and species respectively. Haematocrit of the children was also measured. The data was analysed with Chi-square statistical test and univariate analysis and the significant level was set at $p \leq 0.05$.
Results: Overall 35.8% of the children had malaria parasite infection, 43.8% had intestinal helminth infection while 19.9% had malaria and intestinal helminth co-infection. The mean densities of malaria parasitaemia in children co-infected with malaria and intestinal helminth were significantly ($p < 0.001$) lower compared to those infected with malaria only. The variation in the distribution of malaria parasites and intestinal helminths co-infection with age were not statistically significant ($p = 0.64$), however the age group 9- 12 years recorded the highest prevalence of 11.6%. Also about 54% of the children with co-infection were anaemic.
Conclusion: This study shows that school age children in the study area could be at risk of anaemia and malnutrition and may benefit from deworming and malaria prevention programmes.

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COMMUNITY-BASED PREVALENCE OF TYPHOID FEVER, TYPHUS, BRUCELLOSIS AND MALARIA AMONG SYMPTOMATIC INDIVIDUALS IN AFAR REGION, ETHIOPIA

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Background: In sub-Saharan Africa, where there is the scarcity of proper diagnostic tools, febrile illness related symptoms are often misdiagnosed as malaria. Information on causative agents of febrile illness related symptoms among pastoral communities in Ethiopia have rarely been described.
Method: With a community based cross-sectional survey, we assessed prevalence of typhoid, typhus, brucellosis and malaria among individuals with a set of given symptoms in Amibara district, Afar Region, Ethiopia. Blood samples were collected from 650 participants and examined by Widal and Weilflex of direct card agglutination test (DCAT) and tube based titration tests for *Salmonella enterica* serotype Typhi (*S.* Typhi) and Rickettsial infections. Rose Bengal Plate Test (RBPT) and Complement Fixation Test (CFT) were used to screen *Brucella i*nfection. Thin and thick blood smears were used to diagnosis malaria.
Results: Out of 630 sera screened by DCAT, 83 (13.2 %) were reactive to H and/or O antigens for *S.* Typhi infection. Among these, 46 (55.4%) were reactive by the titration test at the cut off value $\geq$ 1:80. The combined sero-prevalence for *S.* Typhi by the two tests was 7.3% (46/630). The sero-prevalence for *Rickettsia* infection was 26.2% (165/630) by DCAT and 53.3% (88/165) by the titration test at the cut off value $\geq$ 1:80. The combined sero-prevalence for *Rickettsia* infection by the two tests was 14.0 % (88/630). The sero-prevalence for *Brucella* infection was 12.7% (80/630) by RBPT, of which 28/80 (35%) were positive by CFT. The combined sero-prevalence for *Brucella* infection by the two tests was 4.4% (28/630). Out 650 suspected individuals for malaria, 16 (2.5%) were found positive for *P. falciparum* infection.
Conclusion: Typhoid, typhus, brucellosis and malaria were observed among symptomatic individuals. The study also highlighted that brucellosis cases can be misdiagnosed as malaria or other disease based solely on clinical diagnosis. Therefore, efforts are needed to improve disease awareness and laboratory services for the diagnosis of brucellosis and other zoonotic diseases to identify other causes of febrile illness in this pastoral setting.

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G6PD DEFICIENCY IN CHILDREN IN A MALARIA ENDEMIC AREA OF BENGO PROVINCE, ANGOLA

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Introduction: G6PD deficiency has become more prevalent in malaria endemic regions because genetic variants can confer protection against *Plasmodium*. However, these conclusions are still in debate.
Aim: The aim of this work is to evaluate the prevalence of G6PD deficiency in an African holoendemic region for *Plasmodium falciparum*, estimating the genotype and phenotype of the enzyme, and evaluating the risk of malaria associated with the G6PD genotype.
Methods: A prospective longitudinal cohort study, involving 1692 children selected in the maternity ward and monitored over quarterly medical consultations for two years. The G202A and A376G genotypes were determined through Real Time PCR methods. For enzyme activity, we applied the NeoLISA kit for Neonatal G6PD deficiency screening to measure the NADPH produced calorimetrically in the kinetic mode.

Results: The prevalence of the A-allele was 19.4%, with 19% hemizygous boys and 4.5% A-homozygous girls. Enzyme deficiency, measured by enzyme activity, was highly prevalent (32.7% in males and 30.5% in females). The average enzymatic activity was also low for A-hemizygous boys (1.66U/ gHb) and for homozygous girls (0. 97U/gHb). Heterozygous girls would seem to hold some protection against malaria, when compared to the other genotypes, mainly A-/A- (X^2=14.35, p=0.014).
Conclusion: The prevalence of G6PD deficiency among children in Bengo is high. Heterozygous girls, as proposed elsewhere, may be the driving force for positive selection. This data may serve for the ministry of health in taking safe and appropriate decisions regarding the usage of potentially unsafe drugs for G6PD deficient individuals.

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NOSOCOMIAL MALARIA IN A SPLENECTOMISED PATIENT AFTER HEART TRANSPLANTATION

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Introduction: Transmission of non-expected imported diseases from an organ donor to a recipient is rare and can be associated with significant morbidity and mortality. Infrequent hospital transmission of malaria has been described, being the main modes of infection related to parenteral introduction, blood transfusion, and organ transplantation from a malaria-infected patient.
Aim: We describe a case of unexpected nosocomial malaria infection during a cardiac transplantation in a splenectomised patient with favourable outcome.
Methods/Results/Discussion: A 60-year-old patient with terminal ischemic cardiomyopathy underwent elective heart transplantation in January 2019. His previous medical history included total colectomy and splenectomy; no travel history. The donor was a Guinean migrant who had recently returned from his country. Donor screening with commercial PCR for imported diseases was negative. With no immediate complications after surgery, 14 days after transplantation the patient presented fever and chills. A blood smear confirmed the diagnosis of severe Plasmodium falciparum malaria due to hyperparasitaemia of 16,8% (with no other severity criteria). Treatment with intravenous artesunate was started. Parasite density was 15.7% at 8 hours and 0.8% at 24 hours following 0.05% of trophozoites with pyknotic forms of uncertain viability at 48 hours. Treatment was changed to oral dihydroartemisinic/piperaquine after 4 doses of intravenous treatment. The patient presented a good clinical evolution, with no relapses. First negative blood smear was at 28th day with presence of no viable forms. Retrospective review with two PCR, a blood smear and a rapid diagnostic test were also negative. Notification of this case allowed to diagnose other secondary cases confirming the mode of infection.
A multidisciplinary team was essential for an optimal management of the case. Screening of imported diseases as well as epidemiological and medical information should be compulsory for a correct differential diagnosis in travellers and migrant donors. This is a challenging case that illustrates possible difficulties in post-transplantation diagnostic, prolonged parasite clearance in splenectomised patient and efficacy of artesunate.
Conclusions: Unexpected nosocomial malaria transmission can occur in an organ transplantation despite established screening. Complete and accurate donor information and sensitive diagnostic tests are essential. Multidisciplinary approach including Tropical Medicine specialists can optimize the prevention and management of these cases.

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SPONTANEOUS SPLENIC RUPTURE IN P. FALCIPARUM INFECTION: A CASE REPORT AND LITERATURE REVIEW

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Introduction: Splenic rupture is a rare but potentially fatal complication of malaria. Estimates of the overall incidence are poorly reported, ranging from 0% to 2%[1]. Case series suggests that spontaneous splenic rupture is more frequently associated with *P. vivax* infection than other *Plasmodium* species. Surgical intervention with urgent splenectomy is the most common treatment, however more recent case reports have demonstrated the success of conservative management.
Aim: We describe the case of a young gentleman who developed spontaneous splenic rupture secondary to *P. falciparum* malaria and was successfully managed non-operatively.
Methods: A case report was prepared after seeking written informed consent from the patient. We performed a simple literature review to identify existing evidence on the topic.
Results: Our literature review returned 209 studies, of which 17 were relevant and written in English. Of 15 case reports of spontaneous splenic haemorrhage, almost half were caused by *P. falciparum* (7/15, 46.6%), 40.0% by *P. vivax* (6/15), and a minority by *P. ovale* (1/15) or mixed infection (1/15).The vast majority (12/15, 80.0%) underwent a splenectomy; the rest were managed conservatively. We present a 25-year-old Somali gentleman who attended one week after arrival from Uganda with a 2-day history of fevers and rigors. On initial presentation he was unwell, tachycardic and hypotensive with marked abdominal tenderness. Initial investigations confirmed a diagnosis of *P. falciparum* malaria with a 3% parasitaemia, with an Hb of 127g/L, platelets of $38x10^9$/L, and lactate of 5.5mmol/L. Despite intravenous artesunate, ceftriaxone and fluid resuscitation he remained tachycardic with a raised lactate. An urgent computed tomography (CT) abdomen revealed a sub-capsular splenic haematoma and complex free abdominal fluid. Following surgical and intensive care opinions, he was managed conservatively with ongoing artesunate, blood products, and tranexamic acid. Within a further 24 hours, he had improved clinically and a repeat CT revealed a reduction in size of the splenic haematoma and resolving haemoperitoneum. He went on to make a full recovery.
Conclusion: Splenic rupture in *P. falciparum* malaria is an unusual and serious complication. Successful recovery without surgical splenectomy is possible.

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WHERE HAVE ALL THE PARASITES GONE? A MALARIOMETRIC SURVEY TO DETERMINE THE SPECIES OF PLASMODIUM CAUSING CLINICAL MALARIA IN NIGERIA

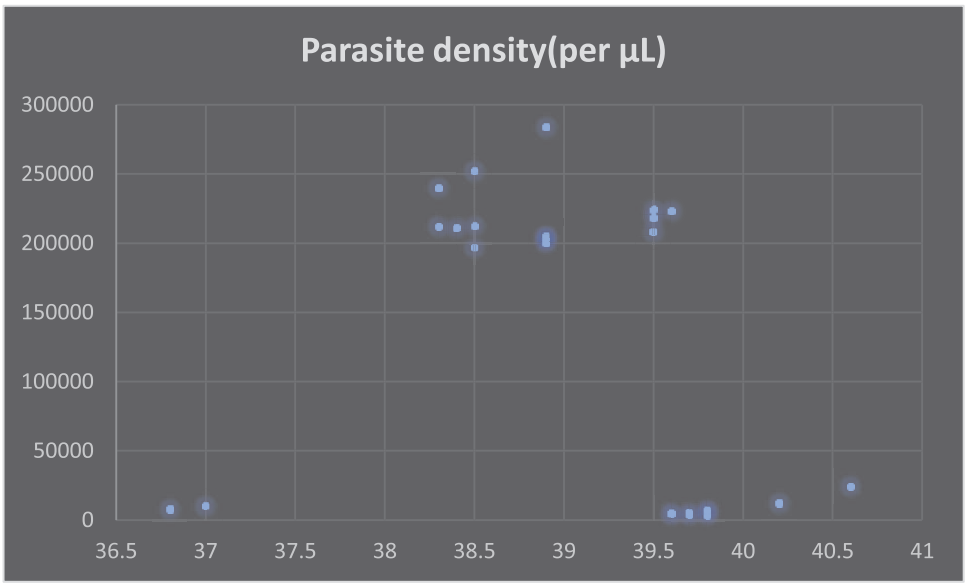

Figure 1. Temperature distribution of children with severe malaria

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Introduction: Malaria remains an important cause of child morbidity and mortality globally. The global incidence of malaria is 59 cases per 1,000 population, with a vast majority of the cases occurring in Africa and Asia. The disease is caused by 5 known species of the Plasmodium parasite: *P. falciparum, P. vivax, P.ovale, P. malariae and P. knowlesi. P. falciparum* is responsible for 99.7% of all cases in Sub Saharan Africa, as reported by the World Malaria report of 2018. Knowledge of parasite types will help to adapt malaria control measures.
Aim: To determine the relative proportion of parasite species causing clinical malaria in Sokoto, Northwestern Nigeria.
Methods: The study was conducted in Wamakko Local Government Area (LGA) of Sokoto State, of Nigeria, located at coordinates 13o2′16″N 5o5′37″E.. It was a two-point cross sectional survey, done in the rainy and dry seasons. It included prospectively, 1017 children aged 2 to 10 years, who had resided in the area for at least two weeks. We examined the children clinically and took samples for malaria testing. A trained investigator identified the parasite species. Each thick film was examined for the presence of parasites and the tail section of the thin films was used to determine the species. The data was analysed using SPSS version 22.
Results: A total of 1136 subjects were screened for inclusion in the study, of which 1017 were eventually included. A total of 354 subjects had positive malaria parasitaemia, of which 279 were adjudged based on the presence of symptoms and signs to have clinical malaria. Of that number, 26 were found to have severe malaria, with only 279 reviewed for uncomplicated malaria parasitaemia. All the parasites found were *P. falciparum,* including for all the cases of severe malaria.
Conclusion: The findings in this study are in keeping with findings from the world malaria reports of 2015 to 2018, which suggest a monoparasitaemia with P. falciparum. These findings can be confirmed with molecular tests and form the basis for interventions for malaria control in that part of the world.

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MALARIA AMONG PREGNANT WOMEN: KNOWLEDGE, ATTITUDES AND PRACTICES IN IBEKU UMUAHIA, ABIA STATE, NIGERIA

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Introduction: Despite national and international efforts, the burden of malaria morbidity remains high, particularly in tropical regions of Africa. In Nigeria, malaria remains a serious public health problem, the majority of the cases occurring among children and pregnant women. Women usually face discrimination in education, employment as well as social and economic status which would usually make them vulnerable to infection.
Aim: The aim of this work was to determine the prevalence of malaria among pregnant women and assess their knowledge, attitudes and practices (KAPs) about malaria in Ibeku, Abia State.
Methods: Data was collected with questionnaires and collection of veinous blood samples (2ml) into EDTA bottles, with permission and ethical clearance from the appropriate authorities. The questionnaires were used to collect socio-demographic data of the consenting pregnant women at the antenatal clinics and responses regarding their knowledge, attitudes and practices about malaria. The specimen bottles were labelled and taken to the ZEB laboratory for analysis. Thin and thick blood films were prepared from the blood samples for each respondent. The slides were viewed under the light microscope. Slides with parasites were noted as infected.
Results: Out of the 300 pregnant women examined, 180 (60.0%) were infected. The highest infection occurred in the age group 21-25 years (72.64%). Artisans had the highest prevalence (68.75%). Women in their

first trimester had the highest prevalence of infection (77.30%). Regarding KAP studies, preventive measures against malaria reported were use of mosquito nets (14.0%), taking preventive drugs (9.33%), use of insecticides (29.0%), keeping windows locked in the morning and evening (35.33%). Possible causes of malaria reported were dirty environment (33.0%), mosquitoes (37.67%), malnutrition (18.0%) and oily food (11.33%). Those who gave malnutrition as the cause of malaria recorded the highest prevalence (72.22%). Reported symptoms associated with malaria were headache (19.0%), fever (27.0%), vomiting/-nausea (14.0%), loss of appetite (16.33%), general body pain/weakness (8.67%).

Conclusion: Prevalence of 60.0% recorded in this work for pregnant women is of great public health importance. Regular environmental clean up to get rid of breeding sites of mosquitoes and provision of insecticide treated nets are recommended. Health education on the cause of malaria, preventive (IPT) and curative drugs to enlighten the populace is advocated.

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PREVALENCE AND PREDICTORS ASSOCIATED WITH CONDYLOMATA ACUMINATA INFECTION AMONG PEOPLE IN SOUTHERN BRAZIL

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Introduction: Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in many countries[1] that presents as a serious public health problem worldwide. To date, approximately 200 genotypes of HPV have been identified; among them, 40 can infect the human anogenital tract.[2]

Aim: To estimate the prevalence of condylomata acuminata/HPV and evaluate associated predictors in patients with the infection.

