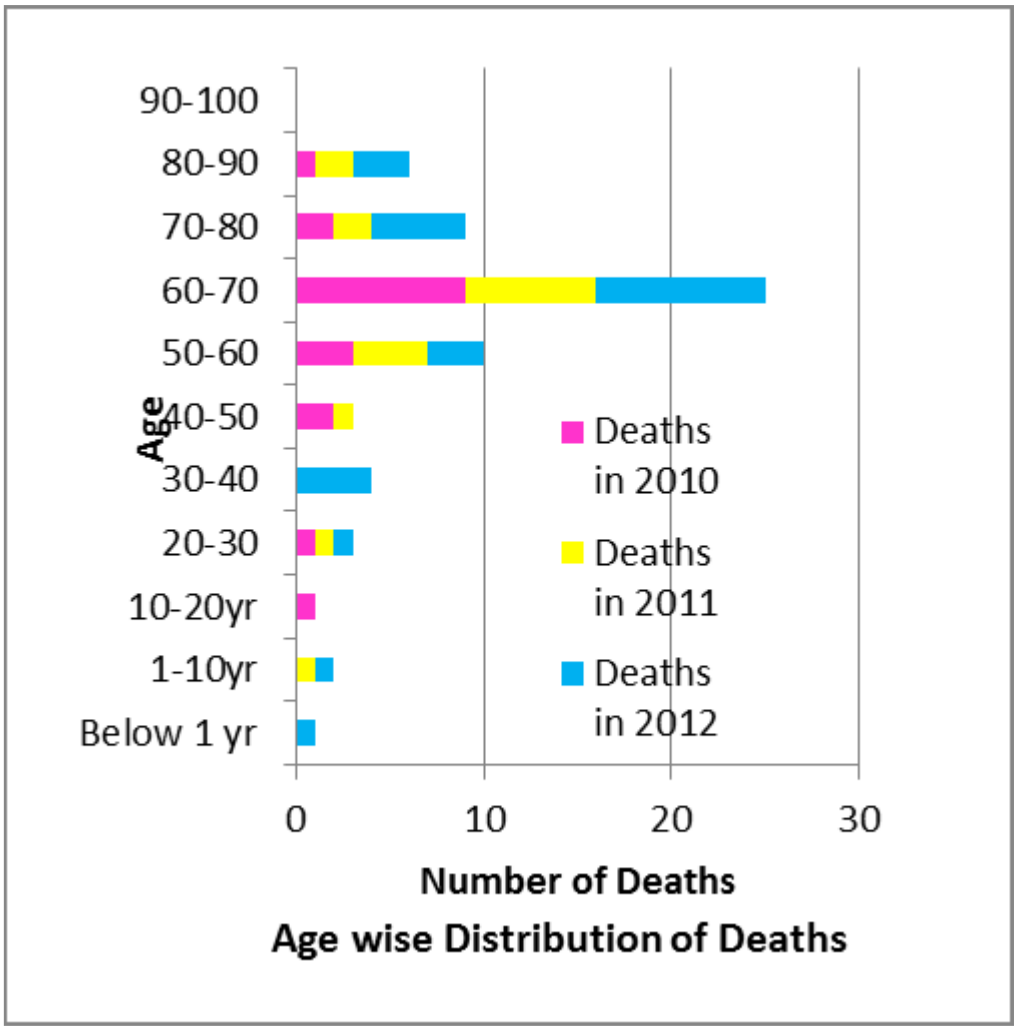
PO01 Airline or Maritime Medicine

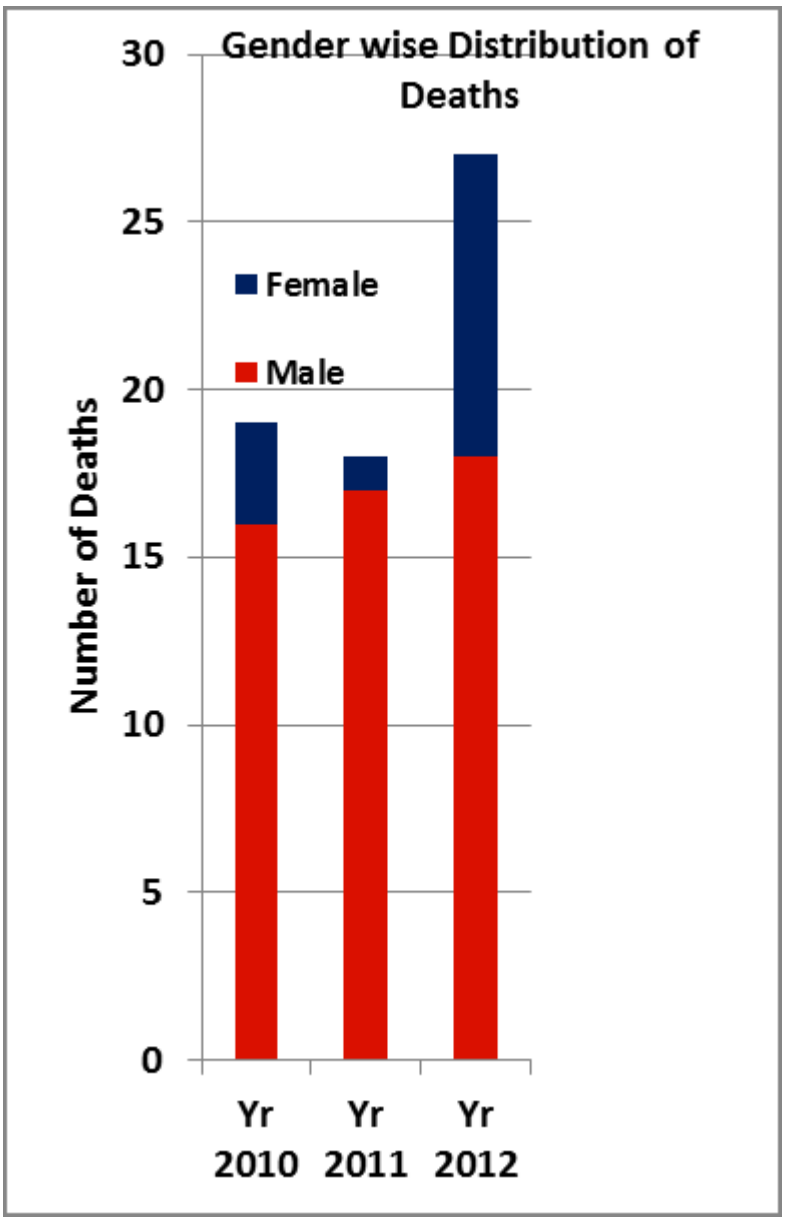
PO01.01
Retrospective Study of Deaths of Air Travelers Attended at Chhatrapati Shivaji International Airport, Mumbai

A.D. More[1]
[1]*Mumbai International Airport Pvt Ltd, Medical Services, Mumbai, India*

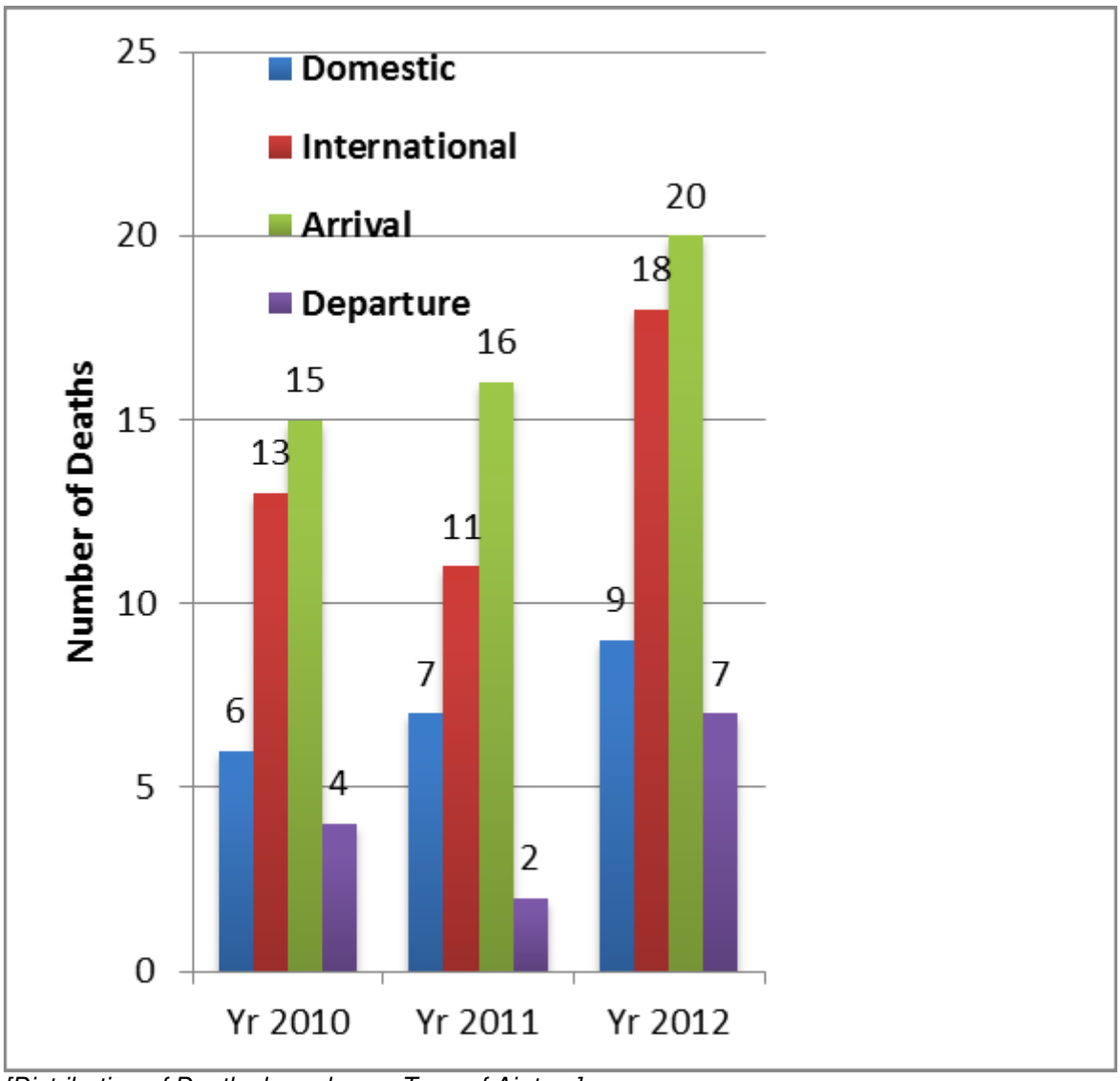
Background: With increasing affordability of air travel, number of Air travelers is increasing. With this, mortality associated with air travel is also increasing. Various factors contribute to this morbidity & mortality associated with air travel.
Objective:The data related to the Air traveler Deaths handled at Mumbai Airport was studied to analyse the various factors affecting the Air travelers' health.
Method: Data of 64 travelers who died either on flight or at the airport & who were attended at CSIA between Jan 2010 to Dec 2012 was analysed using various parameters such as Age & Gender of travelers, type of air travel i.e. domestic or international.
Results: The incidnece of Deaths based upon the various factors, was as below:



[Age wise Distribution of Deaths]



[Gender wise Distribution of Deaths]



[Distribution of Deaths based upon Type of Air trav]

The incidence of Deaths was more in Male, in the Age group of 60 to 70yrs, arrival Travelers and more in International flights.

Conclusion:The incidence of Deaths was more in arriving elderly male international travelers taking long flight.

PO01.02
Medical Problems Encountered during Two Circumnavigations by Semester at Sea

P.D. Sloane[1], A. Herweck[2], A. Malley[2], S. Zimmerman[3]
[1]University of North Carolina - Chapel Hill, Family Medicine, Chapel Hill, United States, [2]University of San Diego, San Diego, United States, [3]University of North Carolina - Chapel Hill, Cecil G Sheps Center for Health Services Research, Chapel Hill, United States

Background: Semester at Sea (SAS) is an educational program in which approximately 500 undergraduate college students, 100 faculty and staff, and up to 70 older persons ("lifelong learners") spend 3½ months in academic classes and a variety of on-shore activities while circumnavigating the globe.
Objective: Describe the medical clinic encounters during two semester-long voyages, and compare the data obtained with reports from more traditional cruise and student health settings.
Methods: Data were abstracted from the Fall 2010 and Spring 2011 voyage medical clinic encounter logs. Reason for the visit was coded using a modification of ICD-9 that combined organ-specific symptoms (e.g., diarrhea) with organ-specific diagnoses (e.g., gastroenteritis). Data were entered into an Excel data base and analyzed using SPSS.
Results: Of 2,272 encounters, the most common diagnostic categories were preventive care (24.5% of encounters), respiratory conditions (14.3%), skin and soft tissue conditions (12.2%), gastrointestinal conditions (10.3%), genitourinary conditions (5.5%), animal bites and stings (4.5%), musculoskeletal problems (4.1%), sea sickness (3.3%), ear conditions (2.9%), and mental health issues (2.5%). Patterns that differed from published cruise ship reports included fewer cardiovascular conditions, fewer serious illnesses/injuries, more preventive encounters; and more bites from animals associated with rabies risk. A pattern that differed from published student health reports was the low incidence of visits related to unprotected sex (1.0% of encounters), birth control (0.6%), and sexually transmitted diseases (0.1%).
Conclusions: Preventive encounters were higher than has been reported from other cruise settings, due to encounters related to sale of bismuth salicylate to prevent traveler's diarrhea and to counseling and sale of medication for malaria prophylaxis. High animal bite rates reflected increased student risk-taking; low rates for sexually-related conditions reflected a policy of making free condoms available 24 hours a day in a bin outside the clinic. Overall illness patterns were similar to more traditional cruise voyages, with some differences due to the younger ages of the clientele and others due to the preventive health orientation of the SAS medical clinic.

PO01.03
***Plasmodium ovale* in Seafarers on Greek Merchant Ships Calling at African Ports**

E. Vassalou[1], C.M. Vassalos[1], G. Spanakos[1], N. Vakalis[1]
[1]*National School of Public Health, Department of Parasitology and Tropical Diseases, Athens, Greece*

Background: Malaria is still a travel health problem in the global maritime community. Greece is the country with the largest merchant fleet, with more than 30,000 seafarers serving on ships [1]. *Plasmodium falciparum* is the major cause of morbidity and mortality among saefarers. Other malaria species, such as *P. ovale* most commonly encountered in West Africa, are also incriminated.
Objective: This study investigated infections with *P. ovale* among seafarers on board Greek merchant ships visiting African ports.
Method: We studied imported cases with *P. ovale* acqjuired in Africa and diagnosed in the Department of Parasitology and Tropical Diseases, National School of Public Health, Greece from 1999 through 2011.
Results: .*P. ovale* was found in eight imported cases (including one case, which was in transit); they were all infected in Western Africa (Table). Of those living in Greece, 4/7(57.1%) were seafarers. In Greek tourists, no *P. ovale* was detected.

Year	Seafarers	Tourists	Immigrants	Sex	Residence	Area of infection	Chemo prophylaxis	Standby treatment	Delayed onset of symptoms
1999	1			Male	Greece	West African ports	No data		
2000			1 [a]	Male	Greece	West Africa			
2001	1			Male	Greece	West African ports	Yes		6 months after traveling
2002	1			Male	Greece	Abidjan, Cote d´Ivoire	Yes, incomplete		1 year after traveling
2003			1	Male	Greece	Nigeria			
2004	1 [a]			Male	Greece	Lagos, Nigeria	No		
2007			1 [a]	Female	Greece	West Africa			
2011		1 [b]		Male	United Kingdom	West Africa		Yes	

[a] Mixed infection *P. ovale/P. falciparum.* [b] A United Kingdom-resident in transit through Greece who had volunteered at refugee camps in West Africa.

[P. ovale malaria imported into Greece in 1999-2011]

Conclusion: Over the 13-year period studied, there were few patients with *P. ovale* malaria recorded. Perhaps that is because only a small number of immigrants in Greece come from Western Africa, whereas Greek tourists rarely go to this destination. Seafarers were the most affected; they all had traveled to West African coastal areas. Greek commercial ships´ masters are able to cope with malaria in general. Antimalarials are carried aboard as specified in the WHO/ILO/IMO *International Medical Guide for Ships Edition 3*; radio medical advice is also sought. However, full protecton against malaria is not afforded and standby treatment does not eradicate persisten liver forms of *P. ovale*. Seafarers with a hostory of fever and travel to malarious areas in West Africa would be tested for P. ovale infection after traveling. Thus, appropriate medication (primaquine) might be considered as radical cure.
[1] EC DG MARE (2006). Employment trends in all sectors related to sea or using sea resources. Country report-Greece. C3135:4.

PO02 Altitude, Diving or Enviromental Exposures

PO02.01

Vibrio and *Stenotrophomonas* in the Caribbean Sea: A Potential Source of Infections in Divers and Snorkelers

R. Naraine[1], K. Farmer[1], S. Kotelnikova[1]
[1]*St. George's University, Microbiology, St. George, Grenada*

Background: Almost half million visitors were enjoying the marine environment in Grenada including 320,000 arriving on cruise ships (Tourism in Grenada 2011). Many of these visitors are older than 55 years old. The beaches of the island of Grenada are popular tropical tourist destinations for swimming, snorkeling and diving. Due to the risks of skin, enteric or respiratory infections in stressed and immuno-compromised travelers caused by *V. cholera, V. mimicus, V. parahaemolyticus, V. harveyii, V. alginolyticus* or *Stenotrophomonas sp.*, there is a considerable interest in tracking tropical marine bacteria. Reliable and safe identification of marine *Vibrio* is challenging because they are pathogenic and carry multiple gene copies of heterogeneous 16S rDNA. The differentiating power of 16S rDNA and Fatty Acid Methyl Esterase Analysis is low for this group of organisms. The reproducibility of phenotypic identification can be limited by differential gene expression.
Objectives: To identify strains PB 7-11, PB 5-21, PB 4-31, DB 6-33 isolated from the sea bottom biofilms (Caputo *et al*. 2005; Kotelnikova *et al.* 2008) and XM-18, IS-8 isolated from tropical marine sponges (Craine *et al*., 2007; Jamiesson, 2008) using the multi-loci sequence analysis (MLSA).
Method: Identification and phylogenetic analysis of seven genes including *recA, pyrH, rpoD, gyrB, rctB, toxR, and 16S rDNA* utilizing the MLSA (Pasqual, J. *et al.* 2009) and Maximum Likelihood, Maximum Parsimony, and Neighbour-Joining methods were performed on six unknown and three reference type strains of *Vibrio*.
Results: The resolving power of each gene varied based on the number of maximum parsimony sites. Evolutionary divergence within a particular clad agreed between different construction algorithms. All isolates from the bottom biofilms in Prickle Bay belong to *V. alginolyticus and V. campbelii* while DB 6-33 isolated from Dragon bay is *Stenotrophomonas maltophila.* The sponge isolates were closely related to *V. communis*. Phenotypical identification alone was ineffective to delineate between the *Vibrio* species.
Conclusion: The approach used in our research enabled the efficient molecular identification of *Vibrio and Stenotrophomonas* species in marine bottom biofilms and sea sponges in popular recreational destinations in Grenada.

PO02.02

Drug Resistance and Frequences of Resistant *E.coli and E.fecalis* in Oceanic Tropical Waters of Grenada

S. Kotelnikova[1], V. Amadi[2]
[1]*St. George's University, Microbiology, St. George's, Grenada,* [2]*St. George's University, St George's, Grenada*

Background: The origin of antibiotic resistance in the tropical marine environment is relevant to traveller's health because of the potential recreational exposure of visitors to the drug-resistant pathogens as well as the need for predicting emerging resistant pathogens. Phenotypic identification of drug resistance in *E.coli* and *E. fecalis* reproducibly isolated from the sea water as indicators of fecal pollution is relevant for the travelers health as almost half of million visited the island of Grenada in 2011.
Objective: We investigated the potential of human exposure to drug resistant marine bacteria in tropical seawaters of Grenada.
Method: The Environmental Testing Unit analised 225 samples using the MPN method between November 2008 and November 2010. The water was collected on weekly basis from Grand-Anse-Beach(GAB), Prickly-Bay(PB), Black-Sand-Beach(BSB), and True-Blue-Bay(TBB). The effect of rainfall on indicator variation was tested using Correlation Coefficient Analysis. The percentage compliance was estimated using theEPA and WHO guidelines. *E. coli* and *Klebsiella pneumoniae* strains were tested against 12 while *Enterococcus faecalis* against six antibiotics. Probability of Exposure was modeled.
Results: Of the 116 coliforms isolated from the tested sites *E. coli* comprised 50%, *K. pneumoniae* 33%, and *E. cloacae, 5***%.** *E. coli* strains were resistant to amoxicillin/clavulanate, ampicillin, cefoxitin, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, and tetracycline. Twelve percent of *E. coli* isolated during this period from the 4 marine sites presented resistance to gentamicine and ciprofloxacine which was comparable to the percentage of UTI originated *E.coli* (Amadi et al., 2012). Five percent of marine *E.coli* presented resistance to amoxicillin and cephalotin. Ampicillin reistance was typical for 37% of marine isolates of *E.coli*. Only seven percent of the marine *E. coli* were multiresistant, and 14% to a single antibiotic. The likelihoods of human exposure in seawater were 9% for to ampicillin-resistant *E. coli*, *20% for K. pneumonia,* and 4% for penicillin-resistant *E. faecalis.*
Conclusions: Tropical seawater was shown to be a source of antibiotic resistant bacteria. Highest level of compliance was observed for coastal water of Grand-Anse. Indicators detected in True-Blue-Bay, Prickley-Bay and Grand-Anse was not a result of rainwater caused sewage or rhizosphere runoff.

PO02.03
Potentially Dangerous Consequences of a Bad-Managed Pre-travel Consultation

A. Rossanese[1], F. Gobbi[1]
[1]*'Sacro Cuore-Don Calabria' Hospital, Centre for Tropical Diseases, Negrar, Verona, Italy*

Background: Travels at high altitude are common, also in tropical and subtropical regions. Tourists who have planned such a travel often seek advice at a Travel Clinic before departure, mainly to obtain counselling on vaccines and malaria prophylaxis.
Objectives: To prove that incorrect pre-travel advice is potentially harmful.
Methods: Three case-reports.
Results:
First case: Italian lady, 72 years. Travel itinerary: Classic Peru, 18 days including Lima, Nazca, Lake Titicaca, Puno, Cuzco and Macchu Picchu. No digression towards the Amazonas. Vaccinated against yellow fever, hepatitis A and B, typhoid, tetanus/dyphtheria, cholera. Anti-malarial prophylaxis: mefloquine for the entire length of the trip. No mention of high altitude illness. Epilogue: suffered from acute mountain sickness (AMS) at the Patapampa Pass (4910 m).
Second case: Irish gentleman, 68 years. Travel itinerary: Ecuador and Galapagos plus golf session in Argentina, 30 days. No visits to the Amazon part of the country. Vaccinated against yellow fever, hepatitis A and B, rabies. Anti-malarial prophylaxis: atovaquone/proguanil for the entire length of the trip. No mention of high altitude illness. Epilogue: AMS at 4800 m, at the foot of Chimborazo Mt., where arrived by an off-road vehicle.
Third case: Italian lady, 45 years. Seen at the outpatient section of our Travel Clinic upon return from Nepal to investigate the cause of a diarrheal disease occurred during travel. Travel itinerary: Nepal, 10 days including Kathmandu and a 4-days walking trip at an altitude > 5000 m. Vaccinated against yellow fever, hepatitis A and B, typhoid, cholera. Anti-malarial prophylaxis: none. No mention of high altitude illness.
Epilogue: On the second day of walking she suffered from a bad headache with nausea and mild vomiting, promptly followed by the onset of a watery diarrhoea. Along the way back to Kathmandu all her symptoms rapidly disappeared, apart from the bowel movements.
Conclusions: A pre-travel consultation not properly centred on the travel itinerary can lead to potentially life-threatening events. Useless vaccinations or prophylaxis expose the travellers to possibly severe side effects. The opportunity to inform on risks at altitude is often missed during pre-travel counselling.

PO02.04

Acute Mountain Sickness Complicated by High-Altitude Pulmonary Edema and High-Altitude Cerebral Edema in a 35-Year Old Hong Kong Traveler Visiting Lake Titicaca, Peru

C.K.B. Wong[1]
[1]*Prince of Wales Hospital, The Chinese University of Hong Kong, Shatin, Hong Kong*

Background: Local study has shown that up to 80% of Hong Kong (HKG) travelers suffered from acute mountain sickness (AMS) after visiting high altitudes in Peru & Tanzania. Only 1 in 10 of HKG travelers sought pre-travel health services.
Objective: To report a case of AMS complicated by high-altitude pulmonary edema (HAPE) & high-altitude cerebral edema (HACE).
Method: Case report.
Results: A 35-year old Chinese with good past health traveled from HKG to Cusco by flight. He complained of sore throat, cough & low grade fever while in Cusco but managed to visit Machu Picchu. He suffered from broken sleep & headache which he attributed to upper respiratory tract infection (URTI). He was described to be withdrawn & apathetic by his companion. While still symptomatic, he traveled to Juliaca on a direct flight. After arriving at Puno, he retired to bed, requested to be left alone & skipped his meals. When approached on the next day, he was confused and ataxic. He was sent to a local clinic and was given oxygen therapy & dexamethasone. Emergency evacuation to Lima and hospital admission was arranged. Chest x-ray showed bilateral lower zone infiltrate & a congested lung field. His conscious level gradually improved in days. MRI brain performed 1 month post-travel showed T2 hyperintense lesion in bilateral globus pallidus suggestive of hypoxic ischemia.

[CXR during acute phase & MRI brain one month later]

Six months afterwards, he complained of residual mental slowness although no significant functional impairment was reported.

Conclusion: Although rare, AMS can progress to potentially life-threatening HAPE and/or HACE. Concurrent URTI, rapid ascent, failure to recognize the warning symptoms of impending HAPE and HACE by both the traveler & his travel companion are factors contributing to the occurrence of this case of AMS with severe complications. As certain high altitude areas are becoming popular destinations for Hong Kong travelers, further efforts should be made to promote the public awareness for AMS and its prevention.

PO03 Enteric Infections

PO03.01
Strongyloides Stercoralis as a Cause of Enteric Infection Is Underestimated in Slovenia and in Balkan Region

M. Skvarc[1], P. Rogina[2]
[1]*Faculty of Medicine Ljubljana, Institute of Microbiology and Immunology, Ljubljana, Slovenia,*
[2]*General Hospital Novo Mesto, Novo Mesto, Slovenia*

Strongyloides stercoralis infection is mainly associated with tropical and subtropical areas, but cases also occur in temperate areas (including the Mediterranean countries and Eastern European countries). It is more frequently found in rural areas, institutional settings, and lower socioeconomic groups.
In the abstract we present all the diagnosed cases from Slovenia in the period from 2006 to 2012 and the patient's data because of possible cross-reactions.
To diagnose *S. stercoralis* infection we use enzyme immunoassay (EIA) antibody detection test. Sometimes we got the stool or respiratory tract samples to examine them for the presence rhabditiform and filariform larvae. Because of possible cross-reactions with some other nematode we tested all the serums also to *Toxocara spp.* and *Trichinella spiralis* and retrieved the data from patient's history to see if they traveled a lot and if they may have any kind of allergic diseases.
We analyzed serums from 191 patients with suspected infection. 36 (18%) patients were positive for S. stercoralis antibodies (Abs). During the years the number of serums sent to us has risen and also the number of patients with *S. stercoralis* infection has risen. All the patients had a history of unexplained gastrointestinal problems. 116 (61%) of them have had eosinophilia. One patient of the positive ones had a history of asthma. The patients mainly got infected in Slovenia or in other Ex-Yugoslavia countries. Just a few of them got the infection during their traveling to tropical and subtropical areas. Eight serology (22%) positive patients had a history of traveling to tropical areas; of them two were of foreign descent. Four (11%) cross reacted during the testing to *Toxocara spp.* They all had EIA confirmed with western blot testing (WB). In one of the positive patients who lived for many years in the tropical countries we found also antibodies against *T. spiralis* and WB was also positive. This patient also had Abs against *Shistosoma spp*. confirmed with WB in the serum. In two (5%) immunosuppressed patients we were able to prove the filariform larvae in the respiratory tract samples.
If clinicians are aware of existence of *S. stercoralis* as possible cause of enteric infection than they use microbiology testing. We got cross-reactions in 5 patients (14%). Special precaution should be taken while interpreting the results of *S. stercoralis* testing since we do not have a commercially available confirmation test like WB.

PO03.02

Safety and Efficacy of a Travelers' Diarrhea Patch Vaccine System Containing Heat-labile Toxin from Enterotoxigenic *Escherichia coli* (ETEC) in Travelers to Asia: A Randomized, Double-blind, Placebo-Controlled Phase 2 Trial

J.P. Cramer[1,2], R.H. Behrens[3], G.D. Burchard[1,2], T. Jelinek[4], U. Schwarz[4], R. Prabhugaunker[5], S. Chatterjee[6], S. Dewasthaly[7], K. Westritschnig[7], R. Steffen[8]

[1]University Medical Center Hamburg-Eppendorf (UKE), Department of Tropical Medicine, Hamburg, Germany, [2]Bernhard Nocht Institute for Tropical Medicine, Clinical Research Department, Hamburg, Germany, [3]Hospital for Tropical Diseases, Travel Medicine, London, United Kingdom, [4]Berliner Centrum Reise & Tropenmedizin, Berlin, Germany, [5]Prabhugaunker's Clinic, Goa, India, [6]Wellesley Medicentre, Kolkata, India, [7]Intercell AG., Vienna, Austria, [8]University of Zurich, Institute of Social and Preventive Medicine, Division of Epidemiology and Prevention of Communicable Diseases, Zurich, Switzerland

Background: A patch vaccine containing heat-labile toxin (LT) from enterotoxigenic *Escherichia coli* (ETEC) had been beneficial in reducing the rate and severity of travelers' diarrhea (TD) in Mexico and Guatemala. To evaluate the efficacy of this transdermal vaccine system in an area with a different diarrheal pathogen profile, an additional phase 2 study was conducted in European travelers to India.
Methods: For this multicenter, randomized, double-blinded, placebo-controlled field study, 723 adult subjects were recruited in the United Kingdom (5 sites) and in Germany (2 sites) between December 2009 and October 2010; 603 (299 LT vaccine, 304 placebo) were included in the Per-Protocol (PP)-Population. Two transcutaneous immunizations with patch application containing 37.5 µg LT or placebo were performed 14 days apart. Efficacy assessments were based on subject diary-reported diarrheal events and laboratory analysis of stool samples submitted during the 17 day-surveillance phase post arrival in India for detection of ETEC and other pathogens. The primary objective of this study was to evaluate the incidence of the vaccine preventable outcome (VPO) defined as moderate to severe ETEC disease (without co-pathogen) in travelers to India.
Results: In the PP-Population, the incidence rate of the VPO was 6.0% (18 of 299) in the vaccine and 5.9% (18 of 304) in the placebo group. In travelers with moderate to severe TD, ETEC (with and without co-pathogen) was isolated in 8.0% and 8.2% in the vaccine and placebo groups, respectively, followed by enteroaggregative *E. coli* (EAEC, 0.7% versus 1.6%) and Norovirus (1.0% versus 0.3%). The patch vaccine system showed good immunogenicity: LT IgG Geometric Mean Titers (GMT) increased significantly from baseline (LT: 812.7, Placebo: 840.5) to 6408.7 in the LT group as compared to 543.2 in the placebo group upon arrival in India. The vaccine delivery system frequently produced rash, erythema and pruritus at the application site, long term hyperpigmentation persisted in 15% of LT recipients.
Conclusion: The trial vaccine showed no protective efficacy, although delivery of LT by transcutaneous immunization was demonstrated through the immune response against LT. Very low rates of LT ETEC strains were observed in travelers to India with moderate to severe TD.

PO03.03

Characterization of Enterotoxigenic *Escherichia Coli* Strains in Patients with Acute Diarrhea in Mexico, Guatemala, India and United States

Z.-D. Jiang[1], V. Kharat[1], J.A. Boom[2], L.C. Sahni[2], H.L. Dupont[1]
[1]University of Texas, Houston, United States, [2]Texas Children's Hospital, Houston, United States

We cultured stools for enterotoxigenic *Escherichia coli* (ETEC) in adults with travelers' diarrhea in Mexico, Guatemala and India between 2010 and 2011 and in children with acute diarrhea in Houston, Texas in 2012. Toxin patterns and colonization factor antigens (CFA) were determined. Diagnosis of infection with ETEC was performed by oligonucleotide DNA probes. CFAs were tested using PCR method. ETEC was the most common bacterial pathogen in all populations, isolated in 61% (63/104) of travelers with diarrhea in India, 45% (112/250) in Mexico and Guatemala combined, and in 41% (185/46) of Houston children. Of the 63 ETEC isolates from India, 62% produced heat stable (ST)-only, 11% produced heat labile (LT)-only and 27% produced ST and LT. Of the 112 ETEC isolates from Mexico and Guatemala, 66% produced ST-only, 15% produced LT-only and 19% produced ST and LT. Of the 185 ETEC isolates from children in Houston, 85% produced ST, 4% produced LT and 11% produced ST/LT. Forty ETEC isolates were characterized for CFAs, including 8 from India, 24 from Mexico and Guatemala, and 8 from Houston. CFAs were identified in 68% of the ETEC strains studied, 75% (6/8) in India, 67% (16/24) in Mexico and Guatemala and 63% (5/8) in Houston. The highest CFA frequency was observed among ST/LT-producers (100%), followed by ST-only -producing strains (55%) and LT-only-producers (43%). Coli surface 6 (CS) antigen was the most common antigen detected in 52% (14/27) of CFA-positive strains. ETEC strains continue to be the most important causes of travelers' diarrhea in various regions of the developing world. ST-only strains predominate globally, which suggests that LT-based immunization approaches will be unsuccessful in preventing most cases of ETEC. LT antigen plus CFA antigens including CS6 will likely be needed for ETEC immunologic control due to the poorly antigenic nature of ST. We found a surprising frequency of ETEC in children in Houston children with diarrhea, which may reflect the increasing importation of foods to the U.S. from the developing world.

PO03.04

Rapid Cessation of Acute Diarrhea in Pediatric Patients Using a Novel Plant Extract: Results of a Randomized, Cross-over Study

A.S. Dover[1]
[1]*LiveLeaf Bioscience, Inc., San Carlos, United States*

Background: Supportive care with oral rehydration solution (ORS) is standard treatment for acute diarrhea, although duration of illness typically is not shortened.
Objective: Assess the effectiveness of a novel plant extract (LifeDrops, LiveLeaf Bioscience) to restore bowel homeostasis in patients with acute diarrhea.
Methods: With IRB approval, pediatric patients in Nicaraguan community clinic with uncontrolled diarrhea in previous 48 hours were enrolled, with parental consent. Patients were randomized to receive either ORS with extract on day 1 and then ORS alone on day 2 (study arm) or receive ORS alone on day 1 and then ORS plus extract on day 2 (control arm). Patients were observed under standard of care (ORS) for 24 hours after administration of fluids and time and number of bowel movements noted; stools in each bowel movement were ranked by Bristol Stool Scale (BSS).
Results: 61 patients were enrolled (30 in the study arm, 31 in the control arm). In the first 24 hours after consumption of the fluids, patients in study arm reported BSS stool 4 or less in a mean time of 3.1 hours contrasted to mean time of 9.2 hours in control arm ($p=0.002$); 66% of patients in study arm had BSS ranking of 4 or less with first bowel movement after drinking ORS+extract fluid. During the second study day, patients given the ORS+extract on day 1 and then ORS alone on day 2 continued with BSS stool 4 or less while crossed over patients who received extract on day 2 achieved a BSS of 4 within 24 hours of extract consumption. For patients in control arm, mean number of bowel movements on day 1 (receiving ORS alone) was 4 but only 2 after extract on day 2 ($p=0.0001$). No adverse events were observed during the study.
Conclusions: Decreased stool frequency and rapid normalization of stool consistency were observed with ORS containing LifeDrops compared to ORS alone.

PO03.05
Traveler's Diarrhea among Foreign Travelers in Southeast Asia

C. Kittitrakul[1], W. Piyaphanee[1], W. Tangkanakul[2], S. Lawpoolsri[3]
[1]Mahidol University, Department of Clinical Tropical Medicine, Bangkok, Thailand, [2]Ministry of Public Health, Department of Disease Control, Bangkok, Thailand, [3]Mahidol University, Department of Tropical Hygiene, Bangkok, Thailand

Background: Traveler's diarrhea (TD) is the most common disease occurred in travelers visiting tropical area, including Southeast Asia. Information regarding TD in this region is limited. We, therefore, conducted this survey in Suvarnabhumi Airport, Thailand, which is the main international hub in this region.
Objectives: To determine the incidence and impact of TD among foreign travelers in Southeast Asia. Secondary objective was to analyze the factors that might be associated with the incidence of TD.
Methods: This cross-sectional questionnaire based study was conducted among foreign travelers in the departure hall of Suvarnabhumi airport just before they departed Southeast Asia. They were asked about their demographic background, trip characteristics, pre-travel preparations, and actual practices related to the risk of TD. For those who had experienced diarrhea, the details and impact of each diarrheal episode were also assessed.
Summary of results: From April 2010 to July 2011, 7963 questionnaires were collected. 59 percents of participants were male; overall, the mean age was 35 years. The majority of participants (37%) were from Europe, followed by East Asia (32%). The incidence rate of TD was 32/100 persons-month. Travelers from Oceania (including Australia and New Zealand) had the highest risk of developing TD (32.9%), while East Asian travelers had the lowest risk (2.6%). Destination country that had the highest risk of developing TD was Vietnam and Indonesia (19.3%). Factors associated with high attack rate of TD were younger age, Oceania nationality, longer duration, education or research purpose, higher numbers of countries visited and drank beverages with ice or ice-cubes. Among those who had diarrhea, 90% of cases were mild, while 6% of cases required a visit to a doctor, only 4% of case required hospitalization.
Conclusion: TD was common among foreign travelers visiting Southeast Asia. The incidence rate was highest in travelers from Oceania followed by travelers from North America, Europe and Africa. Travelers from other parts of Asia had lower risk to developed TD.

PO03.06

Intestinal Parasitism in Business Travellers from 2002 to 2012: Review of 17536 Fecal Specimens Analysis in a French Travel Clinic Laboratory

M. Plisson-Saune[1], X. Chanudet[1], D. Martin[1], I. Tawa[1], P. Piot[1], N. Poulbère[1], M. Carsault[1], F. Tournois[1], O. Marendowski[1], L. Perthuisot[1]
[1]*CMETE, Paris, France*

Background: Intestinal parasitism is very frequent. Some Parasites are considered to play an important role in Diarrhea (especially chronic Diarrhea) but some others are generally considered non-pathogenic.
Patients visiting our clinic are individuals travelling abroad for professional purpose. For some of them, a stool analysis is performed as part of their medical assessment, whether the subject suffers from digestive disorders or not.
Objective: We investigated the prevalence and etiology of intestinal parasitism among business travelers. We aimed to evaluate the risk factors (destination, age and gender, duration of stay) and discuss the usefulness of stool examination for parasites screening in regular travellers.
Method: A retrospective analysis was performed using data collected between 2002 and 2012: 17536 stools samples were examined for intestinal parasitism (wetmounted smear plus concentration technique).
Subjects were classified on the basis of destination, gender, age, and duration of stay.
Results:

- Among the 17536 stool specimens tested, Parasites were found in 18,3% (prevalence ranges from 18,8% in 2002 to 16.7% in 2012).
- *Endolimax nana* and *Entamoeba coli* were by far the most frequently isolated (prevalences are respectively 8,5% and 5,3%). Pathogenic parasites were identified in 4% of subjects (*Entamoeba fragilis* 1,3%, *Giardia intestinalis* 1,1%, *Entamoeba histolytica/dispar* 0,84%).
- Travel to Africa was associated to the greatest rate of intestinal parasitism : 80% of subjects tested positive were returning from Africa.
- 17% of male subjects were tested positive versus 14.8% of females.
- The >60 years old age group is the most affected (21% tested positive versus 19% in the 31-60 y.o. group and 16% in the 20-30 y.o. group)
- Expatriates appear to be at higher risk than rotational workers or short-stay travellers: 77.9% of subjects harbouring intestinal parasites were expatriates.

Conclusion: Regular Travelers would benefit from a systematic screening for intestinal parasitic infections.
Detection of pathogenic agent leads to treatment prescription whereas identification of non - pathogenic parasites should be considered as an indicator of fecal contaminated water or food ingestion and requires reiteration of recommendations on safe eating conduct.
Parasitism screening should particularly focus on travellers with most risk factors i.e. travellers returning from Africa, expatriates, individuals aged over 60 years old.

PO03.07
The Importance of Norovirus as a Cause of Travelers' Diarrhea Is Ill Defined and Underestimated

T. Verstraeten[1]
[1]*P95, Pharmacovigilance and Epidemiology Services, Leuven, Belgium*

Background: Since the development of better detection methods for norovirus, a large proportion of diarrheas previously classified as having unknown origin, has been attributed to norovirus. As a result, norovirus is now recognized as the most important cause of infectious gastro-enteritis across all age groups. An extensive review of the literature on the etiology of travelers' diarrhea (TD) up to 2008 found that norovirus was tested in only 4 out of 51 studies, with detection rates ranging from 3.2% to 16.9%. We review the recent literature on the etiology of TD to assess whether recent studies provide more frequent and reliable norovirus detection rates.
Methods: Medline search for articles on the etiology of TD, restricted to articles published in English and after 2008.
Results: The recent literature on norovirus as a cause of TD is still sparse and heterogeneous in its methods and results. The detection rates of norovirus among cases of TD vary from 1.5% to 17.0 %. Findings of most studies cannot be generalized for various reasons, such as the limited study duration, a single travel destination, or inclusion of only children, elderly, military or other subpopulations. Several study limitations are likely to have resulted in an underestimation of the burden caused by norovirus, such as the unrestricted or unspecified time since return from the travel, inclusion of hospitalized cases only or the use of immunological markers for diagnosis. In studies where none of all the above limitations were present, the proportion of TD attributed to norovirus ranged from 10.5% to 15.7%. As norovirus illness is known to peak during outbreak settings, the proportion of norovirus TD may be even higher if travel occurs under these conditions.
Conclusion: The burden of disease caused by norovirus is considerable but likely underestimated as a result of the specific study designs. Improved and standardized approaches are needed to identify the true burden of disease caused by norovirus among travelers worldwide. Despite these limitations, it can be expected that a safe and effective vaccine against norovirus could potentially reduce a substantial proportion of the health and economic burden caused by travelers' diarrhea.