Methods: In this cross-sectional and retrospective study, medical records of patients who attended a public health referral center located in Southern Brazil between April 2012 and March 2017 were reviewed. Epidemiological, clinical, and laboratory data were analyzed using the chi-square and odds ratio (OR) with 95% confidence interval (CI).

Results: The overall prevalence of condylomata acuminata/HPV in 3,447 patients was 33.1% (1,140). Coinfection of condylomata/HPV with other STI was noted in 23.7% of cases. In general, the population was characterizedby a high prevalence (43.8%) in patients aged <20 years, women (37.4%), whites (33.3%), educational duration of >8 years (33.7%), widowed (39.2%), heterosexual (36.7%), and ages between 13 and 19 years at first sexual intercourse (41.1%). Significant association was observed between male sex and multiple partners and between male sex and irregular use of condoms (p<0.001). The predictors associated with HPV infection were age group of up to 29 years (OR 2.0, 95% CI 1.3-3.7, p<0.013) and homosexual/bisexual (OR 0.2, 95% CI 0.12-0.66, p=0.003).

Conclusion: The findings showed a high prevalence of condylomata acuminata in a public health center study, with emphasis on age range below the third decade of life and sexual behavior predictors. These predictors are important for the determination of preventive measures against the transmission of infection and development of cancer.

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INCIDENCE OF MATERNAL ILLNESSES DURING PREGNANCY IN RURAL SOUTH ETHIOPIA: A COHORT STUDY

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Introduction: Although much work has been done to reduce maternal deaths, the incidence of maternal illnesses during pregnancy is not yet well described in low resource settings.

Aim: To measure the incidence of maternal illnesses during pregnancy in rural south Ethiopia.

Methods: A cohort study of 794 pregnant women attending antenatal care in three local communities was carried out from May 2017 to July 2018. To distinguish obstetric (direct) from medical (indirect) pregnancy-related illnesses, specific criteria were used. Direct illnesses were: pregnancy termination, hypertensive disorders (e.g. systolic >120 mmHg and diastolic >80 mmHg), obstetric haemorrhage, pregnancy-related infection, and other obstetric illnesses (e.g. pain at pelvic area). Indirect illnesses were: gastrointestinal, psychiatric (e.g. lack of sleep), and other medical illnesses (e.g. excessive tiredness and anaemia (Hgb <11 g/dl). Follow-up was done every 2 weeks. Multilevel mixed effect repeated measures logistic regression analysis was used.

Results: The incidence of at least one pregnancy-related illness was 91% (95%CI:88,92). From direct illnesses, pain at pelvic area 48% (95%CI:44,51) was the main illness reported by mothers. There were 14 abortions, 6 mothers experienced vaginal bleedings, and 10 mothers had vaginal discharges or itching. Systolic hypertension occurred among 13% (95%CI:10,15) of pregnant women and diastolic hypertension occurred among 21% (95%CI:18,24). From indirect illnesses, excessive tiredness 72% (95%CI:69,75) was the main illness reported by mothers. There were 496 episodes with heartburn and 135 mothers complained of lack of sleep. The prevalence of anaemia was 22% (95%CI:20,25); however, 94% (95%CI:92,95) did not get Iron-folic-acid supplementation. There was a 25% community-level variance (ICC) among kebeles. Older pregnant women, poor women, or women working outside their homes or lived far away from a health institution, a household with monthly expenditure of >=30 USD, and women who had experienced an abortion had higher incidence rates of illness.

Conclusion: In rural south Ethiopia, there was a high incidence of illness during pregnancy. The unexplained community-level variance remains

significant indicating the presence of other community factors that were not addressed in this study. Therefore, the Ministry of Health should strengthen the early detection and management of maternal illnesses.

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DO PATIENTS WITH CHRONIC CONDITIONS FACE HIGHER OUT OF POCKET EXPENDITURES THAN THOSE WITH AN ACUTE HEALTH PROBLEM? RESULTS FROM A HOUSEHOLD SURVEY IN RURAL TAJIKISTAN

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Introduction: Among its reform efforts, the Government of Tajikistan is emphasising the essential role of primary health care (PHC), to reduce out of pocket (OOP) expenditures and increase the equity of access to health services. OOP expenditures can be critical for patients with chronic conditions due to their need for prolonged care and regular service utilisation. However, little evidence was available from Tajikistan regarding the financial burden of PHC use faced by patients with chronic conditions.
Aim: The study assessed OOP expenditures related to a visit to a family doctor; and compared the experiences of patients with chronic conditions to those with acute conditions.
Methods: A cross-sectional survey was conducted among 1,600 adult patients that had visited a PHC facility. Cost categories included expenditures for travel, formal as well as informal fees for admission and consultation, and expenditure for medicine. Gamma generalized linear models were applied to estimate the expenditures.
Results: The total OOP expenditures resulting from a visit to the family doctor amounted to 17.2 USD for patients with chronic conditions and 13.9 USD for those with an acute condition. However, adjustment for potential confounders reduced the discrepancy from 3.3 USD to 0.5 USD (16 USD and 15.5 USD). Albeit differences between patients with chronic and an acute conditions appear to be small, when looking more closely at the demographics of the patients with chronic conditions (greater age, higher dependency on pensions and social aid, lower socio-economic status), the 40% higher frequency in using PHC services, and the high referral rate to specialists; it emerges that these patients are likely to belong to marginalised groups and encounter high costs due to repeated consultations of PHC services.
Conclusion: The financial burden of patients with chronic conditions cannot only be attributed to costs relating to a single visit to a family doctor at PHC level. Given the vulnerability of patients with chronic conditions and the prevailing high costs on patients and their households due to repeated visits and the referral to specialists, there is a need to identify approaches towards integrated care models allowing the reduction of the financial burden.

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EARLY WARNING SYSTEMS IN OBSTETRICS: A SYSTEMATIC LITERATURE REVIEW

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Introduction: Several versions of Early Warning Systems (EWS) are used in obstetrics to detect and treat early clinical deterioration to avert morbidity and mortality. EWS can potentially be useful to improve the quality of care and reduce the risk of maternal mortality in resource-limited settings. We conducted a systematic literature review of published EWS, determined their predictive accuracy for various outcomes, and the effectiveness of EWS in triggering corrective actions and improving health outcomes.
Methods: We systematically searched primary studies on obstetric EWS published in peer-reviewed journals between January 1997 and March 2018 in Medline, CINAHL, SCOPUS, Science Direct, and Science Citation Index. We also searched reference lists of relevant articles and websites of professional societies. We included studies that assessed the predictive accuracy of EWS to detect clinical deterioration, or/and the effectiveness of EWS in improving clinical outcomes in obstetric inpatients. We excluded studies on paediatric and non-obstetric adult population and cross-sectional and qualitative studies. We performed a narrative synthesis since outcomes reported were heterogeneous.
Results: A total of 381 papers were identified, 17 of which met the inclusion criteria. Eleven of the included studies evaluated the predictive accuracy of EWS, 5 studies assessed the effectiveness of EWS in improving clinical outcomes, while one study addressed both. Sixteen EWS were reviewed, 14 of which included five basic clinical observations (pulse rate, respiratory rate, temperature, blood pressure, and consciousness level). The charts had very high median (inter-quartile range) sensitivity - 89% (72% to 97%) and specificity - 85% (67% to 98%) but low positive predictive values - 41% (25% to 74%) for predicting morbidity. EWS had a very high accuracy in predicting death (AUROC >0.80), significantly reduced the severity of obstetric morbidity, improves the frequency of routine vital sign observation and reduces the interval between thresholds for abnormal clinical observations and corrective clinical action.
Conclusion: EWS are effective in predicting adverse obstetric outcomes and reducing progressive obstetric morbidity. There is limited evidence of the effectiveness of EWS in reducing maternal death. Clinical parameters in most charts are routinely collected in resource-limited settings, therefore implementing them is feasible in such settings.

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A SURVEY OF CATALAN HEALTH PROFESSIONALS' KNOWLEDGE, EXPERIENCE, AND TRAINING NEEDS IN RELATION TO FEMALE GENITAL MUTILATION

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Introduction: Due to globalized migratory processes female genital mutilation (FGM) has spread to many countries, where it remains a concealed and underdiagnosed problem. Management of girls at risk of FGM includes a series of steps to be taken in Primary Care: assessment, prevention and informed commitment to avoid MGF.
Aim: To assess the knowledge, attitudes and practices regarding female genital mutilation (FGM) among health professionals in a Catalan region.
Method: A questionnaire-based survey was administered to health professionals previously a training session on FGM. The questionnaire consisted of 5 questions about general knowledge, 2 about clinical features,

4 about attitudes and management on FGM on their daily routine and 3 about the protocol of girls at risk.
Results: 200 questionnaires were returned. 25,89% from nurses, 23,35% from general practitioners, 23% from paediatricians, 8,12% from paediatric nurses, 6,09% from midwives, 4% from ob-gyn and 6% from social workers. When asked about basic knowledge about FGM 95.7% located it correctly in Africa, 80% correctly related it to a cultural practice but 20% believed incorrectly that FGM is mainly practiced for religious reasons.40% never asks about FGM to their patients and 14,80% of the surveyed mass always does. A 47'8% of the paediatricians and paediatric nurses could correctly identify those girls at risk but 41% were not sure when the Informed commitment to avoid MGF should be signed by the parents. For 70% of them it was their first training on the FGM topic and 90% of them wanted more training on that subject.
Conclusions: Health professionals must take a leading role in raising awareness and combating FGM. To achieve that more training is needed. The survey revealed a better clinical knowledge about FGM than about its prevention and management. It also revealed poor knowledge regarding different aspects of FGM such as its types and complications as well as the knowledge about legislation concerning FGM and prevention on young girls.

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STAKEHOLDER PERCEPTIONS ON PATIENT-CENTERED CARE AT PRIMARY HEALTH CARE LEVEL IN RURAL EASTERN UGANDA: A QUALITATIVE INQUIRY

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Introduction: Patient-centered care (PCC) offers opportunities for African health systems to improve quality of care. Nonetheless, PCC continually faces implementation challenges. In 2015, Uganda introduced PCC as a concept in their national quality improvement guidelines. In order to investigate whether and how this is implemented in practice.
Aims: This research aims to identify relevant stakeholders' views on the current quality of primary health care services and their understanding of PCC. This is an important step in understanding how the concept of PCC can be implemented in a resource constrained, sub-Saharan context like Uganda.
Methods: This qualitative study was conducted in Uganda at national, district and facility level, with a focus on three public and three private health centres. Data collection consisted of in-depth interviews (n=49); focus group discussions (n=7); and feedback meetings (n=14) across the four main categories of stakeholders identified: patients/communities, health workers, policy makers and academia. Interviews and discussions explored stakeholder perceptions on the interpersonal aspects of quality primary health care and meanings attached to PCC. A content analysis of Ugandan policy documents mentioning PCC was also conducted. Thematic content analysis was conducted using NVivo 11.
Findings and conclusion: While Ugandan stakeholder groups have varying perceptions of PCC, they agree on: the need to involve patients in making decisions about their health, the key role of healthcare workers in that endeavour, and the importance of context in designing and implementing solutions. For that purpose, three avenues are recommended: Firstly, fora including a wide range of stakeholders may offer a powerful opportunity to gain an inclusive vision on PCC in Uganda. Secondly, efforts need to be made to ensure that improved communication and information sharing – important components of PCC – translate to actual shared decision making. Lastly, Uganda's health system needs to strengthen its engagement of the transformation from a community health worker system to more comprehensive community health systems. Cross-cutting the analysis, is the need to address, in a culturally-sensitive way, the many structural barriers in designing and implementing PCC policies. This is essential in ensuring the sustainable and effective implementation of PCC approaches in low- and middle-income contexts.

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TRAINING IN POINT OF CARE ULTRASOUND AT QUEEN ELIZABETH CENTRAL HOSPITAL IN BLANTYRE, MALAWI – AN ESTHER-PROJECT

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Background: One of the biggest challenges for helath systems in resource poor settings is the lack of qualified personnell, especially in the field of diagnostic imaging. This is true for both diagnostic imaging and imaging for guiding procedures. At Queen Elizabeth Central Hospital in Blantyre (QECH) most procedures are performed without imaging and waiting time for diagnostic ultrasound can be up to ten days, directly impacting patients safety and timely diagnosis.
Methods: To improve this situation at QECH, a training program for Point of Care Ultrasound (POCUS) was initiated in the frame of the ESTHER cooperation between the University Medical Centre Hamburg-Eppendorf (UKE) and the College of Medicine in Blantyre (COM). Through a combination of short-courses, continuous evaluation and mentoring and external supervision the programme aimed to make POCUS available and routinely used for all patients admitted to the medical department.
Results: This abstract reports the initial steps of the cooperation, the training methods, the current situation and the measures to increase the chance for sustainability. First, clinical questions that were accessible to POCUS examinations in the Malawian setting were identified. Main fields were the guidance of interventions, focused assessment with sonography for HIV-associated tuberculosis (FASH), identification of kidney pathologies, lung pathologies, deep vein thrombosis and basic echocardiography. To date total of 25 doctors and clinical officers have been trained in the use of POCUS, including 5 doctors who have acted as trainers in courses at COM and have been invited as trainers to external courses. POCUS is now routinely used and available for 80-90% of the patients on admission.
Discussion: Systematic training in POCUS is feasible in the Malawian setting, adoption into routine use can be achieved and sustainability is likely. Future training will extend to other departments and include income-generating courses for external staff to increase the chance for sustainability.

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THE USE OF MEDICAL POINT OF CARE ULTRASOUND (POCUS) IN INPATIENTS IN QUEEN ELIZABETH CENTRAL HOSPITAL, BLANTYRE, MALAWI

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Background: Ultrasonography has been categorised as "essential" to improving patient care in low resource health systems. Point of care ultrasound (POCUS) is ultrasound delivered at the bedside by a clinician, is relatively low cost, easily taught and can impact management in up to 70% of cases when used in low resource settings. In 2018 a POCUS training program was initiated in the Department of Medicine at the College of Medicine in Blantyre. The aim of this study is to analyse the distribution of the scans performed in the radiology department versus POCUS and describe common pathologies.
Methods: Adult inpatient records were screened for eligibility. Data was collected from consenting inpatients over the age of 16, receiving an ultrasound scan for medical indications as part of routine care within the period of the study. Total number of patients to be recruited was 250.
Results: Up to 10.01.2019, data from a total of 163 patients was collected. Median age was 38 (range 16 to 82) and 51% were female and 82 (50%) were HIV positive. 171 ultrasound examinations were performed of which 87 (51%) were POCUS (defined as a scan delivered by a clinician at the bedside). Most common examinations were abdominal scans (n=61), echocardiograms (n=37) and focused assessment with sonography in HIV for TB (FASH) scans (n=37). While the proportion of POCUS among FASH-scans was high (88%), the attending clinician performed only 36% of abdominal scans and 33% of echocardiograms. Overall, pathology was reported in 38% of FASH-scans, 67% of abdominal ultrasound and 81% of echocardiograms. The median time from requesting to performing the ultrasound was 2 days (IQR 1-4) for formal ultrasound examinations and 0 days (IQR 0-2) for POCUS (p=0,002). A high proportion of scans had an impact on the management of the patient (123 of 171 examinations, 72%).
Discussion: In a resource limited setting there is a high burden of pathology on ultrasound examination. Six months after introduction of POCUS-Training in Queen Elizabeth Central Hospital, over half of all medical sonography is performed as POCUS, shortening the time to diagnosis and changing the clinical management of patients.

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TEN YEARS OF COORDINATED EFFORT TO IMPROVE MANAGEMENT AND DECREASE INEQUALITIES IN TROPICAL MEDICINE/ IMPORTED DISEASES IN BARCELONA

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Introduction: A multidisciplinary group called AISBE TMIH (Area Integral de Salut Barcelona Esquerra of Tropical Medicine and International Health) was created in 2009 in Barcelona in order to decrease inequities and improve the management of international travellers and migrants attended at Primary Care (PC) services.
The project involved primary care and hospital specialists of an organized health care urban area covering 510.000 inhabitants with 72.000 migrants registered (14%). This includes 19 primary health centres and 3 hospitals, being Hospital Clínic the only one with an International Health Department.
Aim: To homogenise, standardise and implement executive integrated health care strategies for imported diseases and migrant health matters in an urban territory in Barcelona, Spain.
Methods: The group was integrated by two specialists from International Health Department of the Hospital Clinic and one member of every PC centre. Three main objectives in the task work group were defined: 1) continuous health care 2) medical training and 3) promotion research at PC level in TMIH topics. Statement of periodicity meetings, integrated coordination and channels of communication between PC and hospital members of the group were established to accomplish these objectives.
Results: Initially not every PC centre was represented, growing progressively with incorporation of medical and nurse staff and training medical residents in order to give representation of all the area. Excellent relationship between members is present with a stable base of participants.
The main plausible results have been: 1) bimonthly executive meetings; written protocols and clinical guidelines assessing management and recommendations at PC facilities; virtual online outpatient consultation tool, 2) biannual open Symposium covering tropical medicine training aspects at PC level, 3) two studies undertaken (prevalence study of hepatitis B and C in Asian migrants, and CRIBMI funded by Generalitat de Catalunya -design of a digital tool to improve the decision making process of migrant screening at PC level-), an ongoing research national grant involving development of a multiplex tool for migrant screening and two doctoral thesis.
Conclusion: Integrated primary and hospital health care strategies satisfy real needs of target population and professionals. Coordinated efforts facilitate medical training and research in tropical medicine.

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TRAVEL HEALTH PERCEPTIONS AND BEHAVIOR AMONGST PARTICIPANTS IN A TROPICAL MEDICINE DIPLOMA COURSE

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Introduction: In an increasingly interconnected world, travellers face new and unfamiliar risks to their health. Previous studies have explored travel health perceptions and behavior amongst the general population of international travellers. However, few studies have examined the perceptions and behaviors of health care professionals. This information could be used to identify knowledge gaps and improve safety for health care professionals who travel abroad.
Aim: This study aimed to examine travel health perceptions and behaviors amongst participants in a tropical medicine diploma course.
Methods: This study featured a survey presented to participants in the East African Diploma in Tropical Medicine and Hygiene course offered by the London School of Hygiene and Tropical Medicine in 2018.
Results: The response rate for the survey was 71% (n=52). The most common sources of travel health information were the internet (59%), Travel Health specialists (51%) and participants themselves (37%). Participants identified road traffic accidents as the primary threat to their health (78%). Nonetheless, 59% of participants admitted to riding on a motorcycle taxi during their travel and only one-third of respondents noted wearing a helmet with >90% frequency. In fact, 8% confessed to wearing a helmet <10% of the time when using a motorcycle taxi. 68% of survey participants received a prescription for malaria prophylaxis. Of this group, only 71% took the medication as directed. The most common reason for not receiving a prescription for malaria prophylaxis was that participants did not feel prophylaxis was necessary.
Discussion: The health care professionals in this study relied heavily on the internet and their own personal knowledge for travel health information. Participants identified road traffic accidents as the primary threat to their health. Nonetheless, the majority of respondents confessed to high-risk behaviors such as using motorcycle taxis, often without a helmet. Furthermore, the most common health issues experienced by participants during their travels were diarrheal and viral illness. Interestingly, only half of participants were taking malaria prophylaxis as directed. The information from this study can be used to develop travel health education for health care professionals to improve knowledge and decrease high-risk behavior.

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MAPPING OF THE BROILER PRODUCTION INDUSTRY AND ITS TRADE PATTERNS IN PUNJAB PROVINCE IN PAKISTAN- A BASE FOR DISEASE IMPACT ASSESSMENT

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Introduction: The chicken industry of Pakistan is a major livestock subsector, playing a pivotal role in economic growth and rural development.
Aim: This study aimed to characterize and map the structure of broiler production systems, associated value chains, and stakeholders involved in AI control in Punjab province, which accounts for 70% of the total chicken production in Pakistan.
Methods: Qualitative data were collected from key informant interviews and focus group discussions on the types of production systems, inputs, outputs, value addition, and stakeholders involved in the chicken value chains and control of AI.
Results: Two major broiler production systems were identified: 1) Environmentally controlled production (97-98%) and 2) Open house production (2-3%). Farming was classified as I) Independent broiler farming (IBF); II) Partially integrated farming (PIF) and III) Fully integrated farming (FIF) with 65-75%, 16-20% and 10-15% share in broiler meat supply, respectively. Disparities in governance in terms of supply chain management, dominance of actors and provision of health services were found among IBF, PIF and FIF. All of the FIF and some of the PIF systems tend to target high-income customers with formal infrastructure. However, numerous informal chains were identified in IBF and PIF systems, with middlemen playing a key role in the distribution of finished birds to consumer level. Structural deficiencies in terms of poor farm management and price fluctuations were evident in IBF and PIF. The public and private sectors responsible for passive surveillance, strategy development and providing health consultancies, respectively, are major stakeholders identified in control and management of AI.
Conclusion: The mapping provides a stepping stone to develop models for assessment of disease impact and economic efficiency of vaccines in IBF, PIF and FIF systems. Structural deficiencies and stakeholders identified could be targeted for devising policies and successful application of novel interventions for efficient control of diseases in chicken farming sector.

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INTERVENTIONS FOR PREVENTION AND CONTROL OF ANTHRAX ACCORDING TO THE ONE HEALTH APPROACH IN SOUTH OMO ZONE, ETHIOPIA

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Introduction: Vétérinaires sans Frontières Germany (VSFG) has been implementing various integrated projects in collaboration with private and public stakeholders in South Omo zone of Ethiopia for eight years. Communities in South Omo zone, especially Hamer, Dassenech, Nyangatom and Bena-Tsemay districts are regularly affected by anthrax outbreaks. Anthrax is endemic in the area and outbreaks are related to climate change induced meteorological variables (precipitation, temperatures and seasonality) and physical barriers of rivers, altitude and soil types.
Aim: The main objectives of the project activities are preventing new outbreaks, protection of public health from livestock-sourced infections and soil and water contamination during an outbreak and raising awareness for anthrax prevention and control in pastoral communities.
Methods: Besides others, interventions include training of Community Animal Health Workers (CAHWs) for detecting, reporting and controlling outbreaks through vaccination activities. VSFG staff provide technical support as well as logistics during governmental led livestock vaccination campaigns where CAHWs and government veterinary professionals participate. Isolation and innoxious removal of infected animals and localized quarantines are also used as part of disease control measures. Complementary measures include voucher based veterinary treatment, rangeland rehabilitation, irrigated fodder production and awareness campaigns on prevention and control measures as well as behavioural change.
Results: The interventions have contributed to reduced incidence of the disease and associated mortalities in livestock and humans. Case reports and case management, preventative measures as well as preventive behaviour among pastoralist communities have improved. These interventions, which include livestock vaccination against anthrax, as well as public awareness and proper disposal of dead animals are implemented by projects of the European Civil Protection and Humanitarian Aid Operations and the United Nations Office for the Coordination of Humanitarian Affairs.
Conclusion: Anthrax constitutes a major disease burden among pastoral communities, and incidences are associated with major livestock loses

and human disease case fatalities and or conditions. Prevention and control of anthrax requires effective collaboration between the private and public stakeholders.

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RISK FACTORS FOR HUMAN CUTANEOUS ANTHRAX OUTBREAKS IN THE HOT-SPOT DISTRICTS OF NORTHERN TANZANIA: AN UNMATCHED CASE-CONTROL STUDY

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Introduction: *Bacillus anthracis* is an aerobic, Gram positive and spore forming bacterium, which causes anthrax in herbivores. Humans get infected after coming into contact with infected animals' products. The aim of the study was identifying the risk factors for human cutaneous anthrax outbreaks in the hot-spot areas of northern Tanzania.
Materials and methods: Unmatched case control study was conducted to identify the importance of demographic, biological, and/or behavioural factors associated with human cutaneous anthrax outbreaks in the hot-spot areas of Northern Tanzania. A semi-structured questionnaire was administered to both cases and controls.
Results: The age range of participants was from 1 – 80 years with a median age of 32 years. In the younger group (1 – 20 years), the odds of being infected were 25 times higher in the exposed group compared to the unexposed group (OR= 25, 95%CI = 1.5 - 410). In contrast, the odds of exposure in the old group (≥ 20 years) were 3 times lower in the exposed group compared to the unexposed group (OR = 3.2, 95% CI = 1.28 – 8:00).
Conclusion: Demographic characteristics, sleeping on animal's skins, contact with infected carcasses through skinning, butchering and not having formal education were linked to exposure for anthrax infection. Hence, a One Health approach is inevitable for prevention and control of anthrax outbreaks in the hot-spot area of Northern Tanzania.

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KNOWLEDGE, ATTITUDES AND PRACTICES OF HOUSEHOLDS AND PROVIDERS OF CARE FOR FACTORS ASSOCIATED WITH THE SURGERY AND PROPAGATION OF THE EBOLA EPIDEMIC IN KINSHASA

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Introduction: Kinshasa communicates directly with all other DRC provinces, including those along the equator due to the recent outbreak. The weather conditions along the equator meet the living conditions of the Ebola virus.
Managing effective planning to prevent a resurgence of this epidemic is highly recommended for the country.
Aim: This study aims to determine the factors that promote the emergence and spread of Ebola virus in the city / province of Kinshasa.
Methods: A study was conducted in two urban health zones (ZS) and two urban and rural health zones. Our overall sample size was 384 (312 adults in households and 72 health care providers). The probabilistic multistage sampling technique was used to form the sample size.
Results: In households, the average age was 38, and the age group of 31-50 was the most represented (41.7%). In total, 80 households had a dog, and 44% of them were stray dogs. In urban areas, 18.6% of households showed risky eating habits, while five in ten (49.4%) showed no protection from sexual activity. In rural areas, three out of ten (30.1%) showed risky eating habits and nearly three out of ten adults have sexual activity at risk (28.8%). Among providers, 9.7% are unaware of the symptoms, 62.5% are unaware of the mode of transmission, and 65% will behave inappropriately in the face of a suspected case of Ebola Virus Disease. nearly one third of adults (74%) did not know the symptoms of EVD, and another third (75%) did not know the mode of transmission of Ebola Virus Disease.
Conclusion: Training and awareness on Ebola Virus Disease, as well as the implementation of a multisectoral and multidisciplinary action plan are the approaches to prevent the emergence and spread of the Ebola outbreak.

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STRENGTHENING COMMUNITY-BASED RESILIENCE AND HEALTH CARE APPROACHES FOR LASSA FEVER OUTBREAK CONTAINMENT IN NIGERIA

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Background: Paucity of consistent data on rodent (reservoirs)-linked Lassa fever outbreak, weak culturally and socio-behavioural effective prevention and control measures integration, limited community knowledge and awareness to inadequate preparedness capacity and access to affordable case management slows down Lassa fever control in Nigeria.
Aims: We explore these missing gaps and ways of resolving them in strengthening community-based resilience, infection control practices and holistic health care approaches for Lassa fever outbreak containment in Nigeria.
Methods: A qualitative study was undertaken with health care providers and top health managers in Kwara State Ministry of Health, Nigeria. Semi-structured, in-depth interview were held with the top managers (n=12). Focus group discussions were held with the health care providers (6 participants across four (4) focus groups). We used a thematic analysis to report significant themes in participants' responses.
Results: The thematic analysis identified the challenges confronting Nigeria health care system as (i) scarcity of consistent data on rodent (reservoirs)-linked Lassa fever outbreak (ii) weak culturally and socio-behavioural effective prevention and control measures integration (iii) weak or limited community knowledge and awareness (iv) inadequate preparedness capacity (v) limited access to affordable case management in affected zones (vi) weak health intervention access and uptake and (vii) poorly equipped public health laboratories. Resolutions identified to resolve the challenges are (i) establish more functioning Emergency Operations Centre for Lassa fever case management in affected regions and provide support to existing health facilities (ii) Building capacity of health care workers working in these centres in standard infection prevention and control (IPC) as well as in the use of personal protective equipment (PPE) (iii) enhanced surveillance, contact tracing, strengthening of

diagnostic capacity for prompt detection of asymptomatic and mildly symptomatic patients, case management, risk communication and assessment (iv) standardizing treatment guidance across all treatment centres (v) identify associated risk factors for improved community engagement (vi) develop appropriate epidemiological investigation of the infection mode of confirmed cases to guide community engagement and behaviour change.
Conclusion: These resolutions are essential for strengthening community based resilience and health systems and laboratory effectiveness for containment of Lassa fever in Nigeria.

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FABRIC PANELS FOR APPLYING *METARHIZIUM ANISOPLIAE* AGAINST VECTORS OF SLEEPING SICKNESS

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Introduction: Trypanosomiasis poses significant morbidity on populations in sub-Saharan Africa. The disease is extensively controlled by suppressing tsetse flies that transmit trypanosomes. The control of trypanosomiasis can plausibly be improved with integration of novel, low-cost and effective tsetse control tools. Such tools could include biological agents such as *Metarhizium anisopliae,* a fungus known to increase the rate of mortality in many tsetse species.
Aim: This study aimed at developing a fabric-based easy-to-deploy tool for field application of *M. anisopliae* against *Glossina fuscipes.*
Methods: Firstly, the relative capacity of fleece, cotton and polyester to retain fungus was compared by estimating in tandem conidia residual on 25cm×25cm of fabric treated with 0.1g/cm^2 of *M. anisopliae*. For 15 days, conidia were from three random spots (1.9cm×1.3cm) on each fabric quantified and tested for viability every day. Secondly, tsetse landing on fabrics treated with 0.25g, 0.50g and 1.00g of conidia were recovered with electrocuting nets and the incidence of fungus on them estimated. Thirdly, the effectiveness of fabrics with 0.25g of conidia to contaminate field populations of *G. fuscipes* was evaluated on Manga Island in Kenya. The neighbouring Magare island served as a negative control.
Results: There were no differences in conidia retention of fleece and cotton ($p=0.07$). The fabrics retained seven times (95% CI: 5.6 - 8.8 times, $p<0.01$) as much conidia as polyester. Increasing the dose of conidia from 0.25g reduced attraction of tsetse to fabrics ($p<0.01$). However, the proportion of tsetse flies that had conidia after landing on fabrics treated with 0.25g, 0.50g and 1.00g of conidia did not differ ($p=0.09$). The prevalence of *M. anisopliae* in Manga increased steadily to 13.3%, 17.1% and 25% over one, two and three weeks but declined on the fourth and fifth week to 12.5% and 0%.
Conclusion: Fleece treated with 0.25g of *M. anisopliae* effectively contaminate *Glossina fuscipes* in field conditions. Fabric panels with fungus could ultimately offer low-cost biorational tools for the integrated control of tsetse that transmit sleeping sickness.