PO03.08
Case Report of an Outbreak of *norovirus* on a Cruise Ship

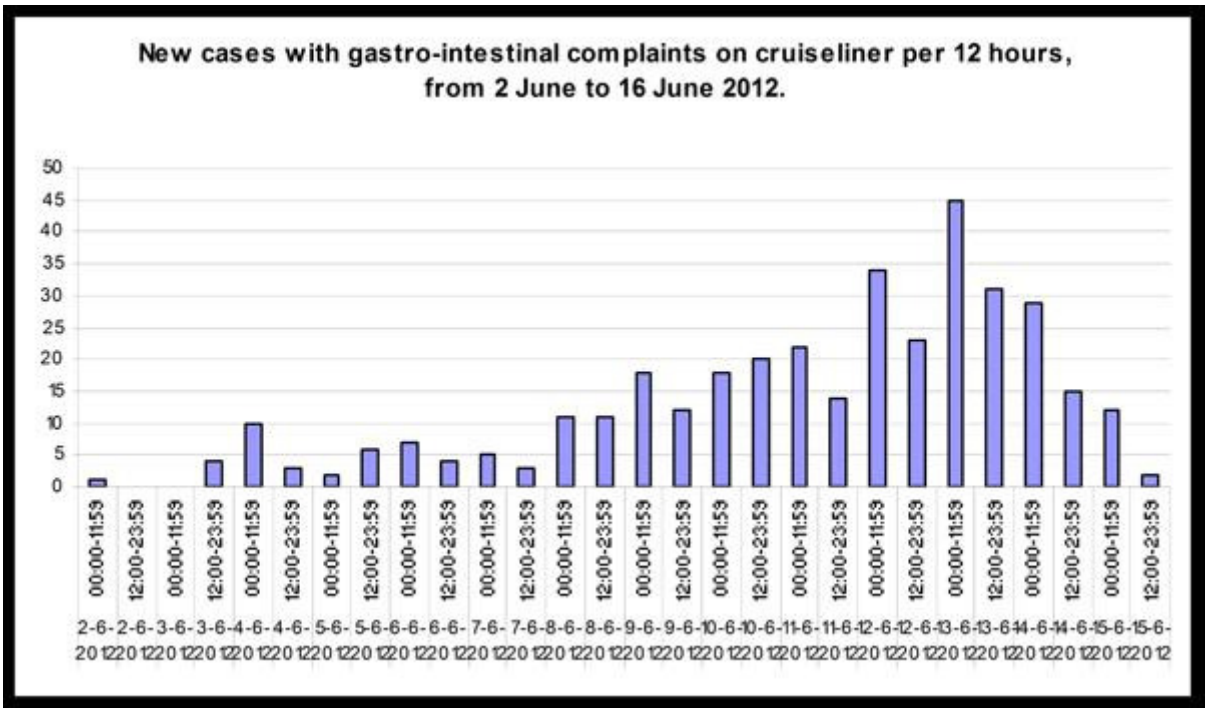
H. Visser[1]
[1]*Public Health Service Rotterdam-Rijnmond, Infectious Disease Control, Rotterdam, Netherlands*

Summary: On the second of May and the 12th of June 2012 the Public Health Service (PHS) Rotterdam-Rijnmond was notified by International Health Regulations (IHR) that several passengers on board a cruise ship suffered from gastro-intestinal (g.i.) complaints. The PHS initiated diagnostics. *Norovirus type GII* was isolated in 6/6 faeces samples. Extreme hygienic measures were taken. Prolonged surveillance demonstrated that the measures taken were effective.

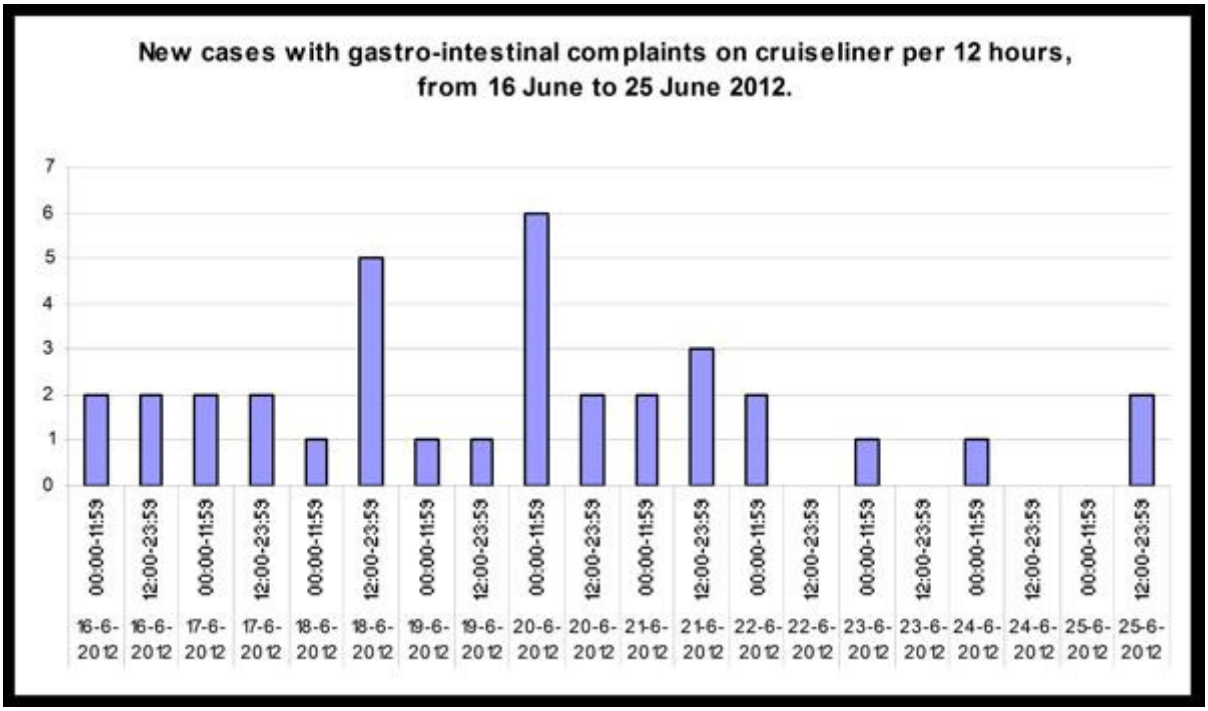
Introduction: Since the start of the Port Health Authority (PHA) Rotterdam in March 2009, no outbreaks in shipping were reported. This first outbreak reported since the collaboration in the PHA was evaluated.

Method: Through surveillance the course of the outbreak was monitored, to evaluate if the measures taken were effective. But also for communication to the shipping line to underline the outbreak is over.

Results: After the first notification on the 2nd of May, no reports were received on the PHS until the 12th of June 2012. The PHS initiated diagnostics. Six/6 samples tested positive for *norovirus type GII*. Extreme hygienic measures were taken. During the next voyage surveillance on g.i. complaints continued. Figure 1 shows the epicurve of passengers and crew for the cruise from 2 to 16 June 2012, figure 2 idem for the cruise from 16 to 25 June 2012.



[Figure 1]



[Figure 2]

At the end of the last voyage the incidence was under the threshold used by the cruise industry. The outbreak was over.

Conclusion: The measures taken were effective stopping the outbreak caused by the *norovirus* but more strict than the Dutch guidelines from the National Institute for Public Health and the Environment (RIVM). The structure of the PHA Rotterdam worked. The collaborating partners worked closely together to keep all informed. Therefore the course of the outbreak could be closely monitored.

Discussion: More literature study and investigation can be done for evidence based hygienic measures to prevent and combat a *norovirus* outbreak on cruise ships. Some hygienic procedures as isolation sabotaged the holiday experience of cruiseship voyagers.

PO03.09
A Description of Enteric Fever Cases in Auckland, New Zealand from 2005 to 2010

R.J. Lane[1], S. Mc Bride[1], D. Holland[1], S. Perera[2], T. Jelleyman[3], K. Read[4], R.J.H. Ingram[5]
[1]Middlemore Hospital, Infectious Diseases, Auckland, New Zealand, [2]Auckland Regional Public Health Service, Auckland, New Zealand, [3]Waitakere Hospital, Auckland, New Zealand, [4]North Shore Hospital, Auckland, New Zealand, [5]Auckland City Hospital, Infectious Diseases, Auckland, New Zealand

Background: Most publications on enteric fever in non-endemic settings describe travellers to the Indian subcontinent (ISC) or South East Asia. There is limited data on enteric fever within the Pacific region. Auckland, New Zealand (NZ), has the largest population of Pacific people of any centre worldwide and travel between NZ and Pacific nations is frequent.
Methods: We reviewed microbiologically (blood or stool) confirmed cases of enteric fever admitted to hospitals in Auckland from January 2005 to December 2010. Demographic, travel, microbiological and clinical details were determined.
Results: 150 patients had microbiologically confirmed enteric fever. The mean age was 25.9 years (range 1.0-67.7). Travel destination was known for 146: ISC 63 cases (43%); the Pacific 39 cases (27%) (37 Samoa, 2 Fiji); no travel or "locally acquired" 35 cases (24%).
All cases acquired in the Pacific were caused by *Salmonella typhi*, and all but one Pacific isolate being fully susceptible (one naladixic acid resistant (NAR)). 33 locally acquired cases were *S. typhi* (one multidrug resistant (MDR) + NAR, others fully susceptible) and two *S. paratyphi* (both NAR). 50/72 isolates from other regions were *S.typhi*. Of the 72 isolates; 53 were NAR, 1 MDR with NAR, remaining sensitive.
Of the 52 cases where purpose of travel was known; 32 (60%) visiting friends or relatives (VFRs), 16 new arrivals and 5 travelled for holiday or work. Only 2 cases (one S. typhi, one *S. paratyphi*) had received prior typhoid vaccination.
Clinical features, treatment and outcomes were consistent with reported experience and did not vary with region of acquisition.
Conclusions: One half of cases of enteric fever in Auckland are either from the Pacific or locally acquired, likely originating from the Pacific. Unlike disease acquired in the ISC, resistance was infrequent in these isolates. Targets for vaccines and pre travel advice should be VFRs both to the Pacific and the ISC.

PO03.10
Amebic Liver Abscess: Epidemiological, Clinical Data and Outcome in a Series of 53 Travelers

C. Rapp[1], C. Valentin[2], C. Verret[3], J. Margery[4], F. Simon[5], T. Carmoi[6], C. Ficko[2], O. Aoun[2]
[1]Begin Military Hospital, Infectious and Tropical Diseases, Saint-Mandé, France, [2]Begin Military Hospital, Saint-Mandé, France, [3]CESPA, Paris, France, [4]HIA Percy, Clamart, France, [5]HIA Laveran, Marseille, France, [6]HIA Val de Grace, Paris, France

Background: Amebic liver abscess (ALA) is the most common extraintestinal manifestation of *Entamoeba histolytica*-related amebiasis. It is rarely described in travelers. Its therapeutic management remains controversial.
Objectives: Describe the health care itinerary, the clinical, biological, and morphological aspects as well as the outcome of a series of imported ALA cases.
Methods: Retrospective study of patients hospitalized for serologically confirmed ALA in four medical departments in military hospitals from January 1st, 2002 to December 31st, 2011.
Results: Fifty-three patients (49 males, 4 females) were included. Median age was 41 years (range: 25-80). Demographics were: thirty servicemen (57%), nine tourists (17%), eight migrants (15%) and three expatriates (5%). Main destinations were: sub-Saharan Africa (69%), Asia (14%), Indian Ocean (12%) and the Balkans (6%). Median duration of travel was 90 days. Twenty-three patients (44%) had a medical evacuation. For the others, the median time between return and onset of symptoms was 60 days (0-700). Patients were first seen by an emergency room (ER) physician in 59% of cases and by a general practitioner in the other cases. Four subjects (7.5%) presented initially with a complicated form. An inflammatory syndrome was almost constantly reported. Chest X-ray was abnormal in 67% of cases. Liver abscess was localized in the right lobe and unifocal in 70% of cases. The latex agglutination rapid diagnostic test carried out on 42 patients was positive in 41 cases. Metronidazole (used as a single therapy) was effective in 75% of subjects. Liver puncture or drainage (25% of patients) was significantly associated with the presence of severe anemia, cholestasis, thrombocytosis and voluminous hepatic lesions. The median length of stay was longer (17 days) in drained patients. Recovery was confirmed in 52 patients after a 12-month average follow up. Only one relapse was noticed at 6 months.
Conclusion: This study confirmed that the diagnosis of ALA is easy. It is facilitated by a high degree of suspicion and use of the qualitative latex agglutination test, simple and reliable upon the ER admission. Medical treatment by metronidazole is efficacious. The indication of drainage must be discussed based on clinical and biological arguments (rather than stiff morphological criteria) and/or prognosis factors assessed in highly endemic areas.

PO04 Infectious Deseases: Epidemiology, Diagnosis, Treatment

PO04.01
Case report: Acute Miliary Tuberculosis Aeromedical Evacuation with a Positive Pressure Aircraft Transit Isolator

H. Raffin[1,2]
[1]*Medic'Air International, Bagnolet, France,* [2]*SAMU de Paris, DAR Necker Enfants-Malades, Paris, France*

Background: The international air transport recommendations prohibit to evacuate contagious patients on commercial airlines (IATA rules) and also air ambulance flights. We worked with WHO for Standard Operating Procedure medical evacuation by air ambulance with bio containment for people exposed to Viral Haemorrhagic Fever or highly infectious disease. With a first experience of confirmed Lassa Fever evacuated by air ambulance from Sierra Leone to Sweden, we used the same procedures to transfer high contagious patients in safe conditions.
Objective: We evacuated from Conakry to Brussels by air ambulance a young lady, HIV positive with neurological signs and reached lungs with diagnosis of bacillary miliary tuberculosis and needing ICU monitoring.
Method: We choose a Positive Pressure Aircraft Transit Isolator (“Bubble”) to evacuate the patient, with capacity to monitor patient, with nursing access and continuity of treatment (oxygen, medication intravenous) because less expensive and easier to use than our new Negative pressure Aircraft Transit Isolator. The positive pressure has a possible favourable effect to minimize the altitude depressive effect during the flight on the Oxygen partial pressure of the lungs'patient.
Results: Even with an aircraft breakdown in Conakry, patient was safely managed during 14 hours in the Bubble, under closed monitoring by medical team (MD & RN), receiving medications and was discharged in St Pierre Univ. hospital, ICU, in isolated room.
Conclusion: Contagious patient can be transferred in safe condition with Negative or Positive pressure Aircraft Transit Isolator under closed medical supervision. The ratio benefit/risk for patient - like every evacuation - must be calculated by experimented physicians before starting any missions but also risk for medical attendants and pilots. It is indispensable to engage medical crews with specific training for these pathologies and knowing how to use these new tools.

PO04.02
Reasons for Outpatient Visits by Foreign Travellers to an Urban Hospital in Tokyo

N. Matsuda[1], T. Naito[1], Y. Uehara[1], H. Isonuma[1], T. Hisaoka[1]
[1]*Juntendo University, General Medicine, Bunkyo-ku, Japan*

Background: International travel has increased in recent years, which has in turn increased the number of people visiting outpatient clinics in the countries to which they travel. International travellers face unique challenges regarding communication and culture, and it is important to understand both the medical and the cultural needs of international travellers.
Objectives: The problems that people experience during their stay in Japan have not yet been studied, particularly with regard to patients visiting general medicine departments. In this study, we investigated the reasons for these visits.
Method: We retrospectively reviewed the charts of travellers who visited the Department of General Medicine at Juntendo University Hospital between April 2008 and March 2011. The charts of 35 international travellers were screened for symptoms, diagnosis, and number of hospital visits.
Results: The age range of the study population was 3-63 years; the mean age was 33.1 years. The most common symptom was fever, which was noted in 15 patients (42.8%). Sore throat and cough were noted in 10 (28.5%) and 8 (22.8%) patients, respectively. Other symptoms were as follows: headache, 7 patients (20%); abdominal pain, 5 patients (14.2%); chest pain, 4 patients (11.4%); and diarrhoea, 2 patients (5.7%). Eight patients (22.8%) had upper respiratory infections (URIs), 5 (14.2%) had influenza, and 5 (14.2%) had gastrointestinal infection. The diagnoses for the other patients included arrhythmia, herpes zoster, sepsis, pneumonia, hyperventilation, and pyelonephritis.
Summary of result: The most frequent reason for medical visits was fever, which was predominantly caused by URIs, gastrointestinal infections, and influenza. We also found a large variation in the diagnosed conditions, indicating the absence of a clinical trend regarding hospital visits.
Conclusion: This study describes the reasons for hospital visits by international travellers who fell ill in Japan and their final diagnoses. The small sample population does not enable a definite conclusion. However, we found that fever-related and non-life threatening problems were the most frequent health issue among international travellers in Japan.

PO04.03
Prevalence of Placental Toxoplasmosis in the Greater Accra Region of Ghana

K.D. Kwofie[1,2], A. Ghansah[1], J.H.N. Osei[1], S. Obed[3], E.H. Frimpong[2], T. Suzuki[4], N. Ohta[4], I. Ayi[1]
[1]Noguchi Memorial Institute for Medical Research, Parasitology Department, Accra, Ghana, [2]Kwame Nkrumah University of Science and Technology, Clinical Microbiology, SMS, Kumasi, Ghana, [3]Korle-Bu Teaching Hospital, Obstetrics and Gynaecology Department, Korle-Bu, Accra, Ghana, [4]Tokyo Medical and Dental University, Department of Environmental Parasitology, Tokyo, Japan

Background: Toxoplasmosis is a parasitic disease caused by *Toxoplasma gondii* which can be acquired by ingestion of infective stages of the parasite or congenitally from mother-to-child. Depending on the stage of pregnancy the women acquired the infection transmission rate could be from 10% to >68%. Infection can be acute with tachyzoites in circulation or chronic with formation of cysts in muscle and organ tissues. Congenital infection of infants is known to result in neurological, brain and ophthalmic disorders later in life. Recent research in Ghana revealed high sero-prevalence among pregnant women and eye patients with eye lesions. Toxoplasmic eye lesions in adults have been known to be a consequence of congenital infection.
Objective: To estimate the prevalence of placental toxoplasmosis and risk of foetal infection among women at delivery in a hospital facility in Ghana.
Methods: Consented third trimester pregnant women from parts of Greater Accra Region were recruited from ante-natal clinic at the Korle-Bu Teaching Hospital. At delivery, placental tissue and maternal blood samples were taken after expulsion of each placenta. Nested-PCR was run on genomic DNA extracted from placental tissues to detect *T. gondii* using SAG3 and GRA6 primers. ELISA was used to detect anti-*T. gondii* IgG and IgM in matched maternal blood samples. Data were analysed using SPSS version 16.
Results: Eighty-eight women aged 18 to 45 years participated**,** from whom 88 placental tissues and 87 maternal blood samples were obtained. Overall, 39.8% (35/88) of placental tissues was positive for *T. gondii* DNA and 40.2% (35/87) were positive for anti-*T. gondii* IgG. All the blood samples were negative for anti-*T. gondii* IgM. Out of the anti-*T. gondii* IgG positive maternal blood samples, 88.6% (31/35) had corresponding placental tissues being positive for *T. gondii* DNA using SAG3 and/or GRA6 markers. Thirty-one (31) placental tissues and corresponding maternal blood tested positive for both Nested-PCR and ELISA.
Conclusion: *Toxoplasma gondii* DNA detected in placenta which is formed during pregnancy may be largely from cysts and is indicative of infection of the mother in the course of gestation. Placental toxoplasmosis exposes the foetus to the risk of infection which implies that almost 40% of the infants were at risk of congenital infection. Further studies needs to be done to determine the rate of mother-to-child transmission of *T. gondii* in Ghana.

PO04.04

Possible and Proven Mixed Infection of Schistosomiasis and Strongyloidosis: A Single Centre Retrospective Analysis

P. Soentjens[1,2], A. Aerssens[2], J. Verschueren[1], D. Van den Bossche[3], M. Van Esbroeck[1]
[1]Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium, [2]Military Hospital Queen Astrid, Polyclinic Department, Brussels, Belgium, [3]Military Hospital Queen Astrid, Lab Department, Brussels, Belgium

Background: Mixed infections of schistosomiasis and strongyloidosis are considered relatively rare. Most travel-related schistosomiasis and strongyloidosis infections are diagnosed by serology.
Methods: The database of the Institute of Tropical Medicine in Antwerp was screened for positive diagnoses of a mixed infection with schistosomiasis and strongyloidosis for a period of six years (from 1 December 2006 until 31 October 2012). Diagnosis of schistosomiasis was based on the presence of Schistosoma eggs in urine and/or stools and/or on serology using enzyme linked immunosorbent assay (ELISA) and/or indirect hemagglutination assay (IHA). Diagnosis of strongyloidosis was based on the presence of Strongyloides stercoralis eggs and/or on a positive PCR test in stools and/or on serology using enzyme linked immunosorbent assay (ELISA) or indirect hemagglutination assay (IHA). Mixed infections of schistosomiasis/strongyloidosis were defined as at least one positive criteria for each infection, by serology for possible infection and by microscopy for proven infection.
Results: Out of a total of 2388 positive serological blood samples for schistosomiasis, 93 patients were considered to have mixed schistosomiasis/strongyloidosis infection. Patients with mixed infections were mainly males (75 %) and had travelled most frequently to African countries (83 %). Hypereosinophilia (>1.0x10^9/L) was seen in 88% of the 93 subjects.
Diagnosis by microscopy in proven positive cases of schistosomiasis was found in 8 infections (of which 7 in stools and 1 in urine) (8%) and for Strongyloides stercoralis in 9 infections (of which 7 by PCR testing in stools) (9%). Only one proven case was diagnosed by microscopy for both infections. Most mixed infections were also diagnosed by positive serology (> 98%). After consecutive treatment of both infections hypereosinophilia disappeared in 69 cases (84%).
Conclusions: Mixed infection of schistosomiasis and strongyloidosis is more frequent than expected. Diagnosis was mostly made in the (hyper)eosinophilic cases by serology and in some cases by microscopy. Serology is valuable and reliable, but results should be interpreted with caution, due to possible cross-reactivity.
As corticosteroids can provoque a hyperimmune reaction of strongyloidosis infection, it is important to exclude mixed infection in symptomatic cases of probable or proven acute schistosomiasis, in which corticosteroids will be used as part of the treatment.

PO04.05

Schistosomiasis Serology in Travellers and Immigrants Returning to Edinburgh, UK: A Retrospective Preliminary Analysis

S. Durkin[1], C. Alexander[2], K.O. Helgason[3], M.E. Jones[4]
[1]Edinburgh University, Edinburgh, United Kingdom, [2]Stobhill Hospital, Scottish Parasitology Laboratory, Glasgow, United Kingdom, [3]Royal Infimary of Edinburgh, Microbiology, Edinburgh, United Kingdom, [4]Western General Hospital, Regional Infectious Diseases Unit, Edinburgh, United Kingdom

Introduction: Schistosomiasis is an important disease of travellers and immigrants returning to Scotland. This study aimed to retrospectively analyse the change in pre- and post-treatment schistosomiasis serology in patients diagnosed with schistosomiasis in NHS Lothian presenting from 2007-2011 to the Regional Infectious Diseases Unit (RIDU), Edinburgh, UK.
Methods: Serum samples from 33 patients were suitable for inclusion. A total of 31 patients' samples (of which 25 were travellers and 6 immigrants) were re-analysed for optical density (OD) using anti-Schistosoma mansoni antibody egg antigen ELISA (SmSEA).
Results: There was a significant reduction in mean post-treatment OD values compared to those obtained pre-treatment ($n=17$, $t(16)=3.014$, $p=0.008$). OD was lower in 82% and higher in 18% of cases at follow-up. No statistically-significant differences were found in pre- and post-treatment OD values and their change between travellers and immigrants. Travellers were not significantly more likely than immigrants to achieve a decline in SmSEA values post-treatment ($p>0.05$).
Conclusions: Further work involving an increased sample size and perhaps prospective data collection is required to quantify the exact nature of changes in SmSEA serology post-treatment over time and the extent of differences between travellers and immigrants. The protocol used in this trial study provides a useful starting point.

PO04.06

Mapping of Filaria Infection in Domestic Cats Living in Brugian Filariasis-endemic Areas Using a Real Time PCR with HRM Analysis

S. Wongkamchai[1], H. Nochot[1], S. Foongladda[2], P. Dekumyoy[3], S. Loymek[4], J.J.J. Boitaino[1], W. Choochote[5]

[1]Mahidol University, Parasitology, Faculty of Medicine Siriraj Hospital, Bangkok, Thailand, [2]Mahidol University, Microbiology, Faculty of Medicine Siriraj Hospital, Bangkok, Thailand, [3]Mahidol University, Helminthology, Faculty of Tropical Medicine, Bangkok, Thailand, [4]Filaria Project, Phikulthong Royal Development Study Center, Narathiwart, Thailand, [5]Chiangmai University, Parasitology Faculty of Medicine, Chiangmai, Thailand

Background: It is natural for domestic cats to be infected with *Brugia malayi* or animal filariae, such as *Brugia pahangi* , *Dirofilaria immitis*. Strategies to prevent the spread of *B. malayi* can be based either on preventing infection, or eliminating the worms in the infected cats with drug treatment. These strategies require current knowledge of whether the cats are infected with human or animal filarial species.
Objective: The present study investigated the epidemiological aspects of filariasis in domestic cats in 4 districts of Narathiwart Province, Thailand, using real-time PCR with High Resolution Melting (HRM) analysis assay and Giemsa staining method.
Methods: Blood samples were taken from a total of 2,039 cats. A real-time PCR with HRM analysis assay was performed to detect and identify the filaria species in the infected cats. Giemsa staining method was also used to detect microfilariae in the study samples.
Results: The overall prevalence of Filaria infection in the study cats was 7.2%; taken by HRM analysis, representing infection with 3.72% of *B. malayi*, 2.2% of *D. immitis*, 0.9% of *D. repens* and 0.15% of *Acanthocheilonema* (*Dipetalonema*) *reconditum* respectively. It is noted that this is the first report of *A. reconditum* infection from Thailand. Further, 0.25% of the cats had mixed infections with more than one species of filarial parasite. Microfilariae were detected in 6.2% of the study cats. HRM-PCR analysis showed more positive rates than Giemsa staining. *Brugia. malayi* was the most predominant filarial species detected in the infected cats, followed by *D. immitis*. The *Brugia malayi* infected cats were distributed in 3 districts indicated as high risk areas of brugian filariasis i.e. Sugaipadi, Sugai kolok and Takbai.
Conclusion: The results of our investigations suggest that the lymphatic filariasis control program in endemic areas of Narathiwart province should pay attention to the domestic cats. Prophylactic treatment should be employed on the infected cats, especially, those infected with *B. malayi*. Furthermore, the molecular approaches presented in our work allowed easy and specific for epidemiological study.

PO04.07

Candida Species of Bloodstream Isolates and Antifungal Susceptibility of *Candida* in the Biggest Tertiary Hospital in Thailand

S. Foongladda[1], P. Petlum[1], D. Boonlert[1], N. Mongkol[1]
[1]*Mahidol University, Department of Microbiology, Faculty of Medicine, Siriraj Hospital, Bangkok, Thailand*

Background: *Candida* is the most common human fungal pathogen and the cause of invasive candidiasis of nosocomial bloodstream infection. Moreover, the recently published species-specific clinical breakpoints with epidemiological cut-off values were released. Therefore, better understanding of species and drug susceptibility of the pathogen is important.
Objective: To update the knowledge of *Candida* species of candidemia episodes and antifungal susceptibilities of *Candida* isolates in Siriraj Hospital, Thailand, during year 2007-2011.
Materials and methods: All candidaemia episodes were analyzed from hemoculture results obtained from the Department of Microbiology, Siriraj Hospital which is the biggest tertiary hospital in Thailand, during year 2007-2011. The species identification was performed using phenotypic rapid tests and/or genotypic method. All MIC results were also analyzed. The tests of susceptibility to amphotericin B, fluconazole, itraconazole, posaconazole, voriconazole, and caspofungin were performed by a microdilution colorimetric method.
Results: A total of 556 candidaemia episodes were observed in adults and children for 507 and 49 episodes, respectively. The leading causes were *C. albicans* (34.35%), *C. tropicalis* (29.68%), *C. glabrata* (17.63%), *C. parapsilosis* (13.31%) and *C. krusei* (1.61%). The other species were *C. zeylanoides, C. famata, C. guilliermondii, C. kefyr* and *C. athensensis.* According to CLSI clinical breakpoints and the recently published species-specific clinical breakpoints with epidemiological cut-off values, most (76.54%) of 357 tested isolates were susceptible to the all antifungal agents. All *C. albicans* isolates were susceptible to amphotericin B and caspofungin. Whereas, all *C. glabrata* isolates were susceptible to amphotericin B and voriconazole. The rate of resistance to amphotericin B (0.84%), fluconazole (11.48%), itraconazole (12.04%), posaconazole (10.92%), voriconazole (7.84%), and caspofungin (4.76%) were observed.
Conclusion: *C. albicans* and *C. tropicalis* were the most two common species in this observation. Resistance to amphotericin B and caspofungin agents was rare among *Candida* species. This knowledge of antifungal susceptibility among *Candida* species could be important for therapy.

PO04.08

Evaluation of the Diagnosis of Travel-related Acute Schistosomiasis Syndrome by Serum PCR: Expertise from a Single Centre

L. Cnops[1], P. Soentjens[1,2], J. Clerinx[1], M. Van Esbroeck[1]
[1]Institute of Tropical Medicine, Antwerp, Belgium, [2]Military Hospital Queen Astrid, Brussel, Belgium

Background: Most travel-related acute schistosomiasis syndrome is initially highly probable due to typical symptoms, hypereosinophilia (>1.0x10^9/L) and is later on mostly diagnosed serologically. We compared the performance of two serum PCR's in contrast to classic diagnostic procedures like serology and microscopy for diagnosis of acute schistosomiasis.
Methods: Serum of patients of initially probable and finally proven acute schistosomiasis were tested by PCR between week 6 and 12 after fresh water contact. To detect the two most common Schistosoma species seen in travelers, we used two serum PCR tests; one more specific for S. mansoni, another recently developed to specifically detect S. haematobium. We targeted clusters of minimum 5 cases presenting at the policlinic of ITM from July 2009 until now. Diagnosis of schistosomiasis was based on the presence of schistosome eggs in stool and/or urine, on positive serology using ELISA and/or IHA, or on a positive serum PCR test.
Results: In total, we evaluated 34 cases for acute schistosomiasis after a travel to Rwanda (n=13), Mali (n=9), Malawi (n=5) or Kenya (n=7). Ova were detected by microscopy in 17 cases (50.0%), an antibody response was demonstrated by serology in 23 cases (67.6%) and schistosome DNA was detected in serum in 28 cases (82.4%) during the initial screening. In all subjects with a positive serology or in which eggs were detected by microscopy, one of the two serum PCRs was positive, except in the 3 of the 5 subjects of the Malawi cluster that demonstrated a positive serology without egg excretion. One patient of the Kenya cluster was negative with all tests (serology, microscopy and PCR). The serum PCR enabled the diagnosis of 3 cases on the moment that it was not yet proven with the classical methods.
Conclusions: In comparison to the classical diagnostic test like serology and microscopy, PCR testing on serum approved to be more sensitive for the diagnosis of acute schistosomiasis. Three additional cases were detected by the serum PCRs at the initial phase of the infection: this fact opens new future diagnostic and therapeutic perspectives.

PO04.09

What Infectious Diseases Are Mostly Reported Following Travelling Abroad? What Types of Travelers Are Affected? Norway, 2011

B. Guzman Herrador[1], T. Bruun[1], L. Vold[1], H. Blystad[1]
[1]*Norwegian Institute of Public Health, Oslo, Norway*

Background: International travel from Norway has increased over the last years, reaching more than 8,100,000 travels in 2011.
Objective: We describe which groups of infectious diseases were most often acquired during international travel from Norway in 2011, and characteristics of the cases in order to better target prevention strategies.
Methods: We included all cases notified to the Norwegian Surveillance System for Communicable Diseases (MSIS) from January to December 2011 with reported place of infection outside Norway. Cases infected abroad prior to first arrival to Norway (i.e. immigrants undergoing screening) were excluded from the analysis. We describe the cases by age, type on infection, reason for travelling and country of infection.
Results: Of the 17,492 cases notified in MSIS in 2011, 2,926 (17%) were reported as acquired abroad. Approximately 5% of the cases were among children under five years of age. Most of the cases were between 20-49 years (66%) and infected in Spain (17%), Turkey (14%) and Thailand (14%). The most frequent reasons for travelling among these cases were tourism (2,382 cases; 82%) and immigrants visiting their former country of residence (237; 8%). Among tourists, the groups of infections most frequently reported were gastrointestinal (86%) and sexually transmitted infections (7%). Among immigrants visiting their former country of residence, gastrointestinal (50%) and vaccine preventable infections (10%) were the most commonly identified. This group was also found to be overrepresented in reported imported cases of four infections: malaria, hepatitis A, typhoid- and paratyphoid fever.
Conclusions: Although age groups and place of infection probably reflect travelling patterns of international travel, we have identified specific groups of infections and target populations where Norwegian public health authorities should focus. Prevention strategies should concentrate on promoting food and water hygiene measures and safe sexual practices for tourists. In addition, special efforts should be made to ensure that immigrants visiting their former country of residence recognize that they are at special risk of acquiring diseases like malaria, hepatitis A, typhoid- and paratyphoid fever and that they should follow the general public health recommendations for travelers regarding preventive measures and vaccinations.

PO04.10
Imported Human Rabies Cases Worldwide, 1990-2012

P. Carrara[1], P. Parola[1], P. Brouqui[1], P. Gautret[1]
[1]*IHU Méditerranée Infection, Marseille, France*

Objective: We present in this work an updated analysis of travel-associated human rabies cases with the objective of identifying potential risk-factors and to describe handling of case by clinicians with the aim to highlight potential problems in diagnosis and management of patients.
Method: We conducted a literature search using the Pubmed and Scopus databases. Additional search was conducted using ProMED-mail and through Google and Yahoo generalist search-engines. Rabies Bulletin Europe miscellaneous articles were systematically scanned.
Results: Sixty cases of human rabies in international travelers were reviewed from 1990-2012. 43.3% of cases were seen in migrants or their descendants when emigrating from their origin country or following a trip with the purpose of visiting friends and relatives or other reason. Cases were not necessarily associated with long-term travel or expatriation to endemic countries; moreover, cases were seen in travelers undergoing short trips of 2 weeks or less. A predominance of male patients was observed (77.2%). Children were underrepresented (12.3%). Cases from India and Philippines were overrepresented (16 cases/60). In 51.1% of cases, diagnostic was challenging with multiple missed diagnosis and transfers from ward to ward, before a diagnostic of rabies was finally assessed. Among 28 patients whose confirmed diagnosis was obtained ante-mortem, the mean time between hospitalization and diagnosis was 8 days, including 4 cases with a delayed diagnosis by 15 days and over. In 5 cases, patient transited through 1 or more countries before ultimate hospitalization. Three factors played a role in delaying the diagnosis of rabies in a number of cases: (i) a low index of suspicion for rabies in countries where the disease has been eradicated since long time or is now rare, (ii) a negative history of animal bite or exposure to rabies, and (iii) atypical clinical presentation of the disease.
Conclusion: Clinical symptomatology of rabies is complex and commonly causes confusion to physicians. Furthermore, failure of diagnosis of imported cases in more developed countries is probably related to the lack of medical familiarity even with typical clinical features of the disease.

PO04.11

Recombinant Nonstructural 1 (NS1) Protein of Dengue Virus for Diagnosis of Dengue Virus Infection

U. Kositanont[1], P. Panyarakkit[1], S. Anantaprecha[2]
[1]Faculty of Medicine Siriraj Hospital, Mahidol University, Department of Microbiology, Bangkok, Thailand, [2]National Institute of Health, Ministry of Public Health, Department of Medical Sciences, Nonthaburi, Thailand

Background: Infection of dengue virus (DENV) causes a spectrum of illness, ranging from unapparent infection, undifferentiated fever, classical dengue fever and more severe form, dengue hemorrhagic fever/dengue shock syndrome (DHF/DSS). Diagnosis of DENV infection should be confirmed by laboratory testing. Circulating IgG and IgM antibodies against nonstructural 1 (NS1) protein with 40-46 kDa could be found in patient sera with primary and secondary infections. Moreover, this protein has been identified as a highly conserved glycoprotein.
Objective: To generate and characterize recombinant NS1 protein of dengue virus serotype 2 (DEN-2) for diagnosis of dengue infection.
Method: NS1 gene of DEN-2 was cloned into expression vector pET15b to construct the recombinant plasmid, pET15b-NS1D2. The recombinant plasmid was transformed into *E. coli* to produce recombinant NS1 protein with a molecular size approximately 43 kDa. Characterization of recombinant NS1 protein was performed by using monoclonal antibody against polyclonal antibody against NS1 protein of DEN-2. Analytical sensitivity and specificity for recombinant NS1 protein assay was tested to detect NS1 antibody in 36 sera consisting 9 of each 4 serotype from dengue and 9 sera from non-dengue subjects.
Results: The recombinant NS1 protein showed reactivity with polyclonal antibody against NS1 protein of DEN-2. The recombinant NS1 protein reacted with IgM and/or IgG antibodies against all serotypes of primary and secondary infections in dengue patients'sera. The sensitivity and specificity for IgM determination were 100% and 100%, respectively. The sensitivity and specificity for IgG determination were 100% and 88.2%, respectively.
Conclusion: These indicate that NS1 protein may be an excellent antigen with high ability in the determination of IgM and IgG antibodies in dengue patients' sera with all serotypes of primary and secondary DENV infections.

PO04.12
Severe Malaria in Canada: Management through the Canadian Malaria Network

A.E. McCarthy[1], J. Geduld[2], C. Prematunga[3], on behalf of the Canada Malaria Network
[1]University of Ottawa and the Ottawa Hospital, Dept of Medicine, Ottawa, Canada, [2]Public Health Agency of Canada, Ottawa, Canada, [3]University of Ottawa, Ottawa, Canada

Background: In Canada, the Canadian Malaria Network (CMN) provides parenteral therapy for those with severe Plasmodium falciparum infections . Although not common in Canada, severe malaria has the potential for complicated and rapid outcomes making expedited access to appropriate treatment, not marketed in Canada, a crucial component of malaria management. The network is made up of 12 medical centres across Canada that facilitates strategically located supplies of effective treatment for severe malaria.
Objective: To describe the epidemiology, clinical features of travellers and assess any delays in malaria management for those with severe or complicated malaria who have accessed treatment through CMN.
Method: A descriptive analysis was undertaken
Results: There were 195 cases of severe or complicated malaria where treatment was accessed through the CMN between August 2001 and 2012. Persons aged less than 18 years represented 21.1% of cases and 22 cases were less than 5 years old. For cases where the reason for travel was known, travellers visiting friends and relatives represented 25.1% of cases. 17.9% were immigrants, 13.8% were business travellers and 7.7% returned from vacation. Immigration was the reason for travel for 57.5% of children who represented 65.7% of all immigrants with severe malaria. The majority of cases acquired malaria in Africa (88.2%). Parenteral quinine was requested for 62.6%, artesunate (available since 2009) for 36.4% and 1.0% had a request for both. Chemoprophylaxis was used in only 25.1% of cases and was deemed appropriate in less than half. There were patient delays in malaria management, only 19.4% presented to medical care within 24 hours of symptoms, 43.9% waited more than three days before seeking medical care. Diagnosis was delayed more than 24 hours in 33.5% of cases.
Conclusion: In Canada, imported severe or complicated malaria is an ongoing risk to those travelling to or from endemic regions, with VFR travellers and immigrants having the highest risk. Children are over-represented and immigrant children are particularly vulnerable. There is an ongoing need for access to these lifesaving medications across the country, with increasing use in the past three years. Better availability of effective oral therapy may help to decrease life threatening cases.

PO04.13
One Case of Cerebral Falciparum Malaria Onset as Thrombocytopenia in a Returning Traveller from China

X.-Y. Wang[1], S.-L. Yu[1], Y.-X. Huang[1], W.-H. Zhang[1]
[1]*Huashan Hospital, Fudan University, Department of Infectious Diseases, Shanghai, China*

Introduction: Although the morbidity of malaria in China went down to 0.55/ 10 million in 2010, the number of imported cases increased sharply , and it had been reported over the endemic malaria cases for the first time. We report a case of successfully treated acute respiratory distress syndrome complicating imported *P. falciparum* malaria at a large teaching hospital in Shanghai China.
Case report: A 42-year-old man was admitted to the hospital because of recurrent fever and rash for over one month, and lost conscious for 3 days. Two months earlier, the patient had traveled to Mali for business. Antimalarial chemoprophylaxis had not been prescribed for the patient. He stayed in an urban hotel and had been bitten by mosquito.
When he returned to China, one month before admission, fever, rash, vomiting, diarrhea and headache was presented. The patient had a temperature ranging from 38℃ to 40℃, despite the administration of antipyretic agents. The local clinic treated it as drug rash. A week later, the patient's platelet fall down to 20*10^9/L, and hematuria was present. Three days before admission, the patient began to lose his consciousness.
Examination of blood smear showed increased parasitemia, with an estimated 18% of erythrocytes infected. The patient fall to deep coma in 24hr, and complicated with hemoglobinuria , multiple organ failure , progressive thrombocytopenia and anemia. Treated with artesunate was initiated, and methylprednisolone was added.
A week later, the patient regained his consciousness and the body temperature fall to normal range. Another blood smear showed only 0.02% of erythrocytes infected. Oral qinghaosu and primaquine were administered. The patient was discharged three weeks after admission with normal platelet count.
Conclusions: This patient was an imported malaria case who traveled back to China from Africa. Because short of blood smear finding at the early stage, the patient was misdiagnosed as drug rash. Despite not being a criterion for severe malaria, thrombocytopenia is one of the most common complications of both *Plasmodium vivax* and *Plasmodium falciparum* malaria. In a systematic review of the literature, platelet counts under 150,000/mm^3 ranged from 24-94% in patients with acute malaria. In most cases, a conservative approach is adopted and platelet counts usually revert to normal ranges a few days after efficacious antimalarial treatment.

PO05 Long-stay Travellers, including expatriates

PO05.01
A Travel Clinic as a Company Hospital

K. Miyagi[1], M. Nonaka[1], M. Osabe[1]
[1]*Nagasaki Shipyard & Machinery Works Hospital, Mitsubishi Heavy Industries, Ltd., Department of Internal Medicine, Nagasaki, Japan*

Background: Many Japanese companies have globalized their business and sent their employees to the various areas in the world. Health management system for the employees overseas varies by company. We MITSUBISHI HEAVY INDUSTRIES, LTD. have sent employees to many areas including South Asia, Southeast Asia, Africa and Central and South America. Nagasaki Shipyard & Machinery Works has also sent many employees mainly to India and Indonesia. On the other hand, well organized health management system for the employees overseas is strongly needed in our company.
Objective: Nagasaki Shipyard & Machinery Works Hospital launched a travel clinic in April 2012. The principal objective of the travel clinic is to take measure against various infectious diseases for our company employees overseas and to implement travel consultation including vaccination for tourists.
Method: Our travel clinic has consultation twice a week. Our service is vaccination, prescription as prophylaxis for malaria and altitude illness, provision of medical information in the world and making medical certificate for overseas stay. We treat typhoid vaccine and meningococcal vaccine which are not approved by Japanese government yet in addition to approved vaccines by Japanese government.
Results: We conducted the consultation 44 times between April and October in 2012.
The total number of visitors is 207. The mean age and median age are 38.6 and 37 respectively. 75.8% of visitors are male and the rest are female. More than 60% of the visitors are our company employees. The leading purpose of visiting is receiving vaccination (98%). The leading destination is India (53%) and Indonesia follows (11%). In addition to routine service in our hospital, we visited our company employees, several medical facilities, an assistant company for emergency evacuation and embassy of Japan in India in July 2012 as one of the activity to strengthen health management system for our company employees overseas. We will present updated data of our travel clinic until April in 2013 in this conference.
Conclusion: We launched a travel clinic in a local city Nagasaki, Japan for both of our company employees and tourists. We have to develop not only pre-travel consultation for all but also health management system for our company employees overseas as a company hospital.

PO05.02

The Medical Evacuation Response Plan (MERP) - a Tool for Companies to Perform Duty of Care for their Travelers and Expatriates While Working Abroad

S. Esser[1]
[1]*International SOS, Central Europe Medical Department, Neu-Isenburg, Germany*

Background: Business travel has become a large part of today's travelling and is an important part of modern companies' activities. Recent analyses show that more and more employees are send abroad, both for long term assignments and for shorter trips. Business travel means travel related health risks for employees and respective duty of care for companies. Companies have the duty to organize medical care for their employees.
Objectives of the presentation: Travel related health risks include traffic and work related accidents, cardiovascular emergencies and infectious diseases as well as psychiatric disorders. Also, in many parts of the world outside of Europe and North-America, medical care standards are below international standards and careful selection of acceptable medical facilities is recommended before starting operations. The wrong selection of medical facilities can be a health risk of its own. Medical preparation and planning should include an evaluation of medical facilities for general care, for emergency care and for specialist care. Medical transport means need to be checked. Also domestic referrals and international air-evacuation must be taken into account.
Methods and process: International SOS has developed a standard process to set up so called Medical Emergency Response Plans (MERP) for companies who send larger groups of employees abroad. This process includes the evaluation of existing medical risks, an audit of local medical facilities or using existing medical provider networks and the preparation of ground transport or air-evacuations for severe emergencies. For larger companies with several overseas facilities a consistent template for such medical response plans is extremely beneficial. The Medical Emergency Response Plan (MERP) will then be part of the company's risk management process and facilitate the medical response process in case of accidents or other emergencies.
Conclusion: Duty of care for travelers and long term expatriates includes medical preparation for overseas facilities of companies. Careful and standardized consistent medical emergency response plans facilitate fast and appropriate medical response. The background and procedure of such plans will be presented in this lecture and an implemented process to establish a MERP will be shown.

PO05.03

High Proportion of Unprotected Casual Sexual Contacts among Dutch Long-Term Travellers to Sub-Tropical Countries, Though No Seroconversions for HIV or Syphilis

J. Whelan[1,2], S. Belderok[1,2], G. Sonder[1,2], A. van den Hoek[1,2]
[1]*Public Health Service (GGD), Department of Infectious Diseases, Amsterdam, Netherlands,*
[2]*Academic Medical Center/ University of Amsterdam, Department of Internal Medicine, Division of Infectious Diseases, Tropical Medicine and AIDS, Amsterdam, Netherlands*

Background: Long-term travel to sub-tropical regions is known to be associated with infection risk, but there is a paucity of data on sexual risk behaviour and incidence of sexually transmitted infections in long-term travellers to endemic areas (HIV, syphilis, hepatitis B): available data are frequently estimates of disease seroprevalence in returning travellers, and few prospective studies are available.
Objective: To determine the number of casual and unprotected sexual contacts, and factors influencing sexual risk behaviour among Dutch long-term travellers to sub-tropical regions, and to estimate the incidence of HIV and syphilis.
Methods: A prospective mono-centre study of Dutch long-term travelers ≥18 years, attending the Public Health Service travel clinic in Amsterdam (2008-2011) and travelling to any (sub)tropical country for ≥12 and ≤52 weeks, was conducted. Travelers reported demographic information, travel purpose, number and nature of sexual contacts while travelling: ethnicity, gender and type of partner (steady/casual) and condom use. Analyses were conducted using Pearson Chi-squared, ANOVA and Poisson regression models (generalized estimating equations to account for multiple partnerships). Blood samples, taken before and after travel, were tested for HIV and *Treponema-pallidum* antibodies.
Results: There were 552 respondents (median age:25 years, 36% male, median travel time: 20 weeks, 73% fully vaccinated against hepatitis B pre-travel) and 34%(n=190/552) had ≥1 casual sexual partner. Provisionally, independent predictors of any casual sex were male gender, young age, prolonged travel duration and more countries visited but travel to Sub-Saharan Africa was protective. Of travelers (n=190) who had casual sex, 39% of encounters were unprotected, similarly with Dutch partners (39%,n=105/270) and local partners (39%,n=75/192). Ethnicity of partner, nor any other factor, was significant in predicting condom use with casual partners. There were no seroconversions for syphilis or HIV post-travel.
Conclusion: Casual sexual contact, particularly among young male long-term Dutch travellers, with both Dutch and local partners, is common. No HIV or syphilis seroconversions were recorded, but there is potential for sexually transmitted infections as half of casual sexual encounters were unprotected. Ethnicity of casual partner did not influence condom use. Long-term travellers should receive advice about STIs and condom use pre-travel.

PO05.04
Changes in Expatriate Psychosocial Well-being during Overseas Assignment

K.L. Gamble[1], D. Westwood[2], J. Gamble[2], N. Gamble[2]
[1]Missionary Health Institute, Canada, Canada, [2]Missionary Health Institute, Toronto, Canada

Background: Expatriates are known to experience culture shock and mental health disorders that are related to their international deployment. Many studies have evaluated the psychosocial impact of expatriation post-assignment. However, a paucity of studies conduct this evaluation in the context of pre-assignment mental health baselines.
Objective: To examine changes in expatriate psychosocial well-being by comparing post-assignment mental health status to a pre-assignment baseline.
Method: A cohort of expatriates (age pre-deployment 40 ± 10 yrs, post-deployment 46 ± 10 yrs, N=144), who had completed a psychosocial patient-computer interview as part of routine screening prior to expatriation and upon return, was randomly selected from five (5) faith-based relief and development organizations. Those who were known to have a clinically apparent psychological condition were excluded from this cohort. Participants were scored based upon their responses: group 1 (no adverse findings), group 2 (minor findings), group 3 (moderate findings), and group 4 (major findings). The collected data was pre-processed in Matlab, Mathworks. Linear mixed effect modeling (*lme*, R) was used to investigate how psychosocial well-being was impacted by factors such as past history, family history, current physical and psychosocial symptoms, and emotional or physical trauma.
Results: There was a significant increase in the cohort's post-international assignment scores when compared to the pre-assignment baseline ($F(1,141)=6.48$, $p< 0.012$). Pre-assignment group 1 (30%) showed a significant increase in their post-deployment scores ($F(1,42)=35.98$, $p< 0.0001$). Pre-assignment group 2 (31%) also showed a significant increase in their post-deployment scores ($F(1,43)=8.19$, $p< 0.0065$). Pre-assignment group 3 (15%) showed no significant change in their post-deployment scores ($F(1,21)=0.24$, $p< 0.62$). Interestingly, our findings for pre-assignment group 4 (24%) showed a significant decrease in post-assignment scores ($F(1,32)=21.77$,$p< 0.0001$), with 51% shifting toward a more favorable post-assignment score.
Conclusion: Expatriation can have an adverse effect on psychosocial well-being. However, it should not be assumed that deterioration in an expatriate´s psychosocial well-being is inevitable. Screening protocols should be in place to help identify those at risk.

PO06 Migrants and Refugees

PO06.01
Developing a Tool to Help Newcomers Refugees

S. Gagnon[1], M. Chamula[2], I. Pirija[2]
[1]CSSS de la Vieille-Capitale, Clinique Santé des Immigrants-Réfugiés, Québec, Canada, [2]Université Laval, Étudiante, Québec, Canada

Intro: As a physician at the Healthcare Refugee clinic in Quebec city, Canada and working with a community organism with the newcomwers we receive, I notice than few tools were available to help this population.
Objective: To develop a practical tool for the newcomers refugees we see at the clinic to help them in the first months after their arrival. This tool could be used by a large proportion of the refugees even those who are illiterate.
Method: Involving undergraduate students I receive at the clinic for rotations, we have conducted a survey with the health professionnals of the Heathcare Refugee clinic and the professionnals of the community organism. According to their opinion the choice of the tool to be developped was made. The tool was developed and tested upon refugees to evaluate the usefulness and the clarity of the tool
Results: Different sheets to help them to find the way to go to the health establishments in the Quebec city area, the bus to take to do so and the documents to bring to the consultation was developed. These tools were tested with some refugees, the opinion of the professionnals, the bus conductors was also asked. After that the format of the tool was modified and tested again to a final format.
Conclusions: It is possible to develop tools to help newcomers even illiterate. Involving undergraduate students in this kind of project is interresting for them and make them to be useful for this population.

PO06.02
Health of Migrant and Travel Medicine: A New Approach for Visiting Friends and Relatives

L. Pecoraro[1], T. D'Arca[1], I. Uccella[1], R. Testa[1], G. Costanzo[1], C. Mirisola[1]
[1]*National Institute for Health, Migration and Poverty, Rome, Italy*

Background of the study: Recent data show that almost 50 million people travel from industrialised nations to tropical or subtropical destinations; out of them, 25%-40% are Visiting Friends and Relatives (VFR). This particular group of migrants have increased risk of travel-related health problems and lower use of pre-travel medical advice. Traditional travel services are considered inadequate for VFRs, new approaches need to be tested.
Objectives: To guarantee the best standards of care to this high-risk population group, the purpose of this study is to investigate the specific health need of VFRs, promoting a new approach to facilitate the access in order to increase the number of VFRs utilizing pre-travel health services.
Methods: A transcultural approach in primary health services addressed to migrants was experimented at the NIHMP, a referral centre for undocumented migrants, refugees, asylum seekers in Italy. In 2010, a Travel Medicine Service was established: pre and post-travel health services are offered to migrants coming back home; medical staff provides specific counselling to VFRs, by adopting a multidisciplinary approach. Migrants who have access for any other health problem classified as VFRs are also investigated on their perception of health risks and travel-related illnesses, through multilingual questionnaires administered by 36 transcultural mediators and multilingual dialogues, aimed at facilitating comprehension, providing translations and educational materials.
Summary of results in sufficient detail to support the conclusions: We found a low level of pre-travel care in VFRs in a primary care clinics for migrants: 5,9% VFR as reason for travel vs others. Preliminary data show that VFRs are mainly young males, travelling to high-risks destinations, with long stays (68%). VFRs mostly utilize pre-travel service to receive mandatory vaccinations (>85%), with unknown vaccination history. VFRs do not adhere properly to malaria prophylaxis indications mainly due to lack of knowledge of travel diseases and low perception of health risks.
Conclusions reached: VFRs as "special travellers and migrants" need appropriate care, effective pre-travel health care, specific guidelines and *ad hoc* services. In order to reduce the risk of travel-related diseases in VFRs a trancultural approach seems to help to overcome obstacles, to improve access and quality of care, but new approaches and more efforts are still needed in this particular group of migrants.

PO06.03
Overseas Tuberculosis (TB) Screening in Peruvian Immigrants to United States

H.R. Siu[1,2], N. Lari[1], J. Echevarria[2,3]
[1]Bristish American Hospital / Clinica Anglo Americana, Travel Medicine, Lima, Peru, [2]Universidad Peruana Cayetano Heredia, Instituto de Medicina Tropical Alexander von Humboldt, Lima, Peru, [3]Bristish American Hospital / Clinica Anglo Americana, Infectious Diseases, Lima, Peru

Background: Tuberculosis (TB) in migrants is a serious problem in several low TB incidence countries as United States since a large proportion of TB in these countries occurs in migrants from high incidence countries. Approximately 163.5 million foreign-born persons admitted to the United States annually, only 500,000 immigrants and refugees are required to undergo overseas tuberculosis (TB) screening. The present study aimed to describe the results of TB immigration medical examination requirements in Perú according with U.S. Centers for Disease Control and Prevention (CDC) guidelines.
Methods: Medical records of 11,583 peruvian resident migrants to United States from 2002 to 2009 were retrospective evaluated according with the CDC guidelines
Results: Study population median age was 32,67 +/- 19.18 years, 7,240 (62.5%) were females and and 99% were peruvians. Seventeen were diagnosed of active TB disease (147/100,000) and 132 of inactive TB (1,140 /100,000). 169 immigrants reported history of TB treated.
Conclusions: Seventeen immigrants with active TB were diagnosed, represent an incidence of 147 / 100,000 habitants that is similar to general populations in Peru. TB screening was based in the CDC guidelines without regular sputum culture.

PO06.04
Perception of Emotional and Behavioral Problems among Refugee Children Living in Canada

S. Gagnon[1], M.-C. Duquette[2], C. Rousseau[3], P.G. Tremblay[2]
[1]Institut National de Santé Publique Du Québec, Québec, Canada, [2]Centre Hospitalier Universitaire de Québec, Québec, Canada, [3]Sick Children Hospital, Psychiatry, Montreal, Canada

Intro: Having found fewer psychological distress and behavioral problems than we expected among refugees children at their arrival in Canada we have conducted a study to verify if it was still the case later on.
Objective: To compare the perception of the children, their parents and their teachers among emotional and behavioral problems among refugees of 6 years old and older who have been living in Quebec city less than 3 years and who attended the healthcare Refugee Cliunic in Quebec city from June 2007 to June 2008.
Method: 35 children participated in this study. Emotional and behavioral problems were assessed using the Child Behavior Checklist (CBCL), the Youth Self-report (YSR) and the Teacher´s Report Form (TRF), as well as a sociodemographic test. Proportions for each detected problem were compared to standard population rates and their association with sociodémographic variables was analyzed.
Results: Refugee children reported internalizing problems at a higher level than children from the standard population. Teachers witnessed more conduct problems among refugees. Parents reported more emotional or behavioral problems in children who experienced a traumatic event or a parent death. Moreover, a difference between informants has been detected for the perception of internalizing and behavioral problems.
Conclusion: This study emphasizes the importance for clinicians to pay close attention to the psychological components of the life of refugee children, not only upon arrival but also during the following months and to ask the parents and the teachers observations.

PO06.05

Cases of Community-acquired MRSA (CA-MRSA) among Immigrants Seen in NYC Community Health Centers

N. Piper Jenks[1], J.N. Tobin[1,2], R.G. Kost[2], S. Balachadra[2], O. Okpukpara[1], C. Khalida[1], A. Tsang[1], B. Rumala[2], C. Coffran[2], M. Pastagia[2], T. Evering[2], P. Holt[2], H. de Lencastre[2], A. Tomasz[2], M. Pardos[2], B. Coller[2]

[1]Clinical Directors Network (CDN) c/o HudsonRiver Community Health, Internal Medicine, Peekskill, United States, [2]The Rockefeller University for Clinical and Translational Science (CCTS), New York, United States

Introduction: Community-acquired MRSA (CA-MRSA) is defined as Methicillin-resistant Staphylococcus aureus (MRSA) recovered from infection among persons without recent exposure to a hospital/health care facility. Community Health Centers (CHC) serve as primary care providers for thousands immigrants in New York State. As part of a research collaborative among 6 New York City-area CHCs, Clinical Directors Network (CDN - www.CDNetwork.org) - a practice-based research network (PBRN), and Rockefeller University Center for Clinical and Translational Science (www.Rockefeller.edu/ccts), 113 patients with skin and soft tissue infections (SSTIs) were recruited. Of these patients, 24% were immigrants, from 11 Caribbean (n=11), Latin American (n=14) and African countries (n=2).

Methods: Six NYC area CHCs adjacent to an established NYC Hospital MRSA Surveillance Network collaborated to; 1)enroll patients with suspected CA-MRSA skin and soft tissue infections (SSTIs); 2) collect demographics, clinical history, physical examination, photos and quality of life date; 3) acquire wound and nasal samples and transport to commercial clinical and research labs; 4) conduct standard microbiologic culture/antibiotic sensitivity and whole genome analysis/identification of genetic determinants of antimicrobial resistance.

Results: To date, 113 wound specimens have been cultured and tested for antibiotic sensitivity. Of these, 39% were MRSA positive and 16% Methicillin Sensitive Staph aureus (MSSA) positive. In 12% of cases, both wound and nasal samples carried MRSA, and all cultures were susceptible to Tetracycline, Trimethoprim/Sulfamethoxazole, Vancomycine, Linezolid and Gentamicin. Immigrants had similar rates of MRSA+ wound cultures [37%] but higher rates of MSSA+ wound cultures [26%] compared to the total study population (p=.02).

Conclusion: Among immigrant patients presenting to participating CHCs with SSTIs, 37% of wound cultures were MRSA + and 26% were MSSA+, with a higher proportion of MSSA among immigrants compared to non-immigrants. Routine lab results showed 12% concordance between MRSA wound and nasal cultures among all participants. Future analyses will examine clinical, demographic, geographic, and microbiological correlates of CA-MRSA .

PO06.06

Cases of Shingles (Herpes Zoster) among Young Healthy Migrants, during a Period of Increasing Varicella Vaccine Coverage

N. Piper Jenks[1], J. Koren[1], C. Kananen[1], J. Yao[1]
[1]*HudsonRiver Community Health, Internal Medicine, Peekskill, United States*

Background: Herpes Zoster (HZ) is caused by reactivation of latent varicella zoster virus and is often associated with substantial pain and disability. HZ has been most commonly seen in the elderly, and immunosuppressed. We have recently identified an increase in cases of HZ in young, healthy migrants.
Methods: Using the analytics program, COGNOS, we searched our Electronic Health Record (EHR) for migrant patients, under the age of 35, with HZ, between May 2010 -December 2012. We reviewed the clinical data from the medical records and interviewed the clinicians who examined these patients. We excluded patients with HIV.
Results: We identified 16 migrants, under the age of 35, diagnosed with HZ. Patients were from 7 Central and South American countries and one Eastern European country. One woman from Guatelmala was 28-weeks pregnant.
Conclusion: In the United States, the varicella vaccination was licensed in 1995 and the uptake of the vaccine in 2006 was 89%. In our practice, we have seen an increase in cases of HZ among young migrants. With the increase uptake of varicella vaccine in the US, and resulting reduction in varicella infection in the community, future analyses will examine incidence of HZ in our patient population pre- and post-varicella vaccine eras.

PO06.07
Taeniasis among Refugees on the Thailand-Burma Border

E.J. McCleery[1], P. Patchanee[2], S. Chailangkarn[2], P. Pongsopawijit[2], S. Tiwananthagorn[2], P. Jongchansittoe[3], A. Dantrakool[4], N. Morakote[4], H. Phyu[5], S. O'Neal[1]
[1]Oregon Health & Science University, Public Health & Preventive Medicine, Portland, United States, [2]Chiang Mai University, Faculty of Veterinary Medicine, Chiang Mai, Thailand, [3]Division of Livestock Development, Mae Hong Son, Thailand, [4]Chiang Mai University, Faculty of Medicine, Department of Parasitology, Chiang Mai, Thailand, [5]International Rescue Committee, Mae Hong Son, Thailand

Background: Neurocysticercosis, caused by *Taenia solium* larval infection, is a leading cause of acquired epilepsy in developing countries. Case reports of NCC are increasing among refugees resettled to the United States and other non-endemic nations, but the underlying prevalence among refugee groups is unknown. *T. solium* infection has been established as endemic in many countries, however little epidemiological work has been done in Southeast Asia, especially among refugee and migrant populations.
Objective: We sought to determine the prevalence of and risk factors for human taeniasis in the Ban Mai Noi Soi refugee camp along the Thailand-Burma border.
Methods: Randomly selected households in the Ban Mai Noi Soi refugee camp were invited to participate. All household members were asked to submit a fecal sample and complete an interview. Fecal samples were analyzed for presence of Taenia sp. antigens using ELISA or for presence of Taenia sp. eggs or proglottids using light microscopy.
Results: Among all participants surveyed, 75% submitted a stool sample for testing (582/777). Of those who submitted a sample, 4% were positive for *Taenia sp.* taeniasis (21/582). After independent analysis, increasing age (OR = 1.05; 95% CI: 1.03, 1.07) and lack of education (OR = 1.20; 95% CI: 1.01, 1.47) were positively associated with taeniasis. Self-reporting of worms in stool was also positively associated with taeniasis (OR = 20.82; 95% CI: 7.33, 59.16) as were eating raw pork and beef (respectively, OR = 5.67; 95% CI: 2.24, 14.32 and OR = 4.97; 95% CI: 2.02, 12.24). Owning a pig was not significantly associated with taeniasis (OR = 1.81; 95% CI: 0.52, 6.24). After building a multivariate model, increasing age (OR= 1.05; 95% CI: 1.02, 1.08), and self-reporting of worms remained positively associated with taeniasis (OR = 3.92; 95% CI: 2.05, 7.65).
Conclusion: The prevalence of taeniasis in this population is relatively high, yet few covariates were significantly associated with infection. Verification of the *Taenia* species present in the camp is needed.

PO06.08
Dramatical Fall in Comoros-acquired Malaria in Marseille, France, 2001-2011

H. Savini[1], C. Martel[1], A. Ali Mohamed[1], P. Gautret[1], P. Minodier[2], R. Piarroux[3], P. Parola[4], F. Simon[1]
[1]Military Teaching Hospital of Laveran, Unit of Infectious and Tropical Diseases, Marseille, France, [2]Hôpital Nord, Assistance-Publique Hôpitaux de Marseille, Pediatric Emergency, Marseille, France, [3]Assistance-Publique Hôpitaux de Marseille, Department of Parasitology and Mycology, Marseille, France, [4]EuroTravNet Coordinating Center, University Hospital Institute for Infectious and Tropical Diseases, Aix-Marseille University and Assistance-Publique Hôpitaux de Marseille, Marseille, France

Background: The follow-up of a community originated from the same area can reflect the local epidemiological trends. The important human flow between Marseille and Comoros archipelago generates a channel of knowledge on locally-acquired malaria.
Objective: The aim of this study was to provide evidence-based information on Comoros-acquired malaria in Marseille.
Method: Data from all the travelers with confirmed imported malaria from Comoros, managed in the 4 public medical centers in Marseille, were collected from January 1, 2001 to December 31, 2011.
Results: A total of 1437 patients were included over the study period (928 adults and 509 children, median age=30 years, sex ratio=1.33). The most frequent species was *P. falciparum* (86.7%, n=1210) and 147 severe malaria cases were described with no death. The travel reason was visiting friends and relatives in more than 90%. Vector control measures were applied by 25.9% of the cases (n=372) and only 50.3% (n=723) declared having taken chemoprophylaxis, that was inappropriate in 87.3%. The number of Comoros-acquired malaria managed in Marseille's hospitals progressively decreased over the studied period with a dramatic fall in 2011, both in adults (n=11) and children (n=7), while the annual incidence of malaria imported from the other countries remained rather stable. No difference in the ratio *P. falciparum/*other species, the severity of the disease and no improvement in preventive measures were observed along the study.
Conclusion: The recent strong reduction of malaria cases imported from Comoros archipelago in Marseille in 2011 is a positive event. It is not explained by a decrease in the number of people travelling to the archipelago, or by a radical change in patients' behaviours. More consistently, this may result from the significant fall of malaria transmission in the visited islands. This hypothesis is confirmed by recent local data, probably as the result of the composite strategy to control malaria in the different Comoros islands.

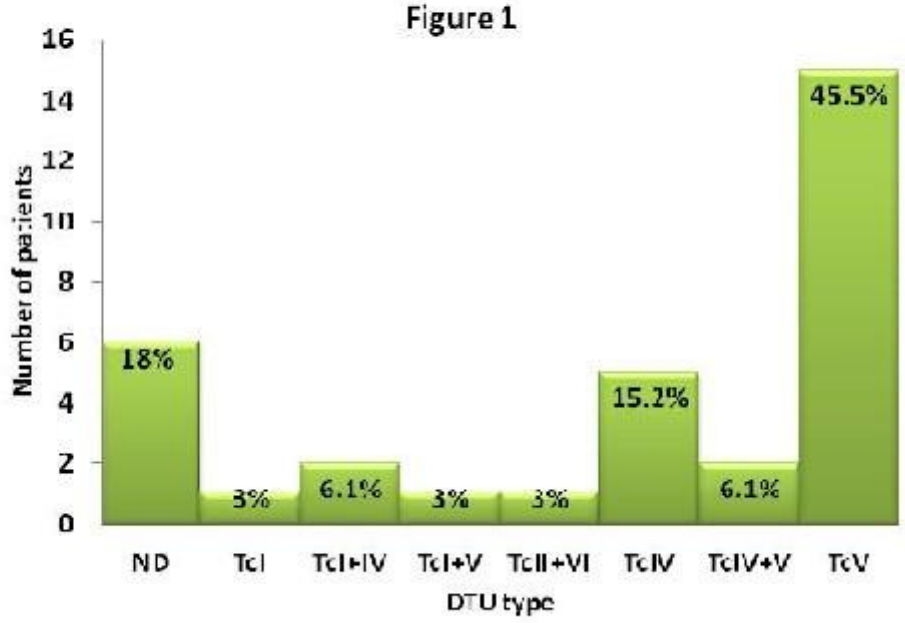
PO06.09

Description of Discrete Typing Units of *Trypanosoma cruzi* in Migrant Bolivian Patients with Chagas Disease: The Strains Remain the Same

J.A. Perez-Molina[1], C. Poveda[2], A. Martinez-Perez[1], F. Guhl[2], F. Norman[1], M. Fresno[3], R. Lopez-Velez[1], N. Gironés[3]
[1]*Hospital Ramon y Cajal, Tropical Medicine and Clinical Parasitology, Infectious Diseases Department, Madrid, Spain,* [2]*Universidad de los Andes, Centro de Investigaciones en Microbiología y Parasitología Tropical, CIMPAT, Bogotá, Colombia,* [3]*CSIC-UAM, Centro de Biología Molecular Severo Ochoa, Madrid, Spain*

Background: *T. cruzi* is the causative agent of Chagas disease. Different strain typing methods have permitted the identification of several parasite ancestral lineages, six species having been identified: TcI to TcVI, known as Discrete Typing Units(DTU) These are linked to geographical variations and might be related to clinical presentations
Objectives: Our aim was to identify the *T.cruzi* strains isolated from a population of chronically infected Bolivian patients, and whether these were related to some epidemiological or clinical characteristics
Methods: 33 patients chronically infected with *T.cruzi* were selected from our clinic in Madrid during 2010-11. They all presented 2 positive serological tests (IFAT + ELISA) and 13 had a positive PCR in blood. Molecular characterization was performed by an algorithm that combines PCR of the intergenic region of the mini exon-gene, the 24Sα and 18S regions of rDNA and the variable region of the satellite DNA as described. We performed a descriptive analysis and tested associations between epidemiological/clinical data and the different DTUs. Qualitative data were analysed with χ^2 and Fisher exact test, while Student´s t test was used for quantitative data
Results: 27 out of 33 patients had their DTU isolated. Mean age was 36 years (IQR 31-43.3) and 23 were women (76.7%). DTUs distribution is shown in Figure 1

Figure 1



[Figure 1]

TcIII was not isolated from any patient. Four patients had cardiac involvement: 2 had TcV and 2 could not have their DTU determined. Neither age, sex nor cardiac involvement were significantly related to any DTU

Conclusions: Most of our sample presented with TcV alone or in association with another DTU, what is concordant with other authors findings in Bolivian patients. No TcIII was isolated maybe because it is associated with sylvatic cycles and rarely present in human infection. We cannot assume association with visceral involvement and DTU type in this study, although this sample size is too small to allow firm conclusions.

PO07 Non-infectious Disease Travel Risks (e.g., pulmonary emboli, jet lag)

PO07.01
Resurgence of Bed Bugs in Thailand and Their Insecticide Resistance: A Pest Control Challenge

A. Tawatsin[1], U. Thavara[1], J. Chompoosri[1], P. Bhakdeenuan[1], Y. Phusup[1], S. Sangkitporn[1], P. Siriyasatien[2]
[1]National Institute of Health, Department of Medical Sciences, Nonthaburi, Thailand, [2]Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Background: Bed bugs are nocturnal, bloodsucking insects that feed on humans and are mainly important as biting nuisance. People who are bitten by bed bugs may suffer from intense itching, inflammation, and secondary infection after scratching, and sleepless episodes. Two species of bed bugs are considered as human pests: *Cimex hemipterus*, which occurs mainly in tropical countries, and *C. lectularius*, which appears in most parts of the world. Bed bugs are found in many countries around the world and in some regions they are resistant to numerous insecticides.
Objective: This study surveyed bed bugs in Thailand and determined their resistance and susceptible to insecticides.
Method: The surveys were carried out in 6 provinces which attract large numbers of foreign tourists: Bangkok, Chonburi, Chiang Mai, Ubon Ratchathani, Phuket and Krabi. Bed bugs were collected from hotels and colonized in the laboratory to evaluate their resistance and susceptibility to insecticides.
Results: *C. hemipterus* was found in some hotels in Bangkok, Chonburi, Phuket and Krabi; whereas, *C. lectularius* was found only in hotels in Chiang Mai. No bed bugs were found in Ubon Ratchathani. The colonized bed bugs showed resistance to groups of insecticides, including organochlorines (DDT, dieldrin), carbamates (bendiocarb, propoxur), organophosphates (malathion, fenitrothion) and pyrethroids (cyfluthrin, deltamethrin, permethrin, λ-cyhalothrin, etofenprox) in tests using WHO insecticide-impregnated papers. The new insecticides imidacloprid (neonicotinoid group), chlorfenapyr (pyrrole group) and fipronil (phenylpyrazole group) were effective against the bed bugs; however, organophosphate (diazinon), carbamates (fenobucarb, propoxur) and pyrethroids (bifenthrin, cypermethrin, esfenvalerate, etofenprox) were ineffective. Aerosols containing various pyrethroid insecticides with 2-4 different active ingredients were effective against the bed bugs.
Conclusion: It is evident that both species of bed bugs in Thailand have developed marked resistance to various groups of insecticides, especially in the pyrethroid group which are the most common insecticides used for pest control. Therefore, an integrated pest management should be implemented for bed bug control. This includes education and training of involved persons, thorough inspection, application of effective insecticides, insecticide resistance monitoring and management, reducing harborages, and regular monitoring of bed bug infestations.

PO08 Occupational and Military Medicine

PO08.01
Development of In-house Travel Medicine Services for a Large Multinational Corporation

A. Trauscht[1], T. Wright[2]
[1]*Advocate Health Care, Occupational Health, Lake Zurich, United States,* [2]*W. W. Grainger, Inc, Health Services, Lake Forest, United States*

The corporation´s vision to become a leader in the distribution of maintenance, repair and operating supplies to commercial, industrial, contractor and institutional customers has expanded business travel to more than 75 countries.
With the spread of H5N1(Avian)flu in the mid-2000´s, a request was made to the manager of Health Services to explore the possibility of providing anti-viral medication for employees traveling to Asia regularly. In discussion with the corporate medical consultant, the need for assuring comprehensive travel medicine services to the expanding international team of employees was realized. A business plan was developed, submitted and approved by senior leadership in June 2007.
The travel medicine services are provided by the corporation´s occupational health nurses with oversight by a the medical consultant who also practices travel medicine. The occupational health nursing staff was apprehensive when the idea of providing onsite travel medicine services was introduced. Six years later they confidently provided professional, comprehensive travel consultation along with immunizations and medications for over 700 employees in 2012.
This poster session will describe the development of in-house travel medicine services for the diverse workforce of a U.S. based multinational corporation. It will review important milestones in program development, challenges faced, lessons learned and current initiative for further refinement and improvement of the program.

PO08.02
First Approach on Global Occupational Health and Travel Medicine Care Reporting Inside a Multinational Company

S. Esser[1]
[1]*International SOS, Central Europe Medical Department, Neu-Isenburg, Germany*

Background: Business travel has become an important part of modern companies' activities. More and more employees are sent abroad, either on short journeys or on long term assignments as expatriates. For companies, comprehensive knowledge about national and local travel medicine and occupational health requirements is essential, if a global health care management shall be implemented inside international operating companies.
International SOS has collected for the first time such data by a worldwide study in 77 countries for an international company.
Method: The survey was performed by a consistent questionnaire for all involved countries. This questionnaire had been evaluated and had been released by travel medicine and occupational health experts in several workshops beforehand. The technical-medical basis of the questionnaire were topics of travel medicine and occupational health, such as vaccinations, pre-trip health checks, on-site medical care or work related health checks. There were nine different chapters of questions. The questionnaire contained about 130 questions, partially open, partially prompted.
Results: Typical occupational health related topics like vaccinations, pre-trip health checks, health screening or health promotion were evaluated by occupational health physicians in all observed countries by a specially designed questionnaire. The results demonstrate clearly the very broad spectrum and diversity of the occupational health situation world-wide for both: the regulations and industrial standards of occupational health.
Discussion: Travel medicine is often closely connected to legal and occupational health topics, when companies send business travelers abroad or ask them to stay as long term assignees (so called expatriates) in foreign countries. Detailed knowledge about the local national travel medicine and occupational health standards and regulations is essential in such cases. The results of this study demonstrate the broad range of such standards and regulations and will give recommendations on how to approach to these standards. Similar data might become the basis of a global health management reporting.

PO08.03
Paederus Dermatitis: Also an Offshore Problem? - Cases from Equatorial Guinea

M. Felfernig[1], J. Teletxea[2], B. Dees[3]
[1]International SOS, MS-Middle East, Nigeria and Equatorial Guinea, Dubai, United Arab Emirates, [2]International SOS, MS-Nigeria, Equatorial Guinea, Bata, Equatorial Guinea, [3]International SOS, MS-EECA and OH, Dubai, United Arab Emirates

Background: In general cutaneus reactions due to insects are common in tropical areas. Even on offshore installations the incidence appears quite high, depending on the localization and the season of course. One insect causing lesions is the rove beetle, which belongs to the genus paederus in the family Staphylinidae.
The rove beetle (genus Paederus) also called “Acid bug or beetle”, has been found to contain a vesicant in their haemolymph called paederin, which is a potent toxin capable of causing a necrotizing lesion (dermatitis linearis) and conjunctivitis. Other terms used in context with paederus dermatitis include “spider-lick”, “whiplash dermatitis”, and “Nairobi fly dermatitis”. Paederin, which is a very powerful toxin, is usually released when the insect's body is crushed, even partially.
Objective: To identify the numbers of cases during the Acid bug season on offshore facilities in Equatorial Guinea on six offshore installments.
Method: We report about cases seen in Equatorial Guinea on offshore facilities. There the insect can be even seen on offshore sites up to 60 sea miles (appr. 110 km) from the land. The Acid Beetle's season in Western Africa starts with the appearance of the Harmattan, a wind which is bringing the insects to the Gulf of Guinea in November and lasts some weeks.
Results: Only four cases have been reported from six offshore facilities within this Acid Bugs approx. 6 weeks long season. The case where all minor and affecting trunk and extremities.
Discussion: Preventing human/beetle contact is the primary method of preventing paederin-based trauma.
This year the incidence of dermatitis cases offshore has dramatically decreased, this seems to be due to the intense awareness trainings.
The palms of the hands are not affected when they get in touch with the toxin, but if not cleaned properly after contact hands potentially spread this poison to all parts of the body.
The treatment recommendations still vary, a study reported good results with a treatment regimen that combined topical steroids with oral antihistamines and antibiotics to prevent secondary infection.

PO08.04

Body System Involved in Case Presentations on Offshore Installations - Is There a Difference between West Africa and Middle East? - A Preliminary Report

S. Ibrahim[1], A. Nosa[2], B. Dees[3], M. Felfernig[4]
[1]International SOS, Middle East, Dubai, United Arab Emirates, [2]International SOS, Nigeria, Port Harcourt, Nigeria, [3]International SOS, EECA and OH, Dubai, United Arab Emirates, [4]International SOS, Middle East, Nigeria and Equatorial Guinea, Dubai, United Arab Emirates

Background: Offshore medical practice is a specialized type of remote medicine. There is an increased interest in the development of offshore medical principles, trainings, awareness programs and protocols. However the impact of the geographical localisation might make universal rules and trainings difficult.
Objective: To evaluate and compare cases in two different locations (Middle East and West Africa) on offshore installations.
Materials and methods: We collected and compared clinical data of 2611 consultations from two offshore installations in West Africa (n =1999) and the Middle East(n=622) over a nine month period from March to November 2012. We related these data to number of patients' consultations and the body system involved in the chief complaint at clinics on offshore installations .
Results: In both regions; Middle East and West Africa, a steady dominancy of the number of case consultations to the offshore clinics that are related to Upper Respiratory Tract during the period of October and November being the most commonly reported chief complaint has been noticed. Middle East (October 38.6%, November 29.8 %). West Africa (October 34.96%, November 22.2%)
During the summer months (June to September), in both regions most consultations have been related to the musculoskeletal system and skin diseases. Middle East (June 24.4%, July 21.5%, August 25.7%, September 22.5%). West Africa (June 23.1%, July 24.6%, August 19.4%, September 22%)
On a separate observation, 0.55% of the total cases consulted at offshore clinics in West Africa were laboratory confirmed malaria cases. No malaria case was diagnosed in the Middle East.
Conclusion: In both regions, Middle East and West Africa, offshore clinics consulted cases that are predominantly related to upper respiratory tract system as a chief complaint during the winter months, and patients with medical conditions related to Skin and Musculoskeletal system were the most common cases during the summer months. This will inform the type of health program that should be delivered on a seasonal basis during the year.
Some medical conditions are associated with the location of the operation, like malaria in West Africa. This requires proper coverage by health programmes accordingly.

PO08.05

Extreme Long-Term Exposure to Fresh Water and Soil in the DRC: Active Screening Results for the Detection of Acute Schistosomiasis and Strongyloidosis from two BE Military Cohorts.

P. Soentjens[1,2], A. Aerssens[1], B. Damanet[1], P. Andries[1], A. Wauters[1], L. Cnops[2], M. Van Esbroeck[2]
[1]Military Hospital Queen Astrid, Polyclinic Department, Brussels, Belgium, [2]Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium

Background: Belgian military troops are regularly exposed to fresh water and soil in the Democratic Republic of Congo (DRC) for professional reasons. Based on the experience of late serological diagnosis in 49 cases of schistosomiasis in Belgian military troops after fresh water contact in Kalemie (DRC) in 2006, active screening was planned at six weeks and at three months after exposure in military troops returning from the DRC.
Methods: Two cohorts of Belgian paratroopers deployed in the DRC were targeted: 34 soldiers after a three week during deployment in the jungle of Buta in 2011 and 200 soldiers after a median two months during deployment in Kindu in 2012. Serum, urine and stool were examined at six and at twelve weeks post-exposure. Diagnosis of schistosomiasis was based on the presence of Schistosoma eggs in urine and/or stools and on serology using enzyme linked immunosorbent assay (ELISA) and/or indirect hemagglutination assay (IHA). In some cases of hypereosinophilia, PCR assays were used.
Results: In total, 184 soldiers with extreme exposure were evaluated. Exposure to fresh water and soil was mostly on a daily basis.
Eosinophilia was found in 33 (18%) cases, of which 9 with hypereosinophilia (>1.0x10^9/L) (5%).
In the 26 of 33 cases with eosinophilia, we diagnosed 11 cases of strongyloidosis (all serology positive and one stool positive for PCR), 5 Entamoeba histolytica infections (all serology positive), 5 cases of cutaneous larva migrans, 4 cases of schistosomiasis (all serology positive and one ova positive), 3 Ankylostoma duodenale infections, 2 cases of giardiasis and 1 case of trichuriasis.
Hypereosinophilia was related to the presence of Strongyloides stercoralis (3), Ankylostoma duodenale (3) and Trichuris (1). All cases with (hyper)eosinophilia were treated for a specific pathogen or empirically treated for soil-transmitted parasites (7).
Mefloquine was taken as malariaprophylaxis in 145/184 cases (79 %).
Conclusions: (Hyper)eosinophilia was mostly related to soil transmitted parasites.
In total, we diagnosed 4 cases of schistosomiasis; no one with hypereosinophilia. We hypothesize that there could be a protective effect of prophylactic antimalarials, like mefloquine, for Schistosoma infections.

PO08.06

Initial Neutralising Antibody Response to 3 or 4 Rabies Intradermal Pre-exposure Vaccination: Is There a Difference? A Single-Center Retrospective Analysis

P. Soentjens[1,2], B. Damanet[1], P. Andries[1], B. Henrion[1], C. Arnould[1], A. Aerssens[1]
[1]Military Hospital Queen Astrid, Polyclinic Department, Brussels, Belgium, [2]Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium

Background: Rabies is a viral infection that causes fatal encephalitis in endemic countries. Volume-sparing intradermal pre-exposure vaccination schedules at low cost are promising for cohorted eligible subjects in the near future.
Objective: To investigate the initial humoral immune response after vaccination with either 3 or 4 intradermal HDCV rabies vaccinations in military troops.
Method: Belgian soldiers are intradermally vaccinated for rabies pre-deployment since 2008. Neutralizing antibody titers against rabies were tested either 7 days after the primary 3 vaccinations (I: day 0,7, 28) or 7 days after booster vaccination (II: day 0,7, 28, 365). Serology results of subjects, vaccinated between the first of april 2008 and the 31st of december 2010, were evaluated. A titer of the Rapid Fluorescent Focus Inhibition Test (RFFIT) ≥ 0,5 IU/ml is considered to be protective. A titer > 10 IU/ml is considered to give long-lasting immunity.
Results: 933 subjects started intradermal rabies vaccination in these period. A total of 136 serology results were available in the central database (age range: 18-47 years, gender: 99 % male): 66 subjects who received three injections were compared against 70 subjects who received 4 injections. Neutralizing Antibodies were as follows: - 63/66 (95,5%) subjects (schedule I) and 67/70 (95.7%) (schedule II) had RFFIT above 0,5 IU/ml; - 42/66 (63,6%) subjects (schedule I) and 44/70 (62.8%) (schedule II) had a long-lasting immunity whit RFFIT above 10 IU/ml; - 13/66 (19.7%) subjects (schedule I) and 12/70 (17%) (schedule II) had a RFFIT between 3.0 IU/ml and 10 IU/ml; - 3/66 (4.5 %) subjects (schedule I) and 4/70 (5.7%) (schedule II) had a RFFIT between 0.5 IU/ml and 2,9 IU/ml; - 3/66 (4.5 %) subjects (schedule I) and 1/70 (1%) (schedule II) had a RFFIT lower than 0.5 IU/ml.
Conclusion: Military soldiers are an ideal population for pooled low cost intradermal pre-exposure vaccination. Neutralizing Antibodies for rabies, as a surrogate marker for rabies protection, were protective in 95% of subjects after three or four vaccinations.
Results of intradermal rabies vaccination prospective clinical trials are urgently needed to determine if pre-exposure schedules with a shorter preparation time are effective immediately after vaccination (other submitted abstract A561-0019-00191) and after post-exposure prophylaxis in the long-term.

PO09 Pre-travel Advice and Approaches; Risk assessment/communication

PO09.01
A Pilot Study on Testing the Effect of HIV Information

G. Hasle[1], L. Heier[2], G. Bjune[3]
[1]Reiseklinikken - Oslo Travel clinic, Oslo, Norway, [2]University of Oslo, Dept. of Biology, Oslo, Norway, [3]University of Oslo, Institute of Health and Society, Faculty of Medicine, Oslo, Norway

Background: In anti-smoking campaigns evoking fear is prominent. In HIV-information, however, avoiding stigmatization is crucial. In the case of HIV, as well as in smoking, the risk depends on the individual's choices.
Objective: A method to test experimentally the effect of evoking fear to prevent sexual risk behavior.
Method: 100 men and women from 18-60 years who planned a trip of 2-16 weeks duration to Asia, Africa or Latin-America without a sexual partner were randomized to receive one out of two information sheets with the same text, but with different illustrations. One of the sheets contained frightening pictures. The main message was: “Don't have sex with the local population, and if you do, use a condom”. After completion of the journey, the travelers received an anonymous questionnaire asking if they had had sex with the local population, how many partners they had, and whether or not condom was used. The respondents' opinion of how scary and useful the information was, how easy it was to read the information and whether or not the information reduced the pleasure of traveling, was reported on a visual analogue scale (VAS) rating from 0-1.
Results: While > 2000 persons visited the clinic, 100 out of 160 eligible accepted. Eight withdrew and 35 did not reply, i.e., 57 completed forms. Rating of scariness was 0.66 and 0.40 for the scary and non-scary sheet, respectively ($P < 0.05$). There scores for usefulness (0.59) reading (0.73) and destroying the vacation (0.10) were similar for the two sheets. There were no gender differences. Seven of 57 (12%) had had sex with the local population.
Conclusions: Frightening pictures will not prevent the information from being read. Recruitment was a main problem. With a response rate of 57%, we would have needed to recruit 7000 participants, assuming that at least 4% have sex with the local population, and we want to detect a 40% reduction of risk behavior. This would be an overwhelming task for a single travel clinic. Considering the immense importance of the questions raised, such an experimental study should be carried out as a multicenter study, based on these experiences.

PO09.02
Evaluating the Effectiveness of the Pre-travel Visit

J. Richards[1], N. Masunaga[2]
[1]Vaden Health Center, Stanford University, Menlo Park, United States, [2]Vaden Health Center, Stanford University, Stanford, United States

Background: Anyone working in student health is aware that college students are traveling more. The 2011 Open Door Report from the Institute of International Education states that the number of U.S. students participating in study abroad programs has tripled over the last 20 years, with 270,604 students participating in 2009-2010.At Stanford University, study abroad is considered a critical part of a student's education and is strongly encouraged. The Graduate School of Business for example, now requires an international experience for all of its 800 plus students. To help prepare our students for international travel, we maintain a nurse run clinic located on the Stanford University campus. In 2011-2012 we saw 874 patients and 200 patients so far this academic year.
Objective: While it seems obvious that a pre-travel visit including travel health education would have many benefits, research is virtually non-existent on the subject. The purpose of our study was to determine the impact of our services on patient behavior as we move toward a more evidenced based approach to service evaluation.
Method: In 2011-2012, groups of GSB students and staff completed 23 trips to a variety of destinations. This year, they will complete 21 trips. Our travel clinic provides comprehensive travel services including an on-line Travel Preparation Course, a thorough risk assessment for the individual patient and trip, extensive travel health education, appropriate immunizations and medications, and a specific plan for follow-up after returning home. We developed a post-travel survey which we submitted to all 160 GSB students who traveled in 2011-2012 on a GSB sponsored trip. We received a total of 66 responses. (We plan to include data from this year's trips on the poster as well).
Summary of results: GSB students who had a pre-travel visit at a travel clinic utilized more food and water precautions, more insect precautions, and more safety precautions than those students who didn't visit a travel clinic. Overall, females were more compliant with recommendations than males.
Conclusions: Visiting a travel clinic impacted behavior in a positive way in our student travelers. They were more likely to adhere to recommendations if they visited a travel clinic before their trip. Our investigation represents an initial first step in evaluating pre-travel interventions assumed to positively affect health outcomes.