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PUTTING ONE HEALTH IN PRACTICE: A COLLABORATIVE TRAINING PROGRAM FOR RESEARCHERS AND PROFESSIONALS

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Introduction: The collaborative MSc in Tropical Animal Health [MSc (TAH)] is a postgraduate training program that provides tools to researchers and professionals to incorporate a One Health strategy in health challenges at the people, livestock and wildlife interfaces. The joint MSc program is unique in its kind and was launched in January 2016. The program brings together the expertise of the Institute of Tropical Medicine in Antwerp and the Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria in South Africa. It supports the building of capacity to meet the challenges to the health of people, livestock and wildlife at such interfaces and at the same time building capacity that can influence the policy process to increase recognition and realization of the One Health concept when dealing with livestock, human and wildlife diseases in the tropics.
Aim: The program mainly focusses on the link between animal and human health, in particular the relationship between infectious and parasitic diseases of animals and humans (zoonoses), diseases and ecosystem health in order to improve disease control strategies, ecosystem sustainability, food security and safety and rural development.
Methods: The MSc (TAH) is offered as a blended program of e-learning and face-to-face teaching to create a tailor-made curriculum that fits into a daily work routine. It has a modular structure in order to ensure flexibility, with continued assessments throughout each module. It also includes a ten day compulsory induction/field-workshop that takes the participants to the interfaces in a South African context and brings them into contact with peers, faculty, local experts, and community members.
Results: Group discussions and field observations are geared to give participants a first-hand experience with the health challenges at the interfaces and illustrates how One Health can be used in practice to improve health. Additionally, participants coming from all continents exchange their own experiences and build a multidisciplinary network of health researchers/professionals.
Conclusion: This program is unique as it goes beyond the theory of One Health and fosters the creation of a multidisciplinary community of practice of open-minded health experts in local and global contexts.

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EVALUATION OF THE IMPACT OF AN INTERVENTION TO REDUCE MALARIA MORBIDITY AND MORTALITY IN BURKINA: 2006-2015 RETROSPECTIVE STUDY

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Introduction: Malaria remains a public health problem in the world and in Africa. In Burkina Faso, 45.7% of consultations and hospitalizations, as well as 25.2% of deaths are related to malaria. Each year, considerable resources are committed to combat this scourge.
Aim: The aim of this study was to evaluate the impact of health expenditure on malaria control monitoring indicators in Burkina Faso over a period of 10 years.
Methodology: This is a cost-effectiveness medico-economic study on the financing committed in the fight against malaria in Burkina Faso from 2006 to 2015. Through the analysis of the data of the health accounts and epidemiological data, the aim was to study the impact of funding on the reduction of morbidity and mortality related to malaria.
Results: In Burkina Faso, health expenditures were set at 4.990.040.000 $US from 2006 to 2015. 14.4% of these expenditures, with an average of 71.814.800 $US per year, were used to combat malaria. The contribution of households in this funding accounted for 42.2%. This has reduced the distances of access to care from 7.8 to 6.8 km, improved attendance of populations with a number of new contacts per capita and per year from 0.37 to 0.87 for the general population and from 1.4 to 1.7 for children under 5 years of age.
Among the observed effects, there is a reduction in malaria lethality from 2.3% to 1.2% in the general population, from 4.0% to 1.5%, in children under 5 and 1.5% to 0.2% in pregnant women (P = 0.0001). Malaria incidence has also been observed to increase from 181 ‰ to 449 ‰ in the general population and from 468 ‰ to 947 ‰ in children under 5, justified by the reduction in access distances to health care, the implementation of subsidy and free healthcare policies.
Conclusion: Direct payments challenge policymakers to maintain advocacy to mobilize more resources and direct action towards universal health insurance to help reduce malaria mortality by 40% by 2020.

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THE NEED FOR EDUCATION OF FOOD VENDORS TOWARDS ELIMINATION OF HELMINTHIASIS IN NIGERIA

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Introduction: Intestinal helminths infection still persists among pupils in Nigeria.
Aim: This two year study evaluated the factors that maybe responsible for the current helminth infection rates in pupils following the Home Grown School Feeding Program (HGSFP) which incorporates deworming of pupils.
Methods: Structured questionnaire was administered to assess knowledge, attitude and practice (KAP) about helminthiasis in 45 consented food vendors in the selected schools. Also 1677 consented primary pupils aged 6 to 11 years from nine schools stratifically selected in Anambra State, Nigeria were enrolled. Fresh faecal samples were collected from the pupils six-monthly after each antihelminthic treatment (400mg Levamisole) and examined using the Kato-Katz technique.
Results: From the 1677 pupils, 53% were males and 47% were females. The study observed a prevalence of 6.0% which was not significant with respect to sex ($p>0.05$), but significantly decreased as age increased. Helminth ova observed were *Ascaris lumbricoides* (3.9%), *Trichuris trichiura* (0.8%), Hookworm spp. (0.2%), *Taenia* spp. (0.5%), and varied coinfections. On the intensity of *A. lumbricoides* voided after treatment, 33 female pupils voided 165 worms and 42 male pupils voided 125 worms. Of 290 voided worms, male worms were 126 and females 164; comprising 119 adult worms and 171 young worms. Young worms could be attributed to cases of re-infection as assessment of KAP were significantly ($p<0.05$) related to transmission such as lack of hand washing by food vendors after toilet use ($p=0.040$), and their poor knowledge of helminth control ($p=0.025$) contributes to transmission.
Conclusion: The efforts of HGSFP is acknowledged in the low prevalence; however education of food vendors on biology of helminths is highly advocated in addition to supervision of food vendors recruited for the HGSFP implementation. This will boost behavioural change as behaviour dynamics of food vendors is key to control and possible elimination of intestinal helminths.

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NEED OF HEALTH POLICY AND SYSTEM RESEARCH FOR ELIMINATION OF FALCIPARUM MALARIA IN PAKISTAN

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Introduction: Policy and Systems Research is the production of new knowledge regarding effectiveness of policy and system. For instance, elimination of *falciparum* malaria is a policy to eliminate the *falciparum* malaria.
Aim: Aim is to advocate the funders of malaria research with a clear understanding that, what is the Policy and System Research and why is it crucial to concentrate.
Methods: A cross sectional study was conducted in a malaria endemic district Muzaffargarh, Pakistan.

- To know the situation 200 primary health care centres in public and private sector were selected within the district to conduct this study.
- Study subjects were selected among senior general practitioners, health managers and Malaria Control staff was identified.
- Study tools used were prepared and two days training was imparted to 10 teams (2 in each), one month was given to complete the study survey.
- Data were collected, analysed by using SPSS v-20.

Results: Highly significant percentage of study subjects was unaware about the national treatment guidelines and track of policy and system research. As per policy in Pakistan malaria is being treated as per *Plasmodium* species, study found that second/third line drugs are being used for the treatment of *Plasmodium vivax* by doctors and malaria staff is treating with first line drug and management is not aware, as no evidence based research study available because of least priority of policy and system research.
Conclusion: It is concluded that policy and system research is least priority of researchers and managers, because it is thought that it is the only domain of government. Annual Parasite Incidence of the district is <2/1000 population, and Malaria Control policy is still adapted, no one is thinking about Malaria elimination policy, it is also due to lack of awareness and interest in policy and system research. Therefore, it is concluded that the basic cause of failure to achieve the goals is, minimum attention towards Policy and System Research.

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LOT QUALITY ASSURANCE SAMPLING SURVEY ON INTEGRATED REPRODUCTION AND CHILD HEALTH SERVICES IN SIERRA LEONE

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Introduction: Two of the most cost-effective child survival strategies are Vitamin A Supplementation (VAS) in areas where vitamin A deficiency exists and child-spacing. Mass VAS has been effectively implemented during campaigns since 2006. In 2011-12, a transitioning to routine VAS (rVAS) at a six-month contact point (6MCP) was piloted. This included infant and young child nutrition counselling with mothers' participation in the preparation of a complementary food and confidential 'quality' family planning counselling and provision. By mid-2017, the 6MCP had been institutionalized to 340 (28%) health facilities nationwide. In early 2018, full transition to rVAS commenced in three targeted districts as the six-monthly contact point (6MlyCP) and VAS campaigns ceased.
Aim: To evaluate coverage of rVAS, deworming, immunisation, complementary feeding practices, uptake of modern contraception and stock-out of essential commodities.
Methods: The districts were divided into 5 Supervision Areas (of 2-4 chiefdoms each) and 19 villages randomly selected by proportional to population size. One questionnaire was administered to caregivers of children aged 6-11 months, 12-23 months and 24-59 months in each of the 19 villages.
Results: 855 caregivers were interviewed (285/district). Overall, rVAS coverage (children 6-59 months) was 87.6% and deworming (12-59 months) was 80.9% by verbal affirmation by caregiver (62.1% and 50% by card confirmation respectively). Overall, 87% of caregivers of children 12-23 months verbally affirmed that their child had received Penta 3 vaccine (71% confirmed by card). Most caregivers of children 6-11 months of age knew that complementary foods should be introduced at six months (77%) and 45% were providing three or more (of six) food groups, 85% were aware of family planning and 38% were using some form of modern contraception. Overall, stock-outs at health facilities were Vitamin A capsules 8% albendazole:18%, male condoms 12%, oral contraceptives: 10%, depot injections 55% and hormonal implants: 22%.
Conclusion: The 6MlyCP has proven to be an effective platform for transitioning from mass to rVAS and deworming whilst also improving complementary feeding practices and access to modern contraception despite the evident challenges of supply chain management. The transition underway in another four districts and expected to be available nationwide by 2020.

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ASSESSING THE UNDERREPORTING OF ARBOVIRAL CASES WITHIN THE COLOMBIAN NATIONAL SURVEILLANCE PROGRAM

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Introduction: Chikungunya, dengue, and Zika are three different arboviruses primarily transmitted to humans by *Aedes* mosquitoes. Historically, Colombia is one of the countries most affected by chikungunya, dengue, and Zika, with the *Aedes* mosquito being widely distributed throughout the country at elevations below 2,000 meters, and it is the eighth most highly endemic country in world for dengue. Despite the mandatory reporting of chikungunya, dengue, and Zika, there is significant underreporting which has been found for different parts of Colombia and a better understanding of the limitations of that surveillance data in Colombia is crucial to inform its improvement and utility.
Aim: To examine (scope, nature and degree of) underreporting of chikungunya, dengue, and Zika case data in the national surveillance system of Cali, Colombia from 2014-2017.
Methods: We assessed the underreporting of the national disease surveillance program, SIVIGILA, in detecting confirmed chikungunya, dengue, and Zika cases through the capture-recapture method, which evaluates the degree of overlap among registries of cases from existing data sources. We evaluate complete captures (e.g., same diagnosis, same information), incomplete captures (e.g., different but relevant diagnosis), inaccurate (e.g., complete mismatch in diagnosis), and non-existent captures (e.g., does not appear) relative to the SIVIGILA system. We fit multilevel Poisson regression with random effects to determine the predictors of the case being captured within SIVIGILA, using individual (e.g., sex, age, type of diagnostic test) and institutional-level (e.g., public institution, city).
Results: In Cali, between 2014-2017 there were 75,963 arboviruses (dengue=54,098; chikungunya=4,423; zika=17,442) reported in Cali, Colombia. Preliminary results showed that 10.6% of vector borne clinically/lab confirmed diseases in private/contributory health care and 8.5% of those reported in the public/subsidized institutions were reported into the surveillance system.
Conclusion: Our preliminary analysis has estimated that the underreporting on arboviruses is above than expected and our next step is to identify patient-level and facility-level determinants of underreporting. Identifying the limitations of the surveillance data is crucial for informed sensitivity analyses for disease burden estimates and also in identifying the determinants of poor reporting, which could then be incorporated into further analysis. The complete analysis will provide extremely relevant information to the National Institute of Health to improve the reporting and coverage of the national surveillance program.

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THE BELGIAN COMMITMENT TOWARDS ASSURING QUALITY OF MEDICINES IN HUMANITARIAN AND DEVELOPMENT PROGRAMS– EXPERIENCE OF STAKEHOLDERS

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Introduction: Twenty-two percent of Belgian official development assistance (ODA) for the health sector are used to procure medical products. However, many low- and middle-income countries (LMIC) have underresourced regulatory authorities, which cannot fully assure the quality of medicines circulating in their territory. In these contexts, the implementers of humanitarian programs have *de facto* the responsibility to assure the quality of medicines in their programmes overseas. Therefore, a group of Belgian stakeholders committed in 2008 through a Charter to rigorously verify the quality of medical products they provide in humanitarian/development programmes. In 2017, the commitment became formal for all implementers funded with Belgian ODA funds.

Methods: We conducted a survey amongst signatories of the 2008 Charter and the 2017 Commitment, to investigate the perceived successes and challenges of adopting stringent quality requirements. Out of 33 signatories, 19 (58%) responded. They include organizations that purchase medicines, or are active in research, advocacy or capacity building.
Results: All respondents were aware of the problem of poor-quality medicines. This prompted important initiatives such as the launch of QUAMED, a network of not-for-profit organizations that mutualize resources to conduct audits of suppliers to guide good procurement practices. At institutional level, the activity most frequently conducted was building pharmaceutical expertise amongst partners in the countries of intervention (67%), followed by prioritizing procurement via public national systems (44%), and reserving a dedicated budget for building medicine quality assurance (QA). On the other hand, it was noted that QA is still insufficiently institutionalized within many organizations, and that networking with other stakeholders on QA-related issues should be further expanded.
Conclusion: The Belgian Charter and Commitment have prompted initiatives to assure the quality of medicines in humanitarian/development programs. We hope that they can inspire similar initiatives elsewhere and be supported by key bilateral and multilateral donors. More resources and funding should be systematically allocated for improving quality standards and building capacity on QA, for NGO's staff and their partners overseas. Quality assurance policy and systems should be considered as an integral part of the wider health system strengthening efforts, to improve quality of care and achieve universal health coverage.

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THE MERCK GLOBAL HEALTH INSTITUTE: A LEADING PRACTICE FOR INNOVATION IN GLOBAL HEALTH

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Introduction: Merck has a long-standing commitment towards improving the health of underserved populations: Corporate Responsibility has been an integral part of the Company's identity for 350 years. As a leading Science and Technology company, Merck continues playing a key role in tackling global health challenges through innovative high-quality health solutions. In 2017, Merck established the Global Health Institute highlighting the Company's continued emphasis on investment into solution developments for infectious diseases.
Aim: The Institute aims to develop and provide access to transformative and integrated innovations (treatments, diagnostics, preventive measures, health system strengthening approaches) for the most vulnerable populations suffering from schistosomiasis, malaria and bacterial infections.
Methods: The Institute's mission is achieved through its R&D engine, its Access path to ensure sustainable market availability and affordability, and its Capacity building efforts to strengthen local health systems. Under the overarching principle of 'Shared Value', the Institute operates as a social business unit which is designed to address key social challenges. The Institute applies a model that synergizes internal expertise of the three business sectors of Merck; it is based on public-private partnerships and innovative financial mechanisms to develop a sustainable portfolio of affordable products and services.
Results: In a few years, the unit moved from an R&D incubator to an internationally recognized Institute, highlighted as a leading practice to accelerate R&D, incorporate access provisions and build capacity for projects and initiatives targeting schistosomiasis, malaria and other infections (Access to Medicine Index Report, November 2018). The Institute has been defining, implementing and broadening its portfolio of projects; the progression of the Pediatric Praziquantel formulation program for schistosomiasis to clinical Phase III, the promising clinical results for a new anti-malarial compound as well as the establishment of a drug discovery platform for malaria are only some examples of recent achievements.
Conclusion: With these efforts and through the Institute, Merck wants to generate significant impact to strengthen control of infectious diseases as well as to contribute to the global elimination agenda of infectious diseases.

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OBSERVATION OF NATIONAL INDOOR RESIDUAL SPRAYING OPERATION FOR KALA-AZAR VECTOR CONTROL IN BANGLADESH

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Background: Visceral leishmaniasis (VL) is a fatal disease in the Indian subcontinent. Research trials demonstrating that indoor residual spraying (IRS) using synthetic pyrethroid deltamethrin 5 WP was very effective at reducing vector densities, no national VL vector control operations took place in Bangladesh between 1999 to early 2012. In 2012, IRS using deltamethrin 5 WP was re-introduced by the national programme as pre-monsoon spraying in eight highly endemic sub-districts (upazilas).
Aim: We aimed to evaluate the process and performance of spraying; and effectiveness of IRS on VL vectors conducted by national programme.
Methods: Fulbaria, Trishal, Mukthagacha, Gaforgaon and Bhaluka upazilas of Mymensingh district were purposively selected to conduct the study using the WHO/TDR monitoring and evaluation (M&E) tool kit. Acceptability survey was conducted using structured questionnaire in 600 households (HHs). Pre-IRS (two weeks prior) and post-IRS (at one and five months after); and vector density was measured using CDC light traps for two consecutive nights. Bioassays, using WHO cone-method, were carried out in 80 HHs (40 sprayed and 40 unsprayed).
Results: Of the 544 spraymen interviewed pre-IRS, 60%, 3% and 37% had received training for one, two and three days respectively. 64.0% of the spraying squads had a supervisor in 4 upazilas but only one upazila (Mukthagacha) achieved 100% supervision of squads. 72.8% of the spraying squads in the study upazilas had informed HHs members to prepare their houses prior to spraying. We found spraying techniques used by all sprayers were sub-standard compared to the standard procedure mentioned in the M&E toolkit. 94.8% of the 600 respondents said that all their living rooms and cattle sheds were sprayed. Total 4132 sand flies were trapped in three intervals, of which 3310 (80.1%) were *Phlebotomus argentipes*; 46.5% (1540) males and 53.5% (1770) females. At one month post-IRS, *P. argentipes* densities were reduced by 22.5% but the 5 months post-IRS reduction was only 6.4% for both male and female. Corrected mortality of *P. argentipes* sand flies at one month post-IRS of 87.3% which dropped to 74.5% at 4 months post-IRS in three upazilas.

Conclusion: The national programme should conduct M&E activities to ensure high quality of IRS operations.

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GEOGRAPHICAL DISTRIBUTION AND PREVALENCE OF PODOCONIOSIS IN RWANDA: A CROSS-SECTIONAL COUNTRY-WIDE SURVEY

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Introduction: Podoconiosis is a type of tropical lymphoedema that causes massive swelling of the lower limbs. The disease is associated with both economic insecurity, due to long-term morbidity-related loss of productivity, and intense social stigma. Reliable and detailed data on the prevalence and distribution of podoconiosis are scarce.
Aim: To determine the prevalence and geographical distribution of podoconiosis within all districts of Rwanda among the adult population (≥15 years) and to estimate the number of podoconiosis cases by district across the country.
Methods: A population-based cross-sectional survey was conducted to determine the national prevalence of podoconiosis. A podoconiosis case was defined as a person residing in the study district for at least ten years with bilateral, asymmetrical lymphoedema of the lower limb present for more than one year, who tested negative for *Wuchereria bancrofti* antigen and specific IgG4 using the FTS and Wb123 test respectively and had a history of any of the associated clinical signs and symptoms. All adults (≥15 years) who resided in all 30 districts of Rwanda for ten or more years were invited at the household level to participate. We then fitted a binomial mixed model combining the site-level podoconiosis prevalence with continuous environmental covariates to estimate prevalence at unsampled locations. Finally, we produced estimates of cases by district combining our mean predicted prevalence and a contemporary gridded map of estimated population density.
Results: In July 2017, a total of 1,360,612 individuals; 719,730 (52.9%) women and 640,882 (47.1%) men were screened from 80 clusters in 30 districts across Rwanda. In total, 1,143 individuals with lymphoedema were identified, of whom 914 (79.9%) confirmed podoconiosis cases were based on the standardized diagnostic algorithm. The overall prevalence of podoconiosis was 68.5 per 100,000 people (95% confidence interval [CI]; 41.0-109.7). Podoconiosis was found to be widespread in Rwanda. District level prevalence ranged from 28.3 (95% CI; 16.8-45.5, Nyarugenge, Kigali province) to 119.2 (95%CI; 59.9-216.2, Nyamasheke, Western province) per 100,000 people. We estimate that 6,429 (95%CI; 3,938- 10,088) people live with podoconiosis across Rwanda.
Conclusions: Despite relatively low prevalence, podoconiosis is widely distributed geographically throughout Rwanda. Many patients are likely to be undiagnosed and morbidity management is limited. The findings presented here are intended to inform national level planning, monitoring and implementation of interventions.

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ASSESSMENT OF DATA QUALITY OF THE ELECTRONIC DISEASE EARLY WARNING SYSTEM FOR INFECTIOUS DISEASES IN YEMEN

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Introduction: The recurrent epidemics and pandemics in many places of the world have generated a strong need for strengthening disease surveillance system. Many developing countries, particularly those which experienced disasters during the last decades have installed the electronic systems for early detection and rapid response, therefore the electronic disease surveillance systems (eDEWS) have been established in Yemen in 2013. Electronic Diseases Early Warning System is an effective mobile-based surveillance system aims to detect the potential threats of outbreak.
Aim: To assess the data quality of the electronic Disease Early Warning System during the conflict in Yemen.
Methods: This study is a mixed methods design. The first part of the study is quantitative data analysis using the raw data that available in the system, the weekly bulletins and annual reports, the qualitative part was conducted by conducting 11 in-depth interviews with the eDEWS focal persons at all levels and staff of relevant stakeholders.
Results: eDEWS is covering 1984 health facilities in 306 districts (92%) out of 333 districts. The average reporting rate was more than 90% from 2013-2017 except in 2015 was around 80%. The leading causes of morbidity were respiratory tract infection, diarrhoea, and malaria (based on standard case definitions). The highest incidence of cholera for first time appeared in 2016, cholera was early detected by eDEWS, in 2017 cholera was considered as one of the leading causes of morbidity with 7% of the total consultancies in all health facilities. Completeness of data is obviously recognized. However, there are some discrepancies in eDEWS reports. There was a delay in timeliness of eDEWS verification and dissemination. Only 14% of immediate alerts were verified within 24 hours from the reporting time. The mean delay time of the weekly bulletin dissemination increased in the last two years, it was 2.8 days in 2014 and increased to 9 days in 2016 and 2017.
Conclusion: eDEWS is able to detect and alert health authorities about new emerging events under the conditions of ongoing civil war, but response timeliness needs improvement.

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GIRLS' MHM KNOWLEDGE, ATTITUDES AND PRACTICES, INFLUENCING FACTORS, AND THE ROLE OF BOYS - FINDINGS FROM MALAWI

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Introduction: Menstrual hygiene management (MHM) is an intricate and still poorly understood phenomenon, especially in many Saharan African contexts.
Aim: This study sought to enhance the understanding of the MHM situation of girls in Malawi by investigating MHM the relationship of knowledge, attitudes and practices (KAP) and influencing factors. Another goal was to

explore the role of boys' knowledge on MHM dynamics, a widely neglected aspect to date.
Methods: The mixed method research, which was commissioned by the Swiss Red Cross in collaboration with Malawi Red Cross, combined a cross-sectional survey (n=522), 29 focus group discussions (n≈200) and key informant interviews (n=13). The research involved pupils (standard 8) from 17 primary schools in two districts (Mzimba and Salima) in rural Malawi.
Results: Qualitative and quantitative findings show that the onset of menstruation presented a negative experience to most girls (85%); 52% had not even heard about menstruation before. Girls during menses were seen as unclean and were restricted from many social activities. Schools were inadequately prepared lacking sanitary infrastructures, such as toilet doors, paper, soap and functional water systems.
Girls had significantly higher levels of MHM knowledge than boys (r=0.43;p=0.000), and girls' knowledge was positively linked to a sister (r=0.30;p=0.000) or a mother group, i.e., a female parent committee, (r=0.36; p=0.000) as their source of MHM information. Girls' knowledge was also positively linked to their school attendance during menses (r=0.22;p=0.002), which was, in turn, associated with the use of industrial sanitary pads (r=0.30;p=0.000). By contrast, MHM boys' knowledge was connected with higher levels of teasing and girls' school absenteeism during menses (r=-0.21;p=0.003). Knowledge, attitudes, sources of information, and absenteeism differed significantly between districts.
Conclusion: The onset of menstruation presents a tabooed challenge for Malawian girls. The linkages between girls' school absenteeism and boys' MHM knowledge suggest, however, that breaking the taboo can initially expose girls to harassment from boys and increase their levels of discomfort. Educators are thus required to address this topic in very sensitive ways.

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"QUICK WIN INITIATIVE" DECENTRALIZING EMERGENCY CARE IN ETHIOPIA TO BATTLE EMERGENCY DEPARTMENT CROWDING IN TERTIARY HOSPITALS

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Introduction: Organized emergency medical care is a recent phenomenon in Ethiopia. Cognizant of this fact Ethiopia's Federal Ministry of Health (FMOH) is working to provide quality emergency care in all areas in its domain. The FMOH launched the Addis Ababa emergency service quick fix initiative to battle Emergency Department crowding in the tertiary hospitals in May of 2018. FMOH implemented certain interventions to reduce crowding. The interventions included establishment of intermediate ward, hallway admissions, bi-directional referral to district level hospitals and increase frequency of consultant rounds.
Aim: Initially, the FMOH performed a gap analysis of the emergency services. Once the quick win initiatives were implemented, the Ministry prepared checklists and collected daily reports from twelve emergency departments of tertiary hospitals, which included the length of stay, frequency of senior rounds and number of patients seen per day. Weekly and aggregate data analysis was conducted using Microsoft excel.
Methods: After the implementation of the quick win initiatives of decentralizing patients to health centres, admitting patients to corridors and intermediate wards and increasing the frequency of consultant r rounds at the tertiary hospitals showed a decrease in their length of stay. The percentage of patients staying greater than 24 hours in the emergency department decreased from 41.5% to 10.6%. Furthermore, the number of patients seen in the emergency departments did not decrease dramatically over the fourteen weeks. The bi-directional referral faced challenges with the implementation and collection of data.
Conclusion: Emergency Department crowding is a major issue in most urban emergency departments. The proposed interventions from the quick win initiatives introduced by the FMOH have shown promising improvements. Based on the lessons learned in Addis, it is planned to cascade these initiatives to other major regional cities in the country.

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CAN WE USE PHARMACOVIGILANCE INTELLIGENCE TO TRACK ANTIMICROBIAL RESISTANCE?

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Introduction: VigiBase contains over 10 million Adverse Drug Reaction (ADR) reports from 134 countries (in 2018) participating in the WHO Programme for International Drug Monitoring (PIDM). Phrmacoviglance (PV) experts argue that antimicrobial resistance (AMR) is an overlooked adverse event which should be reported as part of events around drug ineffectiveness.
Aim: The aim of this study is to investigate the potential role of ADRs reporting tools in the track of AMR cases.
Methods: The antimicrobials to be included in the study were established based on 1) a review of drugs on the AWaRe (Access, Watch and Reserve) list of antimicrobials in the WHO Essential Medicines List (EML), and 2) a review of drugs used to manage diseases on the WHO Priority Pathogens List (PPL). Using active substance names, we conducted a VigiBase search, looking for ADRs recorded using Preferred Terms (PTs) that refer to events of resistance, or events likely to lead to resistance. The Medical Dictionary for Regulatory Activities (MedDRA) was used to identify international codes linked to the PTs in ADRs reports.
Results: Antimicrobials from the following classes were included: Carbapenems, Vancomycins, Methicillins, Clarithromycins, Fluoroquinolones, Cephalosporins, Penicillins and Ampicillins. Retrieved VigiBase records were based on report submitted between 1968 and 2018. The search for events of interests led to a total of 17 PTs, within the following System Organ Classes (SOCs): 1) infections and infestations, 2) general disorders and administration site conditions, and 3) injury, poisons and procedure complications. Important identified PTs include "Pathogen Resistance", "Drug Ineffective" "Drug Resistance", "Off label use" and "Product use in unapproved indication". Pathogen Resistance (MedDRA code 10034133) cases were high with Amoxicillin (n=153), cefalotin (n=143) and Ciprofloxacin (n=140). Drug Ineffective (MedDRA code 100313709) were high with Amoxicillin (n=588), Ciprofloxacin (n=791), clarithromycin (n=538) and levofloxacin (n=621).
Conclusion: Our findings suggest that ADRs reports contain important information on existing or rising AMR cases. Further research should focus on how specific PT codes can be used in PV intelligence systems to capture geo-tagged AMR signals. Such systems would be an important tool in AMR tracking, especially in settings with weak laboratory capacity for causality assessment.

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IMPACT EVALUATION

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Introduction: The Barcelona Institute for Global Health (ISGlobal) aims to ensure that its graduates are professionally competent and meaningfully contribute to the field of global health.
Aim: The aim of this evaluation was to understand how graduates were performing in terms of employability in the global health sector from the following ISGlobal and University of Barcelona (UB) postgraduate programmes: Master of Global Health, Master of Clinical Research in International Health, and Diploma of Global Health Fundamentals. In addition, we examined whether the areas covered by the programmes and the competencies gained were appropriate and relevant for a successful career development in global health.
Methods: An anonymous web-based survey with 44 questions was conducted in July 2018. The survey was sent to a total of 114 graduates from the first five cohorts of the postgraduate programmes mentioned above, among whom 42 responded (37%).
Results: 90% of respondents reported to be employed in a full-time or part-time job, internship or volunteer position. From those that responded, 78% were working in the global health sector, mainly in academic institutions (32%) and international and national NGOs (33%). About 85% of respondents reported that their salary and level of responsibility at work increased after the programme. Moreover, 82% of the respondents felt moderately and very confident with the competencies taught in the programme, and 62% reported to be using them regularly in their current job. Graduates reported four main academic areas to be strengthen in order to be better prepared for the job market: data analysis, biostatics, project management, and grant writing. In addition, career development support was the element identified as missing from the programmes. Lastly, negative gender stereotypes and lack of female roles in the global health sector were the most common challenges that female graduates reported.
Conclusion: The ISGlobal-UB postgraduate programmes have significantly contributed to its graduates' career development. In order to increase its impact, the programs need to enhance its training in technical skills and improve its career development support services, as well as to more proactively address the gender barriers that hamper female students' success.