PO09.03
Which Anti-Malarial? Analysing the Complexities and Variables Involved in Making Safe and Effective Recommendations to Travellers

A. Willcox[1], H. Chera[1], G. Hewitt[1], A. Halliday[1]
[1]*Health Team Ltd., Birmingham, United Kingdom*

Background: Malaria remains a significant risk for travellers. In the UK official resources alert practitioners to the presence or absence of risk in destinations, and of the recommended anti-malarial chemoprophylaxis. However, such resources are limited by a lack of international consensus; the need to reduce and simplify extensive data; separation of the risk assessments for destination and the health status of the individual traveller. An e-health solution to potential safety issues was sought.
Objectives: To identify all variables needing consideration when recommending an anti-malarial to a traveller.To build an algorithm to present these for use by travel health practitioners.
Methods: Macro groups of variables were identified using UK official resources.[1,2] These were further analysed at a micro level, identifying every variable using official data sources, key publications, manufacturer's medical information and summaries of product characteristics. The numbers of variables that a health professional needs to take into account were established and software designed to aid safe and accurate decisions on optimum anti-malarial medicines.
Results:

Macro variable groupings	Micro variables
Countries, regions and territories	351 total. 101 have a malarial risk requiring chemoprophylaxis. 14 seasonal variations. 60 countries with low risk of malaria but requiring anti-bite strategies.
Antimalarial drugs	5 drugs, 6 combinations, 8 formulations. 75 age/weight/dose options.
Medical conditions affecting choice of antimalarial	24 medical conditions with a total of 33 contraindications and 20 cautions for the use of anti-malarials.
Medications which interact with antimalarials	925 interactions identified of which 415 are contraindications and 510 precautions or advisory notifications.

[Results]
Conclusions: As knowledge and research on preventing malaria increases, so do the number of variables that need to be taken into consideration in order to recommend a safe and effective anti-malarial. The problems are that there are too many combinations of variables for practitioners to know and be able to recall; they are subject to change, and they are hard to locate in a busy travel clinic or consultation because many are found only in specialist, hard-copy publications. This inspired the development of knowmalaria®, an online tool to help practitioners make speedy and safe prescribing decisions for travellers.
References:
1 ACMP (2007) Guidelines for malaria prevention in travellers from the UK. London:HPA.
2 NaTHNaC (2012) http://www.nathnac.org/pro/index.htm
3 BNF 64 (2012) London: BMJ Group; Royal Pharm. Soc.
4 Sweetman, S.C.(2011) Martindale: the complete drug reference. London: Pharmaceutical Press.
5 Baxter, K. (2010) Stockleys' Drug Interactions. London: Pharmaceutical Press.

PO09.04
Travel Health Services Experience from a New Travel Clinic in Doha, Al Ahli Hospital, Doha, Qatar

A. Baxarawi[1]
[1]*Al Ahli Hospital, Doha, Qatar*

Background: Travel Medicine developed as a new discipline in Medicine on the area of Qatar is often a destination for foreign from all parts of the world because of its cultural wealth. The Travel Clinic is not popular in Qatar we opened Travel Clinic in Al Ahli Hospital, Doha, on August 2011 and provide consultation for trip, vaccination, prescription of travelers.
Objective: To know the characteristics of our travelers and evaluate our daily work in the field, we review the data and analyzed the clinical records of the pre- travel consults from the date we opened the clinic August 2011 till August 2012.
Materials and methods: Data about age, sex, nationality, destinations of travelling. Types of vaccines given are a retrospective study performed based on medical records of individual travelers assisted for the study.
Result: In one year number of travelers visit our clinic of all age groups **515** but most of them were 31 - 40 years old **154** (30%). Females **265** (51%) and **250** (49%) males. Most of them Europeans **218** (42%). Africa and Asia the most geographic region, Kenya, Tanzania, Thailand was the most common destination countries.
450 (87%) consulted less than four weeks prior to departure date. The length of stay was medium two weeks and the reason for the trip is leisure (tourism). **460** (87%) Hajj Pilgrims**, 25** (5%) work/ business **20** (4%), hiking **10** (2%). Most travelers visited our travel clinic for the purpose of vaccination. The most applied vaccine was vaccine against Typhoid **151** (30%) followed by Yellow Fever 134 (27%), Hepatitis A **109** (22%). Immunization updates **185** (26%). And prophylaxis when indicated. Chemoprophylaxis of malaria indicated **188** (37%) and Mefluquine was the drug more used **105** (56%). All travelers received advice about diarrhea prevention.
Conclusion:
1. Travelers consult our clinic with short span of time before departure date.
2. Tourism is the most activity for travelers visiting our Travel Clinic
3. Travel Clinic good opportunity for immunization update.
4. The common goal for all travelers s to stay healthy and further education of Travel Medicine for them is needed for that reason the establishment of Travel Clinic in Qatar would have great importance.

PO09.05

Travel Related Medications and their Interaction with Chronic Therapy: Highly Frequent and Easily Overlooked during Pre-travel Consultation

S. Stienlauf[1,2,3], B. Streltsin[3,4], E. Kopel[1,2], E. Meltzer[1,2,3], E. Leshem[1,2,3], D. Kurnik[2,3], G. Segal[2,3], E. Schwartz[1,2,3]

[1]The Sheba Medical Ctr, The Travel Clinic & the Center for Tropical Medicine, Tel Hashomer, Israel, [2]The Sheba Medical Ctr, Departments of Internal Medicine, Tel Hashomer, Israel, [3]Tel-Aviv University, Sackler School of Medicine, Tel-Aviv, Israel, [4]The Sheba Medical Ctr, The Arrow Project, Tel Hashomer, Israel

Background: Data regarding the frequency of potential interactions between travel-related medications (TRM) and chronic medications or medical conditions of travelers to developing countries are limited.
Objectives: To assess the frequency of potential TRM drug-drug and drug-disease interactions.
Methods: Retrospective cohort study of travelers who attended the Sheba Medical Center Travel Clinic between the years 2005-2007. We analyzed demographics, travel destinations, use of chronic medications, drug allergies, and relevant medical conditions among travelers. The following TRM were evaluated: fluoroquinolones, rifaximin, azithromycin, atovaquone/proguanil, mefloquine, primaquine and acetazolamide. Drug interactions of TRM were retrieved from the Micromedex® Healthcare Series database.
Results: A total of 16,681 travelers attended the pre-travel clinic during the 3- year period. Of those, 2,221 (13%) travelers reported chronic medication use, 35% of whom (n=780) were taking medication with a potential interaction. There were a total of 1,700 potential interactions between at least one TRM and chronic medications or medical conditions. Fluoroquinolones and azithromycin were the most commonly implicated TRMs (Table).

TRM	Travelers on Chronic Medications with potential interaction to specific TRM n(%)	Total number of Interactions n*
Fluoroquinolone	654(29)	752
Azithromycin	598(27)	625
Mefloquine	152(7)	157
Acetazolamide	117(5)	118
Atovaquone/proguanil	24(1)	24
Rifaximin	23(1)	23

[TRM & Chronic Medications Interactions]

*Travelers may take more than 1 drug with potential interaction Primaquine for malaria
Prophylaxis was contraindicated in 204 travelers (1.2%) due to glucose-6-phosphate dehydrogenase deficiency. Sulfonamide allergy was found in 100 travelers (0.5%), which may pose a relative contraindication for the use of acetazolamide. Similarly, caution regarding fluoroquinolone use was advised in 52 travelers (0.3%) with central nervous system disorders.
Conclusions: Potential drug-drug and drug-disease interactions of TRM occur in a significant proportion of travelers with chronic medical conditions and the medications in use. Fluoroquinolone antibiotics and azithromycin are the TRMs most commonly implicated. Our findings should be considered by travel health practitioners consulting travelers to developing countries.

PO09.06

Communicating Flu Prevention Messages to US-Mexico Land Border Crossers: Lessons Learned

S. Erskine[1], K. Holton[1], K. Carera[2], A. Rodriguez Lainz[1], D. Borntrager[1], L. Lange[2], R. Myers[1], T. Schwartz-Kitchens[1], S. Hale[2]
[1]Centers for Disease Control and Prevention, Division of Global Migration and Quarantine, Atlanta, United States, [2]Oak Ridge Associate Universities/Oak Ridge Institute for Science and Education, Oak Ridge, United States

Background: In 2011, over 153.7 million people crossed the US-Mexico land border; 40 million were pedestrians. Few initiatives to prevent diseases focus on these pedestrians who often cross frequently and have long waits while crossing. Border facilities may be ideal locations for sharing health messages and posters offer a cost-efficient tool for disseminating such health messages.
Objectives: We sought to describe whether seasonal flu prevention posters are noticeable to US-Mexico land border crossers and to capture travelers' flu vaccine beliefs and practices.
Methods: We conducted in-person surveys with 1,423 systematically selected pedestrians crossing from Mexico into the United States at San Ysidro, California, port of entry, April 10-23, 2011. Posters in English and Spanish were displayed at pedestrian entrances and primary inspection booths. These large posters displayed color photos and stated: “Get a flu shot. Wash your hands often. Cover coughs and sneezes. Stay home if you have the flu.” Surveys were conducted in Spanish or English, lasted ~6 minutes, and were collected at various times during weekdays and weekends. Frequencies regarding demographics, crossing characteristics, poster exposure and recall, and flu vaccine beliefs and behaviors were analyzed.
Summary of Results: The average respondent was Hispanic, 37 years, resided in Tijuana, traveled alone, and had a high school or less education. Surveyed travelers believed flu is serious and realized they can catch flu and spread it to others. Most thought getting a flu shot was a good idea and would prevent spread of flu. However, 66% did not get a flu vaccine during the 2011-2012 flu season. Most travelers did not correctly recall the displayed flu prevention messages. Those who crossed the border more often had better recall, but overall, the recall ratio was 2.6%. This is consistent with other studies examining message recall among travelers.
Conclusions: At land borders, posters alone are ineffective. Travelers are focused on other activities, such as talking to fellow travelers. They may not be receptive to health information unless risk is imminent. More studies need to be conducted among US-Mexico border travelers to understand disconnect between perceived benefits of flu vaccine and receiving flu vaccine.

PO09.07

Knowledge, Attitudes and Practices Evaluation About Travel Medicine Counseling in Italian Customers of Pharmacies in Calabria, Italy

S. Neri[1], F. Foti[2]
[1]Salus Pharmacy 'Dr. Neri Quintino', Reggio Calabria, Italy, [2]La Feluca Travel Clinic, Reggio Calabria, Italy

Background: A significant number of travelers sustain travel-related injury or illness, despite receiving pre-travel advice. This appears to be due to a combination of inconsistent guidance about risks and recommendations, and partial adherence.
Objective: This study aimed to determine knowledge, attitudes and practices (KAP) about travel medicine counseling of customers of pharmacies in the area of Calabria, a region of southern Italy.
Method: In the period 1 July to 31 August 2011, 17,000 standardized questionnaires consisting of 16 questions arranged in a semi-open and closed logical sequence were distributed in forty-seven pharmacies participating in the project.
Results: A total of 3,564 (return rate was 21%) respondents were included in this survey and evaluated. Sixty-two percent of travelers were female and 42% are aged between 31 and 50 years. The 83% of customers traveled abroad at least once, mainly for tourism (62%) and work-related or education (20%). Among these travelers, 52% sought advice about the health risks in the country of destination, especially for doctors (60%) and pharmacists (17%). The 82,4% were satisfied with the conversation they have had with a health care professional. When counseling, vaccinations have been prescribed to 28% of respondents, and among these, diphtheria/tetanus (18%), hepatitis B (15%), hepatitis A (15.4%), yellow fever (14.5%) and typhoid fever (11.5%) were found to be the most important. The 70.3% of travelers would vaccinate without problem, while 13% would not vaccinate for fear of side effects. Skin repellents and mosquito nets at night have been recommended to 75% of respondents as the main board to avoid insect bites are dangerous to health, while only 4.8% of the counselor has advised travelers to soak their clothes with permethrin.
Conclusion: Only just now more than half of our respondents considered it appropriate to consult a health care professional to get some advice. No counseling took into account the risk assessment on the prevention of influenza and motor vehicles accidents.

PO09.08

Pre-travel Risk Discussion: How Many and Which Topics are Discussed in an Average Pre-travel Consultation?

M. Croughs[1,2], A. de Gouw[1]
[1]*GGD Hart voor Brabant, Travel Clinic, 's-Hertogenbosch, Netherlands,* [2]*Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium*

Background: According to the Dutch guidelines on travel medicine a pre-travel consultation takes about 10 minutes and not more than 3 health risks, besides the recommended vaccinations and malaria prophylaxis, should be discussed. If information on more than 3 topics is required, it should be given in writing. But international guidelines on pre-travel advice sometimes enumerate a long list of topics which should be discussed during pre-travel consultation.
Objective: We intended to study how many and which health risks are discussed in an average pre-travel consultation.
Method: A nurse observed pre-travel consultations in the Travel Clinic of GGD Hart voor Brabant and registered variables in an anonymous MS Excel-file. Repeat consultations were not used for analysis. The registered variables included destination, type of travel, duration of the consultation and the number and kind of discussed health risks. Information on the recommended vaccines was not included. A distinction was made between discussed topics and topics which were only mentioned with the recommendation to read the written information in the travel health folder, which every client receives at the end of the consultation.
Results: 184 consultations were observed and after discarding 44 repeat consultations, 140 first consultations were analyzed. On average a consultation took 13 minutes and 4 health risks besides the recommended vaccines were discussed. In half of the cases (49%) at least one other topic was mentioned. The most discussed topics were food hygiene (79%), diarrhea treatment (72%), rabies (60%), malaria (46%), dengue (39%), insect bite protection in general (24%), medical travel kit (14%), schistosomiasis (13%), legionella (10%) and tuberculosis (8%). Some risks were seldom discussed, for example the risk on sexually transmitted infections was discussed in only 4% of consultations and sun protection in 2%. There was a significant relation (p< 0, 001) between the number of topics discussed and the duration of the consultation; the more topics were discussed the longer the consultation took.
Conclusion: In the pre-travel consultations of our travel clinic on average 4 health risks, besides the recommended vaccines, are discussed; some important health risks are seldom discussed.

PO09.09
HIV Post Exposure Prophylaxis Following Sexual Exposure: A Missed Opportunity for Intervention during the Pre-travel Consultation?

D. Brawley[1], A. Rea[1]
[1]*Sandyford, Glasgow, United Kingdom*

Discussion regarding HIV post-exposure prophylaxis (PEP) during the pre-travel consultation is usually in relation to occupational risk; however sexual intercourse is the most common route of transmission with rates up to 3%, compared to 0.3% with percutaneous exposure.[1] The British Association for Sexual Health and HIV recently published guidance recommending PEP after unprotected sexual intercourse with HIV positive persons or those from high risk groups (table 1). These guidelines are in agreement with both CDC and WHO recommendations. [2,3]
Sexual transmission of HIV is compounded in travellers with recognised increased rates of unprotected sex and partners from high prevalence countries in addition to an increasing culture of sex tourism.[4,5] An audit performed in our department in 2011 confirmed this showing high rates of unprotected sex in returning travellers with 10% of those audited being eligible for PEP.[6] Although sexual health and HIV prevention using condoms and abstinence are recommended to be discussed as part of the pre-travel assessment, there is currently no guidance regarding the discussion of PEP. NHS Fit for Travel makes no reference to PEP following sexual risk, only recommending discussion and consideration where there is occupational risk.[7] The CDC Yellow book also recommends PEP for occupational risk however states that its use following sexual exposure is not established.[8] Currently there is only one source which recommends discussing PEP in the pre-travel consultation, suggesting it should be offered to those living in high prevalence areas for prolonged periods but only in the context of post sexual assault.[9]
Therefore, although there is established international guidance for the use of PEP after sexual exposure (PEPSE), there appears to an absence of specific pre-travel guidance. Owing to the proven sexual risks that travellers face and the opportunity for intervention at the pre-travel assessment, we propose the recommendation of a PEPSE discussion at the pre-travel consultation to increase awareness of this effective method of reducing HIV transmission should barrier methods fail. The situation is further complicated with emerging evidence of the efficacy of pre-exposure prophylaxis. We suggest that travel health specialists align their guidance with those from the HIV community in order to help reduce the current rates HIV transmission for individuals and the local and international community.

	HIV Positive Viral load detectable	HIV positive Viral load undetectable	Unknown status High risk	Unknown status Low risk
Receptive anal intercourse	Recommended	Recommended	Recommended	Not recommended
Insertive anal intercourse	Recommended	Not recommended	Consider	Not recommended
Receptive vaginal intercourse	Recommended	Not recommended	Consider	Not recommended
Insertive vaginal intercourse	Recommended	Not recommended	Consider	Not recommended
Fellatio with ejaculation	Consider	Not recommended	Not recommended	Not recommended
Fellatio without ejaculation	Not recommended	Not recommended	Not recommended	Not recommended
Semen in eye	Consider	Not recommended	Not recommended	Not recommended
Cunnilingus	Not recommended	Not recommended	Not recommended	Not recommended

[BASHH PEPSE Guidelines]

PO09.10

What Needs to Prepare for a Long Flight to Asia? - Lessons Learned from an Emergency Landed Case with Acute Exacerbation of Chronic Renal Failure

S. Otsu[1], S. Yamaji[1]
[1]*Japanese Red Cross Wakayama Medical Center, Wakayama City, Japan*

Background: Travelers with chronic diseases is said to be more risk to get sick during travel. A flight to Asia from other part of the world is sometimes long enough to cause serious consequences, especially for travellers who have less understanding of their own conditions and also who were not advised by their primary doctors in country about specific risks during travel.
Objective: We experienced an emergency landed case with acute exacerbation of chronic kidney disease (CKD) stage 5. We analyze issues to be considered and roles of pre-travel clinic for travellers visiting Asia with chronic diseases.
Method: A case was investigated by chronologically with cause and outcome. We extracted lessons learned and issues to be considered from the experience.
Results: The case was aware of but did not have a good understanding her condition before her travel to Asia. In addition, she was not well informed about the risk of exacerbation of her condition and expected challenges including cost once occurred, by her primary doctor before travel.
Conclusion: With the hospital and the airline company's efforts, she returned home without major problems nine days after of her emergency landing. It is advisable that travellers with chronic diseases should request a referral letter and a prescription list in English from their primary doctor before their travel to bring with. Also the primary doctor should inform explicitly the patients the specific risk and the expected medical cost once they got sick before their travel.

PO09.11

Pre-travel Consultations in a Travel Clinic: An Opportunity for Interprofessional Eduation

S. Seed[1], K. Sullivan[1], K. Dunican[1], L. Spooner[1], K. O'Connor[2], G. Abraham[3]
[1]MCPHS University, Pharmacy Practice, Worcester, United States, [2]Saint Vincent Hospital, Ambulatory Care Clinic, Worcester, United States, [3]Saint Vincent Hospital, Medicine, Worcester, United States

Background: The World Health Organization (WHO) has recognized that interprofessional collaboration between healthcare professionals can improve health outcomes for patients. Interprofessional education (IPE) occurs when students from two or more healthcare professions collaborate; learning from and with each other to improve health outcomes. Travelers to international destinations are advised to seek pre-travel advice prior to departure. Ambulatory care clinics provide an ideal setting for an interprofessional collaborative approach to patient consultations for healthcare professionals in training.
Objective: Develop an IPE initiative within a travel clinic setting involving medical residents and students from pharmacy, nursing and physician assistant programs.
Methods: A team consisting of an infectious disease physician, a nurse and a pharmacist affiliated with a college of pharmacy worked together to incorporate students in the pre-travel consultation sessions at a newly established travel clinic. Students and residents prior to working at the clinic have varying degrees of training in their respective curriculum. While at the clinic all students are trained on the use of the CDC travel health website and a database for entry of travel visits. Students and residents work together to evaluate a patient's itinerary utilizing the databases in order to appropriately recommend immunizations and prophylactic medications. The primary roles of the team members include providing travel-related education to patients; performing necessary physical assessment and administering required immunizations. All recommendations and interventions are reviewed by an attending physician prior to administration to the patient.
Results: The program was initiated in 2005. Since then over 1,000 patients have been evaluated by hundreds of healthcare professional students. The majority of students involved with this initiative have been in a pharmacy program, followed by medical residents, students in physician assistant programs, and then students in nursing programs. All students overwhelmingly report positive experiences with this collaborative approach.
Conclusions: Travel clinic consultations provide an excellent forum for interprofessional collaboration and education. Students in pharmacy, nursing and physician assistant programs and medical residents can learn from each other in such an initiative.

PO09.12

Seroprevalence of Hepatitis A in Argentine Travelers and Cost-saving Analyses of Two Preventive Strategies

A. Macchi[1], C. Biscayart[1], V. Verdaguer[1], P. Elmassian[1], M.R. Tisi Bana[2], M.L. Strada[1], M. Dalbosco[1], D. Stamboulian[1]
[1]División Medicina del Viajero, Stamboulian Servicios de Salud, Buenos Aires, Argentina, [2]Internal Medicine Department, Hospital Universitario Austral, Pilar, Argentina

Background: Hepatitis A (HA) is one of the most common vaccine-preventable infectious diseases related to travel. The clinical course can be more severe when the infection is acquired with increasing age. Circulation of HA virus in Argentina seems to have decreased as a consequence of HA vaccine introduction to the immunization regular schedule in 2005 (single-dose); however, sanitary conditions are heterogeneous and seroprevalence rates vary between regions. It seems important to determine the most cost-saving preventive strategy for adult travellers to avoid unnecessary costs to the country's health system.
Objectives:
- To determine HA seroprevalence among adults travelers seeking advice at our healthcare center.
- To analyse the costs of two different prevention strategies for this group.
Methods: Study design: Retrospective seroprevalence survey performed from 07/01/2008 to 12/11/12. All non-vaccinated travelers with no medical history of HA infection, older than 20 years old were included. The subjects who had received immunoglobulin or any blood products in the previous five months were excluded. The study population was stratified in age decades.
The formula described by Schwartz in 1998 was employed to calculate the estimated costs for two different preventive strategies:
1) Immunization without serology.
2) Vaccination of susceptible travelers with 2 doses.
For cost analyses we consider for setting 1) the cost of 2 doses of adult HA vaccine, including all medical and administrative costs (US$ 196); and for setting 2) those of setting 1 plus the cost of HA IgG test (US$ 20) and a second visit to the clinic (U$S 50).
Results: We screened 1,259 travelers for HA IgG (331 women and 928 men) between 20 and 69 years old. Overall, 55% were seropositive: 35% in the 20-29 group (n = 264); 38% in the 30-39 group (n = 493); 51% in the 40-49 group (n = 251); 66% in the 50-59 group (n=178) and 85% in the 60-69 group (n = 73). There were no significant differences in seroprevalence between sex groups at any age.
Conclusions: HA seroprevalence in our study population correlates with that of the intermediate-endemicity regions of the world (over 35% in all age groups).
In this scenario, and assuming the costs described previously, the screening of travelers older than 20 years and vaccination of the susceptible ones is the most cost-saving strategy.

PO09.13

A Report on Travel and Vaccination Patterns over a 5 Years Period from a Travel Clinic in Northern Italy

M. Migliorini[1], F. Marchiori[1], D. Berti[1], F. Tognon[1], S. Tardivo[1], F. Gobbi[2], A. Rossanese[2]
[1]University of Verona, Dept. of Public Health, Verona, Italy, [2]'Sacro Cuore-Don Calabria' Hospital, Centre for Tropical Diseases, Negrar, Verona, Italy

Background: The number of travels to tropical and subtropical destinations for any reason (tourism, job, cooperation, mission and visit to friends and relatives by immigrants) has increased in the last 15 years. Irrespectively from the reason of travel, prevention of imported diseases (with vaccinations and prophylaxis) is a paramount tool in Public Health.
Objectives: To analyse the demographic characteristics and preventive measures adopted (also according to destination, reason of travel and pre-existing diseases, if any) for travellers presented at the Travel Clinic of the Centre for Tropical Diseases, "Sacro Cuore - Don Calabria" Hospital, Negrar, Verona, Italy.
Methods: This study included 4587 consecutive travellers who presented at our Travel Clinic between Jan 01, 2008 and Dec 31, 2012. Data were entered and elaborated with Epi Info software (EpiInfo, CDC Atlanta, version 7.0).
Results: Our population has a slight predominance of males (52%), with a median age of 36 years (range 0-78 years). The median duration of travel was 16 days (range 2-1440 days) and the most visited continent was Africa (62% of total travellers) followed by South America (17%). The most frequent reason of travel was tourism (2786 travellers, 60%), followed by volunteering (502 travellers, 10,9%), work (447 travellers, 9,7%) and immigrants visiting friends and relatives (VFR, 191 travellers, 4.1%, probably underestimated because of misclassification). Many travellers (1041 subjects, 23%) were taking at least one medicine at the time of departure. At least one vaccine was administered to 4183 travellers (91.2%), anti-typhoid being the most prescribed (2625 travellers, 53%). In the VFR group, yellow fever was the most administered vaccine (150 subjects, 78.5%). Antimalarial prophylaxis was advised for 2619 travellers to sub-Saharan Africa, of whom 1174 refused (44.9%).
Conclusions:
- Africa was the most visited continent.
- Vaccines are generally well accepted.
- High costs of vaccines limit their use to mandatory yellow fever in many VFR.
- Anti-malarial prophylaxis is refused (generally for fear of side effects) by far more travellers than expected.

PO09.14

Can You Understand Me Now? Online Focus Group Testing of Travel Health Messages for Clear Communication

A.W. Lee[1], S. Erskine[1], C. Brown[2], B. Wilburn[2], K. Holton[1]
[1]Centers for Disease Control and Prevention, Travelers' Health Branch, Division of Global Migration and Quarantine, Atlanta, United States, [2]Oak Ridge Associated Universities, Health Communication and Technical Training, Oak Ridge, United States

Background: CDC Travelers' Health used a strategy called *message mapping* to develop concise travel health recommendations, which answered 12 common travel health questions. Message maps follow a template of 3 main messages composed of 27 words that can be spoken or read in 9 seconds. Message maps were drafted according to clear communication principles and were designed to be easily understood by the general public.
Objectives: We evaluated the message maps to determine if they were clearly understood and influential among diverse US international travelers. We will use testing results to inform the development of print and electronic communication materials.
Methods: In November 2011, we conducted 9 online focus groups with 50 international travelers from 19 states. Participants, connected through webcam technology, reviewed 4 message maps and provided feedback through group discussion and written comments. Project staff observed live or recorded focus group sessions; the transcripts were analyzed in NVivo qualitative analysis software.
Results: Participants positively received all 12 message maps, and most thought the messages were clear, understandable, and helpful. Participants identified parts of the messages that were confusing, difficult to implement, or needed more detail. For many people, the messages created an interest to learn more about the specific travel health topic, particularly diseases. A recurring theme across focus groups was that participants wanted additional resources, including phone numbers, web links, and contact information. Participants wanted to know why recommendations were being made, risk information behind recommendations, and what would happen if they did not follow the recommendations. When this type of information was provided, participants were motivated to follow recommendations. Most participants (68%) were not aware of the CDC Travelers' Health website.
Conclusions: Complex travel health messages can be strategically drafted for the general public, resulting in clear, understandable, influential messages. Brief messages may not address all information a traveler needs to know but provide enough background to encourage travelers to learn more and motivate them to action. Based on these findings, health messages for international travelers should be brief, include information on risk and the rationale for recommendations, and point to resources for additional information.

PO09.15
You Want Me To Do What? A Qualitative Analysis of the Feasibility of Travel Health Recommendations

K. Holton[1], A.W. Lee[1], S. Erskine[1], C. Brown[2], B. Wilburn[2]
[1]Centers for Disease Control and Prevention, Travelers' Health Branch, Atlanta, United States, [2]Oak Ridge Associated Universities, Health Communication and Technical Training, Oak Ridge, United States

Background: CDC Travelers´ Health (TH) used a process called message mapping to develop concise versions of 12 common travel health recommendations. Message maps (maps) are stated as a series of 3 short messages, with 3 supporting messages each. This format allows recommendations to focus on essential messages easily understood by travelers.
Objectives: TH evaluated the maps to determine whether travelers found the recommendations feasible. The evaulation results have helped TH refine its messages to better meet the needs of US residents traveling internationally.
Methods: In November 2011, TH convened 9 focus groups with 50 international travelers from 19 states to evaluate the maps. Focus groups were conducted online, and participants could interact with each other via webcam. Each group evaluated 4 maps. Project staff observed the sessions online and used NVivo qualitative analysis software to develop results. The results helped TH understand participants´ perspectives on a variety of topics, such as pre-travel consultations, injury and disease prevention, insect bite prevention, and malaria. Each focus group included discussions about the feasibility of specific recommendations.
Results: Although participants largely agreed on the main ideas of the maps, responses on feasibility sometimes varied greatly. For example, all participants felt the messages about road safety were understandable, but their perception of feasibility varied according to their own experiences. What one person considered common sense, another viewed as impossible because safety equipment, such as seat belts, is often unavailable in certain destinations. Participants´ concerns about the feasibility of messages largely fell into 3 categories: cost, self-efficacy, and perception of risk relative to the strength of the recommendation. (Table 1)

Type of Feasibility Concern	Positive Feasibility	Negative Feasibility
Cost	On vehicle safety: *You should know ahead of time what to expect, how to prepare yourself. You should use your common sense and spend a little more money to be safe and sound.* On pre-travel consultations: *I see it being very feasible because I want to come home healthy, [and] I want to enjoy my vacation while I'm overseas and not become sick.*	On pre-travel vaccines: *It says "Go to your local travel center." My husband walked out of our local travel medical center here in Alabama with a $500-600 bill. Needless to say, that wasn't part of our budget for the trip.* On buying insurance: *We didn't purchase evacuation insurance because my husband has it through his job … [but] when I looked at all the exclusions and the coverage, it was tremendously expensive.*
Self-Efficacy (Willingness or ability to carry out recommendation)	On pre-travel consultations: *I have the resources available and it is something that's feasible because I have health insurance. I would go see my doctor. I would go get the vaccine at a travel clinic.* On filling prescriptions at home: *I'm going to be going to Spain in March and I have medication that I'm going to be bringing with me. I will be getting my prescription*	On safe drinking water: *If you're in a hotel room that doesn't have a kitchen, where are you going to boil water?* On injury prevention: *The person who wrote this hasn't been out of the country because we just came back from Trinidad and Tobago and we broke every rule on this thing.* On pre-travel consultation:

	filled way ahead of time.	*I'm a last-minute traveler, so … the four to six weeks is generally not enough time because I'm the type of person that will be traveling to India on less than two-weeks' notice. Therefore, it's tough for me.*
Perception of Risk vs. Strength of Recommendation	On insect bite prevention: *You just have to expect the unexpected, so you do have to cover your bases…but I couldn't see myself wearing a whole bunch of protective clothing, unless I was going out into the jungle or a rain forest or something of that nature.* On taking malaria prophylaxis: *There was no doubt that I was going to do this because I didn't want to get sick. …You don't want to get sick while you're over there because you don't know what kind of doctors are available when you're traveling, so prevention is always better than trying to cure something.*	On injury prevention: *I don't live and die by those guidelines because they're not feasible when you really go to places.* On insect bite prevention: *It's too hot to wear all of that [long-sleeved shirts and long pants], and I'm never going to tuck pants into socks. Usually I'm wearing walking sandals or something.*

[Table 1. Examples of perceptions of feasibility]

Conclusions: Receiving information they do not feel they can act on can be frustrating for travelers. Those advising travelers need to acknowledge that some advice might be difficult to follow. Messages can help travelers prioritize recommendations for their unique circumstances. Focus should also be given to empowering travelers to act and emphasizing why certain recommendations are important even though they may be costly, difficult, or inconvenient.

PO09.16
Travel Health: Perceptions and Practices of Travel Agents in London

E.L. Pine[1]
[1]*RCPSG, Glasgow, United Kingdom*

Background: Many travellers are going abroad without seeking travel health advice, which can lead to an increase in diseases such as malaria being contracted. At particularly high risk are those visiting friends and relatives (VFRs) and package tourists to The Gambia.
Objective: This study investigates the travel health knowledge and practices of Travel Agents (TAs) to see if they could play a role.
Method: This study replicates that of Ivatts et al (1999). 100 travel agencies across 32 Greater London locations were visited, 83% took part in the study. More than one TA in each agency was asked to complete a 3-page, self-administered questionnaire. Results are based on 151 completed questionnaires. Participating TAs were given a travel health information pack. Research was undertaken as part of Travel Medicine Diploma.
Results: When asked questions on travel health topics the TAs average score was 6.1 out of 12. 45% of TAs felt there was not enough travel health information available to them. 112 out of the 151 TAs said they advise travellers to see their local doctor and 83 said they give travellers broad travel health guidelines. Yet only just over half of TAs said they would 'always' or 'often' encourage package tourists to The Gambia and VFR travellers to Africa to see a doctor before travelling.
40% of TAs felt they should not provide travel health information to clients because they are not qualified for this and have concerns regarding liability. 38% of TAs felt they should because it is their duty to help travellers stay safe and healthy. Guidelines, training and leaflets/websites to give to clients were some of the suggestions that TAs said would help them to be more involved.
Conclusions: This study suggests that TA travel health knowledge is limited; therefore TAs should not be expected to be providing clients with detailed information regarding travel health risks abroad. If TAs could be reassured that this is not expected of them they may be more willing to discuss general health issues with travellers and encourage them to seek specialist advice in advance of their trip. The travel industry also needs to take travel health more seriously by providing TAs with more training and guidance.

PO09.17

Promoting Diphteria, Acellular Pertussis, Tetanus, Polio (DaPTP) Booster Vaccination instead of DiphteriaTetanusPolio (DTP) Booster Vaccination to Travelers to Protect during and post Travel: A Retrospective Analysis in Dutch Travel Clinics

P.A. de Beer[1,2], H.A. Caris[2]
[1]Medical Services for the Tropics, Maastricht, Netherlands, [2]365-Center for Infection Prevention (CIP) and Travel Clinics, Utrecht, Netherlands

Background: Whooping cough is a highly contagious infectious disease of the respiratory tract. Specially young children who are not (fully) vaccinated are at serious risk. Infection can take place in- or outside the household by patients or carriers. The protection after vaccination or natural infection is about 6 to 10 years. There is no pertussis monovaccin. For vaccination in adults DaPTP is available. Travelers are offered in an elegant way additional immunization against pertussis. No increase of side effects can be expected from this vaccine. This DaPTP vaccine costs 14 euro extra.
Methods: From 1th to 26th October 2010 were data collected and analyzed. Travelers who were eligible for the booster vaccine DiphteriaTetanusPolio(DTP) were offered the opportunity to opt for DTP + Pertussis vaccine (DaPTP). We provided first an information leaflet about the Health risk of Pertussis infection followed by discussion highlighting aspects as direct protection and indirect protection. We indicate the reason of their choice.
RESULTS
58 travelers were enrolled in the study .Total 83% (N=49) choose the DKTP vaccine and 17 % (N=10) choose the DTP vaccine. The mean age was 34 years (range:19-72 yrs).
Reason to choose DTP:
· No close contact with small children expected.
· Client wish to restrict only to travel destination required immunizations
· Client want as little as possible immunizations.
Reason to choose DaPTP :
· Contact with small children is likely.
· Had whooping cough or noticed disease in direct environment.
· Would like to be as comprehensive as possible protected.
· Protection of others is important .
· Good protection on travel is important (including pertussis).
· Costs within certain limits is acceptable for health issues.
Conclusion: A high score of 83% of the travelers consulting our Clinics chose DaPTP instead of DTP. No difference in undesirable side-effects were reported.
Discussion: We still offer this DaPTP vaccine option to our clients and incorporated health risk discussion of Pertussis infection in our general pre-travel counseling. Provisional results until end 2012 show an increase in numbers to choose for DaPTP instead of DTP at our Clinics. We have an indication that combining written and oral information of the pertussis risk resulted in this unexpected high DaPTP percentage in our study

PO09.18
To Notify or Not To Notify: Agency Perspectives on the Development of Travel Health Notices

K.E. Spruit-McGoff[1], J. Geduld[2], D. Jermacane[3], C.V. Lee[1], R. Henry[1], M. Crawley O'Sullivan[1], K. Holton[1], G. Brunette[1], C. Brown[4]
[1]Centers for Disease Control and Prevention, Travelers' Health Branch, Atlanta, United States, [2]Public Health Agency of Canada, Ottawa, Canada, [3]National Travel Health Network and Centre, London, United Kingdom, [4]Centers for Disease Control and Prevention, Atlanta, United States

Background: The national public health agencies of Canada, England, and the United States publish travel health notices on international disease outbreaks and recommendations for travelers. Each agency has specific criteria that determine when a notice is published and when it is removed.
Objective: To evaluate similarities and differences among the travel health notice criteria for the Public Health Agency of Canada (PHAC), Canada; National Travel Health Network and Centre (NaTHNaC), England; and Centers for Disease Control and Prevention (CDC), United States.
Method: We compared and contrasted the criteria and processes by which each agency develops travel health notices. We considered them in terms of what criteria are used to initiate a notice and determine level of risk, average length of time from initiation to posting, and factors used to prompt de-escalation or removal of a notice.
Results: PHAC and CDC have standardized decision instruments for travel health notices that are based on the assessment tool for public health emergencies in the 2005 International Health Regulations (IHR). For example, a determination to develop a travel health notice would be triggered by an IHR assessment about the potential for the international spread of a disease. NaTHNaC has developed disease-specific notification criteria, tailored to assess events for their potential threat considering the health of British travelers. At PHAC, NaTHNaC, and CDC, senior officials and disease experts review notices for accuracy and completeness.
Conclusion: Criteria for posting or removing a notice are similar among the agencies. In each agency, priority consideration is given to a travel health notice if one has been posted by other agencies, highlighting the mutual respect among counterparts. Travel health notices contain up-to-date information about an outbreak, risk to travelers, prevention recommendations, and guidance for clinicians. Because each agency's process for initiating a notice is thorough and systematic, travelers and clinicians can be assured that notices are timely, complete, accurate, and reliable.

PO09.19

Overview of 1749 Travelers Visiting the AMC Center of Travel Medicine from July 2011 to July 2012

R.W. Wieten[1], M.R. van der Schalie[1], C. Stijnis[1], P.P.A.M. van Thiel[1], A. Goorhuis[1], M. van Vugt[1], M.P. Grobusch[1]
[1]*Academic Medical Center/ University of Amsterdam, Center of Tropical and Travel Medicine, Department of Infectious Diseases, Division of Internal Medicine, Amsterdam, Netherlands*

Background: Annually, 8-11.000 travelers visit the center of travel medicine of the AMC in Amsterdam for pre-travel counseling. Travel and vaccination patterns vary for travelers with different demographics. Different patterns of travel and travel preparations impose different travel related health risks.
Objectives: The aim of this study is to provide an overview of demographics, travel patterns (destination and duration), vaccinations received and malaria chemoprophylaxis received among those visiting our center. The results will be used to map differences in travel and vaccination patterns between various groups. This information should facilitate targeting risk reduction strategies.
Method: In this observational descriptive study we collected information from travelers in the period from July 2011 to July 2012. Before consultation travelers filled out a pre-travel questionnaire detailing sex, age, travel destination and length of travel, as well as their medical history. The electronic database Orion Globe 7.4.1 was used for collecting information on pre-travel vaccinations and medication. A 20% sample of 9.000 visitors was consecutively selected according to the chronology of visits.
Results: Data from 1749 visitors of the AMC travel department was collected. Eight hundred and two (45.9%) were male**,** the median age was 35 (IQR 24-50). Nine hundred fifty-five (54.6%) traveled for tourism, 274 (15.7)% for visiting friends and relatives, 167 (9.5%) for business/internships. For 353 (20.2%) visitors, travel purpose was not recorded. In total, 2319 countries were visited. Popular travel destinations were Indonesia with 274 visits (11.8%), Thailand with 179 visits (7.7%), Suriname with 148 visits (6.4%), Ghana with 144 visits (6.2%) and India with 132 visits (5.7%). There were no differences in travel patterns between male and female travelers. Travelers aged over 60 years had a mean travel duration of 27.4 days, which was significantly shorter compared to the mean travel duration of travelers aged 18-30 years (mean 51.3 days). Often, VFR travelers did not have the recommended vaccinations and malaria chemoprophylaxis.
Conclusion: As tropical travel destinations remain popular among Dutch travelers, it is important to monitor travel characteristics. Risk reduction strategies should be targeted at VFR travelers, young persons traveling for longer periods and older travelers.

PO09.20
Travel Agents and Travel Health Promotion: A Study in the Local Health Authority Lucca

R. Banducci[1], G. Pierami[1], D.R. de Wet[2], A. Tomasi[3], K. Farmer[4]
[1]University of Pisa, Hygiene and Preventive Medicine, Pisa, Italy, [2]University of Bologna, Department of Biomedical and Neuromotor Sciences, Bologna, Italy, [3]AUSL 2 Lucca, Department of Prevention, Lucca, Italy, [4]St. George's University, Microbiology, St. George, Grenada

Background: One the factors influencing travellers to seek preventive health advice before departure is the travel agent's recommendation.
Objective: The aim of this study was to document the knowledge, attitudes and practices of travel agents in Lucca, Tuscany, relating to the prevention of health problems among travellers.
Method: A descriptive transversal study that included all the travel agents in the Local Health Authority of Lucca was conducted from July to September 2012. The data was collected with a questionnaire completed individually by each travel agent.
Results: All travel agencies (100%) agreed to participate in the study. Eighty questionnaires were distributed, 60 of which were collected (participation rate:75%). Most respondents (75%) believed that the travel agent has a role to play in the prevention of health problems, in particular to recommend a travel clinic consultation before departure. However only 25% of respondents felt that they were adequately prepared to provide accurate health related information. Travel agents identified HIV infection as a very high risk for travellers travelling to Cuba and Kenya, but the majority of travel agents (79%) stated that they never discuss the risk of sexually transmitted diseases with their clients. Most respondents (90%) mentioned recommending a visit to a travel clinic before an organized tour to Thailand or a backpacking trip in Mexico whereas 50% said they make the same recommendation for a stay in a Red Sea resort. When asked about the best way to receive travel health information, more than half of respondents favoured an updated travel medicine website and regularly receiving information newsletters from public health departments. A regression analysis showed that the factors associated with a recommendation to visit a travel clinic for a trip to Cuba are: Knowledge of a travel clinic to which they can refer clients, considering that the agent's role in prevention is to give health advice and believing that they contribute in protecting their clients' health whilst travelling.
Conclusions: Travel agents are willing to be more involved in initiatives that promote travel health and the preparation of travellers. Collaborating with travel agents based on the preferences indicated by them represents a stimulating challenge for professionals in the field of public health.

PO09.21
The Emergency Department as a Venue for Pre-travel Prophylaxis and Advice

R. Partridge[1,2], L. Proano[1]
[1]Warren Alpert Medical School of Brown Univerisity, Department of Emergency Medicine, Providence, United States, [2]Emerson Hospital, Department of Emergency Medicine, Concord, United States

Background: Appropriate travel vaccinations and advice are not always obtained by citizens traveling abroad, as a result of limited access to travel clinics or primary care providers, time constraints imposed by unexpected or emergency travel, or patient procrastination. Preventable travel related illnesses, including malaria, are often reported. Emergency departments (ED) frequently offer pre- and post-exposure disease prophylaxis but have not traditionally offered pre-exposure travel vaccinations or education.
Objective: To consider the potential of hospital emergency departments as venues for pre- and post travel vaccinations and advice for persons anticipating travel abroad.
Discussion: Hospital EDs offer care 24/7/365; non-emergency visits are common. Pre-exposure seasonal influenza and pneumococcal vaccine prophylaxis is often provided as a public health measure through emergency departments. The (ED) could potentially be a convenient and available health care venue for travelers to receive travel prophylaxis and advice if a visit to a travel clinic or primary care provider is not possible. EDs have access to and could effectively provide vaccine and/or immunoglobulin prophylaxis against hepatitis A, hepatitis B, rabies, typhoid, polio, tetanus, diphtheria, pertussis, measles, mumps and rubella. Yellow fever is an exception, as a license to dispense this vaccine is required. Importantly, malaria chemoprophylaxis could be initiated. Additional prophylaxis against traveler's diarrhea and travel advice to limit exposure risk to other diseases could also be provided. As information about travel related disease risk and mitigation has become easily available via on-line resources and continuing medical education courses, emergency practitioners could offer safe and effective pre-travel prophylaxis and advice. Hospitals also have physicians trained in infectious diseases available on-call for particularly challenging cases. Appropriate referral to a travel clinic could also be provided after the traveler´s return home.
Conclusion: Hospital EDs could be considered a resource for travelers to seek rapid and efficient pre-travel prophylaxis and advice when standard travel clinic or primary care visits cannot be obtained before travel abroad. Trials of pre-travel vaccinations and advice in academic and community ED settings will determine the utilization and efficacy of this novel approach.

PO09.22
Does Pre-travel Self Assessment of Risk Reduce Adverse Events during Medical Electives?

H.C. Bond[1], S.F. Raffe[1], K. Smith[2], M.L. Schmid[1]
[1]*Royal Victoria Infirmary, Infection & Tropical Medicine, Newcastle upon Tyne, United Kingdom,*
[2]*University of Newcastle upon Tyne, Medical School, Newcastle upon Tyne, United Kingdom*

Background: Medical students in Newcastle undertake an 8 week elective during year 4. A compulsory "10 hazards" risk assessment tool and HIV risk map were introduced to improve student awareness and aid pre-travel planning.
Objectives: Describe the experience of the 2012 cohort and compare this with those surveyed in 2007, prior to the introduction of compulsory risk assessment.
Method: Analysis and comparison of post-elective questionnaire on destination, pre-planning and advice, HIV prevention, malaria prevention, illness, adverse, or unanticipated events.
Results: In 2012 all 335 students completed the questionnaire: 183 female, aged 21 - 45. 87% travelled overseas, 39% to more than one country. Destination choice was wide (93% tropical/sub-tropical). 87% travelled alone. Majority (75%) sought further (sometimes multiple) travel advice in addition to compulsory university sessions: Infectious Diseases (ID) clinic 211, GP 122, alternative travel clinic 14. Malarial prophylaxis was indicated in 42%: of those 95% obtained prophylaxis and 75% were fully compliant (similar to 2007). Doxycycline was most common antimalarial agent (59%) but had side effects in 45% compared to 22% each for atovaquone/proguanil or mefloquine. Compulsory HIV prevalence risk assessment was introduced in 2012 enabling all students travelling to high risk HIV areas to access a post exposure prophylaxis (PEP) starter pack through the ID clinic compared with 67% in 2007. Potential blood-borne virus exposure was less common (5%) compared to 2007 (12%). 5 students took PEP (22 in 2007). 108 (33%) reported illness (of which 83% were diarrhoea) compared to 50% in 2007. Of those only 3 require ongoing treatment. There was no major illness. 11% reported incidences (theft in 60%), but also assault and road traffic accidents (13 incidences). There were only few unanticipated incidences mostly related to road/personal safety but also an outbreak of Ebola in Uganda curtailing an attachment of 4 students.
Conclusions: Elective travel for Newcastle medical students is generally safe, aided by pre-travel planning, risk assessment and integrated payable PEP provision. Compared to 2007 the incidence of unanticipated incidences, potential HIV exposure, malaria and general illness has been reduced. However personal safety remains a significant risk which may still be underestimated.

PO09.23
The Use of SOAP in Pre-travel Advise

O. Olatunde[1]
[1]*dalhoiuse university, Family Medicine, Moncton, Canada*

Background of the study: The SOAP outline is a generally accepted outline use in everyday patient encounter especially in family medicine in Canada
Objective: Since the act of pre-travel advise is not limited to travel specialist alone, the purpose to be able to recreate this template for the adviser could be a potential tool. The assumption is that the traveller will first consult his or her family physician before any travel specialist.
Method: Upon review of the information by the CDC (centre for disease control and prevention) and current practises, a soap template was developed
Summary of results: This template will incorporate both the basic and essential information needed for the traveller to be able to have a safe trip. There is also the expectation to satisfactorily place the traveller at a risk level that could entail referral to the appropriate medical or travel specialist.
Conclusion: The expectation is that the template can be talked about and ideas for change if any, to be obtained during the conference. This criticism will then be put into use for updating this template which can then be used by anyone that is giving the pre-travel consultation

PO09.24
Development of the Scottish Malaria Advisory Group 2012

L. Boyne[1], C. Doherty[2], F. Genasi[1], M. Jones[3], A. MacConnachie[4], F. Marra[5], C. Redman[1], K. Smith[1], H. Sutton[1], M. Umeed[6]
[1]Health Protection Scotland, Travel and International Health Team, Glasgow, United Kingdom, [2]Royal Hospital for Sick Children, Yorkhill, Paediatric Infectious Disease, Glasgow, United Kingdom, [3]Western General Hospital, Regional Infectious Diseases Unit, Edinburgh, United Kingdom, [4]Gartnavel General Hospital, Brownlee Infectious Diseases Unit, Glasgow, United Kingdom, [5]Brownlee Infectious Diseases Unit, Pharmacy, Glasgow, United Kingdom, [6]General Practice, Specialist Nurse Practitioner, Glasgow, United Kingdom

Background: A key remit of the Travel & International Health (T&IH) Team in Health Protection Scotland (HPS) is the provision of information and advice to health care professionals and the general public on the prevention of malaria. This information is disseminated mainly through the TRAVAX and fitfortravel websites.
The malaria advice on TRAVAX and fitfortravel is consistently cited as one of the most popular and well used aspects of the websites. Malaria advice includes general principles of malaria prevention but also more detailed information, for example country specific risks, levels of drug resistance, chemoprophylaxis recommendations, and the ´malaria maps´.
Objectives: In 2012 the HPS T&IH team set up the Scottish Malaria Advisory Group (SMAG) to provide a governance structure representing the NHS in Scotland that is professional, knowledgeable and easily accessible. This governance shall ensure that malaria advice published by the T&IH Team is evidence based, practical and patient focussed.
Methods: The group is made up of representation from the following:

- Two Infectious Diseases (I.D.) Consultants in Scotland (both external to HPS and one to act as Chair of the group).
- Consultant Paediatric I.D. Physician.
- Pharmacist.
- Representative from General Practice.
- Representative from Scottish Government.

In addition, the HPS T&IHealth team take part (Medical Lead, Travel Health Nurse Consultant, two Specialist Travel Health Nurses (one to act as Secretariat for the group), and an Epidemiologist.
The group will meet at least twice per year. Minutes of the meetings will be published on TRAVAX and a copy will be sent to the Chair of the ACMP. Where SMAG recommendations differ from those of other UK authorities and where such differences are considered by SMAG to be significant, T&IH Team will inform the other authorities of these differences prior to publication on TRAVAX and fitfortravel.
Results: Examples of problem areas SMAG were asked to consider and advise on in the first six months include:

- countries in sub-Saharan Africa with areas of high altitude where malaria risk is lower, but where the high altitude areas are difficult to show clearly on the malaria map
- changes to malaria advice for India.

Conclusions: In 2012 the Scottish Malaria Advisory Group (SMAG) was developed to provide a governance structure to ensure that malaria advice published by the HPS T&IH Team is evidence based, practical and patient focussed.

PO09.25
Economics of Malaria Prevention in United States Travelers to West Africa

M.S. Coleman[1], K. Adachi[1], N. Khan[2], E.S. Jentes[3], P. Arguin[4], S.R. Rao[5,6], R.C. LaRocque[7,8], M.J. Sotir[3], G. Brunette[3], E.T. Ryan[7,8], M.I. Meltzer[9], The Global TravEpiNet Consortium
[1]CDC, DGMQ Policy Team, Atlanta, United States, [2]CDC, DGMQ, Atlanta, United States, [3]CDC, Travelers Health, Atlanta, United States, [4]CDC, DPDM, Atlanta, United States, [5]University of Massachusetts Medical School, Department of Quantitative Health Sciences, Worcester, United States, [6]Bedford MA Medical Center, Center for Health Quality, Outcomes, and Economics Research, Bedford, United States, [7]Massachusetts General Hospital, Division of Infectious Diseases, Boston, United States, [8]Harvard Medical School, Department of Medicine, Boston, United States, [9]CDC, DPEI, Atlanta, United States

Background: Pre-travel health consultations help international travelers reduce and manage travel-related illness risks through education, vaccination, and medication.
Objective: Evaluate the costs and benefits of that portion of the health consultation associated with malaria prevention provided to U.S. travelers bound for West Africa.
Methods: The estimated change in risk of disease and associated costs and benefits resulting from traveler adherence to malaria chemoprophylaxis were calculated from two perspectives: the health care payer's and the traveler's. We used data from the Global TravEpiNet (GTEN) consortium, a network of U.S. travel clinics that collects de-identified pre-travel data for international travelers. Disease risk and chemoprophylaxis effectiveness data were estimated from published medical reports. Direct medical costs were obtained from the Nationwide Inpatient Sample and published literature.
Results: We analyzed 1,029 records from January 2009 to January 2011. Assuming full adherence to recommended chemoprophylaxis regimens, pre-travel consultations saved health care payers a per-traveler average of $14 (9-day trip) to $372 (30-day trip). For travelers, the pre-travel consultation resulted in a range of net cost of $20 (9-day trip) to a net savings of $32 (30-day trip). Differences were mostly driven by risk of malaria in the destination country.
Conclusions: In addition to reducing the risk of contracting malaria, both health care payers and travelers save money when travelers adhere to malaria recommendations and prophylactic regimens in West Africa, especially for longer durations of travel. This is a potential incentive to health care payers to offer consistent pre-travel preventive care to travelers.

PO10 Professional Education and Training

PO10.01
Membership Examination of the Faculty of Travel Medicine (Royal College of Physicians and Surgeons of Glasgow) - Part 2 Objective Structured Clinical Examination

L. Boyne[1], E. Anderson[2], L. Bramham[3], P.L. Chiodini[4], G. Flaherty[5], A. Green[6], A. Grieve[1], V. Hogg[7], M. Jones[8], A. McDonald[1], A.W. Todd[9]
[1]Royal College of Physicians and Surgeons Glasgow, Faculty of Travel Medicine, Glasgow, United Kingdom, [2]NHS Greater Glasgow and Clyde, Public Health Protection, Glasgow, United Kingdom, [3]MASTA, Leeds, United Kingdom, [4]Hospital for Tropical Diseases, London School of Hygiene and Tropical Medicine, London, United Kingdom, [5]National University of Ireland, School of Medicine, Galway, Ireland, [6]Royal Centre for Defence Medicine, Infection Prevention and Control, Birmingham, United Kingdom, [7]Royal College of Physicians and Surgeons Glasgow, Department of Examinations, Glasgow, United Kingdom, [8]Western General Hospital, Regional Infectious Diseases Unit, Edinburgh, United Kingdom, [9]Monklands Hospital, Infection Unit, Airdrie, United Kingdom

Background: The Royal College of Physicians and Surgeons Glasgow (RCPSG) established the first Faculty of Travel Medicine (FTM) in 2006. The Faculty aims to lead the way in setting the highest possible standards in travel medicine. Members benefit from high quality education and training, continuing professional development and examinations and assessment.
Admission to the Faculty as a Member is through successful completion of *Part 1 (written) and Part 2 (practical) examinations.
[*Entrance to Part 2 examination is through written confirmation of Pass in Part 1 examination, or possession of an exempting qualification i.e. RCPSG Diploma in Travel Medicine or the International Society of Travel Medicine (ISTM) Certificate in Travel Health].
Objectives: This paper will describe the first diet of the FTM Part 2 examination which took place in Glasgow on 24th May 2012.
Methods: The FTM Part 2 examination is an Objective Structured Clinical Examination (OSCE) consisting of up to 20 stations. In this first diet there were 15 stations each of 8 minutes duration.
Of the 15 stations, 12 were talking stations with the presence of an examiner and simulated patient (actor) and 3 were non-talking. Candidates were given brief written instructions prior to each station.
Examination content was based on the syllabus (topics and competencies). Examples of stations include:

- yellow fever risk assessment and advice, demonstration of vaccine administration and certificate completion
- advice for a pregnant traveller going to the Dominican Republic
- demonstrating knowledge of water purification methods (non-talking station).

Prior to the exam, examiners were given formal training by an educational specialist and set the examination passing standard, using the Angoff method of standard setting.
Summary of Results: The pass rate for the first diet was 46%. This is comparable with other Membership examinations and is within expected parameters. Independent statistical analysis concluded that the examination performed well with good reliability. Only one station / question did not perform well in terms of reliability.
Conclusions: The RCPSG Faculty of Travel Medicine aims to lead the way in setting the highest possible standards in travel medicine. Entrance to the Faculty as a member is through successful completion of *Part 1 and Part 2 Examinations. Applicants are invited for 2013.

PO10.02
Information Overload or News You Can Use: How Nurses View Travel Immunization Resources

G. Rosselot[1], E. Rosenblatt[2], American Travel Health Nurses Association Board of Directors
[1]Travel Well of Westchester, Inc., Briarcliff Manor, United States, [2]University of Wisconsin Medical Foundation, Madison, United States

Background: The American Travel Health Nurses Association (ATHNA) is the only organization in North America focused solely on the professional development of nurses caring for the international traveler. Immunizations are a critical component of the pre-travel visit. Since 2004 ATHNA has developed multiple communication methods to inform and educate nurses about travel vaccines. In 2012 ATHNA undertook a descriptive study to evaluate these methods and to also learn about preferences for other immunization education resources.
Objectives: The purpose of this study was to determine how ATHNA members perceive the value of 4 immunization communications as educational resources: web postings, bimonthly newsletter, Facebook page postings, and online puzzles. In addition, nurses were asked to identify other immunization resources they regularly use and to rank 7 potential methods for vaccine education and updates.
Methods: 152 ATHNA members were invited to complete a 10 item electronic questionnaire using Surveymonkey.
Results: Overall response rate was 45% (81 % RNs / 19% Advanced practice nurses). 87% ranked the ATHNA newsletter as very useful for vaccine information and education. The website update, *What's News*, ranked second with 67% rating it very useful. 57% of members either don't use Facebook (26%) or have not yet used this newest communication method (31%). 22% of respondents rate puzzles as very useful, but 40% do not do them. Members ranked 7 potential communications in descending order from “What I really need” to “Not important to me”: CE programs, resources lists, email blasts, more newsletter immunization content, standing orders, pediatric content, and a nurse chat room. Respondents listed 23 other immunization resources they regularly use for vaccine information.
Conclusions: This study suggests that ATHNA is meeting the perceived needs of its members for immunization education with newsletters and the *What's News* web column. Facebook and puzzles were not the most widely used vehicles for obtaining immunization information in this group. Respondents top ranked three potential communications to improve vaccination knowledge and education: #1 CE programs, #2 more immunization resource listings on the website and in the newsletter and #3 periodic email blasts to members about immunization updates. Among 23 non-ATHNA vaccine resources, three are regularly used by a majority of respondents:CDC resources, IAC, and Shoreland´s Travax EnCompass.

PO10.03
Travel Health and Cultural Awareness of Short Term Volunteers Providing Healthcare in Honduras

K. Avery[1], L. Kennedy Sheldon[2], R. Martin[1]
[1]Mount Auburn Hospital, Cambridge, United States, [2]University of Massachusetts, Boston, United States

Background: Short term service trips (≤ 3 weeks) are increasingly being utilized to provide healthcare in developing countries. Volunteer healthcare providers participating in these trips require preparation in self-care and cultural awareness prior to travel. Short term volunteers providing healthcare in Honduras have varying experience in service trips.
Objectives:
1. Assess knowledge regarding pre-travel preparation and self-care strategies of volunteers.
2. Explore volunteer's perceptions regarding the provision of culturally aware healthcare.
3. Develop and provide an educational curriculum to prepare volunteers in self-care and delivery of culturally aware care.
4. Evaluate the effectiveness of the curriculum and educational intervention.
Methods: Convenience sample of short term volunteers traveling to Honduras to provide healthcare. Mixed-methods study using questionnaires, focus groups and an educational intervention. The pre-trip questionnaire and focus group collected demographics, knowledge, and needs data, which informed curriculum development for the educational intervention. The intervention was delivered in lecture and small group discussions. The post-trip focus group and questionnaire were used to assess the educational intervention.
Results: Data from the pre-trip questionnaire (N=18) revealed the majority of participants had received preparation in self-care (85%) and two-thirds had pre-travel preparation in cultural awareness (67%). 53% felt only somewhat prepared in cultural awareness prior to their first trip. Pre-trip focus group themes included self-care, safety and fulfilling Honduran expectations. While the post-travel group was small (N-5) and all had previous trip experience, the majority felt well-prepared to stay healthy and deliver culturally aware care (80%) during the trip. Post-trip focus group themes included the trip as a transformative journey, accepting one's limitations, and the power of caring. A deeper understanding of the complexities of Honduran cultural views was also expressed.
Conclusions: Healthcare providers participating in short-term trips to developing countries such as Honduras require preparation in cultural awareness. The results of this study will be used to further refine the curriculum to prepare volunteer healthcare providers for short term service trips. Study limitations include a convenience sample and small post-trip focus group.

PO10.04

Delegated Tasks and Quality Control in the Collaboration of Nurses and Physicians Active in Travel Clinics in the Netherlands

P.A. de Beer[1,2], H.A. Caris[3]
[1]Medical Services for the Tropics Maastricht, Travel Clinics, Maastricht, Netherlands, [2]365-Center for Infection Prevention (CIP) and Travel Clinics, Utrecht, Netherlands, [3]365-Center for Infection Prevention (CIP) and Travel Clinics, utrecht, Netherlands

The extended arm construction results in two opposing views, on one hand the nurse evolves more as an assistant to the physician and on the other it induces a need for independence and a search to acquire their own identity.
Officially, according Dutch Law, extended arm construction between Physician and Nurse does not exist anymore.
We now speak of delegated tasks.
In this presentation we will present some examples of the common practice in Travel Clinics.
It include medical services to expats and trainees oversees.
Existing tools and practices used in the Netherlands will be shown and discussed including ,peer review , quality assurance, internal en external audit.
We will demonstrate how continuous training and good communication between Nurse and Physician are essential to guarantee a quality product for the customer.

PO10.05
Improving Travel Medicine Education at a Multi-disciplinary US Healthcare Company

S.A. McDevitt[1], D. Keane[2]
[1]Walgreens - Take Care Health Systems, Product Solutions, New York, United States, [2]Walgreens - Take Care Health Systems, Corporate Health, New York, United States

Background: Over the past seven years, the Travel Medicine Education Program at Walgreens' Take Care Health Systems (TCHS) clinics has evolved to improve the traveler's health through better risk assessment and the communication of risk management strategies.
Objective: To improve educational programs to allow learners to perform effective risk assessment and risk management strategies, for optimized patient outcomes.
Method: A reflective study of curriculum was undertaken to determine areas for improvement, supplemented by a review of learner feedback and evaluation to determine areas for future focus.
Results: The study found that the concept of risk management was the most difficult to effectively convey and learn. Most clinicians initially focused on vaccine administration over patient education and risk management planning, necessitating a redirection of the learners' practice focus. Time constraints were reported to negatively impact the destination research critical to the development of an effective risk assessment and risk management plan.
Conclusions: Travel Medicine, already offered in many of the 300 TCHS worksite clinics, is expected to expand further in 2013. Travel Medicine is also rapidly expanding in the Walgreens retail pharmacies. The expanded focus will necessitate enhanced and truly effective educational experiences. At present, the educational programs are delivered via live webinars in six one-hour live sessions four times per year, and in a four-hour intensive learning module. A learner-paced web-based curriculum is also available. The curriculum has been rewritten to focus on building risk assessment and management plans, with a series of scenarios presented throughout the six weeks.

PO10.06

The Travel Health Advisory Group, Australia: A Joint Travel Industry and Travel Health Special Interest Group Promoting Healthy Travel

P.A. Leggat[1], Travel Health Advisory Group, Australia
[1]*James Cook University, Discipline of Public Health and Tropical Medicine, Townsville, Australia*

Introduction: The Travel Health Advisory Group (THAG), established in 1997, is a joint initiative between the Australian travel industry and travel medicine professionals that aims to promote healthy travel. THAG seeks to promote cooperation in improving the health of travellers between the travel industry and travel medicine professionals and to raise public awareness of the importance of travel health.
Methods: The major activities of THAG are described which include: networking and exchange among groups interested in travel health; undertaking travel health research; travel health promotion targeting travel service providers and the public; and the redevelopment of an increasingly popular travel health public website and bookmark.
Results: THAG became affiliated with The Australasian College of Tropical Medicine (ACTM) as a Special Interest Group in 2011. THAG´s welltogo.com.au website, developed in 2004, was updated and relaunched in 2011, and was ranked Page 1 (#3) on a search of Google.com.au (as at 10 January 2013) and Page 3 (#3) on a search of Google.com (as at 10 January 2013). The THAG website is mirrored on other websites, such as welltogo.org.au, launched in 2011.THAG members advocate for healthy travel in a number of forums and is strengthening its links with the travel industry. An updated travel health bookmark is now available. THAG has also undertaken a number of research projects published in leading travel medicine journals and 1000´s of THAG travel health bookmarks continue to be circulated amongst travel health providers and the travel industry.
Conclusion: A partnership approach between the travel industry and travel medicine professionals can effectively support a range of activities to promote the health of travellers. THAG programs, including the welltogo.com.au website, are making an important contribution in providing information to the Australian public on travel health.

PO11 Returning Travellers

PO11.01
The Risk Factors of the Colonization of Extended-Spectrum β-Lactamase Producing *Escherichia coli* in the Stools of Returning Japanese Travelers: A Retrospective Case-Control Study

K. Yaita[1], T. Suzuki[1], Y. Yoshimura[1], N. Tachikawa[1]
[1]*Yokohama Municipal Citizen's Hospital, Division of Infectious Diseases, Yokohama, Japan*

Background: Travel overseas has recently been considered a risk factor for the colonization of drug-resistant bacteria. However, the epidemiology and risk factors associated with the acquisition of drug-resistant bacteria by Japanese travelers have not been studied.
Objective: The purpose of our study was to clarify the epidemiology and risk factors of extended-spectrum β-lactamase (ESBL) producing *Escherichia coli* colonization in Japanese returning travelers.
Method: Between October 2011 and September 2012, we screened the stools of 68 Japanese returning travelers for ESBL-producing *E. coli*. All specimens were sampled for clinical reasons. Based on the results, the participants were divided into an ESBL positive group (18 cases; 26 %) and an ESBL negative group (50 cases; 74 %), and we performed a case-control study.
Results: In univariate comparison, travel to India was the risk factor (Odds Ratio 13.6, 95% Confidence Interval 3.0-75.0, $p < 0.0001$). There were no statistical differences in the characteristics of the travel, such as backpacking travelers, purpose of travel, duration from return to sampling stool and duration of travel.
Conclusion: We must be aware of the possibilities of acquiring ESBL-producing *E. coli* during travel in order to prevent the spread of these bacteria not only in Japan but globally.

PO11.02
Schistosomiasis among Returned Travellers: A Continuing Underestimated Condition

A. Goorhuis[1], A. Bart[2], T. van Gool[2], M. van Vugt[1], C. Stijnis[1], M.P. Grobusch[1], P.P. van Thiel[1]
[1]*Academic Medical Center, Infectious Diseases and Tropical Medicine, Amsterdam, Netherlands,*
[2]*Academic Medical Center, Parasitology, Amsterdam, Netherlands*

Background: In September 2011, a 19-year old woman presented with macroscopic hematuria since 9 months. Cystoscopic examination elsewhere had raised suspicion of bladder cancer. She had travelled to Mali with her school class in august 2010, for a geography project, which had been an annual school trip for a third successive year. She had swum in fresh water in the Dogon area. After establishing the diagnosis schistosomiasis, her class mates and those from the preceding two years who had swum in the same water, were also called for testing.
Objective: To establish the rate of schistosomiasis in this patient group.
Results: We tested 23 patients, 11 from the 2010 trip (including the index case), 5 from 2009 and 7 from 2008.
Ten patients (91%) from 2010 had positive serology, versus 2 (40%) from 2009 and 5 (71%) from 2008. All positive patients from 2010 excreted viable *Schistosoma haematobium* eggs in urine/semen, versus none from 2009/2008.
Eight patients (80%) from 2010 had suffered from swimmer's itch during or immediately after swimming, versus none in 2009 and 1 (14%) in 2008. In 2010, Katayama fever had possibly occurred in 4 patients (40%), versus none in 2009 and 2 (28%) in 2008. Five patients (50%) from 2010 had present or past macroscopic hematuria, versus none from 2009 and 1 (14%) from 2008. The male patient from 2010 with eggs in his semen had an altered ejaculate. Six patients (60%) from 2010 had eosinophilia, versus none from 2009 /2008.
Discussion: Based on 1 patient, we found 22 other patients with schistosomiasis, who would otherwise not have been recognized and treated. All patients but one from 2010 were infected, all of whom excreted eggs. Of these, 40% did not have hematuria and 50% did not have eosinophilia. The attack rate in 2010 was higher than in previous years.
Conclusion: This study illustrates the annual fluctuation in epidemiology at the same site and emphasizes the need to screen every traveller exposed to fresh water in endemic areas for schistosomiasis, even in the absence of symptoms, because of the therapeutic consequences.

PO11.03

Suggestive Paradoxical Reactions after Treatment with Praziquantel in Two Asymptomatic Travelers with Chronic Stage of Schistosomiasis

P. Soentjens[1,2], A. Aerssens[1], E. Bottieau[2]
[1]Military Hospital Queen Astrid, Polyclinic Department, Brussels, Belgium, [2]Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium

Background & Objectives: Travel-related schistosomiasis is often asymptomatic. Praziquantel therapy (more than three months after the latest possible exposure) is usually considered to be safe.
We report here two initially asymptomatic cases of serologically proven schistosomiasis, which developed acute symptoms, suggestive of paradoxical reaction, immediately after their first praziquantel treatment, administered more than three months after infection.
Methods: Retrospective data were collected from the medical records.
Results: Initially both cases were asymptomatic. Diagnosis was based on positive serology, microscopy of the stools was negative. They were treated with a single dose of praziquantel (15 mg/kg). Both cases were Belgian soldiers, deployed in 2006 in Kalemie (the Democratic Republic of Congo) and diagnosed 26 and 31 months after exposure respectively. Both subjects developed acute symptoms directly following praziquantel treatment (after one day):
- Patient 1 developed severe general itching, dry cough and diarrhea for several months. There was no eosinophilia and no raised inflammation neither before nor after treatment. More extensive investigations with CT thorax-abdomen, bronchoscopy and colonoscopy didn't reveal pathogenic features. The patient was treated a second time with 3 days of praziquantel. He started methylprednisolone and was completely asymptomatic during follow-up visit six months later.
- Patient 2 suffered from profuse bloody diarrhea. He had a mild eosinophilia of 604 (10%). Colonoscopy showed an ulcerohemorrhagic rectocolitis. The patient responded well on a retreatment with praziquantel of three days, with corticosteroids. The patient was completely symptom-free after 4 months.
Conclusions: Prolonged (cutaneous, respiratory or gastro-intestinal) illness directly following praziquantel treatment has been observed in two asymptomatic travelers incidentally diagnosed with chronic schistosomiasis. Our data is limited by the retrospective design and the lack of biopsy-proof.
Clinicians have to be aware of the possibility of post-praziquantel clinical deterioration resembling paradoxical reactions even in asymptomatic patients with chronic schistosomiasis.

PO11.04
Seroprevalence of Schistosomiasis in Scottish School Groups Returning from Sub-Saharan Africa

C.C. Smith[1], C. Redman[1], F. Genasi[1]
[1]*Health Protection Scotland, Travel and International Health, Glasgow, United Kingdom*

Background: Schistosomiasis is a highly prevalent parasitic infection causing significant morbidity and mortality in sub-Saharan Africa and other endemic areas. Exposure occurs as a result of contact with fresh water which harbours the snail intermediate host. Infection is often chronic and asymptomatic for many years. Long term complications such as portal hypertension and bladder carcinoma may occur in untreated patients and can be prevented by treatment with Praziquantel.
Increasingly, school groups travel to schistosomiasis-endemic areas for educational and volunteering purposes. Younger people are more likely to expose themselves to freshwater and are therefore at greater risk of infection with schistosomiasis.
Objectives: To assess the seroprevalence of schistosomiasis in children who had travelled as part of organised school groups returning from schistosomiasis-endemic areas in sub-Saharan Africa.
Methods: The Scottish Parasite Diagnostic and Reference Laboratory and Health Protection Scotland databases of schistosomal seropositive patients from 2007-2011 identified positive returning travellers aged between 12-20 years old. Discussion with local consultants in public health medicine and schools identified those who had travelled as part of organised school groups.
Results: In 2007, twelve percent (n=79) of those tested were seropositive, rising to 21% (n=147) in 2011. Forty two percent of the seropositive cases diagnosed in 2011 were aged 12-20 and approximately30-50% of those tested from school groups were seropositive. In one case, in a group that had travelled to Lake Malawi, the seroprevalence was 62%. This school had been told that the area they were visiting was schistosomiasis-free.
Conclusions:

- Schistosomal seroprevalence among school groups was high
- Most infections were asymptomatic.
- Awareness of risk appears low among those organising these trips and poor advice regarding risk may be given.
- In view of the possible serious late sequelae of schistosomiasis infection and relative ease with which it can be diagnosed and treated, raising awareness of this infection is mandatory in this group of travellers.

PO11.05

Acute Schistosomiasis: A Risk Underestimated by Travelers and a Diagnostic Challenge for Medical Practitioners

L. Rochat Stettler[1], A. Bizzini[2], N. Senn[3], P.-Y. Bochud[2], S. de Vallière[1]
[1]University Hospital, Travel Clinic, Department of Ambulatory Care and Community Medicine, Lausanne, Switzerland, [2]University Hospital, Division of Infectious Diseases, Lausanne, Switzerland, [3]University Hospital, Department of Ambulatory Care and Community Medicine, Lausanne, Switzerland

Background: After one patient, who had bathed near the Lily waterfalls in Madagascar in 2011, was admitted to our hospital with acute schistosomiasis, infection was suspected in 41 other subjects from 4 groups who visited the same place during journeys in Madagascar between 2009 and 2011.
Objective: 1) to investigate the knowledge of the travelers about the risk of schistosomiasis. 2) to investigate the challenge of diagnosing acute schistosomiasis in non-immune travelers.
Methods: A questionnaire was sent to 42 travelers about whom we learned that they visited the Lily waterfalls between 2009 and 2011. The questionnaire was centered on pre-travel knowledge of the disease, bathing conditions, clinical presentation, first suspected diagnostic and treatment. All participants except one asymptomatic traveler who was treated empirically were subjected to serologic testing.
Results: 34/42 (81%) questionnaires were returned. 28/34 travelers (82%) had a pre-travel consultation and 7/34 (20%) were aware about the risk of schistosomiasis. 32/34 (94%) reported exposure to freshwater at the Lily waterfalls. Serology was positive in 24/32 (75%) at least 4 months after exposure. 17/32 (53%) exhibited symptoms and the following diagnoses were retained after the first consultations of these patients: undetermined diagnosis and acute schistosomiasis (4 cases each), viral infection (3 cases), pneumonia, invasive gastroenteritis, amoebiasis, malaria, allergy and rheumatic disease (1 case each). The 4 patients who were correctly diagnosed with acute schistosomiasis, consulted actually after the information of acute schistosomiasis had spread among the groups and the medical practitioners of the region. None of the patients investigated before the information of the outbreak had spread, had a serology for schistosomiasis done during the first consultation.
Conclusion: Most travelers did not perceive freshwater exposure as a risk and prevention messages should therefore be enhanced during pre-travel consultations. The clinical presentation of acute schistosomiasis is often misleading. The medical practitioners involved in this outbreak did not include acute schistosomiasis in their initial differential diagnosis. The diagnosis of schistosomiasis among one member of a group with the same exposure should lead to the screening of the entire group to identify asymptomatic patients who are nevertheless at risk of complications.

PO11.06
Diagnosis of Travel-related *Schistosoma mansoni Infection* in a Cohort of 21 Subjects

P. Soentjens[1,2], L. Cnops[1], W. Peetermans[3], R. Mertens[4], J. Van der Hilst[5,6], A. Van Gompel[1], E. Van Wijngaerden[3], M. Van Esbroeck[1]
[1]Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium, [2]Military Hospital Queen Astrid, Polyclinic Department, Brussels, Belgium, [3]Internal Medicine, Universitaire Ziekenhuizen Leuven, KU Leuven, Leuven, Belgium, [4]Vrije Universiteit Brussel, Internal Medicine - Infectiology, Brussels, Belgium, [5]Jessa Hospital, Department of Infectious Diseases and Immunity, Hasselt, Belgium, [6]University of Hasselt, BIOMED, Diepenbeek, Belgium

Background: The Victoria lake is known to be a source of schistosomiasis in travelers. Most travel-related schistosomiasis is diagnosed serologically without detection of ova. We performed a multi-centre post-travel screening of 21 exposed Belgian travellers to this area with the aim of determining the clinical characteristics of imported schistosomiasis.
Methods: A group of 22 persons visited the Mfangano Island in the Victoria Lake in July 2012. All had a relative short exposure to fresh water. Serum and/or stools of 21/22 subjects were examined at six to twelve weeks post-exposure in a clinical center in Leuven (11), Antwerp (7), Hasselt (2) or Brussels (1). Diagnosis was based on the presence of Schistosoma eggs in urine and/or stools and on serology using enzyme linked immunosorbent assay (ELISA) and indirect hemagglutination assay (IHA). A genus-specific PCR to detect schistosomal DNA in stool and a PCR to detect *S. mansoni* in serum was performed on 5/7 and 7/7 of the subjects who presented for screening in Antwerp respectively.
Results: A Schistosoma infection was diagnosed during the initial screening by detection of *S. mansoni* ova in stool (2/21), positive serology (15/21) or both (1/21). The genus-specific PCR was positive in 2/5 stool samples of which one contained eggs and one belonged to a patient with antibodies. The S. mansoni PCR was positive in 6/7 sera of patients positive by microscopy (1) or serology (4).
Twelve of the 21 screened members developed symptoms: diarrhea or abdominal cramps (11), fever (5), cough or dyspnoe (4), fatigue (6), headache (2) and cutaneous lesions (4). Hypereosinophilia ($>1.0x10^9$//L) was detected in 10/21 cases.
Conclusions: Clinical aspects and laboratory test findings of travel-related schistosomiasis are very heterogeneous. We report a cluster of 17 patients with a proven S.mansoni infection: 16 were diagnosed by classical methods and 1 additional case by PCR testing on serum. All **22** group members were treated with praziquantel, mostly in two sequential phases.

PO11.07
Gastrointestinal Illnesses during and after Travel among Boston-Area International Travelers

P.V. Han[1], L.H. Chen[2,3], M.E. Wilson[4], E.S. Jentes[1], C.M. Benoit[5], W.B. Macleod[6,7], R.J. Stoney[1], D.H. Hamer[6,7,8], E.D. Barnett[5], Boston Area Travel Medicine Network
[1]Centers for Disease Control and Prevention, Division of Global Migration and Quarantine, Atlanta, United States, [2]Mount Auburn Hospital, Travel Medicine Center, Cambridge, United States, [3]Harvard Medical School, Boston, United States, [4]Harvard School of Public Health, Global Health and Migration, Boston, United States, [5]Boston Medical Center, Maxwell Finland Laboratory for Infectious Diseases, Boston, United States, [6]Boston University, Center for Global Health and Development, Boston, United States, [7]Boston University School of Public Health, International Health, Boston, United States, [8]Boston University School of Medicine, Infectious Diseases, Boston, United States

Objectives: To describe 1) types of gastrointestinal illness (GII) occurring during and/or after travel among international travelers; 2) impact of GII on planned activities; and 3) association of GII with adherence to prevention measures.
Methods: Surveys were conducted from 2009 to 2011 among travelers ≥18 years of age attending 3 Boston-area travel clinics. Travelers completed pre-travel surveys, at least one survey weekly during travel, and a post-travel survey 2-4 weeks after return. GII was defined as ≥1 symptom, including diarrhea, constipation, nausea/vomiting, or abdominal pain. Data were evaluated by chi-square test for categorical and Wilcoxon rank sum test for continuous variables. Weekly dietary practices during travel were analyzed by using logistic generalized estimating equation models.
Results: Of 628 travelers who completed all three surveys, 253 (40%) experienced GII during and/or after travel. Of those with GII, 82% had diarrhea, 21% nausea/vomiting, 19% constipation, and 13% abdominal pain. Most travelers (99%) received advice about food/water precautions and diarrhea management during pre-travel consultation. Of the 205 experiencing GII during travel, 23% stopped activities, 6% saw a doctor, and 1% were hospitalized. Among the 105 with GII after travel, 21% stopped activities, 13% saw a doctor, and none were hospitalized. Those who developed GII during and/or after travel had been prescribed ciprofloxacin (63%), loperamide (62%), and azithromycin (33%) before travel. Those with GII traveled for slightly longer durations than those who remained healthy (median, 13 days vs. 11 days, $p< 0.001$). Destination (based on UN human development rankings) was not associated with GII ($p=0.06$). Of those with GII, 58% ate salads at least once during their trip, 49% had ice in drinks, 26% consumed unpasteurized dairy products, and 16% drank tap water. Consuming unpasteurized dairy products was the only dietary factor significantly associated with GII ($p=0.02$ during only, $p=0.048$ during and/or after travel).
Conclusion: A high proportion of travelers experienced GII during and/or after travel; these illnesses resulted in interruption of activities and in health care visits. Despite receiving pre-travel advice, travelers still engaged in risky dietary practices. Health care providers should continue to emphasize food/water precautions, particularly avoidance of unpasteurized dairy products, and consider providing medication to treat GII during travel.

PO11.08
A Returning Traveller with Congo Crimean Haemorrhagic Fever: Challenges and Lessons

A. MacConnachie[1], D. Barr[1], D. Bell[1], R. Fox[1], M. Jacobs[2], I. Cropley[2], S. Hopkins[2], N. Dawood[2], C. Aitken[3], C. Brown[4], T. Brooks[4], S. Ahmed[5], B. Jeffs[1]
[1]Brownlee Infectious Diseases Unit, Glasgow, United Kingdom, [2]Royal Free NHS London Foundation Trust, London, United Kingdom, [3]West of Scotland Specialist Virology Centre, Glasgow, United Kingdom, [4]Health Protection Agency, Porton Down, United Kingdom, [5]Department of Public Health, NHS Greater Glasgow and Clyde, Glasgow, United Kingdom

A 41 year old man was admitted with a non specific febrile illness on return from Afghanistan. Specialist review highlighted the possible diagnosis of Congo Crimean Haemorrhagic Fever (CCHF) and the diagnosis was subsequently confirmed. Early recognition allowed appropriate infection control measures to prevent nosocomial transmission. Unfortunately, despite aggressive management and transfer to a specialist unit in London the patient did not survive.
This is the first known case of CCHF in the UK and it highlighted a number of challenges. These include presentation to a non specialist setting, the importance of specialist review in addition to national guidelines, management of a critically ill patient with minimal laboratory back up, the investigation and management of contacts and the logistics of transferring an infectious patient to a specialist unit. These issues were overcome through multi agency working and adaptive clinical practice. The lessons learned from this case must be shared because extensive population travel makes it likely that other units will have similar experiences.

PO11.09

Hepatitis A with Delayed Elevation in the Serum Hepatitis A Virus-specific Immunoglobulin M Antibody Titer: A Case Report and Literature Review

J. Sugihara[1], Y. Kato[1], K. Takahashi[2], Y. Yanagawa[1], M. Ujiie[1], N. Takeshita[1], S. Kanagawa[1], N. Ohmagari[1], S. Mishiro[2]
[1]National Center for Global Health and Medicine, Disease Control and Prevention Center, Tokyo, Japan, [2]Toshiba General Hospital, Department of Medical Sciences, Tokyo, Japan

Background: Hepatitis A is usually diagnosed on the basis of the serum hepatitis A virus (HAV)-specific immunoglobulin M (IgM) antibody titer. The sensitivity and the specificity of this assay is almost 100% at the onset of the disease, and this assay is believed to be a "gold standard" of hepatitis A diagnosis. However, several studies have shown that this test yields a negative result at the onset of the infection.
Objective: To describe a patient with hepatitis A, in whom the HAV IgM antibody titer was initially negative, and to review the literature concerning this case.
Methods: We performed serological and virological analyses of the blood samples of this patient, and we reviewed the literatures of similar cases.
Case report: A 53-year-old previously healthy woman developed headache and fever a day prior to her visit to our clinic. She had been to Papua New Guinea for 8 days—21 days prior to the onset of the disease—and she was not vaccinated against hepatitis A. On day 3 after the onset, acute elevation in the levels of serum aminotransferases was observed, but the serum HAV IgM antibody titer was negative. High fever was sustained until day 5. Her serum alanine aminotransferase levels increased to nearly 4000 IU/L, and prothrombin time was prolonged to 42%. Her bilirubin levels increased from day 5. We rechecked the HAV IgM levels and obtained positive results on day 10.
Results: A retrospective analysis of serum HAV RNA PCR and HAV IgM assay of the preserved specimens revealed that seroconversion occurred between days 6 and 7. Complete sequencing of the HAV genome confirmed that the virus belonged to the IA genotype-the most common genotype found globally. A retest using the other lot of the HAV IgM kit showed the same result. The patient was not infected with HIV nor was she using immunosuppressive drugs . Her serum immunoglobulin status was also normal.
Conclusion: The sensitivity of the HAV IgM assay is almost 100%, but it is not 100%. If hepatitis A is suspected even after obtaining negative results for HAV IgM, RNA PCR or recheck of HAV IgM titer should be performed for confirmation.

Year	First Author	Country	Journal	n	Method	Comorbidity
2012	Hyun JJ	S Korea	Korean J Hepatol	28	N/A	N/A
2011	Chakvetadze C	France	Ann Intern Med	1	ELISA (Bio-Rad®)	Rheumatoid Arthritis with rituximab
2010	Shin HP	S Korea	Dig Dis Sci	13	ECLIA (Roche®)	N/A
2010	Jung YM	S Korea	J Med Virol	38	N/A	N/A
2008	Lee EJ	S Korea	Korean J Gastroenterol	15	N/A	N/A
2003	de Paula VS	Brazil	J Clin Virol	12	ELISA (Abbott®)	N/A
1996	Wilairatana P	Thailand	SEA J Trop Med Public Health	1	N/A	N/A
1995	Hirata R	Japan	Am J Gastroenterol	2	N/A	N/A

[Reported cases of seronegative hepatitis A]

PO11.10
Diagnosis and Management of Travellers Returning from a Developing Country

P. Zimmermann[1], K. Mühlethaler[1], H. Furrer[1]
[1]*University Hospital, Department of Infectious Diseases, Bern, Switzerland*

Background: With the significant increase in international travel health care providers need a wide understanding of the changing spectrum of travel related diseases and their management.
Objective: To identify likely diagnosis of returning travellers presenting to an outpatient clinic according to destination and profile of the travellers.
Method: The charts of 360 patients returning from a developing country who sought medical care at the outpatient infectious disease clinic of the University Hospital of Bern, Switzerland were reviewed. The spectrum and frequency of different symptoms and diseases were correlated to the areas visited. Further we analysed the duration and purpose of travel to delineate their effect on clinical presentation. The diagnostic strategies and the applied therapies were investigated.
The role of pre-travel advice and immunisation was taken into consideration.
Results: The main symptoms were gastrointestinal complaints (n=200, 56%) and fever (n=124, 21%) followed by skin problems (n=40, 11%). Longer duration of travel, close contact to the population and repeated travel to the destination were all associated with a higher occurrence of both fever and diarrhoea. Travellers who originated from the destination less often suffered from diarrhoea (p=0.01). The most frequent diagnosis was “flu-like” illness in 44 patients (12%). In 45% (n=161) no specific diagnosis was made. 30% of the travellers (n=108) were diagnosed with a specific imported infectious disease; malaria (6%), giardiasis (6%) and amebiasis (4%) being the most prevalent. Among patients with diarrhoea a specific diagnosis was made in 56 cases (31%) and among patients with fever in 73 cases (75%). 23 travellers presenting with fever were diagnosed with malaria (9 with falciparum malaria) and 6 with dengue fever. 12 patients (3%) needed hospitalisation. Specific antimicrobial treatment was administered to 83 patients (23%).
Conclusions: More than half of the traveller's illnesses presented to an outpatient clinic are self-limiting or can not be specified. Destination is the main predictor for different diseases, but individual risk factors need to be accounted. Malaria remains the most frequent potentially life-threatening disease. In less than 25% of patients a specific antimicrobial treatment is indicated.