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SYMPATRIC EXISTENCE OF FALCIPARUM AND NON-FALCIPARUM PARASITES TRIGGERS OCCURRENCE OF SYMPTOMATIC MALARIA IN ENDEMIC REGIONS OF WESTERN KENYA

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Background: Malaria species in Kenya is *Plasmodium falciparum* (*Pf*) which can occur sympatrically with *Plasmodium ovale (Po)* and *Plasmodium malariae (Pm)*. Detection and frequency of species has been conducted by screening symptomatic than asymptomatic cases. Study assesses composition of *Plasmodium* species in symptomatic versus asymptomatic individuals in Kombewa Kisumu West sub-county.
Methods: 437 symptomatic and 1,100 asymptomatic malaria individuals recruited in a study between 2013 and 2016 within the same catchment. 2 mL of blood drawn from participants, tested for malaria parasites by microscopy, Rapid Diagnostic Tests and 18s rRNA real-time PCR, positive samples typed for species composition.
Results: In symptomatic cases, *Pf, Po and Pm* had prevalence of 96.3%, 28.4% and 6.9% respectively as both mixed and single species infections. Single species of *Pf* were higher at 60% followed by *Po* at 3.7% while no *Pm* single infection detected. Mixed infections between *Pf* and *Po* were highest, 29.5% while *Pf/Pm* and *Pf/Pm/Po* detected at 6.4% and 0.5% respectively. In asymptomatic *Pf, Po* and *Pm* observed at 89.5%, 15.5% and 18.5% respectively as both mixed-species and single-species infections. Single infections of *Pf*, *Po* and *Pm* detected at 72.9%, 5.5% and 3.4% respectively. *Pf* and *Po mixed* infections observed at 6.1% while *Pf/Pm, Pf/Pm/Po* and *Pm/Po prevalent* at 5.3%, 5.2% and 1.7%. Comparison between two groups showed frequency of infections containing *Po* in symptomatic was statistical higher (OR of 1.54, 95% CI range [1.19 – 1.97 and P = 0.0007) than asymptomatic. Further, *Pf/Pm/Po*-mixed-species infections were more frequent in asymptomatic than symptomatic cases (OR of 0.08, 95% CI ranged [0.02 – 0.36 and P = 0.0008). *Pf* single-species infections were more in asymptomatic than symptomatic (OR of 0.8, 95% CI ranged [0.68 – 0.98 and P = 0.0314).
Discussion: High frequency of *Po* infections among symptomatic than asymptomatic cases was noted. Single species with disease tolerance and lack symptoms and multiple species involving *Po* with virulence. *Plasmodium ovale* single species are asymptomatic and that *Pf* versus *Po* virulence is augmented by entry of either of them.
Conclusion: Finding argues for consideration of malaria asymptomatic in estimating malaria burden based on analyses of treatment seeking habits.

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CHASING VISCERAL LEISHMANIASIS ELIMINATION IN NEPAL; A SWOT ANALYSIS

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Introduction: By 2016 Nepal has entered to consolidation phase of visceral leishmaniasis (VL) elimination program[1]. Elimination validates the effectiveness of an intervention tool[2]. The number of VL patients at early 2000AD were more than 2000 whereas by now it has been less than 200[3].
Aim: We aimed to enumerate strength, weakness, opportunity and threat during two decades journey of VL program in Nepal.
Methods: It was a qualitative study. The entities were collected during meetings and trainings on leishmanisis from different international, national and regional level in Nepal. Besides public health authorities, administrators, planner and national and international scientist the participants were different level of stakeholders like female community health volunteers, clinicians from health post, district, zonal and regional hospitals who had been active in VL program. These entities were then classified to strength, weakness, opportunity and threat.
Results: The strengths of VL program owned by Epidemiology and Disease Control Division are 1) At least one training at regional level ensuring participants from each endemic or potentially endemic area for consecutive couple of years 2) Mobile application to notify new cases 3) Proper line listings of each cases and 4) Prompt supply of drug and rapid diagnostic test at field had been established. The weakness are 1) VL program has given the least priority for tissue diagnosis, upgrading better diagnostic tools for relapses and reinfections, 2) Adequacy of entomologist and clinical research 3)Rate of treatment failure as per national treatment protocol is higher than expected and 4)Porous border with spillage effect. The opportunity is collaboration between university and ministry for priority and need based sustainable clinical research and system capacity building. The threat are 1) Status of specific political ownership with new political scenario 2) Agent and vector geography novelty 3) Lack of effective drugs in pipeline and 4) Breaking crux of socio behavioural phenomenon at low transmission rate.

Conclusion: Leishmaniasis incidence and case fatality has dropped drastically to the elimination phase in Nepal. Sustainability of this achievement needs strong political commitment with high standards of performance.

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ARE NIGERIANS WILLING TO PAY MORE TAXES FOR MORE GOVERNMENT SPENDING ON HEALTH: EVIDENCE FROM THE 7TH AFRO-BAROMETER SURVEY IN 2016/2017

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Introduction: Nigeria presently spends less than 8% of its budget on healthcare despite being a signatory to the 2001 Abuja Declaration when and where African Union countries committed to allocating at least 15% of their budget to improve the health sector.
The National Health Insurance Scheme, established by the 1999 Act to provide social health insurance for health care of contributors from a common pool of funds. As at 2018, it is estimated that less than ten percent of Nigerians are presently covered by the scheme with majority of the population contributing to health expenditure through out of pocket spending. The aim of the study is to examine Nigerians willingness to pay more taxes for greater government spending on health.
Methods: Using the data from the 7th round of the Afrobarometer surveys, an exploratory analysis of the responses of a nationally representative sample of Nigerians on public attitudes on taxation as a resource of more health expenditures.
Results: The findings revealed that 74% responded being able to access a health facility within walking distance, and 22.5% reported finding it easy with 12.4% experiencing extreme difficult in obtain healthcare. 48.1% of the sampled population responded that the government handling of the health sector has generally been poor with 41.2% being satisfied with sector.
72% of the responded that the citizens must pay taxes for the country development and 8.1% strongly believes resources should be mobilised from other sources without having to tax the people.
52.7% responded that unemployment is the biggest problem confronting the country however 8.1% responded that provision healthcare is the number one challenge for the Nigeria.
Conclusion: A greater proportion of Nigerians believes in paying tax and in paying more for a better health sector. There is need for greater engagement of the citizenry on improving health expenditures for Nigerians through taxation.

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WHY WELL-TRAINED HEALTH PROFESSIONALS ARE NEEDED TO MAKE UNIVERSAL HEALTH COVERAGE HAPPEN

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Introduction: Universal health coverage (UHC) has become the Number One priority in global health. UHC implementation and success critically depends on the quality of health services. A lot of evidence is accumulating to point the fact that highly graduated health professionals contribute to better health outcomes. A solid basic training of health professionals is needed to succeed at this respect.
Aim: This study aims to discuss how the only national higher training institution of healthcare professionals located in Burundi (INSP) works to improve the quality of health professionals' teaching, with a focus on nurses' clinical training.
Methods: A simultaneous qualitative-quantitative mixed method with data triangulation, using focus groups with students of INSP and clinical supervisors combined with field observations to quantify the phenomenon, enabled to describe and understand the process of clinical supervision of nursing students during internships.
Results: We observed: a weak clinical supervisor/nurse student ratio; shortened internships within teaching programmes; complexity of coaching and evaluation tools, not properly used by the different stakeholders; lack of training and lower educational level of clinical supervisors; low motivation of clinical supervisors; competition between training institutions to access internship fields.
Conclusion: There are numerous challenges to take on regarding the clinical supervision of graduated nurses of INSP. The liberalisation of the education sector without appropriate regulation has complicated the situation by multiplying the number of healthcare training institutions. Public health policies should consider the number of trained healthcare professionals but also require and offer adequate conditions for a high quality training level. Otherwise, this could have a potentially negative impact on the quality of delivered care, compromising the UHC as defined by WHO that includes "*a sufficient capacity of well-trained, motivated health workers to provide the services to meet patients' needs (...)*".[1] Like in other countries, the reinforcement of national training regulations and legal framework of nursing practice could help improve the quality of healthcare, considering that nurses are often the only accessible first-line healthcare practitioners.

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HOW TO MAKE UNIVERSAL HEALTH COVERAGE HAPPEN THROUGH BETTER INFORMATION SHARING AND SUPPORT TO EVIDENCE-BASED DECISION-MAKING? QUESTIONING BEFORE IMPLEMENTATION OF A NATIONAL HEALTH OBSERVATORY IN BURUNDI

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Introduction: Health data and information are not readily understandable by a wide audience, and many factors limit the capacity of decision-makers to utilise evidence for policymaking in the health sector. Availability, quality and utilisation of health information to improve population's health is often limited, especially in sub-Saharan Africa. The World Health Organization runs a Global Health Observatory which centralises key data and statistics enabling to give a picture of the health situation worldwide. Countries also produce their own data like censuses, routine and surveillance health data, or Demographic and Health Surveys. Usually information is not centralised and these "raw data" are difficult to use on their own. A "tool" is missing to generate evidence ready to use for policymaking. National Health Observatories (NHOs) could fill that gap.
Aim: This study analyses the implementation conditions for a NHO in Burundi.
Methods: A literature review enabled to analyse experiences of existing platforms of knowledge transfer, and an open questionnaire addressed to public health professionals (healthcare providers, policymakers, donors, . . .) in Burundi enabled to collect their expectations, as potential users, regarding health observatories.
Results: NHOs can be a good tool to support decision making if they respect some principles. They have to generate knowledge that is understandable and usable, by combining health data and data from other sectors, so as to give them more meaning. They should have an "active" role to facilitate the utilisation of knowledge in decision processes. They have an important function of mediators to facilitate dialogue between policymakers, researchers and health professionals. Finally, NHOs have to disseminate knowledge to the appropriate public. Potential users questioned in Burundi look for an NHO that would fill the following key missions: high quality data production, political guidance, provision of recommendations based on evidence.
Conclusion: The expectations of potential users in Burundi are very close from what is recommended by the literature. NHO should be a dynamic platform, not just collecting all health data available in the country, but combining them to produce evidence and share it with a wide public. Burundi will soon implement this approach which is also considered in Senegal.

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MEDICAL LABORATORIES AND QUALITY OF CARES: THE MOST NEGLECTED PART AT HOSPITAL LEVEL

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Introduction: The quality of care is essential to save life. Many investments are done in terms of human resources, commodities, drugs, equipment. However, the clinical laboratory is one of the neglected components in the aim to have an acceptable quality of care. Indeed, bad diagnosis cannot end up with good management of patients. We conducted a descriptive cross-sectional in three general hospital in the Democratic Republic of Congo to assess the performance of clinical laboratory.
Methods: Observations, visit and structured interviews were performed using questionnaires. A team with national experts in laboratory visits the three laboratories. We used also recommendations from guidelines on laboratory platform at hospital level.
Results: Clinical laboratories had a lot of gaps especially regarding infrastructures, training of the personnel, equipment, supervision and the quality control. The platform is not adapted to the need of quality of care. For example, there is no one dedicated for laboratory supervision at te level of the hospital even at the level of health zone.
Conclusion: In conclusion, there is a need of investments in laboratory to ensure the quality of care. Within the system, there is a need to dedicate more attention to the laboratory in term of budget but also in term of training, supervision etc. . .

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PROGRESS TOWARDS ELIMINATION OF LYMPHATIC FILARIASIS AND NTDS IN THE DEMOCRATIC REPUBLIC OF THE CONGO, DESPITE CO-ENDEMICITY, POLITICAL INSTABILITY AND CONFLICT

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Introduction: The Democratic Republic of the Congo started Onchocerciasis control activities in the 1990s. In 2000 Kasai province started first mass distribution of Ivermectin for Onchocerciasis control. Mapping of NTDs finalized in 2015. Integrated Mass Drug Administration for elimination of Lymphatic Filariasis (LF), Onchocerciasis and control of Schistosomiasis (SCH) and Soil-Transmitted-Helminths (STH) started in 2014. Elimination was confronted with political instability and insecurity, lack of resources, co-endemicities requiring complex preventive medication, and a fragmented national program. But the creation of an integrated NTD National Program, compromise of partners and donors, provision of technical assistance and the development of harmonized planning, implementation and monitoring tools have resulted in DRC progressing towards elimination of NTDs in its territory.
Aim: We present the current strategy for and the progress of NTD elimination in DRC.
Materials and Methods: After completing mapping, DRC developed its Master Plan for Elimination of NTDs. Since 2014 the country has implemented integrated MDA campaigns according to co-endemicities: twice a year Albendazole in districts with Loa-LF co-endemicity: once a year Ivermectine and Albendazole in districts co-endemic LF- Onchocerciasis, once a year Ivermectine for Onchocerciasis, adding Praziquantel for SCH. The master plan was followed by the development and implementation of harmonized planning, reporting, financial and monitoring tools. Annual meetings and constant communication have allowed for identification of challenges and prompt action planning.
Results: DRC is progressing towards elimination of NTDs. After five years of preventive treatment initial results show levels of endemicity under 1% in 54 districts of 9 provinces, ready to complete the first transmission assessment survey to show presence or absence of the parasite in these districts. Morbidity mapping was undertaken in 245 districts, 7481staff have been trained in Lymphedema management and 401 persons with hydrocele have successfully underwent surgery.
The country is developing the Onchocerciasis elimination protocol, having already implemented control activities for 18 years.
Conclusion: Despite challenges, the development of an integrated NTD National Programme, its leadership together with compromise

of partners supporting the country and harmonization of planning, implementation, financial and monitoring tools are contributing to DRC advancing towards elimination of Lymphatic Filariasis (NTDs) in his territory.

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ESTABLISHMENT OF TECHNICAL VECTOR CONTROL ADVISORY GROUPS (TVCAGS): EXPERIENCES FROM THREE COUNTRIES (CAMEROON, BURKINA FASO, AND MALAWI) WITHIN THE PIIVEC PROGRAMME

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Introduction: Vector control is fundamental in reducing the burden of vector borne diseases (VBDs) however, implementation in many settings is difficult. A primary challenge is a result of vertical administration of specific VBD control programmes, which creates duplicating or conflicting activities that results in wastage of limited and valuable resources. Additionally, overall outcomes would benefit from collaboration with government sectors such as education, agriculture, environment, and construction, which normally operate independently. Against this background the Partnership for Increasing the Impact of Vector Control (PIIVeC) programme (Liverpool School of tropical Medicine) is focused on establishing Technical Vector Control Advisory Groups (TVCAGs) in target countries to enhance integration of vector control planning and implementation.
Aim: This study is aimed at understanding the important processes required to establish TVCAGs in each country.
Methods: In-depth interviews with disease programme managers, officials from ministries of health, and key stakeholders included in the advisory groups were conducted to seek their views (8 in Malawi, 7 in Cameroon, and 6 in Burkina Faso). Review of documents was also conducted to verify events and decisions made.
Results: In Malawi and Burkina Faso, the TVCAGs are administered within the Ministry of Health (MoH). In Malawi the existence of other functional working groups in the malaria control programme provided key lessons, while in Burkina Faso the efforts of the PIIVeC country coordinator, who is within the MoH, was important. In Cameroon, the TVCAG is administered by a private research institution which has a memorandum of understanding with the MoH. The major challenge recognized by all countries is maintaining continuous funding from donors and/or governments after the PIIVeC programme conclusion.
Conclusion: The success of the TVCAGs in meeting initial programme goals will be directly correlated with subsequent support from various stakeholders including the donor community. Our initial findings form the baseline situation from which subsequent evaluations will be conducted and compared. Lessons from these processes can be used to inform setting up similar groups within countries of similar settings.

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BODY-MAPPING & PEOPLE LIVING WITH CHAGAS DISEASE: TIME FOR ACTION

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Introduction: Body-mapping is a method of telling stories in which the perspective and experience of the narrator strongly contributes to the story's significance. Since 2002, it has been as both a therapeutic and research tool, primarily for people living with HIV/AIDS. These body-maps consist of a series of texts, pictures, paintings, and collages, drawn from stories told by the participants and collected within a silhouette of the individuals' body. Chagas Disease (CD) is one of the 20 neglected tropical diseases outlined by the World Health Organization (WHO) and affects 6 million people worldwide, resulting in the death of roughly 7000 people annually. Originally confined to the American continent, CD has become a global concern due to international migration resulting in the disease's spread.
Aim: To use body-map storytelling as a research and advocacy tool for people living with CD.
Methods: In November 2018, a multidisciplinary team from Bolivia, Germany, and Spain implemented body-mapping in a CD hyperendemic region of Bolivia. Three independent sessions with each participant were conducted by one researcher respectively and the following topics were explored: pre- and post- CD diagnosis (session 1); living with CD – gender respective – (session 2); resilience and coping (session 3). These sessions were audio-recorded and the transcriptions were analysed and triangulated. After editing photos of the body maps, some life-size maps were printed for upcoming exhibitions. Ethical approval was granted by the University of Sucre (Bolivia) and the LMU.
Results: Twelve men (n=7) and women (n=5) living with CD had body-maps constructed by researchers based on their personal experiences with CD. Ages ranged from 24 to 63 years old. Ten were living in rural areas. Most remarkable findings: how participants dealt with CD according to gender, how their lives changed after diagnosis, and medical pluralism. Two predominant concerns were: incertitude and economic difficulties. Main support structures were family and faith. The exhibition is initially planned in the frame of two National Conferences on International Health (Germany and Spain), in 2019.
Conclusion: This research demonstrates the challenges that CD patients face and what their unmet needs are. The ultimate goal of exhibiting the body-maps is to raise awareness concerning CD.

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INTEGRATED SERVICE DELIVERY AT FACILITY AND COMMUNITY LEVEL TO IMPROVE SERVICE QUALITY AND OUTCOMES IN SOUTHWESTERN UGANDA

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Introduction: Amref Health Africa in collaboration with partners, the Ministry of Health, District leadership, and stakeholders is providing technical assistance to 16 districts in South West Uganda with a goal to improve access and utilization of quality health services and consequently accelerate reduction in maternal and perinatal mortality. Technical support is focusing on service integration and utilising a health system strengthening approach to improve quality. The regional institutional PMR was 33 per 1000 births in October to March 2016, contributed to by health provider capacity gaps, poor service quality and low user demand.
Aim: To document the impact of deliberate efforts to improve service integration and its impact on quality of services and perinatal outcomes.

Methods: Strategies employed focusing on high burden communities where most deaths occur include; A District led Approach, Strategic Integration, high impact interventions including; i) Focused Antenatal Care emphasizing directly observed drug therapy and net use for prevention of Malaria in Pregnancy, birth preparedness and experience of care ii) quality labour monitoring iii) prevention and management of sepsis and preeclampsia iv) Essential new-born care and resuscitation v) Kangaroo Mother Care and antenatal corticosteroids vi) Maternal Perinatal Death Surveillance and Response vii) Essential equipment viii) lifesaving commodities management ix) integration of postpartum FP, WASH and nutrition. Strengthened community engagement and referrals through: I) Family Health groups, VHTs and adolescent peers for FP uptake and service linkages; and male partner engagement.
Results: Improved partograph monitoring, 67% (Oct-Dec 2016) to 87% (Jan-Mar 2018); reduced FSBs by 47.4% from 122 (Oct -Dec 2017) to 64 (Jan-Mar 2018) and birth asphyxia by 18% from 194 to 158; at facilities implementing QI initiatives. Increased perinatal death reviews from 17% (Oct-Dec 2017) to 62% (Oct-Dec 2018). Overall reduction in institutional PMR at all facilities in the region from 33 per 1000 births (Oct-March 2016) to 25 (Oct to Dec 2018).
Conclusion: Stakeholder involvement strengthens implementation and success of site level QI approaches. Feasible integrated service delivery improves service quality. Community groups are an effective platform for needs based service delivery. Peer to peer mobilization promotes access and uptake of RH services.

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THE IMPACT OF SPRING CAPPING AND EDUCATIONAL INTERVENTIONAL REGIME ON THE INCIDENCE OF DIARRHOEAL DISEASE IN BONKE WOREDA, ETHIOPIA

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Introduction: Diarrhoea, despite rarely being a fatal condition in many regions of the world is still a leading cause of death in Ethiopia. In its more rural and inaccessible areas, such as Bonke Woreda, basic human rights such as access to clean water and sanitation are often lacking throughout communities. Non-governmental aid organisations are commonly found working within such regions as this in order to try and rectify these inequities in basic resources; however, the work they are doing is often left unscrutinised by scientific analysis.
Aim: To identify the impact of a 2-year intervention comprising of clean water provision and education on good sanitation practices on the incidence of diarrhoeal disease in local populations.
Methods: This retrospective cross-sectional survey was carried out by directly surveying the local population in five areas having received varying levels of intervention. Information regarding sanitation practices, water access and health status for the past 12 months was collected and analysed using SPSS software.
Results: Significant reductions (p= 0.000) were found in the 1-month and 12-month incidence of diarrhoeal disease in the participants surveyed, and the households they lived in, across the five areas surveyed.
Conclusion: The combined intervention program, involving the provision of clean water as well as health and sanitation education significantly reduced the levels of diarrhoeal disease experienced in the local population. Both potability of water and quality of sanitation practices contribute to this reduction, however, the combination of factors was associated with the greatest reduction.

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PREVENTION OF MALARIA IN PREGNANCY AMONG PASTORALISTS IN A HUMANITARIAN SETTING: AN EXPLORATORY STUDY OF AMBULATORY SERVICE DELIVERY MODELS FOR ADMINISTERING PROPHYLAXIS

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Introduction: Malarial infection during pregnancy (MIP) remains a public health problem that affects pregnant women and the developing foetus. To mitigate the impact of MIP, the World Health Organisation recommends three prong interventions including intermittent preventive treatment with optimal doses of three. However, for pastoralists, uptake of these optimal doses is very low compared to the general population mainly due to intermittent migration with their flock in search of pasture. Especially in humanitarian settings with weaker primary health systems as a result of ongoing conflict, the impact of MIP is stronger and major contributor of preventable maternal deaths.
Aim: To explore the feasibility of implementing ambulatory care for administering integrated malaria prophylaxis.
Methods: The study was conducted in five areas of Kapoeta County in the Eastern Equatoria of South Sudan. A stepwise approach of four stages were taken to achieve the set objectives. First, ethnographic observation of ethnographic movement, second, social network analysis of health seeking behaviour of pregnant pastoralists including factors that facilitate or hinder antenatal care access. Third, based on results, various ambulatory models were identified which at the final stage, together with local health authorities, a qualitative realist evaluation were conducted and a model selected for implementation.
Results: Social network analysis shows that the strongest influencer to ANC attendance are the hegemony that exists within the household and community as a whole. Three models emerged as possible strategies for implementing ambulatory care. These were: community health workers as mobilisers for administering IPTp monthly, mobile clinic facilitated by skilled health workers to provide comprehensive ANC care including malaria prophylaxis and finally, self-medication in the form of distributing sulphadoxine tablets to pregnant women. The final qualitative evaluation showed that while all models were potentially effective in encouraging optimal uptake of IPTp, safety of drugs could only be assured when delivered via the mobile clinic.
Conclusion: Mobile clinics have proven to be a cost-effective intervention in several settings. In humanitarian setting where there are apparent weaker health system, mobile clinics are relevant ensures that safe and optimal doses of IPTp are administered.

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CANADIAN ABORIGINALS HEALTH STATUS SPEAKS LOUD AND CLEAR

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Introduction: Canada is made up of Immigrants and non immigrant communities. Amongst the non-immigrant communities are the indigenous Aboriginal people that are classified into several groups but mainly First nations, Métis and Inuit.

In this study, the Aboriginals were classified into four groups which are those identified as First nations that don't live on the reserves, the Métis, the Inuit.
Aim: To compare the health status of Canadian Aboriginals with focus on First Nations, Métis and Inuit people.
Method: Statistics Canada data was filtered to reveal data on some chronic diseases examples of which are hypertension, Diabetes mellitus, High BP, Arthritis and Mood disorder. Other factors that could affect the health of Canadians were identified like smoking status, alcohol intake (greater than 5 drinks/month, food insecurity, participation in physical activities (sometimes), self reported high BMI (over weight/obese), contact with medical doctor in the past 12 months and whether or not they have their own medical doctors. All these were subdivided into 2 periods. The period 1 was 2007-2010 while period 2 was 2011-2014.
Result: Diabetes was least reported at values of 8.4, 8.2 for First nations, 5.6, 6.4 for Métis and 2.9, 2.6 for Inuit. High BP was 15.3, 17.7 for First nations, 14.2, 18.3 for Métis and 11.7, 13.7 for Inuit. Arthritis was 18.7, 18.7 for First nations, 18.2, 19.1 for Métis and 12.5, 14.6 for Inuit. Smoking was 40.1, 37.5 for First nations, 36.8, 33.6 for Métis and 49.0, 52.5 for Inuit. Alcohol intake was 25.0, 25.3 for First nations, 25.2, 26.1 for Métis and 27.2, 23.1 for Inuit. High BMI was 60.6, 64.3 for First nations, 57.8, 61.1 for Métis and 61.7, 62 for Inuit.
Conclusion: Chronic disease prevalence for Arthritis and High BP were the highest even though contact with the medical doctor rates rages from 63.9 to 77.5 in period 1. There is need for further data gathering and education on disease and lifestyle choices that can improve health status. There is need for more policy that focus on eradication of negative health contributors.

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INNOVATIONS IN REVENUE COLLECTION AMONG INFORMAL SECTOR FOR SOCIAL HEALTH INSURANCE: LEVERAGING ADOPTION TO ENSURE EXPANSION OF COVERAGE IN THE ANAMBRA STATE HEALTH INSURANCE SCHEME

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Introduction: National Health Insurance Scheme in its 13 years of operation have registered only 5% of Nigeria's population. Informal sector enrollees in this pool is insignificant. Given that informal sector represents over 60% of Nigeria's population, the scheme can be said to have underachieved.
Aim: To explore innovative and sustainable mechanism of collecting prepayments from the informal sector for subnational social health insurance schemes in Nigeria in order to achieve universal health coverage.
Method: Anambra state has a population of 5.5 million, out of which 90% are in the informal sector. The state has the presence of well-organized sociocultural organizations and philanthropists who have contributed immensely to community development and currently pay healthcare bills for indigent community members out-of-pocket. Anambra State Health Insurance Agency leverages on the aforesaid existing traditional social support system to expand the informal sector pool in the state health insurance scheme. This model utilizes community gatekeepers and people of influence to reach out to altruistic indigenes of Anambra state to redirect their acts of charity towards payment of premium for the state health insurance scheme for members of their communities as far as they can afford. In implementing adoption model, advocacy visit is paid to traditional and religious leaders in their domains, aimed at promoting health insurance as a means to reducing catastrophic health expenditure. Mapping of vulnerable persons and identification of philanthropists is done with the help of these community gatekeepers for every community. The identified philanthropists are subsequently approached to pay the premium for as many adoptees as they could.
Result: 33% of the about 31,000 lives registered so far in the scheme (registration commenced in November, 2018) are informal sector enrollees. About 97% of these informal sector enrollees were adopted into the scheme.
Conclusion: Adoption model holds promise of strong prepayment system for social health insurance scheme in settings where philanthropy extends to payment of medical bills for indigent community members, as is obtainable in Anambra.

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POLICY DRIVERS OF ZOONOTIC DISEASE VULNERABILITY AND INTERVENTIONS IN INDIA

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Introduction: Global risks of zoonotic disease are high on international and national policy agendas exemplified by the widespread commitment to the One Health approach. Despite the several efforts to promote the One Health concept, its implementation has proven challenging, especially in most developing contexts including India. Whereas the One Health paradigm calls for inter-sectoral coordination as a pathway to disease prevention and control, the lack of appropriate policy frameworks and mechanisms for inter-sectoral collaboration have often undermined a coordinated response. To improve inter-sectoral capacity for improved disease surveillance and interventions, there is the need to better understand the policy and institutional context within which One Health approaches are operationalised.
Aim: This paper explores India's health policy system, linked to the prevention and control of zoonotic diseases, highlighting the areas of tension or collaboration, and the potential for leveraging of inter-sectoral capacity for improved disease surveillance and interventions. Specifically, the paper explores: (1) how policy for zoonotic diseases are organised across sectors and scales; and (2) the extent to which policies) enhance (or limit) inter-sectoral collaboration in disease surveillance and control.
Methods: Through a desk-based analysis of the peer-reviewed and grey literature supplemented by semi-structured interviews with key stakeholders working within the human, animal and environment interface in India; we conducted a network analysis of policies affecting zoonotic diseases and disease management across the relevant sectors.
Results: Although there have been considerable efforts towards advancing One Health, conflicting policy priorities, 'vested' institutional interests, limited human resource and logistical capacities hamper effective inter-sectoral coordination on disease prevention and control. Policies which increase vulnerability to zoonotic diseases in India are highlighted.
Conclusion: In a unifying sense, supporting the development of integrative policy frameworks and mechanisms within India's human, animal and environmental health sectors is important for leveraging inter-sectoral capacity for improved disease surveillance and interventions.

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THE PROFESSIONAL DEVELOPMENT SCHEME (PDS): MEASURING CAPACITY DEVELOPMENT FOR RESEARCHERS (WWW.GLOBALHEALTHTRAININGCENTRE.ORG/PDS)

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Introduction: Health researchers need a reliable and globally recognized mechanism to record their skillset, track career development and identify gaps in knowledge. Teams, sponsors and organisations also require ways to monitor and report capacity development over time. The Global Health Network, a knowledge sharing platform aiming to support more and better research, is now able to provide researchers with such tools.
Aim: Development of a tool to measure changes in capacity development.
Methods: The Global Health Network compared diverse data types and user feedback to create The Professional Development Scheme (PDS). In conjunction with The Special Programme for Research and Training in Tropical Diseases (TDR) a framework was developed and a list of the core competencies that a research team need to demonstrate in order to carry out a successful study was generated. Users assess their research competencies, are awarded a membership level and are required every year to review and update their profiles. In addition a multi-functional dashboard was designed for research coordinators, funders and sponsors to assess the capacity development of individuals, groups and organisations.
Results: The Professional Development Scheme (PDS) provides researchers with a step by step process for recording their career and core competencies. The core competency framework can be applied to any research study, regardless of the size of the team, place, disease focus and type of research. Research coordinators, funders and sponsors can gain access to data of large networks, individual sites or specific staff roles. Study managers and consortia can quickly and easily produce reports of a specific programme or team. These visual records show the strengths and weaknesses in research competencies, such as GCP or laboratory quality management, allowing the implementation of strategies to address any gaps. Together with the supporting tools in the PDS, teams can plan staffing requirements, carry out appraisals and guide the career development and training of staff.
Conclusion: The Global Health Network has created a multi-functional method and set of tools called The Professional Development Scheme (PDS) to support researchers, teams and organisations to identify and track capacity development; an essential requirement for conducting effective health research.

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IMPROVING MIGRANTS' ACCESS TO PUBLIC HEALTH SYSTEM

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Introduction: Migration is a part of human history but international migration flows have increased substantially in the last decades. Access to public health care system for immigrants is often difficult due to cultural differences and language among other barriers consequence of their immigrant status or their irregular situation.
Aim: To describe and evaluate the implementation of an integral care system for newly arrived immigrants in an urban area by a multidisciplinary team formed by a physician, a nurse, a social worker and administrative staff. Calculate prevalence of imported pathology in the immigrant population and evaluate their health status upon their arrival.
Methods: Prospective observational study of immigrant patients attended since January 2017 in an urban primary Care centre. New arrivals were referred to the multidisciplinary team to do an initial evaluation of each patient, including acute and imported pathologies, vaccinations, chronic health, social and administration problems, legal status and such.
Results: 186 visits with 37 losses before starting or during the intervention. 39.5% came from Africa and 34.2% from South America. In 60% of the cases it was their first contact with the public health system. 68% did not provide a vaccine register and 96% required extra vaccines to complete it. 65.5% have been visited by the social worker and 73.68% have been referred to other social services for additional resources. 56.9% were referred to other services: Ob-Gyn (21%), dentistry (10%), hospital outpatient units (22%), including haematology, gastroenterology, international health, imported pathology and Tuberculosis units. Main findings: sickle cell disease (7), intestinal parasites (8), schistosomiasis (1), iron deficiency anaemia (4), alpha thalassemia (1), tuberculosis (3). Among our findings there were 14 cases of Female Genital Mutilation (FGM) (girls and women) and 8 girls were identified as at risk of FMG.
Conclusion: With this multidisciplinary intervention screening for imported pathologies has increased, improving its early diagnosis, treatment, referral and registration. Vaccination rates and vaccine registration have also increased. This intervention has achieved a global and multidisciplinary care covering not only health but also social, economic and psychological problems associated with immigration.