PO11.11

Common-sense Interpretation and Application of An International Treaty: Applying International Health Regulations At Points of Entry

C.A. Redman[1], J. Hart[2], A. Wilson[3], N. Black[4], K. Smith[5]
[1]Health Protection Scotland, Glasgow, United Kingdom, [2]Public Health Wales, Mold, United Kingdom, [3]Public Health Agency Northern Ireland, Belfast, United Kingdom, [4]Health Protection Agency, Newcastle, United Kingdom, [5]Health Protection Scotland, Medical Lead - Travel Health, Glasgow, United Kingdom

Background: As a signatory to the international Health Regulations (IHR) the United Kingdom (UK) undertook to enhance surveillance and response capabilities in order to reduce the risk of wide-spread, cross-border spread of infectious, radiological, nuclear, and chemical agents and contaminants. As part of this commitment and in line with IHR the UK agreed to designate appropriate sea and air ports.
Objectives: To apply articles 19-21 of the IHR in order to identify points of entry (sea and air ports) as Designated Points of Entry (DPsoE).
Method: Following the IHR and WHO Guidance on Core Capacity Requirements for DPsoE the four administrations for the UK (England, Scotland, Wales and Northern Ireland) surveyed ports against WHO criteria, amended to improve capture of data on port limitations. Following the surveys the UK set up a DPoE Working Group to work through issues and to present a list of UK ports for designation. The Working Group analysed barriers to designation, taking into account views and advice from health protection, port operators, and the Civil Aviation Authority.
Results: Surveys carried out separately in the four administrations highlighted a high standard of practice from public and environmental health responders as well as airport operators. Also noted was a common concern among port operators as to how designation would affect business if it carried with it special responsibility for responding to public health emergencies of international concern (PHEIC). After considering IHR documentation and submissions from key parties the Working Group considered the wording of IHR to be a major barrier to designation as it allowed wide interpretation of DPsoE, from any international point of entry in a state to one per state. In additional problems were foreseen in utilising DPsoE during any PHEIC arising from the all hazard approach and international aspect of potential PHEICs and the need to clarify what would be expected from international hubs which were not DPsoE.
Conclusions: UK port health response at international ports operates at a high standard. However, if DPsoE are not clearly defined , co-ordinated and planned for, confusion may result in early stages of any PHEIC resulting in increased risk to public health.

PO11.12
Leishmaniasis Acquired by Travellers to Endemic Regions in Europe - a EuroTravNet Multi-Centre Study

J.P. Cramer[1,2], U. Ehehalt[1], M. Schunk[3], M. Jensenius[4], P.J.J. van Genderen[5], E. Gkrania-Klotsas[6], F. Chappuis[7], P. Schlagenhauf[8], R. Lopez-Velez[9], P. Parola[10], G.D. Burchard[1,2]
[1]University Medical Center Hamburg-Eppendorf (UKE), Section Tropical Medicine, Hamburg, Germany, [2]Bernhard Nocht Institute for Tropical Medicine (BNITM), Clinical Research, Hamburg, Germany, [3]Ludwig-Maximilians University of Munich, Department of Infectious Diseases and Tropical Medicine, Munich, Germany, [4]Oslo University Hospital and University of Oslo, Department of Infectious Diseases, Oslo, Norway, [5]Harbor Hospital, Institute for Tropical Diseases, Rotterdam, Netherlands, [6]Addenbrooke's Hospital, Department of Infectious Diseases, Cambridge, United Kingdom, [7]Geneva University Hospitals and University of Geneva, Geneva, Switzerland, [8]University of Zurich Centre for Travel Medicine, Division of Epidemiology and Communicable Disease, Institute for Social and Preventive Medicine, Zurich, Switzerland, [9]Hospital Universitario Ramón y Cajal, Tropical Medicine and Clinical Parasitology, Infectious Diseases Department, Madrid, Spain, [10]Aix-Marseille-Université and Assistance Publique-Hôpitaux de Marseille, University Hospital Institute in Infectious Diseases, Tropical Medicine Unit, Marseille, France

Leishmaniasis is a disease caused by protozoan parasites which belong to the genus *Leishmania.* Important clinical manifestations of leishmaniasis include cutaneous leishmaniasis (CL) and visceral leishmaniasis (VL). About 90% of cases with leishmaniasis occur in the tropics or subtropics but the disease is also endemic in the Mediterranean area. To date, no systematic analysis on leishmaniasis in European travellers visiting endemic areas in Europe is available.
Within the European travel medicine network EuroTravNet (www.eurotravnet.eu), we performed a retrospective analysis in travellers who acquired leishmaniasis within Europe diagnosed within the years 2000 to 2012. A total of 40 cases of leishmaniasis (30 CL and 10 VL) were reported; the majority of cases were acquired in Spain (*n*=20, 50%) followed by Malta and Italy (each *n*=7, 18%); 48% of the cases were diagnosed in females. The median age at diagnosis was 47 years (range 1 - 79). In the majority of cases the travel reason was tourism (83%). The median duration of travel for patients with CL and VL was 2 weeks with ranges of 1 - 21 weeks in CL and 1 - 67 weeks in VL, respectively (*P*=0.03).
Health professionals should include leishmaniasis in the differential diagnosis in patients returning from southern Europe with typical skin lesions (CL) or systemic alterations like fever, hepatosplenomegaly and pancytopenia (VL).

PO11.13
Melioidosis: A Case Report in a Returning Traveler from Singapore

S. Amadasi[1], S. Dal Zoppo[1], L. Signorini[1], F. Castelli[1]
[1]*University Division of Tropical Medicine and Infectious Diseases, Brescia, Italy*

Background: Melioidosis is caused by *Burkholderia pseudomallei*, an environmental gram-negative bacterium which is present in soil and surface water in endemic regions (South East Asia, Northern Australia and China). Cases reported outside these regions are mostly from travelers to areas of endemicity.Transmission of infection occurs via percutaneous inoculation, inhalation or occasionally ingestion.Most cases are probably subclinical. The most common clinical manifestations are pneumonia, localized skin infection (ulcers or abscesses) and bacteremia. The bacteremic spread of *B. pseudomallei* can result in clinical manifestations involving virtually any site (e.g. parenchymal abscesses, septic arthritis or osteomyelitis).
Medical History: F. is an italian healthy man aged 37. He went to Singapore for a business travel from 13th to 19th June 2010. Since the return he presented fever, asthenia, dry cough and diffused myalgias. The general practicioner prescribed ceftriaxone with no benefit so on 25th June he was admitted to the Internal Medicine ward.
Diagnostic Pathway: The abdomen ultrasound showed a mild hepatosplenomegaly. A chest CT scan revealed the presence of bilateral pulmonary nodules of 4 mm of diameter. Biochemical tests showed a mild neutrophilic leukocytosis (WBC 10920 cells/µl) and an elevated C-Reactive Protein (16.7 mg/dL, normal values < 1mg/dL). On the 29th June *Burkholderia pseudomallei* was isolated from blood cultures. An antibiotic therapy with high-dose intravenous ceftazidime was started and on 30th June F. was moved to the Infectious Diseases ward.
Therapeutic Choice: A combination therapy with intravenous meropenem 1g q6h and oral CTX 160/800 mg tid was initiated. An abdominal CT scan revealed the presence of a hypodense splenic lesion, most likely suspected for abscess localization. Moreover, because of the onset of pain and impaired function at the right shoulder, CT and MR scan were performed with evidence of localization of the infection at the head of the homerus. F. was discharged on 13th July after two weeks of intensive therapy.
Outcome: An eradication therapy with oral CTX was carried on for six months because of the suspected osteomyelitis. Follow-up was performed with abdominal CT scan, shoulder CT scan and PET/CT scan at the end of the entire period of treatment. All the exams resulted negative.

SUSCEPTIBILITY	Amoxicillin/clavulanate, ceftazidime, imipenem, meropenem, trimethoprim/sulfamethoxazole (CTX), piperacillin/tazobactam.
INTERMEDIATE SUSCEPTIBILITY	Quinolones.
RESISTANCE	Aminoglycosides, ampicillin, tigecyclin, ertapenem and colistin.

[Burkholderia psudomallei, Antimicrobial s]

PO11.14
HIV and Hepatitis A, B and C Screening in Patients Admitted with Imported Malaria

A.S. Santos[1,2], C. Abreu[1,2], A. Sarmento[1,2]
[1]Hospital S João, Infectious Diseases, Porto, Portugal, [2]Medical School, Porto, Portugal

Background: persons returning from African countries are at higher risk of hepatitis and HIV infection due to higher prevalence rates of these diseases.
Aim: to screen for HIV and hepatitis A, B and C in patients admitted with imported African malaria.
Methods: the clinical charts from adult patients returning from African countries and admitted with malaria from 1 January 2005 to 31 December 2012 were retrospectively reviewed concerning demographic data and results of hepatitis A B and C and HIV screening.
Results: from the 92 patients included 81 (88%) were men, median age 42 years-old and standard deviation 9.7 years. From the 78 (85%) tested for HIV two(2.6%) were positive and not known before and another two had a false positive ELISA test associated with malaria; 74 (94.8%)were HIV negative. All the 14 (15%) patients tested for hepatitis A were immune. Hepatitis B screening was done in 68 (74%): 33 (49%) were susceptible, 25 (37%) were immune and 10 (15%) had seromarkers of cure. From the 61 (66%) patients tested for hepatitis C one was positive and 60 were negative.
Conclusions: in this population of 92 in-patients with malaria, mainly of middle age man, it seems worthwhile to screen for HIV and hepatitis B and C virus: two were HIV infected, 10 had had hepatitis B and cured and one was hepatitis C infected. Remarkably two patients had a false positive HIV test. Although almost all of the patients had had a pre-travel appointment, 49% of those tested would beneficiate from hepatitis B vaccination; curiously from the 14 patients tested all were immune for hepatitis A, probably reflecting the prevalence of the disease in our country, more than vaccination.

PO11.15

Usefulness of Influenza Rapid Diagnostic Tests for the Management of Travellers Returning with Fever: a Randomized Controlled Study

D. Berthod[1,2], B. Genton[1,2,3], J. Blum[3], C. Hatz[3], S. de Vallière[1]
[1]Travel Clinic, Department of Ambulatory Care and Community Medicine, University Hospital, Lausanne, Switzerland, [2]Division of Infectious Diseases, University Hospital, Lausanne, Switzerland, [3]Swiss Tropical and Public Health Institute, Basel, Switzerland

Background: Because of the rather low sensitivity of rapid diagnostic tests for influenza (RDTi) and the high positive predictive value of clinical signs in epidemic period, RDTi are only recommended for population with intermediate risk for influenza. WHO considers returning travellers with fever such a population and proposes to use RDTi's in this context.
Objective: The objectives of this study were to assess whether the use of a RDTi modified the clinical management of febrile returning travellers.
Methods: Inclusion criteria were fever >38°C or history of fever plus respiratory symptoms in the last 4 days occurring within 14 days after returning from a trip abroad. Eligible patients were randomized into 2 groups: i) patients with RDTi performed (BD Directigen A+B), ii) patients receiving usual care. All patients had a nasopharyngeal swab to detect influenza by PCR but the result was not available for clinicians. Physicians were asked to estimate the likelihood of influenza on clinical grounds. Clinical management was evaluated on the basis of number of visits, number and cost of investigations and prescription of anti-infective drugs.
Results: 100 patients were recruited. 7 patients did not have a PCR test. Among the 93 remaining, 28 (30%) had a positive PCR. When the probability of influenza was estimated to be >50% on clinical grounds, the PCR was positive in 58% of patients. Cases occurred throughout the year. The sensitivity of the rapid test was only 20%, and specificity 100%. In the group with RDTi mean cost of medical management was USD 546 (95%CI 481-611) and in the group without RDTi the costs were USD 689 (95%CI 553-825). Antibiotics were used in 24% (95%CI 14-34%) of patients with RDTi and in 32% (95%CI 17-47%) of patients without RDTi.

Estimated probability of influenza based on clinical evaluation	Number of patients	Number of patients with positive PCR for influenza
0-19%	21	0(0%)
20-39%	13	0(0%)
40-59%	22	9(40%)
60-79%	12	8(67%)
80-100%	19	10(53%)

[PCR proven cases of influenza compared to estimat]
Conclusion: Influenza was a frequent cause of fever among these febrile returning travellers. The likelihood of PCR proven influenza increased with higher probability estimated on clinical grounds. The use of RDTi seemed to lower cost of medical management and decrease antibiotic use, but these trends were not statistically significant, possibly because of the small sample size and/or the very low sensitivity of the RDTi.

PO11.16
Medical Tourism: Infection with Acid Fast Bacteria after Cosmetic Breast Surgery in India

C.D. Vinnemeier[1], A. Wawrzyniak[2], G.D. Burchard[1,3], S. Schmiedel[1], J.P. Cramer[1]
[1]University Medical Center Hamburg-Eppendorf (UKE), Section Tropical Medicine, Hamburg, Germany, [2]Department of Tropical Medicine at the Bernhard Nocht Institute, German Armed Forces Hospital of Hamburg, Hamburg, Germany, [3]Bernhard Nocht Institute for Tropical Medicine (BNITM), Tropical Medicine, Hamburg, Germany

In recent years, non-tuberculous mycobacteria (NTM) have increasingly been reported as important etiological agents causing skin and soft tissue infections in healthy persons. The majority of affected patients have undergone surgical interventions or cosmetic procedures subsequently resulting in the development of abscesses, ulcers and suppurative nodules. Notably, mesotherapy - a cosmetic procedure comprising injection of vitamins or lecithin - as well as liposuction and breast augmentation in poor hygienic settings have been related to outbreaks of NTM infections. Therefore, NTM infections may play an increasingly important role in medical tourism and travel medicine.
Here, we describe the clinical case of a male European patient residing in the Middle East who was admitted to our clinic with a non-healing wound after cosmetic breast surgery in India.
A 38-year old patient originating from Scandinavia presented to our hospital with chronic granulomatous leasions at both mammae. In July 2012, he had undergone a cosmetic surgical breast reduction for gynaecomastia in Mumbai, India. Eight weeks later, he developed small but progressive bilateral, livid-coloured lesions on his breasts. After multiple drainage of pus, microbiological analysis of a skin biopsy in Abu Dhabi revealed acid fast bacteria without further characterisation. Antibiotic treatment was started with ciprofloxacin and clarithromycin. After referral to our clinic 16 weeks post surgery and two weeks after the initiation of antibiotic therapy, lesions were still imminent with encapsulated fluids and fistulas. Examination of clear fluid by PCR and culture remained negative. Antibiotic therapy with ciprofloxacin and clarithromycin was continued. After a surgical debridement 19 weeks post surgery and after changing the antibiotic regimen to clarithromycin, co-trimoxazole and moxifloxacin, lesions finally improved.
Due to antibiotic pre-treatment, it was not possible to identify the causative mycobacterium species. Reduced hygiene standards in combination with limited diagnostic infrastructure abroad and a lack of post-interventional follow up may be characteristics of medical tourism in many cases. The frequency of case reports indicate that medical tourism, in particular for aesthetic and plastic surgery may be associated with an increased risk of NTM infections and physicians should be aware of returnees presenting with late onset non-healing wound infection.

PO11.17
Infections in Returning Travellers to Vancouver/Victoria BC Tropical Medicine Group

W.G. Ghesquiere[1], P. Doyle[2], Y. Mirzanejad[3], M. Imperial[4], M. Payne[4], Tropical Medicine Group, BC
[1]Vancouver Island Health Authority, University of British Columbia, Medicine, Division of Infectious Diseases, Victoria, Canada, [2]Vancouver General Hospital, University of British Columbia, Vancouver, Canada, [3]Fraser Health Authority, University of British Columbia, Surrey, Canada, [4]University of British Columbia, Vancouver, Canada

Background: Illness and especially infectious diseases in travellers & immigrants is a major public health concern. The Vancouver/Victoria/BC Tropical Medicine Group is a multi-physician, multi-clinic virtual site that has collected data on infections and illnesses associated with travel outside of the country since March 30th, 2009.
Objective: To evaluate the most frequent infection/illnesses, traveller type and destinations identified in the Vancouver/Victoria/BC site by travellers returning to British Columbia, Canada.
Method: All patient data was collected prospectively and entered into a data base from the inception of the site, March 30, 2009 to Dec, 31st, 2011. Thirty four months of data was evaluated for traveller type, demographics, type of infection/illness and country of travel.
Results: A total of 619 diagnoses were made in 393 patients. Tuberculosis was the most common diagnosis at 90 cases, diarrhea 82 cases, malaria 41cases (sub-Saharan Africa 16, India 15), respiratory illnesses 39 cases, dengue at 19 cases and typhoid 11 (India 9/11). Reason for travel was tourist 30%, immigrants 27%, VFR 25%, researchers/students/missionaries 8% and business 6%. The top three most travelled to countries were India 26%, Philippines 5% and Mexico 5%. The top 4 countries of birth of the travelers were Canada 36%, India 23%, China 6%, Philippines 4.5% and Pakistan 3.3%. Age break down of the travelers was 36-65yrs 41%, 18-35yrs 36%, >65yrs 19% and < 18yrs 4%.
Conclusion: A multi-clinic virtual site is an effective way to collect data. Immigrants and VFR's accounted for over 50%of all cases of infections in the Vancouver/Victoria/BC site. We hypothesize that this group represents a small minority of travelers yet they make up a majority of the infections. Greater attention needs to be made of screening upon entering to Canada and likely other countries both upon immigration and post travel.

PO11.18
Travel-associated Primary Skin Melioidosis

J.F. Beert[1], B. De Smet[2], E. Van den Enden[2], P. Wattiau[3], J. Steenbergen[1], M. Stalpaert[1], F. Van Gompel[2], J. Jacobs[2], E. Vlieghe[2]
[1]Algemeen Medisch Laboratorium, Department of Microbiology, Antwerp, Belgium, [2]Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium, [3]Highly Pathogenic & Foodborne Zoonoses, Veterinary and Agrochemical Research Center, Brussels, Belgium

Background: Melioidosis is an infection caused by the environmental Gram-negative bacterium Burkholderia pseudomallei. Major endemic regions are Southeast Asia and Northern Australia. The clinical manifestations range from localized infection to overwhelming sepsis and death.
Objective: We report a case of imported primary skin melioidosis in Belgium after traveling to Thailand.
Case description: A 60-year-old Thai woman, living in Belgium since 1984 regularly visits her family in Udon Thani province, Northeast Thailand. The past four years, she was treated for non-insulin dependent diabetes mellitus with gliclazide 80 mg and metformin 500 mg daily.
In July 2012, while visiting Phetchabun, she fell in a muddy field and superficially scratched her right lower leg. The following 6 weeks, this scratch developed into a small painless ulcerating lesion that became progressively larger. The patient remained afebrile and without any other symptoms. In September, her general practitioner took a wound swab and prescribed an empiric antibiotic treatment of amoxicillin-clavulanic acid 875/125 mg q8h for 7 days.
Bacterial culture of the swab yielded B. pseudomallei, identified by automated biochemical testing with VITEK2 (ID GN card, bioMérieux) with a 99% probability score. Confirmation of identification was performed by specific PCR (CODA-CERVA) and latex agglutination (Mahidol-Oxford Tropical Medicine Research Unit). Antibiotic susceptibility testing was performed with E-test macro-method (bioMérieux).
The patient was referred to the post-travel clinic at ITM. Clinical examination was unremarkable besides an indurated, non-suppurative skin ulcer with a purple edge on the right lower leg. There were no signs of dissemination or systemic inflammation: chest X-ray and abdominal ultrasound were normal, blood cultures remained negative. Despite partial improvement on the initial antibiotic treatment, a new wound swab still yielded abundant growth of B. pseudomallei. The patient was restarted on amoxicillin-clavulanic acid 875/125 mg q8h with trimethoprim/sulfamethoxazole 800/160 mg q8h for 9 weeks.
The medication was taken correctly with good tolerance. Six weeks later, the wound was healed with a dark residual pigmentation.
Conclusion: Clinicians should consider cutaneous melioidosis in the differential diagnosis of skin lesions in travellers returning from countries where melioidosis is endemic, especially during or shortly after the rainy season.

PO11.19
Occurrence of Pulmonary Complications in Murine Typhus May Be Associated with Geographic Region

T.W. van der Vaart[1], M. van Vugt[1], C. Stijnis[1], M.P. Grobusch[1], P.P. van Thiel[1], A. Goorhuis[1]
[1]*Academic Medical Center/ University of Amsterdam, Infectious Diseases and Tropical Medicine, Amsterdam, Netherlands*

Background: Murine typhus is an acute, usually mild febrile illness caused by *Rickettsia typhi*. Two recent case reports describe severe murine typhus with pulmonary complications. In our hospital, we recently treated a returned traveller from Borneo with severe murine typhus, complicated by acute respiratory distress syndrome (ARDS), necessitating ventilator support on the intensive care unit.
Objective: Review of the literature with the aim to extract the prevalence of cough and pulmonary complications associated with murine typhus, in relation to the geographic region.
Methods and results: We included all published studies of confirmed murine typhus from the past 25 years, in which country of infection was known and clinical data were available. We recovered 29 cohort studies and 56 studies containing individual patient data. On a total of 1395 patients, presence/absence of pulmonary symptoms was recorded in 801 (57%) and Chest X-ray (CXR) results in 483 (35%) patients.
The table shows the rates of cough and abnormal findings on CXR, for several geographic regions. Cough occurred significantly more frequently in Asia, compared to both the Mediterranean and North America. Abnormal CXR-findings occurred significantly more frequently in Asia, compared to the Mediterranean ($p < 0.001$ for all comparisons). Among the 56 studies with individual patient data, including our own unpublished case, 6 patients with respiratory failure/ARDS were identified: 4 from Asia, 1 from the Mediterranean and 1 from North America.

	Geographic region					
	Mediterranean		Asia		North America	
	n/N	%	n/N	%	n/N	%
Cough	108/414	26.1	99/258	38.4	28/129	21.7
Abnormal CXR	45/322	14.0	30/80	37.5	10/81	12.3

[Table pulmonary symptoms_2]

Discussion: In our literature search, we observed significant geographic differences in the occurrence of cough and pulmonary complications in relation to murine typhus. Reported cases of severe complications originated in majority from Asia. Possibly, differences in bacterial sub-type play a role
Conclusion: Pulmonary manifestations/ARDS may be underestimated among patients with murine typhus, particularly if originating from Asia.

PO11.20
NS1 Antigen Testing for the Diagnosis of Dengue in Returned Israeli Travelers

I.N. Fuchs[1], H. Bin[2], S. Schlesinger[2], E. Schwartz[3]
[1]The Pediatric Infectious Disease Unit, Soroka University Medical Center, Ben-Gurion University, Beer Sheva, Israel, [2]National Center for Zoonotic Viruses, Central Virology Laboratory, Ministry of Health, Public Health Services, Sheba Medical Center, Tel Hashomer, Israel, [3]Center for Geographic Medicine and Tropical Diseases Sheba Medical Center, Tel Hashomer, Israel

Background: Acute disease due to dengue virus infection is a common cause of illness in Israeli travelers. Antigen testing with NS1 provides rapid diagnosis during the febrile phase of illness before appearance of IgM in serum of patients from dengue-endemic areas.
Objectives: We aimed to determine the diagnostic accuracy of NS1 antigen testing in travelers returning from dengue endemic countries with clinical illness and serologically confirmed dengue infection. Sera of patients with serologically confirmed West Nile virus disease were used as controls.
Methods: Sera obtained from patients who returned from dengue-endemic countries with positive dengue-IgM and sera from patients with confirmed West Nile virus infection were tested for NS1 antigen using the Panbio Dengue Early ELISA assay within 21 days of symptom onset. Demographic data and travel destination as well interval between testing and disease onset were retrieved retrospectively from patient files. Sensitivity and specificity were calculated as a function of time since symptom onset.
Summary of results: Fifty eight sera from 40 dengue- infected patients and 26 sera from 26 West Nile virus- infected patients were tested. Sensitivity of NS1 testing in dengue patients was 87% during the first 3 days of symptoms and declined to about 70% during days 4-7. Specificity was 92% for the entire testing period.
Conclusions: The NS1 Panbio assay is sensitive for the detection of DEN viral infection in returning travelers during the febrile phase of illness, and is highly specific for dengue even in a region where West Nile virus co-circulates.

PO11.21
Dengue Fever in Travelers from a Non Endemic Country

C. Perret[1], E. Balcells[1], C. Vizcaya[1], T. Hirsch[1], T. Azócar[2], C. Martinez[2], L. Montecinos[2], M. Ferrés[1]
[1]Pontificia Universidad Católica de Chile, School of Medicine, Santiago, Chile, [2]Pontificia Universidad Católica de Chile, Virology Laboratory, Santiago, Chile

Background: In the last decade dengue cases and dengue severe cases have increased significantly in The Americas, mainly in South America. Chile reports cases only on Easter Island but not on the continental territory where Aedes aegypti does not exist.
Objectives: To analyze imported cases of dengue in Chile and to identify risk factors associated with dengue infection.
Methods: Database analysis of international travelers with travel related diseases seen in a University Hospital during 2003 to 2012. Dengue diagnosis was confirmed by dengue-IgM ELISA after 5 days of illness and serotypes were not determined.
Results: 394 travelers were seen during this period. Main diagnosis syndromes were Febrile systemic illness 95 (24%), Acute Diarrhea 91 (23%), Dermatologic 87(22%) and Respiratory 52 (13%). 54 patients were confirmed with dengue infection and 20 (37%) were admitted to hospital. The region of exposure was South America 35 (65%), Caribbean -Central America 13(24%) and South East Asia 5(9%). The main country of exposure was Brazil 22 (41%) followed by Bolivia 3 (8%), Venezuela 3 (8%) and Ecuador 3 (8%). The overall incidence of dengue was 137/1000 ill travelers, 132/1000 ill travelers to South America and 344/1000 ill travelers to Brazil. In 35(65%) cases the duration of the trip was ≤ 14 days. Compared with other febrile illnesses patients traveled for a shorter period (40 days vs. 69 days, p=0.02) and sought less frequently pre travel encounter (11% vs. 39% OR= 0.2; 95%CI 0.07- 0.63 p < 0.001). Risk factors for dengue infection compared with travelers with other febrile illness were: travelling within South America (OR= 2.6; 95%CI 1.13-5.9), travel to Brazil (OR=8.7; 95% CI 2.4-32) and travel in summer season (OR 3.3; 95%CI 1.3-8.4).
Conclusions: In a non endemic country dengue fever is related to travel and it is the most likely diagnosis in travelers returning with fever. Traveling within South America, specifically to Brazil during summer season in southern hemisphere, represents high risk of dengue infection. Clinicians must be aware of this risk and suspect this diagnosis in travelers to South America. Pre-travel encounter must include insect bite prevention and use of day time repellent.

PO12 Trauma, Injury, Security

PO12.01
Studies on Anti-inflammatory, Anti-oxidant and Wound Healing Properties of the Tea Fungus, Kombucha

J.A. Ofori[1], G.A. Larbie[1], P. Addo[2], A. Ocloo[1], M.F. Ofori[3], W.S.K. Gbewonyo[1]
[1]University of Ghana, Biochemistry, Cell and Molecular Biology, Accra, Ghana, [2]Noguchi Memorial Institute for Medical Research, Animal Experimentation, Accra, Ghana, [3]Noguchi Memorial Institute for Medical Research, Immunology, Accra, Ghana

Background: Kombucha, used both as beverage and a medicinal product is a tea composed of a symbiotic culture of acetic bacteria and some genera of yeasts fermenting sugared tea is claimed to help in many ailments such as improving resistance against cancer, preventing cardiovascular diseases, promoting digestion, stimulating immunity and reducing inflammation.
Objective: The study extensively evaluated and established some biological activity of the Kombucha.
Method: Sugared-tea was fermented for periods of 2, 4, 8 and 12 weeks. *In vitro* and *in vivo* anti-inflammatory activities were determined by measuring the effect of the tea on levels of interleukin-10 (IL-10) and tumor necrosis factor-alpha (TNF- alpha) in supernatants from human peripheral blood mononuclear cells (hPBMCs) and sera from Sprague-Dawley (SD) rats using Enzyme Linked Immunosorbent Assay (ELISA). Antioxidant activities were determined *in vitro* by 1, 1-diphenyl-2-picrylhydrazyl (DPPH) method and *in vivo* by analysis of arsenic-induced lipid and protein peroxidation in SD rats. Wound-excised rats were treated with different Kombucha extracts and healing determined by percentage rates of wound contraction.
Results: The highest ratio of IL-10 to TNF-alpha was observed in the hPBMCs stimulated with unfermented tea (1737.6) and the lowest by the 8 weeks old Kombucha extract (74.7). Rats treated with 4 weeks old Kombucha (77.23) recorded the highest IL-10 to TNF-alpha ratio while the unfermented-tea treatment gave the lowest (25.03). The various Kombucha extracts showed comparable antioxidant activity to the standard, butylated dihydroxyltolouene (BHT) for the *in vitro* studies. The 2 weeks old Kombucha significantly decreased malondialdehyde (MDA) level whilst the 2 and 12 weeks old Kombucha caused significant decrease in the level of protein carbonyl production. The 2 week old Kombucha (77.52%) was found to enhance wound healing better than the unfermented (71.74%) and the 4 week old Kombucha (64.97%).
Conclusion: Kombucha appears to possess some anti-inflammatory activity through the stimulation of IL-10 production and/or suppression of TNF-alpha levels. Also, 2 weeks fermented Kombucha showed a stronger antioxidant activity and wound healing property. These findings support the anecdotal evidence and other reports that the consumption of Kombucha helps in controlling many ailments.

PO13 Travel Medicine Practice

PO13.01
The Certificate of Fitness to Fly

V. Mera[1], L. Cebrián[2]
[1]*Clinica Benidorm, Internal Medicine, Benidorm, Spain,* [2]*Clinica Britannia, Travel Medicine, Calpe, Spain*

Background: Some airlines require medical certificates confirming that a patient is currently stable and fit to fly. The physician is not due to guarantee that someone in particular can travel without any problem but rather state that, on the available evidence, there is nothing to indicate a greater risk for this person than for others. Regardless of a doctor´s opinion, the ultimate sanction to refuse travel lies with the airline and captain of the flight. If they consider there is a risk to the aircraft or its passengers, they may refuse to carry a particular passenger.
Objective: A consensus is pursued amongst the conflict of four poles of interest, namely the patient´s right to fly promptly, the comfort and safety of the other passengers, the liability of airlines and international authorities involved in the operation of the flight, and the doctor´s opinion concerning the medical factors that could adversely affect the patient´s health.
Method: Review of the islands of evidence-based medical literature amidst the ocean of somewhat contradictory opinions of all sort of experts.
Summary of Results: Decalog of basic considerations when assessing a patient´s fitness-to-fly:

1. The effect of mild hypoxia and decreased air pressure in the cabin.
2. The consequence of immobility.
3. The ability to adopt the brace position in emergency landing.
4. The timing of regular medication for long-haul/transmeridian travel.
5. The ability of the patient to cope mentally and physically with travel to and through the airport to reach the flight and on disembarkation.
6. Will the patient´s medical condition affect the other passengers and the operation of the aircraft?
7. What health insurance cover does the patient have in case of problems?
8. Did the patient choose to disclose to the physician all about past health problems?
9. Is the patient´s repatration a medical emergency?
10. Cost-effectiveness of a swift repatriation

Conclusions: A list of recommendations is given according to a dozen of groups of medical conditions, as follows:

1. Cardiovascular disease
2. Deep vein thrombosis
3. Respiratory disease
4. Pregnancy
5. Infants and children
6. Anaemia and bleeding
7. Ear, nose and throat problems
8. Postsurgical patients
9. Trauma/orthopaedics
10. Neurological/psychiatric illness
11. Diabetes mellitus
12. Contagious infectious disease

PO13.02
Epidemiological Characteristics of Long-Term Travelers Around the World in Kurume University Hospital, Japan

H. Hidaka[1], H. Watanabe[1]
[1]*Division of Infectious Diseases, Department of Infectious Medicine, Kurume University School of Medicine, Kurume, Japan*

Background: At present, the number of Japanese travelers to foreign countries is increasing. Also, long-term travelers around the world seem to be increasing. Because they travel in many developing countries, their trip is usually high risk compared to another type of travel.
Objective: To investigate the characteristics of long-term travelers around the world, we conducted the following study.
Methods: Forty-three long-term travelers around the world (23 males and 20 females, mean age 26.8 years, range: 21-43) visited our travel clinic from April 2007 to December 2012. We investigated the period between their first visit to our clinic and departure, duration of travel, and vaccination, etc.
Results: The periods between their first visit to our clinic and departure were within one month in 8 traveler (18.6%), one to 5 months in 32 travelers (74.4%), and more than 6 months in 3 travelers (7.0%). The durations of travel were 6 to 11 months in 16 travelers (37.2%), and more than one year in 27 travelers (62.8%). The main vaccinations who they received were hepatitis A in 42 travelers (97.7%), tetanus in 40 travelers (93.0%), rabies in 34 travelers (79.1%), Japanese encephalitis in 34 travelers (79.1%), and hepatitis B in 28 travelers (65.1%). Five travelers requested mefloquine to prevent malaria and 11 travelers requested acetazolamide to prevent acute mountain sickness.
Conclusions: Our data indicates long-term travelers around the world tend to visit our clinic earlier than another type of travelers. The knowledge for travel medicine in long-term travelers around the world is potentially improving. However, further education of travel medicine for travelers, travel agents and doctors is still necessary in Japan.

PO13.03
Travel Medicine in Mexico - First Clinic

D.A. Rivera-Avila[1], X. Vite-Velázquez[1], I. Cortes-Tapia[1], L.M. Uribe-Castro[1], P.A. Reyes[1], B. Diaz-Ramírez[1]
[1]*Clínica de Atención Preventiva del Viajero, UNAM, Research Division, Mexico City, Mexico*

Background: Traveler's demography/health characteristics are unknown in Mexico. Since August 2011, we have an University Clinic at the Mexico City International Airport.
Material and methods: This Clinic in one year obtained information. It offers medical consultation, provides travel advice for specific travel, give vaccination/health certificates and relevant information. There is active post-vaccination pharmacovigilance via e-mail. In all cases observed bioethical recommendations.
Results: Demographics: 610 men, 472 women (1082). Age, years: Mode 29, Mean 36, Median 34, range 1-87 years. Most (70%) live at Mexico City and suburbs, 25% in other regions and 5% abroad. Education: university degree 80%. Health: 434 (40%) known vaccines they received, only 276 (26%) prove it. At consultation 286 (26%) patients were known ill, of whom 238 (83%) had chronic degenerative disease, 776 (72%) have no treatment and other have established treatment by their physicians. We were able to identify travelers with one or more risk factors of Venous Thrombosis associated with air travel.

	41-70 years	> 70 years
BMI >25	230/309	10/16
Height <1.65 m	121/309	9/16
Height >1.85 m	8/309	0/16
Cardiac disease	79/329	11/18
Hyperlipidemia	59/329	5/18
Diabetes Mellitus	33/329	4/18
>2 flights a month	47/304	0/17
flight >8 hrs	49/304	1/17
flight >12 hrs	159/304	11/17

[Risk factors]
They were business travelers 295 (30%), pleasure 282 (28%), teaching/study 176 (18%) and the remainder were on safari, camping, missionaries or visiting friends/relatives. Most will visit urban area, but 438 (46%) go rural. Vaccinations and malaria prevention: 993 (92%) were immunized at least against one of the following: yellow fever; diphtheria, tetanus, acellular pertussis, inactivated polio in one injection, *Salmonella* sp, seasonal influenza, hepatitis A; measles, mumps and rubella in one single injection; hepatitis B, *pneumococcus* and *meningococcus* in decreasing order. Malaria prevention occurred in 236 (48%) with mefloquine (50%), atovaquone/proguanil (29%) and doxycycline (21%).
Conclusions: This Clinic at the AICM, provided valuable medical attention, education and research in traveler medicine. It is very important that this pioneering effort of the Clinic becomes widespread in Mexico.

PO13.04

What Kind of Clients Should Be Targeted On? Seven-month Experience of a Brand New Travel Clinic in Japan

M. Norizuki[1], S. Iwamoto[2], E. Kusumi[2], Y. Morisawa[1]
[1]Jichi Medical University, Center for Clinical Infectious Diseases, Shimotsuke, Japan, [2]Navitas Clinic Kawasaki, Kawasaki, Japan

Background: More than sixteen million people traveling foreign countries, only a small number of Japanese international travelers visit travel clinic. Because all vaccine and consulting fees are not covered by universal health care, there are a few travel clinics in Japan. Yellow card issue and vaccination are not allowed in Japanese private clinic. We have newly opened travel clinic in Kawasaki city (located between Tokyo and Yokohama) and provided pre and post travel counseling, vaccinations, prescription and medical certificate by ISTM certificated physicians since May 10, 2012.
Objectives: The objectives of this study include: 1) to determine the characteristics of clients, 2) to know what they demand for the travel clinic.
Methods: We reviewed the characteristics of clients including the reason for travel, destination, duration, time to travel, co-morbidities, immunizations, and prescribed medication during the period from May 10, 2012 to November 30, 2012. We also analyzed visiting time and days of the week.
Results: One hundred and six clients were evaluated: 56% of male, mean age 30.7 years (interquartile range, IQR: 15.25 - 45). Mean time to travel was 56 days (IQR: 22.25-90). Mean duration of travel was 575 days (IQR: 14 - 1095). 19.8 percent had medical co-morbidities (7% asthma, 3% dyslipidemia). The common reasons for travel were expatriates and their families (53%). The frequent travel destination was Asia (70%). The top 5 countries were Thailand (14%), India (13.2%), US (13.2%), China (12.3%) and Singapore (6.6%). Vaccination we had a total of 3.1 doses/person (hepatitis A 24.1%; hepatitis B 22.0%; tetanus 20.1%; rabies 12.7%; Japanese encephalitis 8.0%; typhoid 7.4%). Vaccines not approved in Japan were 38.2%. The malaria prophylaxis was applied only in 3.8% of clients. 31% of clients visited clinic on Wednesday. 25.5% of clients visited clinic after business hours.
Conclusions: We found that most common clients were expatriates visiting Asia for whom companies covered all counseling and vaccination fees. We conclude that travel medicine providers should communicate with the occupational health physicians in Japan. In addition world standard travel vaccine (eg. typhid) is not sold in Japan, we should imported 38.2% of all vaccine from other countries.

PO13.05
Medical Specialty Impacts Delivery of Travel Medicine Services

P.W. Hickey[1,2], D.C. Girasek[1], M. Salisu[1], T.D. Gleeson[3]
[1]Uniformed Services University, Preventive Medicine, Bethesda, United States, [2]Uniformed Services University, Pediatrics, Bethesda, United States, [3]Uniformed Services University, Internal Medicine, Bethesda, United States

Background: Travel Medicine (TM) care is provided by both specialists and those with limited formal TM training. European studies have demonstrated disparities in care provided by non-specialists but, in the U.S., little attention has been paid to the impact of practice setting on care quality.
Objectives: Assess non-specialist practice patterns and attitudes regarding barriers to TM care and malaria prevention specifically.
Methods: Survey of physicians in the state of Maryland affiliated with local chapters of the American Academy of Pediatrics and American College of Physicians. Five-point Likert scales measured importance of barriers to care or likelihood of specific practices.
Results: 129 completed surveys were included in the analysis. If requested by patients, 62% reported that they would provide TM services rather than refer to a specialty clinic. All cited the CDC Yellowbook as a reference they used. Perceived barriers and practice patterns for the pediatrician and internist subset are reported below.

	Pediatrics (n=26) Mean Score	Internal Medicine(n=26) Mean Score	T-Test, P value
Perceived Physician Barriers: 1 (important), 2 (somewhat important), 3 (neutral), 4 (somewhat unimportant), 5 (unimportant)			
Physician knowledge of regional malaria risks	3.3	2.5	.037
Physician knowledge of appropriate chemoprophylaxis	3.4	2.3	.011
Likelihood to recommend: 1 (very likely), 2 (likely), 3 (unsure), 4 (unlikely), 5 (very unlikely)			
DEET repellant	1.6	2.4	.024
Picaridin repellant	3.5	3.4	NS
Permethrin treated clothes	3.0	1.9	.011
Bed nets	1.8	3.6	<0.001
Avoid outdoor activity at high risk times	2.2	3.4	.001

[Self Reported Barriers and Practice Patterns]
When given clinical vignettes of travelers to West Africa asking for chemoprophylaxis choices, 53% stated they would “look up the correct medication”, but ineffective regimens were chosen by 10% for the adult vignette, and 16% for the pediatric vignette. Only 70% of physicians recommend against purchasing chemoprophylaxis medications at the destination.
Conclusions: Provider level barriers to the delivery of effective antimalarial prevention exist. These are both in perceived knowledge and reported practice of recommending malaria prevention methods. This is in spite of all responding physicians stating that they utilize CDC recommendations (Yellowbook) to guide their counseling of patients. Existing prospective studies of TM practice patterns in specialty clinics likely do not reflect the broader practice of TM. Additional studies to assess practice patterns in the primary care setting and how decision support tools can be improved are needed.

PO13.06
ISTM Member Survey on Sustainable Tourism: A Preliminary Report

M.P. Muehlenbein[1], G. Brink[2], ISTM Destination Communities Support Interest Group
[1]Indiana University, Anthropology, Bloomington, United States, [2]ISTM Destination Communities Support Interest Group, Durban, South Africa

Background: Understanding health risks of travellers to nature-based tourism destinations is critical. Ecotourists represent an important category of travellers for which travel medicine specialists advise and treat. It is important to not only keep travellers healthy, but also protect the health of the communities these travellers are visiting. This may also include endangered species that travellers may put at risk.
Objective: To gauge the general understanding of ecotourism and a specific understanding of risks of zoonoses/anthropozoonoses to/from ecotourists, as well as identify the types of advice and treatment that ISTM members give to their patients regarding risks of nature-based travel.
Method: ISTM members were invited via email to complete an online, anonymous survey designed by the Destination Communities Support Interest Group.
Results: 311 (approximately 12.5% of ISTM membership) responses were obtained in November and December 2012. 55% of respondents were female, and 54% were USA residents. 36% of respondents never advise ecotourists, and 38% advise ecotourists only a few times annually. Despite these facts, a majority of respondents believe that health risks of ecotourists are substantially different from those of other travellers, due primarily to location of travel, and the biggest health risks are accidents, food and water-borne diseases, and vector-borne diseases. A majority does advise travellers on preventing the spread of pathogens (mainly sexually transmitted infections) to host inhabitants in destination communities. However, most pre-travel consults do not involve advising travellers on how to minimize traveller impact on destination communities and habitats or on how to avoid risks of anthropozoonoses to wildlife. 82% do advise about limiting contact with wildlife, but primarily in reference to preventing zoonotic diseases, mainly rabies.
Conclusion: ISTM members may benefit from the production of simple and clear materials (to be distributed at pre-travel consults) on health risks associated with ecotourism, including risks to destination communities and anthropozoonoses to endangered species.

PO13.07

Assistance Medicine - A New Sub-Specialty in Travel Medicine - First Approach to Post-graduate Education and a Medical Curriculum in Germany

S. Esser[1], K. Sickmann[2]
[1]International SOS, Central Europe Medical Department, Neu-Isenburg, Germany, [2]Volkswagen AG, Medical Department, Wolfsburg, Germany

Taking care of travelers and expats during their stay abroad far from home has become more and more important over the last 20 years. Private and business travelers expect appropriate medical care during their trip and do not rely anymore on good pre-travel preparation such as health checks and vaccinations only. In the same time period, travelling has become far more common than ever with millions of people staying far from home in unknown surroundings, either for business or for leisure. Modern telecommunication has made it possible to manage patients even over a long distance and beyond their own national domestic health system.
Managing medical cases over a far distance and taking care of patients while they are travelling defines modern assistance medicine. This case management covers a broad range of activities, beginning by simple telephone based medical advice and ending in evacuating a heavily injured or sick patient home by air-evacuation.
In Germany, a group of physicians dedicated to assistance medicine and supported by the German Society for Travel Medicine (Deutsche Fachgesellschaft für Reisemedizin) has launched a process:
· To define assistance medicine
· To explain the technical pre-conditions to perform assistance medicine
· To set up post-graduate training in assistance medicine and
· To establish this subject as a new sub-specialty.
Similar activities have been launched in the United Kingdom and in the Netherlands.
The presentation shall prescribe the sub-specialty of assistance medicine, give a definition of the subject and explain a possible curriculum for post-graduate training in assistance medicine.

PO13.08
Travel Health Knowledge, Attitude and Practices among Zimbabwean Travellers

S.E.T. Mba[1]
[1]*University of Zimbabwe, Harare, Zimbabwe*

Background: Zimbabwe has an estimated six million individuals in the diaspora and an estimated one million cross the borders each week mainly to South Africa and Overseas. With this high mobility and given the recent outbreak of Cholera, it is important to assess the health seeking behavior of travelers and this has an impact travel medicine practice and recommendations.
Objectives:
- Evaluate the use of pre travel consultation amongst Zimbabweans
- Assess the source of health advice
- Determine the travel health preparation as well as the perceived health risk in host countries.
Methods: Data was randomly collected from 325 Zimbabwean travelers through self-administered questionnaires (in three languages, English, Shona and Ndebele) at Harare International Airport and Roadport Bus Departure lounge; the data was validated by trained interviewers.
Results: 71%(231) thought the host country pose no significant health risk since they are perceived to have a better health care system and facilities.
221 (68%) respondents did not know what was the relevance of pre-travel consultation and of those 199 (90%) had never visited a travel clinic.
Most travelers (21%) sought advice from friends and relatives and 51% relied on the media for health advice.
HIV was perceived to be of concern for 26 (8%) of interviewees, mainly cross border traders.
Travel health preparation time varied from two days to one month, the lengthiest time ben seen amongst college students. 60% reported spending more than one month preparing for their trip.
Conclusion: Despite the high mobility of Zimbabweans, access to travel health information is scanty and scarce. The importance of travel clinics is only highlighted in their use to provide yellow fever vaccination
there is a need to provide more health education about the importance of travel health in Africa.
More ressource should be invested in training health professionals in the various aspect of travel medicine.

PO13.09
New and Emerging Hazards Surveillance; Travel Medicine Expertise applied in Health Protection

C.A. Redman[1], F. Genasi[1], H. Sutton[1]
[1]*Health Protection Scotland, Glasgow, United Kingdom*

Background: With over 300 new diseases identified in the past 70 years, combined with expansion of international travel and trade, increasing attention is being paid to assessing these various risks to national public health. When Health Protection Scotland began a programme to assess emerging hazards risk to Scotland it turned to the Travel and International Health (T&IH) Team to oversee this work in Scotland due to T&IH experience in assessing a wide range of hazards as risks to travellers abroad.
Objectives: To draw up a preliminary model to 1) survey media for potential hazards 2) identify realistic threats to Scotland and 2) aid organisational resilience to tackle such threats.
Method: Stakeholders with their own niche areas of interest in infectious disease and environmental health were asked to survey the media for incidents and to report those considered to be a potential hazard using a standard template summarising chronological, demographic and geographic data. Results were summarised in a report in tabular and map form for circulation around Scotland for feedback.
Results: For a 1 month period (April 2012) 24 incidents were reported of which 7 were due to single cases of H5N1 abroad. The remaining incidents were related to infectious diseases (N=14), chemical contaminants (N=1), failure of testing kits (N=1), vaccine-related outcomes (N=1) and one due to recovery from clinical rabies. Two incidents, Schmallenberg virus in livestock and Sodium Nitrate mislabelling, had realistic potential to affect the international public health through the food chain, while the report on malaria in the Bahamas had the potential to affect risk groups for donating blood products. Feedback on the format and content of reports from stakeholders was positive. Major weaknesses identified with the model were 1) risk assessment of the threat was not being consistently applied by each data supplier and 2) restricted ability to quickly escalate and flag an emerging threat.
Conclusions: Risk assessment is a term often used in clinical and health protection practice but it is clear we may each approach it differently. This preliminary work has indicated the need for HPS to develop guidance on risk assessment to encompass an all-hazard approach.

PO13.10
Implementation of a Multidisciplinary Health Travel Program in the University of Campinas (UNICAMP) - Brazil

M.C.C. Del Monte[1], I.D.C. Guerreiro[1], M.H.P. Pavan[1], P.A.T. Leme[1], R.T. Mendes[1], R.C.G. Trevisane[1], T.M. Nieri[1]
[1]*Universidade Estadual de Campinas, Campinas, Brazil*

Background: The University of Campinas (UNICAMP) is a public university funded by the State of São Paulo, Brazil. It has strong undergraduate and graduate programs covering a wide range of areas in science, technology, health, humanities and arts. At the end of 2009 UNICAMP had approximately 32 thousand students and its budget was close to US$ 1 billion.UNICAMP has nearly 1,800 faculty members with a prolific research output. The Office of International Relations (CORI) has been encouraging and managing institutional agreements that provide exchange programs for both students and faculty members. In 2012 it is estimated that six hundred students left the country to participate in some kind of exchange program. Therefore, it is important to implement a Health Travel Program in the University and CECOM (Community Health Center) is where this program is being developed.
Objective: To share the implementation of a Health Travel Program in a big University.
Method: It is a descriptive study.
Results: In 2012 many actions were taken:

- The set-up of a multidisciplinary health team (physicians, nurses and dentists)
- Training of this team with specific health travel courses, visit to an ambulatory in another public university (USP) with expertise in this subject, purchase of specific literature and research in specialized websites
- Team meetings to define action plan and next steps of the project and the formulation of printed material to assist travelers going abroad
    - Brochures to be distributed for students and faculty members with specific pre-travel information
    - Pre travel forms to be completed by the program's nurses with the traveler's health information and vaccines; post travel treatment with physicians/dentists when required
- A lecture to students and with specific pre and post travel orientation

Conclusion: In the beginning of December 2012, CORI already asked for a lecture to be given to 150 students which would leave Brazil in exchange programs. With the program implemented in 2013 the team will be able to provide even more students and faculty members with a better and broader understanding of Health Travel, which is essential for a university with an increasingly international community.

PO13.11
Compliance in Travel Medicine Consultation in Brazil: *A Pilot Study*

K.M.P. Rodrigues[1], F.S.V. Martins[1]
[1]*Universidade Federal do Rio de Janeiro, Cives (Centro de Informação em Saúde para Viajantes), Rio de Janeiro, Brazil*

Background: During pre-travel consultation is mandatory to provide specific information about possible risks and preventive advices. Considering that most impact in protection is related to behaviour, travellers must be committed with those practices.
Objective: Investigating the compliance of travellers to the preventive measures.
Method: Participants were consulted by one of our physicians, from February 29th to September 25th. Based on the pre-travel consultation records, we developed a score (0-5: from none to total adhesion) evaluating the degree of adherence on preventive measures, answered by phone.
Results: Of 46 travellers, eleven could not be contacted, two were excluded (infants), five did not travel, and twenty-eight were interviewed. The most frequent destinations were South America (10) and Sub-Saharan Africa (9). Concerning protection from food/water-borne diseases 23 travellers related optimal adhesion (score 5) to preventive measures. From 25 travellers for whom vaccines were prescribed, 20 took all vaccines. Concerning repellent use, from 25 travellers, 16 referred optimal adhesion (score 5). From the 13 travellers for whom malaria chemoprophylaxis was prescribed, 11 had optimal adhesion (score 5). Concerning acetazolamide prescription, from the 10 for whom acetazolamide was indicated, 8 took medication as prescribed (score 5). Disease was reported in 7 travellers: six (21%) had watery diarrhoea and one reported kinetosis during a boat travel, but none needed to seek a doctor.
Conclusion: The risk perception by the traveller is essential to compliance. However, obtaining reliable data to define risks on each travel demand a lot of effort and is frequently imprecise. Information from returned travels helps, but is biased by those who seek pre-travel advice. Despite of the careful and specific discussion of all preventive measures, during 60 min, we still observe lack of compliance. It means we must pursuit and find ways to change a culture in which prevention isn´t popular yet. Concerning prevention to food-water diseases, we observe diarrhoea within the lower rates related in literature, possibly associated to high score in compliance. Nevertheless, the study needs to be increased with ways to improve adherence.

PO13.12

Evolution of the Pre Travel Consultations in the North of Portugal during the Period from 2002 to 2011

G. Saldanha[1], S. Barbosa[1], A. Silva[1], I. Cruz[1], A. Cardoso[1], N. Rodrigues[2], D. Antunes[1]
[1]Sanidade Internacional CVI Porto, Porto, Portugal, [2]Sanidade Internacional CVI Matosinhos, Matosinhos, Portugal

Introduction: The Public Health Department of Portugal Northern Region integrates seven International Vaccination Centers (IVC).
In 2002 only one IVC existed in the Northern Region of the country. In the meantime six other centers were developed to respond to the growing need of travel advise replicating the model of the first IVC (Oporto International Vaccination Center).
These services were established to face the agreement between WHO and the Portuguese Authorities.
Objectives: Evaluate the evolution of the pre travel services in Portugal Northern Region in the period from 2002 to 2011.
Methods: This is a descriptive study. We build a data base in Microsoft Excel, using all the medical records of all pre travel consultations in all centers in the same period of time. The statistical analysis was performed using the same software.
Results: Between 2002 and 2011, 98 934 travel consultations were performed to international travelers in Northern IVC´s. We observed a mean annual growth of 9,42% per year.
Conclusions: With the increase of new IVC´s in the Northern Region, we observed a higher number of pre travel consultations in all region including the first one created the Oporto IVC.
We hypothesize that economical crisis among Portuguese worker´s lead to an increase of migration mainly to Portuguese former colonies of Angola, Mozambique and Guinea Bissau. For this reason the pre travel consultations are nowadays of high importance in Portugal, answering the preparation needs of several thousands of portuguese workers and travelers to abroad.

PO13.13

Rethinking Standby Emergency Treatment for Malaria: Acute Respiratory Distress Syndrome Despite Treatment of Uncomplicated Malaria in Returned Travelers

K.R. Tan[1], P.M. Arguin[1]
[1]*Centers for Disease Control and Prevention, Atlanta, United States*

Background: Standby emergency treatment (SBET) for malaria involves travelers to malaria endemic areas carrying a treatment course of antimalarials to self-treat presumptively should they develop fever. One rationale for SBET is that readily available antimalarials would prevent morbidity from treatment delays. Integral to SBET is the recommendation to seek immediate medical attention. Adherence to medical follow-up among travelers is poor (58% Nothdurft , et al., 44% Kimura, et al.). Outcomes of using SBET without follow-up have not been formally studied, but may be observed in the complications of patients who received appropriate treatment for uncomplicated malaria.
Objective: Describe cases of initially uncomplicated malaria in returned travelers who, despite appropriate treatment, developed acute respiratory distress syndrome (ARDS).
Method: Cases of uncomplicated malaria developing ARDS post-treatment were reported to the US Centers for Disease Control (CDC) through a telephone consultation service from 2010-2011. Information was gathered from case report forms and consultation notes. Appropriate treatment was defined as receiving antimalarials recommended by CDC for treatment of uncomplicated malaria.
Results: Nine travelers aged 4-64 years developed ARDS in < 3 days (median=1 day) after receiving appropriate treatment for uncomplicated P. falciparum (n=7) or P. vivax (n=2) malaria. Presenting parasitemias ranged from < 1-1.6% (n= 5 cases). One case, treated with atovaquone-proguanil based on a positive rapid diagnostic test (RDT), developed ARDS in < 24 hours after treatment, and pre-treatment slides read afterwards showed parasitemia=5%. All four cases with survival data lived. An additional tenth case took SBET (unconfirmed antimalarial), did not seek follow-up for two weeks, and developed severe malaria. None of these cases adhered to prophylaxis.
Conclusion: These cases illustrate that despite immediate treatment, clinical course can worsen; a sobering indication of the consequences of poor adherence to clinical follow-up after SBET. One case delayed seeking care after SBET. RDTs, if used to target SBET, may miss parasitemia levels indicating a need for severe malaria management. Despite these issues, the proliferation of counterfeit medications may make carrying a reliable supply of antimalarials useful if diagnosed with malaria abroad. The guidance and rationale for SBET should be re-examined with further studies.

PO14 Japanese Encephalitis

PO14.01
Long-Term Data on Cross-reactive Immunity after Primary and Booster Vaccinations against Japanese Encephalitis

E.O. Erra[1,2], H. Hervius Askling[3], S. Yoksan[4], L. Rombo[3,5], J. Riutta[6], S. Vene[7], L. Lindquist[3], O. Vapalahti[1,8,9], A. Kantele[1,2,6]
[1]Haartman Institute, University of Helsinki, Helsinki, Finland, [2]Helsinki University Central Hospital, Division of Infectious Diseases, Department of Medicine, Helsinki, Finland, [3]Karolinska Institutet, Department of Medicine, Unit for Infectious Diseases, Stockholm, Sweden, [4]Institute of Molecular Biosciences, Mahidol University, Nakhon Pathom, Thailand, [5]Centre for Clinical Research, Sörmland County Council, Eskilstuna, Sweden, [6]Travel Clinic, Postitalo, Lääkärikeskus Aava, Helsinki, Finland, [7]Swedish Institute for Communicable Disease Control, Solna, Sweden, [8]HUSLAB, Division of Virology and Immunology, Helsinki University Central Hospital, Helsinki, Finland, [9]University of Helsinki, Department of Veterinary Biosciences, Helsinki, Finland

Japanese encephalitis (JE) is a leading cause of viral encephalitis in Asia accounting for approximately 70 000 annual cases of clinical disease. As no effective treatment exists, vaccinations are recommended for endemic populations and travelers at risk.
In travelers' vaccinations, the new Vero cell-derived, inactivated vaccine, Ixiaro, has largely replaced the traditional mouse brain-derived, inactivated preparations (Je-Vax, Japanese Encephalitis Vaccine GCC). Ixiaro is based on GIII-strain SA14-14-2, while JE Vaccine GCC is derived from GIII-strain Nakayama. We have recently showed that crossreactivity exists between these two vaccine strains: instead of the regular 2-dose schedule recommended for travelers, those primed with JE Vaccine GCC reach protective levels of antibodies after a single dose of Ixiaro (1). However, no data exist on the longevity of this response.
Japanese encephalitis viruses (JEV) are divided into 5 genotypes. All the JE vaccines currently available are based on JEV strains belonging to genotype III. For decades, this GIII genotype used to be the dominant type circulating. Recently, however, strains belonging to GI have displaced GIII in large areas of Asia. Consequently, the need to assess the cross-protective capacity of the current GIII-derived vaccines against non-vaccine genotypes was recognized. We have recently showed that a protective level of antibodies is reached against genotypes GI-IV (2), thus justifying the use of the vaccine in travelers. However, no data exist on the longevity of this response.
We have now collected long-term follow-up serum samples from the participants of the two previous studies. We include travelers who have previously received one of the following 3 vaccination regimens: (1) primary series with Ixiaro, (2) primary series with JE Vaccine GCC + booster with Ixiaro, and (3) primary + booster with JE Vaccine GCC. In all groups, we will determine the titers of crossreactive neutralizing antibodies with plaque-reduction neutralization test.
We are going to present the follow-up data on the longevity of cross-protection elicited by different JE vaccination regimens.

References:

(1) Erra EO, et al. Clin Infect Dis. 2012; 55:825-34.
(2) Erra EO, et al. Clin Infect Dis. 2013; 56:267-70.

PO14.02

Reduced Vaccination Rate against Japanese Encephalitis at a Norwegian Vaccination Clinic after Introduction of Ixiaro®

R. Raastad[1], L. Heier[1], G. Hasle[1]
[1]*Oslo Travel Clinic, Oslo, Norway*

Background: Formerly available vaccines against Japanese encephalitis (JE) were associated with serious, but rare, adverse reactions. Ixiaro®, a new formalin-inactivated, purified whole cell vaccine, was authorized in the European Union 31 March 2009 and granted Marketing Authorisation in Norway 27 July 2009. Ixiaro® rapidly replaced other vaccines against JE and is currently the only available JE-vaccine in Norway. However, the cost of Ixiaro® is three times the cost of the discontinued vaccines.
Objective: The present study aimed to examine the vaccination rate against JE before and after the introduction of Ixiaro® at Oslo Travel Clinic in September 2009.
Method: A retrospective study was carried out at Oslo Travel Clinic, the largest vaccination clinic in Norway, performing approximately 12,000 consultations annually. Monthly number of immunizations against JE and total number of consultations was recorded from 2007 to 2012. There were no changes in national vaccination recommendations during the study period. At our clinic, both Green Cross JE-vaccine and JE-Vax® were administered as two doses at day 0 and 14-21. A third dose was recommended after >12 months, if needed. Ixiaro® was administered as two doses at day 0 and 28 with a recommended booster dose after 12-24 months in case of continued need of protection. Based on estimated number of patients receiving the respective vaccines each year, we applied two-sample t-test assuming unequal variances using the statistical software package R. Similar analysis based on the proportion of total number of consultations was also performed.
Results: The estimated mean annual number of patients vaccinated against JE was reduced from 173 to 103 (-40.5%) after the introduction of Ixiaro®. The reduction was statistically significant with p=0.017 and 95% confidence interval (20,119). Similarly, there was a significant reduction in vaccination rate calculated as estimated number of patients receiving JE-immunizations/total number of consultations (p=0.012).
Conclusion: We found that the annual number of immunizations against JE was significantly reduced after the introduction of Ixiaro®. We hypothesize that this is due to the higher cost.

PO14.03

Antibody Persistence in Children and Immunogenicity and Safety of A Booster Dose of the Inactivated Japanese Encephalitis Vaccine IXIARO®, IC51

K.L. Dubischar-Kastner[1], V. Kadlecek[1], B. Sablan Jr[2], C.F. Borja-Tabora[3], S. Gatchalian[4], S. Eder[1], K. Westritschnig[1]

[1]Intercell AG, Vienna, Austria, [2]University of the Philippines, Philippine General Hospital, Department of Pediatrics, Manila, Philippines, [3]Research Institute for Tropical Medicine, Department of Health, Manila, Philippines, [4]University of the Philippines, Manila, Philippines

Background: A booster of IXIARO (IC51, unlicensed for pediatric use), Vero cell-derived, inactivated Japanese encephalitis (JE) vaccine manufactured by Intercell AG, is recommended after 12-24 months in adults. Antibody persistence and response to a booster in children needed further study.
Objectives: To evaluate immunogenicity and safety of an IC51 booster and antibody persistence without booster in children aged 1 to < 18 years.
Methods: Interim analyses of a randomized, controlled open-label study in the Philippines. 300 children vaccinated with IC51 in a previous trial were randomized 1:1 to receive either no booster or a booster (3 mcg/0.25 ml < 3 years, 6 mcg/0.5 ml ≥3 years) 12 months after initiation of the primary series. Neutralizing antibody (NT) titers were assessed by PRNT on Month 12 and 1 Month after the booster. Systemic and local adverse events (AEs) were solicited for 7 days, unsolicited AEs were collected up to Month 13.
Summary of Results: Overall, 30 subjects aged 2 months - < 1 year at the primary series, 187 subjects 1 - < 3 years, 27 subjects 3 - < 12 years and 56 subjects 12 - < 17 years, respectively, were followed up. 148 children received a booster (81 an 0.25 mL and 67 an 0.5 mL dose). NT titers declined by 12 months after the primary series (depending on age, GMTs of 26 - 71), but remained above the protective titer ($PRNT_{50}$≥1:10) in most children (79 - 100%). The booster led to a pronounced increase in NT titers (GMTs of 890 - 4076) and 100% seroconversion ($PRNT_{50}$≥1:10). The booster was well tolerated, 8.1% of children reported local (mainly pain) and 14.2% systemic reactions (mainly fever) within 7 days of the booster. Most AEs were mild.
Conclusions: A booster dose of IC51 (unlicensed for pediatric use) was well tolerated and highly immunogenic. Twelve months after the primary series seroprotection rates remained high but titers declined considerably. During the study conducted in an endemic country, children may have encountered JEV. Studies are underway on antibody persistence in children from western countries, to conclude on the duration of protection for IC51 in children.

PO14.04

Immunogenicity and Safety of the Inactivated Japanese Encephalitis Vaccine IXIARO®, IC51, in Elderly

K.L. Dubischar-Kastner[1], J.P. Cramer[2], S. Eder[1], T. Jelinek[3], B. Jilma[4], H. Kollaritsch[5], E. Reisinger[6], K. Westritschnig[1]

[1]Intercell AG, Vienna, Austria, [2]University Medical Center Hamburg-Eppendorf (UKE), Department of Internal Medicine, Section Tropical Medicine / Infectious Diseases, Hamburg, Germany, [3]Berlin Center for Travel & Tropical Medicine, Berlin, Germany, [4]Medical University Vienna, Department of Clinical Pharmacology, Vienna, Austria, [5]Medical University Vienna, Institute of Specific Prophylaxis and Tropical Medicine, Center for Pathophysiology, Infectiology and Immunology, Vienna, Austria, [6]University of Rostock, Department of Tropical Medicine & Infectious Diseases, Rostock, Germany

Background: IXIARO® is a Vero cell-derived, inactivated Japanese encephalitis (JE) vaccine manufactured by Intercell AG. IXIARO is licensed for use in adults, including the elderly. Limited immunogenicity and safety data in this latter relevant traveler population have been available.
Objectives: To evaluate safety and immunogenicity of IXIARO in elderly subjects (≥ 65 years).
Methods: Open-label, single arm, multi-centered study. Two-hundred subjects with good general health, including adequately controlled chronic conditions, received two doses of IXIARO, 28 days apart. Neutralizing antibody titers were tested by PRNT 42 days after the second dose. Systemic and local adverse events (AEs) were solicited for 7 days after each dose, unsolicited AEs were collected up to day 70 and in a phone call at month 7.
Summary of **Results:**
Subjects were aged 64 - 83 years (mean 69.5 ± 3.7), hypertension (40.5%) and hypercholesterolemia (10.5%) were common comorbidities, 74.5% reported concomitant medications (most commonly antihypertensive, antithrombotic and lipid-lowering drugs). Nineteen percent of subjects had serious or medically attended AEs up to Day 70 (Primary Endpoint), none of them causally linked to IXIARO. Solicited local AEs were reported by 33.5% (most common: local tenderness) and solicited systemic AEs by 27% (most common: headache) of subjects. The seroconversion rate (SCR, defined as PRNT50≥1:10) was 65% with a GMT of 37. Results did not differ for ages 65 - < 75 years (N=175, GMT 37) and ≥75 years (N=24, GMT 42). Subjects with tick borne encephalitis (TBE) vaccinations in the past 5 years (N=29) had a SCR of 90% and GMT of 65.
Conclusions: IXIARO is generally well tolerated in the elderly, and the safety profile is largely comparable with younger adults. SCR and GMT are lower compared to younger adults, but SCR is in the range reported in elderly for other vaccines (e.g. against TBE, HAV/HBV, Influenza). The differences in SCR and GMT from younger to elderly adults were in the range of other vaccines. Subject age ≥75 years has no obvious effect on GMT and SCR compared to 65-74 years. In this trial, TBE vaccination during the past 5 years led to a higher SCR and GMT.

PO14.05

Post-marketing Safety Profile of the Inactivated Japanese Encephalitis Vaccine IXIARO® - Experience Three Years after Launch

Z. Müller[1], K.L. Dubischar-Kastner[1], R. Hennig[2], K. Westritschnig[1]
[1]Intercell AG, Vienna, Austria, [2]SCRATCH Pharmacovigilance GmbH, Butzbach, Germany

Background: IXIARO®, Vero cell-derived, inactivated Japanese encephalitis vaccine manufactured by Intercell AG, is licensed for use in adults since 2009. A review of postmarketing safety data in adults is relevant, especially as previously used mouse-brain derived JE vaccines had a concerning safety profile.
Objectives: Compile a postmarketing safety data overview covering the first 36 months after launch of IXIARO®.
Methods: IXIARO® is currently licensed in 38 countries. Safety information from any geographic location and source, i.e. consumers, regulatory authorities, distribution partners and publications including the US Vaccine Adverse Event Reporting System (VAERS), is collected in the global pharmacovigilance (PV) database.
Summary of Results: In the first 36 months after launch, 169 ADR (adverse drug reaction) reports were received globally (13.0 per 100,000 doses distributed). Most reports were non-serious reactions known from clinical trials. Two-thirds of the reported cases can be summarized under nervous system disorders (23 %, mostly headache and dizziness), general and administration site conditions (22.4%, mostly influenza like illness and associated symptoms) or skin and subcutaneous tissue disorders (21.3%, mostly rash and urticaria (28 cases of rash or urticaria, post vaccination interval immediately to 25 days).
No cases of angioedema, anaphylactic shock, ADEM, Bell´s palsy or serum sickness following vaccination with IXIARO® were reported 3 years after launch. 21/169 reported ADRs (12.4%) were assessed as serious (per current regulatory guidance, e.g. hospitalization; reporting rate 1.6 per 100,000 doses). Serious ADRs were very diverse with no apparent clustering of specific reactions, and included neuritis, convulsion (including reports resembling vaso-vagal syncopes), or encephalitis (IXIARO® given concomitantly to suspect smallpox vaccine).
This review confirms the good safety profile of IXIARO® in post-marketing use. 13 ADRs reported per 100.000 doses distributed is within the range expected for vaccines in general, i.e. 2-30 cases / 100,000 doses (1, 2), and roughly half of that reported for JE-VAX® (inactivated, mouse brain-derived JE vaccine, distributed by Sanofi Pasteur Inc.) in the US (24 per 100.000)(3). The safety profile of IXIARO® is favorable and remains consistent with that determined in clinical trials.

References:

1 Lloyd Vaccine 2003;21:3746-50
2 Rosenthal Am J Public Health 1995; 85: 1706-9
3 Lindsay Vaccine 29 (2011) 58-64

PO15 Rabies

PO15.01
Frequency of and Responses to Potential Rabies Exposures in Peace Corps Volunteers, 2011

K. Harvey[1], E.S. Jentes[1], M. Charles[2], B. Petersen[3], K. Johnson[1], J. Blanton[3], M.J. Sotir[1], G. Brunette[1]
[1]Centers for Disease Control and Prevention, Division of Global Migration and Quarantine, Atlanta, United States, [2]Peace Corps, Office of Medical Services, Washington, United States, [3]Centers for Disease Control and Prevention, Division of High Consequence Pathogens and Pathology, Atlanta, United States

Objective: To assess the frequency of potential rabies exposures, clinic procedures, and availability of rabies postexposure prophylaxis for Peace Corps Volunteers (PCVs) seen by Peace Corps medical officers (PCMOs) in 2011.
Methods: In June 2012, online surveys were sent via e-mail to one PCMO in each country where a PCMO office was located. PCMOs were asked to provide information for the year 2011. Based on the strength of vaccine recommendations from the U.S. Centers for Disease Control and Prevention Travelers' Health website, countries were classified into no, weak, moderate, and strong recommendation strengths. Countries with no or weak recommendations were excluded from analyses. Data were analyzed by using SAS 9.3 (Cary, NC).
Results: The survey was sent to 67 PCMOs; 43 (64%) completed the entire survey and 3 (5%) completed a portion of it. Thirty-eight (83%) of the 46 responding PCMOs were in countries with moderate or strong rabies recommendations and were included in the analyses. Of these 38, 29 (76%) reported evaluating at least one PCVs for potential rabies exposure during 2011. Potential rabies exposures accounted for 0.5% of all PCV visits to PCMOs. PCMOs reported evaluating potential rabies exposure in 140 (3%) of the 5,071 PCVs located in the 38 countries in 2011. Of these 140 PCVs, 129 (92%) presented with adequately cleansed wounds, 125 (89%) had been previously immunized against rabies, and postexposure prophylaxis was deemed necessary for and was provided to 106 (76%). Thirty (87%) PCMOs reported that rabies vaccine was always available to PCVs within 24 hours. Of these, 22 (69%) reported using Vero cell rabies vaccine.
Conclusions: Although they represent a low percentage of total PCMO visits in high- and medium-risk countries, potential rabies exposures in PCVs do occur. Most potentially exposed PCVs in responding countries have been vaccinated against rabies prior to potential exposure and exercised proper wound care following potential exposure. Most PCMOs also reported access to rabies vaccine within 24 hours. PCVs should continue to be educated on rabies prevention, including animal avoidance, proper wound care, and prompt medical evaluation after a mammal bite.

PO15.02

Immunogenicity of a Modified Intradermal Pre-exposure Rabies Vaccination Schedule Using a Purified Chick Embryo Cell Vaccine (Rabipur)

C. Lau[1,2], N. Hohl[3,4,5]
[1]University of Queensland, Queensland Children's Medical Research Institute, Brisbane, Australia, [2]Travel Medicine Alliance Clinics, Perth and Brisbane, Australia, [3]Griffiths University, School of Medicine, Gold Coast, Australia, [4]Bond University, Faculty of Medicine, Gold Coast, Australia, [5]Travel Medicine Alliance Clinics, Gold Coast, Australia

Background: In Australia, recommendations for pre-exposure rabies vaccination involve 3 doses of vaccines on days 0, 7, and 28 using either 1.0mL intramuscular (IM) vaccines, or 0.1 mL intradermal (ID) vaccines (1). The use of IM vaccines is limited by the prohibitive cost, and the use of ID vaccines is limited by the time required to have rabies antibody levels tested 2 to 3 weeks post-vaccination.
Mills et al reported the successful use of a modified ID schedule (2 x 0.1mL ID on days 0 and 7) that was more affordable for travellers and required less time to complete than the standard ID schedule (2). The study involved the use of human diploid cell rabies vaccines and found a seroconversion rate of 94.5%.
Objective: In this study, we report the immunogenicity of pre-exposure rabies vaccination in travellers using a purified chick embryo cell vaccine (PCECV) with the above modified ID schedule.
Method: Travellers were offered the modified ID schedule if they were aged 10 to 50 years and have no history of immunosuppression. Two 0.1mL ID doses of PCECV (Rabipur, CSL/Novartis) were given on days 0 and 7, and serology was performed at day 28. An additional 0.1mL ID dose was given at 28 to ensure non-inferiority to the standard ID schedule. All travellers provided informed consent, and seroconversion was defined as rabies antibody levels of >0.5 IU/mL.
Results: Fifty-four travellers aged 10 and 49 years were vaccinated from June to September 2012, with an overall seroconversion rate of 94.4% (95% CI: 90.1% to 100.0%). As found in the Mills et al study, seroconversion rates decreased with increasing age (10 to 19 years: 96.0%; 20 to 29 years: 93.3%; ≥ 30 years: 92.9%), and no significant adverse reactions were reported.
Conclusion: This case series supports the effectiveness of the modified ID schedule reported by Mills et al, and found the schedule equally effective using a PCECV. The schedule has high immunogenicity in young travellers, and would be particularly useful for backpackers with limited budgets, and families travelling with multiple children.

References:

1. Australian Government Department of Health and Ageing. National Health and Medical Research Council. The Australian Immunisation Handbook. 9th ed; 2008.
2. Mills DJ, Lau CL, Fearnley EJ, Weinstein P. The immunogenicity of a modified intradermal pre-exposure rabies vaccination schedule--a case series of 420 travelers. Journal of Travel Medicine 2011;18(5):327-32.

PO15.03
Rabies Post Exposure Consultations in New Zealand 1998-2012

M. Shaw[1], J.T. Visser[2], C. Edwards[2]
[1]James Cook University, Townsville, School Public Health, Auckland, New Zealand, [2]University of Otago, Primary Health Care & General Practice, Wellington, New Zealand

Background: Studies have indicated that New Zealanders might be over represented in travel-related rabies exposures [1].
Objective: To identify risk factors for rabies exposure in NZ travellers, and to describe their experiences of potential rabies exposure.
Methods: Data from 363 post-travel consultations for potential rabies exposure presenting to travel health clinics (1998-2012) was collated retrospectively. Data on traveller ethnicity, country of residence, demographics, the country and nature of exposure, purpose of travel, pre-travel rabies awareness/vaccination and post exposure care was extracted.
Results: Consultations in the 2010-2012 period accounted for 45.7% of all data. 50.8% of those presenting for post-exposure care had seen a health professional for a pre-travel consultation (78.1% saw a Travel Medicine Specialist (TMS), the remainder a General Practitioner [GP]). 96.1% (95% CI 86.5-99.5%) who saw a TMS recalled discussion of rabies compared with 53.3% (95% CI 26.6-78.7) who saw a GP.31.1% exposures occurred in Thailand, followed by China (13.2%), Indonesia (12.3%) and India (7.4%). Exposed travellers visiting friends and relatives (VFRs) were less likely to have a pre-travel consultation but more likely to commence post exposure care in the country of exposure. NZ residents of Chinese ethnicity accounted for 9.3% of all consultations.When compared to all other travellers, VFRs were more likely to be exposed via domesticated animals (especially dogs), as were aid volunteers. 20% of those who should have received rabies immunoglobulin in country-of -exposure received it there, while 81% who should have received rabies vaccine in-country did so.
Conclusions:
1. NZ travellers need better guidance in the need for rabies vaccination, emphasized by the inadequate post-exposure management in countries of possible rabies exposure described in this study.
2. VFRs (especially NZers of Chinese ethnicity returning to China) are at higher risk of a rabies exposure and the animal responsible for exposure in this group is more likely to be a domesticated one.
3.The increase in consultations from 2012-2012reflect an increased awareness of both travellers and health professionals for the need to present for care after potential rabies exposure.
References: 1. Shaw MT, O'Brien B, Leggat PA. Rabies post-exposure management of travellers presenting to travel health clinics in Auckland and Hamilton, New Zealand. J Travel Med 2009; 16: 13-17

PO15.04
Young Short-Term Travelers are at Potential Risk of Rabies

E. Rowe[1], F. Dimatatac[1], C.J. Go[1], P.L. Lim[1]
[1]*Tan Tock Seng Hospital, Infectious Diseases, Singapore, Singapore*

Background: Singapore is rabies-free but is located close to rabies endemic countries. These surrounding countries are popular tourist destinations but often lack the resources to provide rabies post-exposure prophylaxis (RPEP) in accordance with World Health Organization (WHO) guidelines.
Objective: To describe the characteristics of patients presenting for RPEP to a large travel clinic in Singapore.
Methods: Retrospective review of patients that attended Travellers' Health and Vaccination Clinic, Tan Tock Seng Hospital for rabies post-exposure management between March 31 2010 and August 1 2012.
Results: Three hundred and fifty eight cases (302 adults and 56 children) were included from 380 patient records reviewed. The mean age of subjects was 29.6 years (SD=14.7), 52% (187/358) were male and 25% were Singaporean. Exposures occurred most frequently in Thailand (23%) and Indonesia (22%). The most common reasons for travel were tourism (61%), visiting friends and relatives (10%) and business (7%). The median duration of travel was 8 days (data available for 293 patients) range 0 - 370 days. Dogs, monkeys and cats were the most implicated animals and accounted for 63%, 25% and 8% of exposures. Injuries predominantly occurred on the limbs with 43% (156/358) and 42% (153/358) occurring on the upper and lower limbs respectively. Three hundred and fifteen of the injuries (88%) were classified as WHO category III.
Two hundred and seventy eight patients (77%) commenced RPEP overseas but only 13% (34/244) who fulfilled WHO criteria received rabies immunoglobulin (RIG). Thirty four percent of patients were unable to receive RIG in Singapore as more than 7 days had elapsed since vaccination. Of the 141 patients that accepted RIG in Singapore 81% were citizens of high-income countries. In contrast 82% (33/40) of patients that declined RIG were citizens of low or middle income countries. Only 5% (19/358) of patients had received rabies pre-exposure vaccination.
Conclusion: Rabies is a potentially fatal disease and post-exposure management overseas may be inadequate. Young short-term travelers may require enhanced education about rabies post-exposure management and re-consideration of pre-exposure vaccination as they often travel with suboptimal protection. Country of citizenship may alter acceptability of RIG and should prompt us to assess how we counsel patients from low and middle-income countries.

PO15.05
Case Series of Animal Bites Obtained by Patients in a Japanese Hospital When They Were Abroad

N. Takeshita[1], Y. Kato[1], S. Kutsuna[1], M. Ujiie[1], K. Hayakawa[1], S. Kanagawa[1], N. Ohmagari[1]
[1]*National Center for Global Health and Medicine, Disease Control and Prevention Center, Tokyo, Japan*

Background: An animal bite is related to several infectious diseases, and it is important for starting the rabies post-exposure prophylaxis vaccination (PEP). However, the risk of rabies is not common in Japan because it is free of rabies.
Objectives: To determine the characteristics of patients who had a history of animal bites and scratches obtained when they were abroad.
Method: We collected data of patients with animal bites who visited our travel clinic (National Center for Global Health and Medicine, Tokyo, Japan) from January 1, 2005 through December 31, 2012.
Result: In total, 228 patients (129 men and 99 women) were included in this study. The mean age of patients who were exposed to animal bites was 35.1 years (range, 2-79 years). Most patients were exposed to animal bites in Asia (Thailand, 22.4%; China, 14.0%; Indonesia, 13.6%; and India, 10.5%). Tourism (60.5%), business (15.4%), and visiting friends and relatives (8.8%) were commonly reported as reasons for travelling by the patients. Most patients were exposed to bites from dogs (60.5%), cats (18.4%), and monkeys (15.8%). The most common sites of exposure to animal bites were legs and feet (37.7%), hands (31.6%), and arms (9.2%). Further, 106 (51.0%) animal exposures were graded as World Health Organization category III contacts, and 215 (94.3%) patients had not been provided with pre-exposure prophylaxis. PEP was started after an average of 5.8 days after exposure to bites.
Conclusion: Most patients with animal bites were exposed to them in Asia, and their reasons for travel were mainly tourism. Bites from dogs were the most common, but those from cats and monkeys totaled over 30% of the bites. The most common injury site was legs and foot, but arms and hands accounted for over 40% of the injury sites. Further, PEP was not started soon, and rabies is uncommon in Japan. Thus, many patients do not have enough knowledge about PEP and the risk of animal bites.

PO15.06

A Comparative Study on Efficacy of Purified Chick Embryo Cell Rabies Vaccine (Rabipur®) as a Pre-exposure Prophylaxis for the Japanese, Administering Three Doses on Days 0, 7, 21 or 28 and Three Doses on Days 0, 30, 180

N. Mishima[1,2], M.J. Yoshikawa[3], T. Shimono[1], I. Nakatani[1,2], H. Ishizaki[2], M. Miyake[1], S. Kanda[1], T. Nishiyama[1,2]

[1]Kansai Medical University, Department of Public Health, Hirakata, Japan, [2]Kansai Medical University Takii Hospital, Center for Travel Medicine, Moriguchi, Japan, [3]Kyoto University, Inter-Graduate School Unit for Sustainable Development and Survival Societies, Center for the Promotion of Interdisciplinary Education and Research, Kyoto, Japan

Human rabies is a preventable zoonosis. One of the important keys for prevention is using proper vaccine administration. Various kinds of human rabies vaccine are available globally for preventing this life-threatening burden. The purified chick embryo cell rabies vaccine (PCECV) is well known as an effective and safe rabies vaccine for both pre-exposure and post-exposure prophylaxis. Although rabies is not currently endemic in Japan, PCECV is manufactured domestically and provided in general. However, the supply of PCECV is limited in Japan and medical institutions, especially travel clinics, cannot always keep PCECV in stock. Recently, fifteen million Japanese travel abroad every year and their destinations are often rabies endemic regions. To address the rabies vaccine shortage in Japan, it is necessary to import other rabies vaccine. Therefore, we chose Rabipur®, which component is almost similar to that of Japanese products. The objective of this study is to determine the effectiveness of Rabipur® inoculation for the Japanese since there has been very few information. The subjects are twenty-six Japanese healthy volunteers (age range: 22-49 yrs, average: 27.3 yrs) with no history of rabies vaccine inoculation. These subjects were divided into three groups, the first group received 3 doses inoculation on days 0, 7, 21, the second was on days 0, 7, 28, and the third on days 0, 30, 180, respectively. Rabipur® was administered by intramuscular route. The injection sites of all subjects were deltoid muscle. The geometric mean titers were measured at days 0, 7, 21, 30 and 180 after inoculation using the rapid fluorescent focus inhibition test (RFFIT). We also evaluated the adverse effects after inoculation. Seven subjects (26.9 %) showed some mild adverse reactions, which were local pain at the injection sites and fatigue after inoculation, and no serious adverse reactions were detected. We report the efficacy and safety of Rabipur® inoculation for the Japanese subjects with three different administration schedules and analyze the immunogenicity of Rabipur® inoculation among these Japanese subjects.

PO16 Yellow Fever

PO16.01
Yellow Fever Vaccination at Mexico's Traveler Preventive Care Clinic - First Year

D.A. Rivera-Avila[1], X. Vite-Velázquez[1], I. Cortes-Tapia[1], L.M. Uribe-Castro[1], P.A. Reyes[1], B. Diaz-Ramírez[1]
[1]*Clínica de Atención Preventiva del Viajero, UNAM, Research Division, Mexico City, Mexico*

Objectives: To identify the rate of adverse reactions following immunization (AEFI).We conducted a pilot study Internet self-reporting for adverse events following yellow fever vaccine (YFV) in a Travel Clinic at Mexico Airport.
Methods: We apply 648 vaccines during the period of August 29th 2011, to November 30th 2012. Two emails with self-report AEFI form were sent to each participant: one for days 7-14 and, another for 21-28 after immunization. Data was analized in SPSS.
Results: 528 receive the questionnaires. YFV was the only given in 427(66%) and more than one vaccine simultaneously in 221(34%). The response rate for the first questionnaire was 213/528(40%). Answered Yes for at least one AEFI 114(54%) for the first and 45 traveleres in the second questionnaire . Sex and age showed any significant difference, the most common AEFIs were myalgia, weakness, headache, malaise and dizziness.

	7-14 days n=213(%)	21-28 days n=138(%)
Myalgia	71(33)	11(8)
Weakness	64(30)	24(17)
headache	58(27)	30(22)
Malaise	45(21)	18(13)
Dizziness	29(14)	17(12)
Nausea	20(9)	10(7)
Fever	18(8)	4(3)
Inability to do daily activities	7(3)	4(3)
Vomit	3(1)	2(1)

[Adverse events reported]

Those who received YFV with another vaccine were likely to report malaise, myalgia and inability ($p< 0.01$); than those who receive only YFV that reported more headache and weakness ($p< 0.01$).
Conclusions: It is necessary to detect all AEFI timely. The active surveillance requires clinical regular assessment of all vaccinated individuals although it is difficult in travelers. It is feasible to develop a system to monitor AEFI in a mobile population that offers multiple opportunities to report AEFI which may appear until 28 days post vaccination, this study shows statistical significance difference between first and second questionnaire responses ($p< 0.01$), as of multiple or single immunizations at the same visit ($p< 0.01$). Reporting rates may not be a true estimate of AEFI due to under-reporting and incomplete denominator information provided for traveler population, in which other factors like altitude and climate changes and most important the impossibility of determining if a symptom was attributable to vaccine or consider a tropical disease.