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IMPACT OF A TRIO OF TARGET-SITE MUTATIONS ON PYRETHROID RESISTANCE IN *AEDES AEGYPTI* FROM ACROSS NORTHERN BRAZIL

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Introduction: In Brazil and elsewhere *Aedes aegypti* is the main vector of four fatal and/or debilitating arboviruses (dengue, chikungunya, yellow fever and Zika). Despite the crucial importance of targeting *Ae. aegypti* for disease control, our understanding of evolving mechanisms underpinning insecticide resistance across Brazilian *Ae. aegypti* mosquitoes and its threat to effectiveness of vector control interventions remain limited.
Aim: To infer the likely impact of three pyrethroid-resistance associated target-site mutations (Val410Leu, Val1016Ile and Phe1534Cys – the voltage-gated sodium channel gene (*Vgsc*) in reduced effectiveness of anti-vector programmes.
Methods: Field-caught mosquitoes were sampled between 2016 and 2017 from 10 counties in four Brazilian's Northeast State (Paraíba-PB, Pernambuco-PE, Rio Grande do Norte-RN and Sergipe-SE) spanning urban to rural locations. The frequency of three pyrethroid resistance-associated target-site (voltage-gated sodium channel gene, *Vgsc*) mutations - Val410Leu, Val1016Ile and Phe1534Cys – were screened using TaqMan assays.
Results: The resistant-alleles for each marker are widely disseminated across populations, with fixation of one or more mutations in some locations. Moreover, contrasting patterns in genotype frequencies among the four Brazilian Northeast regions, suggest contrasting strength of selection across geographic locations. Across the three mutant positions we identified a total of 13 genotypes, including triple mutants (410Leu, 1016Ile and 1534Cys), which were most strongly associated with resistance in pyrethroid-selected mosquitoes.
Conclusion: Our data support co-evolution of a triple mutant allele in the *Vgsc* gene of *Ae. aegypti* mosquitoes which produces strongly resistant phenotypes and could impact the efficacy and sustainability of pyrethroid-based insecticides.

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DEVELOPMENT OF THE HIV PATIENT MASTER INDEX: A BASIS FOR MONITORING THE HIV CONTINUUM OF CARE AND FORMULATING INTERVENTIONS FOR PEOPLE LIVING WITH HIV IN SURINAME

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Introduction: Over the past decade the information need for HIV has evolved from just service delivery information (e.g. number tested, number on treatment) to a system more focused on people-centered monitoring where people living with HIV (PLHIV) are followed though the continuum of care. This requires a case-based surveillance system. Till 2014, Suriname did not have such a case-based-surveillance system and data collection and reporting on the HIV treatment cascade was not possible.
Aim: Establish an electronic case-based surveillance system, which will facilitate the monitoring of the continuum of care for PLHIV and allow for more complex analysis; this while utilizing minimal resources.
Methods: The existing national electronic data sources for PMTCT -, CD4 -, viral load, HIV test and treatment were used, and the data was cleaned to establish uniformity. A deduplicated cohort of HIV patients was generated.
Results: Using the Unique Identifier, available in all data sources used, the cleaned data was linked to each other. Linking was done by probabilistic (fuzzy) matching, which provides a possibility to identify similarities between two different health patient IDs, thus addressing data entry and code formulation errors. For probabilistic matching the Link-plus program, provided by CDC[1], was used. A Master Patient Index was constructed containing the de-duplicated unique patient codes which were initially housed in Microsoft Access and then transferred to MySQL. Through this Master Patient Index which initially contained 7481 patients, the formulation of HIV treatment cascade was made possible.
Conclusion: The establishment of an unduplicated HIV master Patient Index using unlinked existing data sources was accomplished and could serve as a basis for further expansion of the HIV surveillance. There is a need to have a closer look at the quality of data collected and to improve the algorithm for deduplication. This system can definitely serve as an example for the establishment of case-based-surveillance systems for other diseases or HIV case-based-surveillance systems in other countries.

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EXPLORING BARRIERS TO AN EFFECTIVE SUPPLY OF LEISHMANIASIS DRUGS AND DIAGNOSTICS IN EASTERN AFRICA: A QUALITATIVE STUDY

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Introduction: Control of visceral leishmaniasis (VL) in eastern Africa requires effective supply to diagnostics and medicines. Challenges such as shortages, low-quality products, and complex procurement hamper access to these life-saving commodities. We explored VL supply barriers from stakeholders perspective (international organizations, manufacturers, control programs) from VL endemic countries in eastern Africa.
Aim: To understand stakeholders' perceptions of the access barriers to quality-assured diagnostics and medicines for leishmaniasis in the high burden region of eastern Africa, to identify key bottlenecks in order to improve supply of commodities for neglected diseases.

Methods: Designed as qualitative in-depth interview study with purposive sampling. Between May-July 2018, 29 representatives from international organizations, non-governmental agencies, national control programs from six countries and manufacturers were interviewed. Data analysis was aided by NVivo, applying the framework method as a part of the thematic content analysis approach.
Results: The barriers along the VL supply chain were identified as emerging themes, grouped across supply chain activities (medicine and health systems component. Stakeholders expressed perception of progress, but bottlenecks persist. VL medicines, in general, lack multi-source production capacity and with small market volume, expansion of suppliers is difficult. Procurement is plagued by forecasting difficulties, complex regulatory policies and procedures, and distribution challenges. Weak communication and coordination across different levels resulted in shortages and loss of trust. Cross-cutting issues spanned from limited political and resource commitment due to low awareness and in-country capacity. However, study respondents were optimistic to pursue several remedies, most importantly to build bridges between supply and demand side through continued dialogue and collaborations. Diagnostics supply has mostly been overlooked; thus improved investment is needed.
Conclusion: Addressing supply barriers in eastern Africa requires consistent, specific efforts at global and national level, progressing from current partnerships and agreements. Priority actions include pooled procurement, improved forecast, and increased commitment and resources. Sustainability remains an elusive goal, yet to be integrated into discussions moving forward.

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GEOSPATIAL DISTRIBUTION OF CHIKUNGUNYA AND ZIKA VIRUS OUTBREAKS IN THE DOMINICAN REPUBLIC: TWO SIDES OF THE SAME COIN?

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Introduction: Chikungunya and Zika arboviruses caused worldwide outbreaks in 2014 and 2016. Tropical regions played an important role in the distribution of the outbreaks, serving as case exportation platforms for many previously unaffected areas. These viruses managed to cause outbreaks in Dengue-endemic regions where strict-vector control strategies were being implemented.
Aim: Our objective is to further identify distribution patterns and important foci for the outbreaks that occurred in 2014 and 2016 of Chikungunya and Zika in the Dominican Republic.
Methods: Chikungunya and Zika epidemic periods were identified between February – December 2014 and December 2015 – August 2016. Data was obtained from the Ministry of Health's obligatory report system pertaining to the municipal residency for each reported case. Percentage of cases were analyzed by provinces at three different points in time, the first being the point at which 10% of the total cases were reported, the second being the point in time with the peak of incidence, and the third being the total incidence number at the end of the epidemic.
Results: During the initial stages of both outbreaks, Santo Domingo, its neighboring provinces, and the provinces that border Haiti represented important foci. During the epidemic peak, the main foci of both outbreaks were located in Santo Domingo, its neighboring provinces, and the Dominican Republic's mountain region. Total incidence number showed that the main foci for Chikungunya were present in Santo Domingo, its neighboring provinces, and the Dominican Republic's mountainous region; while Zika had a national distribution, with Santo Domingo serving as the main focus of the 2016 outbreak.
Conclusion: Both outbreaks have similar dissemination patterns, which might be influenced by vectorial capacity and distribution, and lack of immunity among large cities. Border provinces and urban areas played a key role in the spread of both outbreaks. Dissemination patterns and other viral endemicity (eg. Dengue) should be further studied with the aim of building preventive strategies. Understanding how new outbreaks occur and spread regarding arboviruses would help shed light on how to develop and improve preventive strategies for the Dominican Republic and other countries that are most vulnerable to epidemics.

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DOES ACCREDITATION LEAD TO BETTER QUALITY OF CARE? FIVE YEARS' EXPERIENCE IN RWANDA

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Introduction: The Ministry of Health has identified healthcare facility accreditation as a priority to lead to the improvement of quality of healthcare services at all levels of health facilities in Rwanda through implementing and measuring achievement of standards: Every Rwandan will consistently use quality health services that are easily accessible, meet internationally accepted standards of care, and directly respond to both the perceived and actual needs of the individual.
Aim: The main objectives of accreditation are (i) to standardize systems and practices; (ii) to institutionalize a culture of quality and safety; (iii) measure performance, by implementing a structured system for measuring compliance to standards with the aim of improving outcomes; and (iv) to improve accountability of health facilities to regulatory or other agencies and to protect the interests of patients and other stakeholders.
Methods: Development of national policy and strategy for quality with standards organized in a framework of 5 Domains: (1) Leadership Process and Accountability; (2) Competent and Capable Workforce; (3) Safe Environment for Staff and Patients; (4) Clinical Care of Patients; (5) Improvement of Quality and Safety. Three levels of efforts are defined: (1) Defining quality (2) Implementing quality standards (3) Improving quality. Link with Performance Based Financing for rewarding quality.
Results: Starting with five hospitals in 2013, the three-level accreditation program is now implemented in 46 hospitals. Two provincial and twenty district hospitals have already achieved level one, while four are at level two accreditation. 69 accredited surveyors and 58 facilitators were trained. 23 hospitals developed Quality Improvement initiatives to address critical challenges. As a result, reduction of post-cesarean section infection observed from 8.0% to 2.9% in some facilities. Other initiatives address waiting time, maternal and neonatal mortality.
Conclusion: Due to tireless efforts by the Ministry, accreditation process is now well established countrywide and results start impacting on health outcomes. Next steps include linking insurers' medical claim reimbursement rates to accreditation scores, establish an independent institutional home for accreditation and become more sustainable by relying on domestic resources, from insurers and health facilities, who benefit from higher reimbursement rates and added "value for money" in accredited sites.

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AVAILABILITY OF EVIDENCE ON TRACHOMA IN LOW AND MIDDLE-INCOME COUNTRIES: A REVIEW OF REVIEWS USING EVIDENCE GAP MAP APPROACH

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Introduction: Rigorous and relevant research evidence on what works in low-and middle- income countries is essential for planning cost-effective and scalable approaches to deal with avoidable visual impairment, such as trachoma. However, evidence on what works is relatively scarce. To address this need, we developed eye health Evidence Gap Maps (EGMs). These maps summarise, critically appraise and present evidence in a user-friendly format.
Aim: The aim is to present the state of evidence on trachoma and to highlight knowledge gaps.
Methods: Following a comprehensive search of relevant databases, we sifted and extracted data from all relevant reviews on trachoma. Critical appraisal was conducted by two reviewers independently using Supported the Use of Research Evidence checklist and a summary quality assessment was shared with the authors for comments.
Results: A total of 15 unique reviews were included in the map, where one study reported on more than one intervention and was therefore included twice in the map [1]. Identified studies were written in English and the majority of the reviews addressed risk and prevention of trachoma (8), followed by treatment (4). Of the eight studies reporting evidence on risk and prevention of trachoma, half showed strong evidence in response to their research question. However, the majority showed to be of low quality in terms of the methods used to conduct the review as methods were not clearly reported by the authors.
Three out of the four studies on treatment of trachoma reported inconclusive findings in response to their research question, where the methodological quality of each differed from low, medium and high. Clear gaps on evidence were identified on the broader aspects of trachoma-related health systems and impact/economic evaluation. No reviews were identified on trachoma quality of non-clinical care and access, uptake and equity. No systematic reviews are available on trachoma epidemiology, case detection and quality of clinical care.
Conclusion: EGMs support policy makers and programme managers to make informed decisions and enable researchers to prioritise future work based on the most evident gaps on knowledge. There is a need for systematic reviews on trachoma and health systems.

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10 YEARS OF HARNESSING COMMUNITIES OF PRACTICE TO ENABLE FASTER AND BETTER RESEARCH IN GLOBAL HEALTH

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Introduction: The World Health Organisation called for Low and Middle-Income countries to be the generators rather than the recipients of health research data. To address the lack of locally-led research in these regions, The Global Health Network was set up to transfer knowledge, resources and methods between disease areas, regions, roles and organisations.
Aim: To deliver the skills, resources and training needed to enable quality health research data to be generated in diseases, regions and communities where evidence to tackle local disease burdens is lacking.
Methods: A platform comprising of an online science park and three regional hubs in Africa, Asia and Latin America has been developed and online and face to face framework communities of practice have been built within. This provides a mechanism for research consortia to share outputs, methods and processes whilst raising engagement and awareness of their work. Alongside this, research teams and health-workers are accessing training, career development and each other to build their research competencies and experience.
Results: The idea for this facility was conceived 10 years ago and has grown to become a unique resource that is being used widely across the globe. The platform has been viewed over 15 million times and over 800,000 online research skills training courses have been taken. Many hundreds of thousand research documents have been shared. Research teams report how the guidance tools and templates they have accessed from this platform have made their study design, planning and operational delivery easier and faster. Furthermore, we know that research teams are sharing standards and processes and therefore raising quality. Such data can be shared because research teams are helping each other collect data in the same way.
Conclusion: The Global Health Network has proven to be a trusted resource that enables the capture of high quality data in places where research experience was lacking. This has shown why it is important to share methods and processes across regions, roles and studies because we have learnt that challenges that make research difficult do not vary between diseases. Better progress by all can be made by sharing what works.

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BREAKING BARRIERS TO RESEARCH SKILLS TRAINING AND ENABLING ACCESS TO THOSE WHO NEED IT THE MOST

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Introduction: The Global Health Network operates a free and open access Training Centre that provides research staff and healthcare workers of all roles, all regions and all disease areas with the 'how-to' training courses required to safely conduct high quality research in resource limited settings.
Aim: Everyone working in global health research should have access to effective and appropriate research skills training. This is particularly important in resource-poor settings where the need for locally applicable research findings is so important. The Training Centre aims to provide online training courses that can be accessed by everyone in every setting for free.
Methods: The Global Health Training Centre offers 30 high quality, peer reviewed online training courses across a wide range of research topic areas and each course is designed to be accessible from areas with low bandwidth internet connectivity, which can often be a barrier accessing online training in resource-poor settings. All of the courses (and certificates of completion) are completely free of charge and available to download so they can be taught offline individually or in a group setting.
Results: The online training courses are hugely popular with 2018 seeing over 264,000 modules taken by over 52,000 e-Learners, this was a 58% and 63% increase respectively compared to 2017 bringing the total overall modules taken to 600,000 by 110,000 e-Learners with over 250,000 certificates awarded. Individuals from 195 countries across the globe have utilised the courses offered by the Training Centre, with Africa the continent accessing the most with 35% of all access. 96% of e-Learners would recommend the courses to a colleague and 85% percent rated their confidence of completing a course-specific task between 7

to 10 on a confidence scale (1= not confident at all, 10 = extremely confident).

Conclusion: Free, easily accessible, high quality online research skills training is clearly a need in the research community in resource-poor settings. Increased collaboration and sharing of training materials between organisations and institutions is required to produce further online training courses to support staff and develop capacity to conduct research.