PO17 Other Immunizations

PO17.01
From 'Non-responders' to 'Poor-responders' - Successful Use of Multi-site Intradermal Hepatitis B Vaccination

A.D. McCallum[1], M.E. Jones[1]
[1]*NHS Lothian, Regional Infectious Diseases Unit, Edinburgh, United Kingdom*

Background: Vaccination can provide effective protection against hepatitis B virus. A small percentage of individuals fail to respond to standard vaccination regimens and boosters and are labelled 'non-responders'.
Objective: The aim of the present study was to assess whether repeated multi-site, multi-dose hepatitis B vaccination can achieve protective seroconversion in previous healthy non-responders.
Methods: This is a retrospective study of 11 patients referred to an Infectious Diseases Unit with non-response to hepatitis B vaccine regimens. Patients received 4 or 8 x 2µg intradermal hepatitis B vaccine injections on a 4-weekly basis. Hepatitis B surface antibody (anti-HBs) responses were assessed 28 days after each vaccination.
Results: Protective anti-HBs levels (≥100mIU/mL) developed in 7 (63.64%) of 11 study subjects. A further 2 patients did not have a final anti-HBs titre checked, but by extrapolating their previous titres they were expected to have achieved a titre of ≥100mIU/mL in response to their final course of intradermal injections. One patient defaulted and another was still undergoing treatment. An average of 15.11 multi-site intradermal injections, or a total dose of 45.33µg of hepatitis B vaccine, was required to reach a titre of ≥100mIU/mL in this cohort of non-responders.
Conclusions: An estimated 81.82% of previous non-responders developed anti-HBs titres of ≥100mIU/mL in response to multi-site, multi-dose intradermal hepatitis B vaccination. This is a safe and effective way to provide protection for this cohort.

PO17.02
A Double Dose Hepatitis B Vaccination Schedule in Travellers Presenting for Late Consultation

S.L. Hollenberg[1], J. Wong[2], M.K. Payne[3]
[1]University of British Columbia, Department of Family Medicine, Vancouver, Canada, [2]University of British Columbia, School of Population and Public Health, Vancouver, Canada, [3]University of British Columbia, Pathology and Laboratory Medicine, Vancouver, Canada

Background: Travel-associated Hepatitis B (HB) infections are still a health risk for Canadians, particularly as travellers are more frequently seeking elective medical and surgical procedures abroad. Many people who present to a travel clinic are non- immune, and it is recommended that they be vaccinated before departure. If there is insufficient time for the standard three dose HB series given over six months, there is an accelerated vaccination schedule approved in Canada consisting of three doses given over twenty-one days. However, travellers commonly present to the travel clinic with less than this time. In these cases, some travel clinic physicians have offered a double-dose of HB vaccine to give travellers the best possible immunity for their upcoming trip. A third single dose of HB vaccine was administered four to twelve months later, and serology (anti-HBsAg) was drawn one to six months after the final vaccine.
Objectives: The main objective of this study was to assess the seroprotection against HB with a two visit vaccination schedule. Secondary outcomes were to evaluate variables influencing immunity and determine compliance rate with this schedule.
Method: This was a retrospective cohort study in three travel medicine clinics in British Columbia. Adults over twenty years of age who presented to the travel clinic, with no history of HB disease or vaccination against HB, and, unable to complete a standard vaccine series prior to departure, were offered the alternate schedule.
Results: In total, 117 participants met the inclusion criteria. Of these, 97 (82.9%), were immune after the two visit schedule. This is statistically significantly less than the 96% seroprotection achieved after the standard three visit series ($p < 0.001$). Overall compliance with the two visit vaccination schedule was 32.6% over a 12 month period in two clinics.

Age group	Proportion Immune (anti-HBsAg≥10mIU/mL)
20-39 years	88.9%
40-59 years	85.7%
>60 years	77.7%

[Proportion Immune by Age]
Conclusions: This two visit vaccination schedule appears to provide some level of protection against HB. However, further studies are needed to assess the degree of protection afforded after the first HB double dose. Increasing age was associated with reduced immune response but was not statistically significant. Completion of the series was better in the travel clinic where there was systematic follow up.

PO17.03
Meningococcal Vaccination Patterns of Travelers from Greece Visiting Sub-Saharan Africa

A. Pavli[1], A. Spilioti[1], P. Smeti[1], V. Silvestros[2], F. Antoniadou[3], A. Gregoraki[3], H. Maltezou[2]
[1]Hellenic Centre for Disease Control and Prevention, Travel Medicine Office, Athens, Greece, [2]Hellenic Centre for Disease Control and Prevention, Department for Interventions in Health Care Facilities, Athens, Greece, [3]Regional Department of Public Health and Social Welfare, Athens, Greece

Background: Meningococcal meningitis is a serious disease. Travel-associated infection for the general traveler is low; however regular epidemics, particularly in sub-Saharan Africa are responsible for significant morbidity and mortality. Quadrivalent meningococcal vaccination is recommended for travelers to the sub-Saharan meningitis belt.
Objectives: To identify patterns of meningococcal vaccination of travelers visiting countries of sub-Saharan Africa where meningitis is endemic.
Methods: A prospective study was conducted from 01/01/2009 to 31/12/2010 in all (57) health departments. Tetravalent meningococcal vaccine (polysaccharide) is available only at these departments, which are the official travel medicine providers in Greece. Conjugated tetravalent meningococcal vaccine has been available on the Greek market since January 2011. Data were collected using a standardized form per traveler including demographic characteristics, travel variables and travel counseling information from travelers seeking pre-travel medical advice.
Results: 3832 travelers attended the 57 health departments during the study period. 30.6% (1172) of them traveled to sub-Saharan African countries; 25.3% (296) of those were vaccinated with meningococcal vaccine. 63.8% (189) were male. 2.4% (7) were children under 14 years of age, 63.2% (187) were 15-44 years of age and 26.3% (78) were 45-64 years of age. 50.7% (150) traveled for work, 32.8% (97) for vacation, 6.8% (64) for visiting friends and relatives and for 9.7% (29) of them the reason was unknown. According to the area of travel 59.5% (176) stayed in urban areas, 33% (98) stayed in urban and rural areas, and 3.5% (10) stayed in rural areas. For 4% (12) the area of stay was unknown. Regarding duration of travel, 71% (210) stayed < 1month, 13.8% (41) stayed 1-3 months, 5.1% (15) stayed 3-6 months, and 8.1% (24) stayed >6months. According to the place of residence, 65.2% (193) stayed in hotels, 25% (74) stayed at local people's home, 4% (12) in camping, and 2.7% (8) on cruise ships.
Conclusions: Our results show that there is a need for improvement regarding recommendation of meningococcal vaccination for travelers to meningitis endemic countries. This indicates the necessity for individualized and more selective recommendations of meningococcal vaccine for travelers seeking pre-travel advice.

PO17.04

Antibody Persistence 4 Years after a Single Dose of a Quadrivalent Meningococcal ACWY Tetanus Toxoid Conjugate Vaccine in Adolescents and Adults

C. Borja-Tabora[1], C. Montalban[2], Z.A. Memish[3], V. Bianco[4], M. Van der Wielen[4], J.M. Miller[5]
[1]Research Institute for Tropical Medicine, Muntinlupa City, Philippines, [2]Philippine General Hospital, Manila, Philippines, [3]College of Medicine, Alfaisal University, Riyadh, Saudi Arabia, [4]GlaxoSmithKline Vaccines, Wavre, Belgium, [5]GlaxoSmithKline Vaccines, King of Prussia, United States

Background: *Neisseria meningitidis* is associated with high morbidity and mortality and is a major cause of endemic and epidemic invasive bacterial disease worldwide. Persistence of post-vaccination antibodies at protective levels is indicative of long-term protection against meningococcal disease.
Objective: We evaluated antibody persistence 4 years after administration of 1 dose of an EU-licensed meningococcal serogroups A, C, W-135, Y tetanus toxoid conjugate vaccine (MenACWY-TT, GlaxoSmithKline Vaccines) in adolescents and adults.
Methods: In this phase II, open-label, randomized, controlled multi-center study (NCT00356369) in the Philippines and Saudi Arabia, 426 healthy subjects who previously received 1 intramuscular dose of MenACWY-TT (N=317) or 1 subcutaneous dose of a licensed quadrivalent meningococcal polysaccharide vaccine (MenACWY-PS, N=109) were assessed for antibody persistence four years later by serum bactericidal antibody assay using rabbit complement (rSBA) measured by the Health Protection Agency, United Kingdom.
Results: At Year 4, 420 subjects were included in the according-to-protocol (ATP) cohort for persistence (313, MenACWY-TT; 107, MenACWY-PS). At least 74.0% and 68.6% of subjects who received MenACWY-TT had rSBA titers ≥1:8 and ≥1:128, respectively. Exploratory analyses suggested that percentages of subjects retaining these levels of antibodies were statistically significantly higher in the MenACWY-TT than in the MenACWY-PS groups for serogroups A, W-135 and Y and comparable in both groups for serogroup C (Table). Geometric mean antibody titers for serogroups A, W-135 and Y remained statistically significantly higher with MenACWY-TT than with MenACWY-PS.

Table: Percentage of subjects with rSBA titers ≥1:8 and ≥1:128 and rSBA geometric mean titers (GMTs) 4 years after vaccination (ATP cohort for persistence)

Antibody	Group	N	% ≥1:8 (95% CI)	% ≥1:128 (95% CI)	GMT (95% CI)
MenA	MenACWY-TT	312	86.5 (82.2; 90.1)	78.5 (73.5; 83.0)	278.6 (219.7; 353.2)
	MenACWY-PS	107	73.8 (64.4; 81.9)	61.7 (51.8; 70.9)	105.4 (67.6; 164.4)
MenC	MenACWY-TT	312	88.5 (84.4; 91.8)	81.4 (76.6; 85.6)	273.6 (220.6; 339.4)
	MenACWY-PS	107	84.1 (75.8; 90.5)	73.8 (64.4; 81.9)	315.0 (196.8; 504.1)
MenW-135	MenACWY-TT	312	74.0 (68.8; 78.8)	68.6 (63.1; 73.7)	175.1 (131.5; 233.0)
	MenACWY-PS	107	25.2 (17.3; 34.6)	20.6 (13.4; 29.5)	11.3 (7.8; 16.3)
MenY	MenACWY-TT	309	82.8 (78.2; 86.9)	78.6 (73.6; 83.1)	350.5 (268.9; 456.7)
	MenACWY-PS	107	43.9 (34.3; 53.9)	34.6 (25.6; 44.4)	26.0 (16.6; 40.7)

N = number of subjects with available results; 95% CI = 95% confidence interval

[Table ACWY-TT 019]

Conclusion: Four years after a single dose of MenACWY-TT, the majority of subjects retained rSBA titers ≥1:8 and ≥1:128 for each serogroup. The proportion of seroprotected subjects was higher after vaccination with MenACWY-TT than with MenACWY-PS.
Funding: GlaxoSmithKline Biologicals SA

PO17.05
The First Norovirus Bivalent GI.1/GII.4 Virus-like Particle (VLP) Vaccine in Man

P. Mendelman[1], J. Treanor[2], S. Frey[3], R. Gormley[4], R. Atmar[5], D. Topham[2], W. Chen[6], J. Ferreira[7], R. Bargatze[1], C. Richardson[1]
[1]Takeda Pharmaceuticals Inc, Vaccines, Bozeman, United States, [2]University of Rochester Medical Center, Rochester, United States, [3]Saint Louis University, School of Medicine, Saint Louis, United States, [4]Navy Medical Research Center, Silver Springs, United States, [5]Baylor College of Medicine, Houston, United States, [6]University of Maryland School of Medicine, Baltimore, United States, [7]The EMMES Corporation, Rockville, United States

Noroviruses are highly infectious and easily spread in all age groups. We conducted a randomized, double blind, placebo controlled study to evaluate the safety and immunogenicity of a bivalent norovirus virus-like particle (VLP) candidate vaccine given by the intramuscular (IM) route. The vaccine included a GI.1 VLP and a consensus GII.4 cVLP adjuvanted with Monophosphoryl Lipid A (MPL; GlaxoSmithKline) and aluminum hydroxide. Adults 18-49 (n=64), 50-64 (n=19) and 65-85 (n=19), were sequentially enrolled to receive two doses of vaccine or saline four weeks apart. Local and systemic symptoms, unsolicited symptoms, and serious adverse events (SAEs) were evaluated. Serum Pan-Ig, IgG, and IgA ELISA assays, histo-blood group antigen blocking, and hemagglutination-inhibition antibodies to GI.1 and to GII.4 were measured at baseline and on days 7, 21, 28, 35 and 56 after vaccination and antibody persistence was measured at 6 months and one year.
Prior to vaccination, each of the 102 adults were seropositive for both GI.1 and GII.4 VLPs by the Pan-Ig ELISA assay and most adults were seropositive by the other assays tested. Antibody responses to each VLP increased at day 7 after the initial dose, the first time point measured. The second dose did not boost significant increases in titer. The seroresponse rates (4-fold rises) and geometric mean fold rise in titers to the GI.1 VLP were higher than those to the GII.4 cVLP. The antibody responses to both VLPs were significantly increased compared to baseline and the immunogenicity response pattern to both VLPs was similar in each age group. Elevations in antibody persisted at one year compared to baseline. Injection site pain and tenderness were the most common symptoms following vaccination. No subjects reported fever or vaccine-related SAEs.
Conclusions: These initial data with a first Norovirus bivalent vaccine candidate support that a single dose of this investigational vaccine given IM was generally well tolerated and immunogenic. Future studies will continue to explore responses to the vaccine in adults, older children and naïve infants.

PO17.06

Factors Determining the Uptake of MMR Vaccination among Korean International Travelers: Focus on Measles Outbreaks in Europe

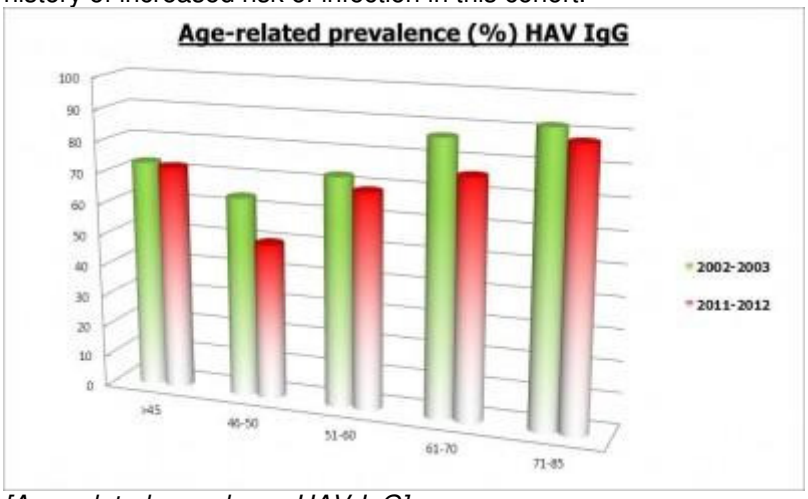
S.Y. Shin[1]
[1]*Korea Medical Institute, Seoul, Korea, Republic of*

Background: Measles outbreaks continue to occur in many countries in Europe since 2010. In June 2012, Korea Centers for Disease Control and Prevention (KCDC) immunized the Olympic athletes against measles and announced guideline for international travelers to prevent measles by mass media such that all travelers to Europe were recommended to check their MMR vaccination history and get vaccination before travel if necessary.
Objective: We investigated the major determinants of MMR vaccination for International travelers.
Method: The surveys were undertaken for 748 travelers before travel who were visited the Adult Immunization and Travel Clinic of Korea Medical institute from 25 June 2012 (after KCDC announcement) to 11 August 2012 (end of Olympic games). Chi-square or Fisher exact tests were used to test for differences between groups. T-tests were used for continuous variables.
Results: Among the 748 travelers, 110 (14.7%) were travelers to Europe and 638 (85.3%) were travelers to non-European countries, Of those traveling to Europe, 3(2.7%) travelers had awareness of measles outbreak in Europe. Of those traveling to non-European countries, there was no traveler had awareness of measles outbreak in Europe or non-European countries.
As following the guideline of KCDC, 643 travelers needed MMR vaccination for international travel, including 93 (14.5%) travelers to Europe and 550 (85.5%) travelers to non-European countries. Of those traveling, 21(22.6%) travelers to Europe got MMR vaccination and 4 (0.7%) travelers to non-European countries got MMR vaccination (22.6% vs. 0.7%, p=0.000).
Among the 25 vaccinated travelers, 24(96%) travelers were vaccinated through the persuasion by doctor of travel clinic and only 1(4%) traveler to Europe had awareness of necessity of MMR vaccination through the KCDC announcement.
Conclusion: Visiting a travel clinic is more important determinant to vaccinate travelers to Europe than governmental announcement using mass media.

PO17.07
Hepatitis A Serologic Screening in Travellers: An evaluation '10 years after'

B. Ngo[1], R. Cartuyvels[1], K. Magerman[1], I. Geyssens[2], J. van der Hilst[2], A. Mewis[1]
[1]JESSA Hospital, Laboratory Medicine, Hasselt, Belgium, [2]JESSA Hospital, Infectious Diseases, Hasselt, Belgium

Background: In 2004 we reported on hepatitis A-IgG antibody (anti-HAV) prevalence in 306 travelers out of 3626 travelers visiting our Travel Clinic in Hasselt, Belgium during an eighteen-month period. The data suggested that screening for anti-HAV made vaccination redundant in 73% of people over 45 years of age (Y). We also noticed a proportional relationship between the presence of anti-HAV and age. Subsequently, in our centre an anti-HAV test was proposed to previously unvaccinated travelers of >45 Y.
Objective: In this study we investigated the current estimated age-specific anti-HAV prevalence in travelers >45 Y and compared the data to the cohort of 10 years ago.
Method: A similar method was used as in 2004. Files of 6435 travelers who visited our centre between February 15th 2011 and December 12th 2012 were analysed retrospectively. Anti-HAV results were available for 282 travelers. Travelers reported/suspected to have lived for more than 1 year in a high endemic country were excluded (n=64).
Results: Among the travelers who were excluded, 95% tested positive for HAV-IgG. Of the remaining 218, 154 (71%) were positive for anti-HAV. Antibody prevalence was correlated with age: 50% (age 46-50), 69% (age 51-60), 76% (age 61-70) and 88% (age 71-85). Compared to our results of 2002-2003, (64% (46-50), 73% (51-60), 87% (61-70) and 92% (71-85)) we noticed a decrease of antibody prevalence in all age-groups >45 Y (figure).
Conclusion: Screening of Belgian travelers for anti-HAV remains useful for selected groups. Elevating the cut-off age of testing for HAV-IgG (those born before 1960) actually still results in avoiding Hepatitis A vaccination in 70% of those travelers in our centre. Follow-up of HAV-IgG prevalence among travelers results in a cost effective HAV vaccination strategy. Reported prevalence of anti-HAV in the age group 46-50 Y may be an overestimation as some physicians only tested travelers with a history of increased risk of infection in this cohort.



[Age-related prevalence HAV-IgG]

PO17.08
Hepatitis a Vaccination Coverage and International Travel among US-born and Foreign-born Adults

T.J. Cunningham[1], J.A. Singleton[2], T.V. Murphy[3], C.M. Brown[1], G. Brunette[4]
[1]Division of Global Migration and Quarantine, Centers for Disease Control and Prevention, Atlanta, United States, [2]Immunization Services Division, Centers for Disease Control and Prevention, Atlanta, United States, [3]Division of Viral Hepatitis, Centers for Disease Control and Prevention, Atlanta, United States, [4]Travelers' Health Branch, Centers for Disease Control and Prevention, Atlanta, United States

Background: US residents traveling internationally to visit friends and relatives (VFRs) have an increased risk of morbidity from certain infections. Although the reasons for this are multifaceted, it is in part due to a lack of pre-travel health preparation. Hepatitis A is among the most common vaccine-preventable travel-related diseases; however, few population-based studies in the US have examined the influence of country of birth on receipt of hepatitis A vaccine among those embarking on international travel.
Objective: We tested whether nativity status modified the association between international travel and receipt of hepatitis A vaccine.
Methods: We analyzed data from the 2011 National Health Interview Survey of 24,398 adults aged 18 years and older. International travel was determined by responses to a question regarding ever having traveled outside of the US since 1995, excluding Europe, Japan, Australia, New Zealand, and Canada. Receipt of hepatitis A vaccine was determined by self-report. In separate multivariable log-binomial regression models for US and foreign-born adults, we estimated adjusted prevalence ratios (APRs) and 95% confidence intervals (CI) using SUDAAN. Models were adjusted for age, gender, race/ethnicity, geographic region of residence, marital status, educational attainment, usual source of health care, and health insurance coverage.
Results: The prevalence of international travel to potentially higher-risk countries varied among US-born (29.9%) and foreign-born (55.9%) adults. US-born (26.3% vs 9.7%: APR=2.3; 95% CI: 2.1-2.5) and foreign-born (24.4% vs 11.1%: APR=1.8; 95% CI: 1.5-2.2) adults who reported international travel were more likely to report receipt of hepatitis A vaccine compared with US-born adults and foreign-born adults who did not travel, respectively. Receipt of hepatitis A vaccine was similar by nativity status.
Conclusions: Foreign-born adults were more likely to travel internationally to countries with potentially higher-risk of hepatitis A infection. Both US- and foreign-born adults who traveled internationally were more likely to report higher and similar hepatitis A vaccine coverage levels compared with those who did not travel. The overall coverage was relatively low even among travelers, regardless of nativity status, and therefore improved strategies are needed to increase hepatitis A vaccination coverage levels among both US- and foreign-born residents traveling internationally.

PO17.09
Influenza Vaccination Uptake among Australian Hajj Pilgrims in 2011

O. Barasheed[1], H. Rashid[1], I. Ridda[1,2], L. Heron[1], D. Dwyer[2,3,4], R. Booy[1,2,3], Hajj Research Team
[1]National Centre for Immunisation Research and Surveillance, Westmead, Australia, [2]The University of Sydney, Sydney Medical School, Sydney, Australia, [3]The University of Sydney, Sydney Emerging Infections and Biosecurity Institute, Sydney, Australia, [4]Westmead Hospital, Centre for Infectious Diseases and Microbiology Laboratory Services, Westmead, Australia

Background: Hajj is the most diverse mass gathering of people which attracts Muslims from all over the world. The risk of respiratory infections, including influenza, is high at Hajj.
The World Health Organisation (WHO) recommends vaccination as the most effective way to prevent influenza. The influenza vaccine uptake rate among Hajj pilgrims is varied by country and by year. So far, there are no data on influenza vaccination rates among Australian pilgrims.
Objective: Our study aimed at estimating the influenza vaccine coverage rate among Australian Hajj pilgrims and exploring reasons for not receiving the influenza vaccine.
Method: During 2011 Hajj season, a cross-sectional study was conducted in Mecca by using an anonymous self-administered questionnaire. A total of 442 questionnaires were returned. Of these, 11 were excluded due to ineligibility criteria (7 non-Australian and 4 uncompleted surveys).
Result: Of the 431 pilgrims who completed the questionnaires, 55% were males; the median age was 42 years (range 7-86). In 2011, 65% received influenza vaccine, 88% of those from their General Practitioners (GPs); 21% had one or more indications for vaccination. In 2010 only 30% received the vaccine.
There was a trend towards higher uptake in those with risk conditions (72.5% versus 62.4%, p=0.07). In multivariate analysis the likelihood of being vaccinated against influenza in 2011 was higher for being a female (OR: 1.62, 95% CI: 1.0 - 2.6; p=0.05) and being from a tour group other than group “A” (OR: 3.4, 95% CI: 1.9 - 6.0; p< 0.01), and having had the seasonal influenza vaccine in 2010 and pandemic vaccine in 2009, with an odds ratio of 2.1 (95% CI: 1.1 - 3.9; p=0.02) and 2.2 (95% CI: 1.2 - 4.0; p< 0.01), respectively.
The main reported reason for not receiving the influenza vaccine in 2011 was that people relied on their natural immunity (33%).
Conclusion: Almost two-third of the Australian Hajj pilgrims received influenza vaccine in 2011. Whereas in 2010 only one third were vaccinated when they were not attending Hajj.
There were misconceptions about the vaccine which need to be addressed in future research as well as learning why uptake in females is better.

PO18 Dengue

PO18.01
Dengue Surveillance by Proxy: Travellers as Sentinels for Outbreaks in the Pacific Islands

C. Lau[1,2], P. Weinstein[3], D. Slaney[4]
[1]University of Queensland, Brisbane, Australia, [2]Travel Medicine Alliance Clinics, Perth and Brisbane, Australia, [3]University of South Australia, Barbara Hardy Institute, Adelaide, Australia, [4]Institute of Environmental Science and Research, Porirua, New Zealand

Background: Dengue is a global emerging infectious disease, with unprecedented scale of outbreaks over the past decade. Sensitive surveillance systems are crucial for effective control of outbreaks, and regional surveillance could provide valuable data to supplement global systems, improve sensitivity and timeliness of reporting, or capture otherwise undetected outbreaks. Timely reporting of dengue in travellers has been shown to provide important sentinel information on outbreaks in the countries or regions where infections were acquired. In New Zealand, there are no endemic arboviral diseases in humans, and most dengue cases are imported from neighboring Pacific Islands where comprehensive surveillance systems are under development. Dengue surveillance data from New Zealand could therefore provide valuable sentinel information on dengue in the Pacific, and be used to support regional capacity to manage outbreaks.
Objective: In this study, we examine epidemiological data on all reported cases of dengue diagnosed in New Zealand from 1997 to 2009, and discuss the use of such surveillance data as sentinel information for dengue outbreaks in the Pacific Islands.
Methods: Dengue is a notifiable disease in New Zealand, and all cases reported from 1997 to 2009 were analyzed. Incidences of dengue in travellers who acquired their infections from the Cook Islands, Samoan Islands (Samoa and American Samoa), Fiji, Tonga, or French Polynesia were compared to WHO reported incidences of dengue for those areas.
Results: From 1997 to 2009, 679 cases of dengue were reported in New Zealand. The most common regions where dengue was acquired were Pacific Islands (74.2%), Asia (20.8%), and Australia (1.5%); and the most common Pacific Islands where infections were acquired were the Cook Islands, Samoan Islands, Fiji, Tonga, and French Polynesia. The incidence of dengue acquired from Pacific Islands and reported in NZ closely reflected WHO reported dengue incidences in local populations in those islands.
Conclusion: NZ is in a unique position to provide alerts on dengue outbreaks in the Pacific Islands, potentially providing early warnings to facilitate more timely public health interventions. Importantly, such collaboration would reduce disease burden from outbreaks both at the source and in the country of importation, and provide a model for transnational collaboration in disease surveillance with regional as well as global benefits.

PO18.02

Dengue Virus Infection in Bali, Indonesia: A Continued Challenge to a Tropical Tourist Destination

M.J. Yoshikawa[1], R. Kusriastuti[2], A. Suwandono[3,4], N. Mishima[5,6], T. Nishiyama[5,6]
[1]Kyoto University, Center for the Promotion of Interdisciplinary Education and Research, Inter-Graduate School Unit for Sustainable Development and Survivable Societies, Kyoto, Japan, [2]Ministry of Health, Directorate General of Disease Control and Environmental Health, Vector Borne Disease Control, Jakarta, Indonesia, [3]Diponegoro University, School of Public Health, Semarang, Indonesia, [4]Ministry of Health, National Institute of Health Research and Development, Jakarta, Indonesia, [5]Kansai Medical University Takii Hospital, Center for Travel Medicine, Hirakata, Japan, [6]Kansai Medical University, Department of Public Health, Hirakata, Japan

Background of the study: Dengue hemorrhagic fever (DHF) was first reported in the Republic of Indonesia in 1968, and DHF incidence is reported based on hospitalized cases in all 33 provinces. The number of reported DHF cases peaked in 2009 (158,912 cases) and declined marginally in 2010 (156,086 cases). In Bali Province, a tropical tourist destination, the reported DHF cases soared from 5,810 in 2009 to 11,697 in 2010, and we previously reported several local-specific factors that might explain the spread of this mosquito-borne infection in recent years.
Objective: The purpose of this study is to investigate the reported DHF cases in Bali in 2011.
Methods: Since virus information in Bali allowing phylogenetic or serotype analyses remains unavailable, data of reported DHF cases, including unpublished data, were collected from the Ministry of Health. We analyzed national and provincial monthly data between 2001 and 2011, and conducted interviews with health officers and local residents in Bali to incorporate social perspectives into our interdisciplinary research.
Summary of results: Reported DHF cases declined 58% nationwide in 2011 from 2010, while Bali showed a larger decline of 74%, reporting only 2,996 cases. A comparison with the neighboring East Java Province and the nation's capital Jakarta, from where substantial numbers of domestic tourists and migrant workers arrive in Bali, revealed declines of 79% and 65% in 2011 from 2010, respectively. DHF incidence in 2011 peaked in January in all 3 areas. Bali may have benefited from the reduced incidence in the two areas. In addition, the local health office and other sectors in Bali have promoted social advocacy for vector control in response to the large outbreak in 2010. Several villages have also enhanced community customary law to reduce plastic waste, which can provide mosquito breeding sites.
Conclusions: Despite the reduced DHF cases and improved awareness among the local people in Bali, imported cases from Bali continue to attract attention. In Japan, 11 of 55 (20%) patients confirmed by the national laboratory in 2011 reported Bali as the suspected area of origin. Dengue virus infection still remains a challenge for this international tourist destination.

PO18.03
Intended Mosquito Aoidance Practices International Travel Behavior Model (IMAP-ITB) for Dengue Prevention in U.S. Travelers

K.C. Allen[1]
[1]*Kent State University, College of Public Health, Kent, United States*

Background: Imported Dengue to non-endemic regions presents an unwelcome opportunity for Dengue establishment. Little is understood on transmissibility, vector density, thresholds and climactic impact in temperate zones like the United States. Travel recommendations for US travelers to Dengue endemic regions include the use of mosquito avoidance practices (MAP). To understand risk of Dengue establishment in the US, it is important to conduct research on travel behavior and significant factors that influence compliance with MAP, particularly in high-risk populations such as visiting friends and relatives (VFR) travelers and repeat travelers.
Objective: To determine factors associated with compliance to MAP recommendations for high risk US international travelers.
Methods: A pre-travel behavioral assessment survey on MAP was developed and tested in travelers to the cultural celebration of Carnival in the Republic of Trinidad and Tobago in 2012. The survey used an adaptation of the Precaution-Adoption Process Model (PAPM) to identify stages of awareness to compliance with MAP for Dengue prevention. Data was collected using snowball sampling through social media. An exploratory factor analysis established construct validity and revealed a tentative intended MAP international travel behavior model (IMAP-ITB). Field observations of comparative population samples were conducted as a complete participant/participant observer with travel groups to Brazil and Thailand. Field notes were collected for qualitative analysis to inform the tentative IMAP-ITB model.
Results: The survey can identify PAPM-Dengue stage of the traveler to determine behavioral risk of Dengue acquisition. The IMAP-ITB model revealed cultural embededdness, risk distractions, type of travel and past experiences as constructs associated with intended MAP. Field observations revealed social interactions as influential on actual MAP, insect repellent use was considered a personal responsibility for travelers, repeat travelers had lower risk perception for travel-associated illnesses, and social/physical environment directly influenced MAP based on cultural embededdness, risk perception and perceived severity in the travel destination.
Conclusions: Social and physical environmental factors play an important role on intended and actual MAP. More research is needed to understand differences in travel experiences and the role of environment on actual travel behavior.

PO18.04
Half Century of Dengue in Thailand

A. Tawatsin[1], U. Thavara[1], J. Chompoosri[1], P. Bhakdeenuan[1], S. Anantapreecha[1], S. Sangkitporn[1], P. Siriyasatien[2], P. Asavadachanukorn[3]
[1]National Institute of Health, Department of Medical Sciences, Nonthaburi, Thailand, [2]Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, [3]Department of Statistics, Faculty of Commerce and Accountancy, Chulalongkorn University, Bangkok, Thailand

Background: Dengue which includes dengue fever, dengue haemorrhagic fever and dengue shock syndrome is caused by dengue viruses that transmit to humans through the bites of infective vector mosquitoes (*Aedes aegypti* and *Ae. albopictus*). The disease is now one of the major public health problems worldwide, especially in the tropical region, including Thailand.
Objective: This paper aims to provide epidemiological and virological data of dengue in Thailand.
Method: The data of reported cases and deaths of dengue in Thailand was obtained from the Bureau of Epidemiology, Department of Disease Control. The serotypes of dengue viruses from patients from various provinces were obtained from the National Institute of Health, Department of Medical Sciences.
Summary of results: The first epidemic of dengue occurred in 1958. Later, the annual incidence of dengue (morbidity/100,000 population) has fluctuated over time and increased from 8.9 in 1958 to 120 in 2012, with the highest incidence of 325 in 1987. The highest mortality rate of dengue in Thailand (1.88/100,000 population) was observed in 1987; however, it has appeared below 0.8 since 1988. The case fatality rate of dengue decreased dramatically from 13.9% in 1958 to 0.11% in 2012. The most prevalent age group of dengue patients was shifted from young people (0-9 y) in early decades to elder people (10-24 y) in recent decades. Dengue occurs in Thailand all year round with high incidence during the rainy season (May-October). The disease has been found in all provinces of Thailand; however, most cases were reported from central and southern regions. All of the 4 serotypes, DEN-1, DEN-2, DEN-3 and DEN-4 were found throughout Thailand. The serotyping of dengue virus from patients from various provinces showed changing proportion among the 4 serotypes.
Conclusion: Dengue has remained an important mosquito-borne disease of Thailand since late 1950s with high annual incidence but relative low mortality. This may imply that the vector control is still far from success but medical services have been improved substantially. All of the 4 serotypes of dengue viruses circulate continuously in Thailand with fluctuations in dominant serotypes from year to year and from place to place. It is impossible to eradicate dengue but controlling of the disease is possible. Since there is no vaccine available currently, vector control and self protection are the main strategies to control this disease.

PO18.05
Identification of High Risk Areas for DHF in Thailand

U. Thavara[1], A. Tawatsin[1], J. Chompoosri[1], P. Bhakdeenuan[1], S. Sangkitporn[1], A. Phumee[2], P. Siriyasatien[2], P. Asavadachanukorn[3]
[1]National Institute of Health, Department of Medical Sciences, Nonthaburi, Thailand, [2]Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, [3]Department of Statistics, Faculty of Commerce and Accountancy, Chulalongkorn University, Bangkok, Thailand

Background: Dengue haemorrhagic fever (DHF) is caused by dengue viruses and transmitted to humans through the bites of infected *Aedes* mosquitoes, *Ae. aegypti* and *Ae. albopictus*. DHF is now the most important infectious disease of Thailand.
Objectives: This paper surveyed DHF vectors in Thailand and investigated dengue viruses found in these vectors under natural conditions. The obtained information was used to predict high risk areas of DHF in Thailand.
Methods: DHF vectors in 5 regions (5 provinces from each) of Thailand were surveyed, collected and examined for dengue viruses employing reverse transcriptase polymerase chain reaction (RT-PCR) technique. The Hot Spot analysis was employed to predict the high risk areas of DHF.
Summary of results: Both species of vectors were found in 25 provinces of Thailand. *Ae. aegypti* was commonly prevailing up to 1,509 meters above sea level while *Ae. albopictus* was detected at higher altitude up to 1,928 meters. All 4 dengue serotypes were detected in female mosquitoes of both species; however, the infection rates found in *Ae. aegypti* were higher than those in *Ae. albopictus* and the prevalence of the predominant dengue serotype in each species varied from province to province. The highest infection rates of dengue viruses were found in the southern region in both species (37.75% in *Ae. aegypti* and 24.24% in *Ae. albopictus*). Dengue viruses were found in larvae and adult male mosquitoes of the two species. Double infections with two serotypes of dengue viruses were detected in both species. The Hot Spot analysis showed most of the high risk areas for DHF were in 4 provinces in the southern region of Thailand.
Conclusion: It is essential to control both species of the vectors in the infested areas, especially in the southern provinces where the high infection rates of dengue virus in both vectors were found. The incidence of dengue viruses found in larvae and male mosquitoes reveals the role of transovarial transmission of the viruses in field populations of DHF vectors and elucidates circulation of dengue viruses in vectors in the natural environment of endemic areas. The incidence of multiple serotypes of dengue viruses in *Ae. aegypti* and *Ae. albopictus* in the same area points toward a high risk for an epidemic of DHF. These findings provide greater understanding of the relationship among mosquito vectors, virus transmission and DHF epidemiology in endemic areas.

PO18.06

High Prevalence Rate of Previous Dengue Virus Infection among First Generation Surinamese Immigrants in The Netherlands

F.W. Overbosch[1], A. van den Hoek[1,2], J. Schinkel[3], G.J. Sonder[1,2,4]
[1]Public Health Service (GGD), Department of Infectious Diseases, Amsterdam, Netherlands, [2]Academic Medical Center, Department of Internal Medicine, Division of Infectious Diseases, Tropical Medicine and AIDS, Amsterdam, Netherlands, [3]Academic Medical Center, Department of Medical Microbiology, Section of Clinical Virology, Amsterdam, Netherlands, [4]National Coordination Centre for Traveller's Health Advice (LCR), Amsterdam, Netherlands

Background: Dengue is endemic in most (sub)tropical regions. Four distinct serotypes of the virus can cause dengue. Recovery from infection provides lifelong immunity against that particular serotype. However, subsequent infections by other serotypes increase the risk of developing “severe dengue“.
Large groups of immigrants in the Netherlands grew up in dengue endemic countries such as Suriname, and frequently return to their country of origin to visit friends and relatives (VFRs). As these immigrants may have had a dengue virus (DENV) infection before immigrating, this group is possibly at risk for a secondary, and thus more severe, dengue infection.
Objective: To assess how many Surinamese immigrants living in the Netherlands have had a previous dengue infection.
Method: We conducted a seroprevalence study among first generation Surinamese immigrants living in the Netherlands who attended the travel clinic of the Public Health Service Amsterdam between February 2008 to December 2011. Blood samples were tested for IgG antibodies to DENV antigen serotypes (1, 2, 3 and 4). We tested gender, age, years lived in Suriname before immigration, history of yellow fever vaccination and time between yellow fever vaccination and blood sample collection as possible predictors for previous infection.
Results: 400 Surinamese travelers were included with a mean age of 52 years (range 18-89) and 37% were male. Serology suggestive of past dengue virus infection was found in 329 (82,3%; 95% CI:78-86%) participants. Of the determinants, increasing age (OR 1,03, 95% CI:1,01-1,05) and increasing years lived in Suriname (OR 1,1 95% CI 1,1-1,2) were significant predictors for positive serology.
In multivariate analysis, only the time lived in Suriname before immigration remained a significant predictor for previous dengue infection.
The seroprevalence was not related to gender, history of yellow fever vaccination and time between yellow fever vaccination and blood sample collection.
Conclusion: Most first generation Surinamese immigrants living in The Netherlands were previously infected with dengue virus, making them potentially at increased risk for severe dengue virus infection when visiting their country of origin. More research, both in Suriname and The Netherlands, is needed into the incidence of severe dengue infection among this group.

PO19 Malaria

PO19.01
An Unusual Case of Non-*Falciparum*, Non-*Vivax* Malaria in Singapore Presenting as Dengue Fever

R.K.C. Fong[1]
[1]*Changi General Hospital, Department of Medicine, Division of Infectious Diseases, Singapore, Singapore*

Background: Despite being a malaria-free country since 1982, cases of malaria do present to healthcare facilities occasionally in foreign or returning travellers throughout the year in Singapore. Most cases of malaria from travellers are Plasmodium *falciparum* or P *vivax* in Singapore. Another tropical disease not unfamiliar to doctors here is dengue. The patient handling capacity of healthcare institutions are often stressed during dengue epidemics that occur annually in Singapore from May to October, worst being in years 2005 and 2007.
Objective: This case highlights the similarity in presentation of malaria to that of dengue and the need to ponder the origin of a foreign traveller in considering differential diagnoses of an acute febrile illness, even during the occurence of a dengue outbreak.
Method: Our institution presents a case of P *malariae* in a traveller from Congo manifesting as a possible case of dengue fever during a dengue outbreak in October 2012.
Summary of Results: The patient presented with fever and headache a week after arriving in Singapore. She had mild throbocytopenia (120 $x10^9$ /L) and a weakly positive Dengue IgM result. A subsequent blood film for malaria parasites revealed P *malariae*, 1.4% ring form and band forms seen. She was promptly started on oral chloroquine treatment and recovered uneventfully. Interestingly, she had never taken anti-malarial prophylaxis all her life in Congo and this was her first episode of malaria, which incidentally developed outside her home country.
Conclusions: Patients presenting with fever and thrombocytopenia during a dengue outbreak period may be mistaken to have dengue fever. Without a detailed travel history, a patient at risk of developing malaria maybe misdiagnosed as dengue and result in potentially fatal consequences. Interestingly, cases of P. *malariae* in our region should also have further tests to exclude P. *knowlesii* as a possible differential cause of malaria with the appropriate epidemiological risk factor.

PO19.02
Malaria Prevention Strategies: Adherence among Boston-Area Travelers Visiting Malaria-endemic Countries

R.J. Stoney[1], L.H. Chen[2,3], E.S. Jentes[1], M.E. Wilson[4], P.V. Han[1], C.M. Benoit[5], W. Macleod[6,7], D.H. Hamer[6,7,8], E.D. Barnett[5], Boston Area Travel Medicine Network
[1]Centers for Disease Control and Prevention, Division of Global Migration and Quarantine, Atlanta, United States, [2]Mount Auburn Hospital, Travel Medicine Center, Cambridge, United States, [3]Harvard Medical School, Boston, United States, [4]Harvard School of Public Health, Global Health and Migration, Boston, United States, [5]Boston Medical Center, Maxwell Finland Laboratory for Infectious Diseases, Boston, United States, [6]Boston University, Center for Global Health and Development, Boston, United States, [7]Boston University School of Public Health, International Health, Boston, United States, [8]Boston University School of Medicine, Infectious Diseases, Boston, United States

Objective: To assess malaria prevention strategies used during and after travel among travelers to malaria-endemic countries.
Methods: Travelers ≥18 years were enrolled from September 2009--September 2011 during pre-travel consultations at three Boston-area travel medicine clinics. Travelers were asked to complete a pre-travel survey, a weekly diary during travel, and a post-travel survey 2-4 weeks after return. Travelers were divided into categories based on tertile cut-points for duration of travel. Traveler demographics, trip characteristics, and malaria prevention strategies were evaluated by chi-square tests; statistical significance was set at $p< 0.05$.
Results: All three surveys were completed by 628 travelers, including 370 (59%) who traveled to a malaria-endemic country and were prescribed anti-malarial chemoprophylaxis. Of these 370, 61% were female, 66% were tourists, 82% were US-born, and the median age was 46 years (range, 20-82). Median duration of travel was 13 days (range, 4-65); India (13%), Tanzania (8%), and Kenya (7%) were the most common destinations. Commonly prescribed anti-malarials were atovaquone/proguanil (82%), chloroquine (10%), doxycycline (5%), and mefloquine (3%). During travel, 79% reported any insect repellent use, 61% slept in air-conditioned rooms, and 46% used a bednet at least once. During travel, 70 (21%) travelers missed ≥1 dose of chemoprophylaxis; neither duration of travel ($p=0.16$) nor whether the anti-malarial was prescribed to be taken weekly or daily ($p=0.08$) was associated with missing ≥1 dose. After travel, 85% (310/363) of travelers reported chemoprophylaxis continuation after leaving an area of malaria risk. Of 29 travelers stating after travel that they did not take chemoprophylaxis during their trip, 12 (41%) did not adhere to their regimen due to peer advice. One traveler self-reported malaria and hospitalization in Tanzania despite full compliance with the doxycycline regimen; however, no confirmed diagnosis by a clinician or parasitologic exam was reported.
Conclusions: Most travelers seen in these travel clinics took anti-malarials as prescribed, though a small proportion took none of their prescribed drug. Travelers should be advised that optimal malaria prevention is a combination of mosquito avoidance strategies and chemoprophylaxis adherence. Interventions to address peer opinions that are contrary to clinician prescribed advice may be critical in assuring adherence.

PO19.03
Travel-related Cases of Malaria in Quebec, Canada

Y.-G. Bui[1,2,3], S. Trépanier[4], M. Blackburn[1,3], F. Milord[1,3], É. Levac[3]
[1]Université de Sherbrooke, Public Health, Longueuil, Canada, [2]Institut National de Santé Publique Du Québec, Montreal, Canada, [3]CSSS Champlain-Charles-Lemoyne, Public Health, Longueuil, Canada, [4]CSSS Manicouagan, Public Health, Baie-Comeau, Canada

Background: In 2006, Quebec travellers undertook 1 384 000 overseas trips. This represents an increase of more than 50% in the number of trips since 2000. Europe remains the most frequent destination, followed by the Caribbean. However, more at-risk countries in Central America and Africa are gaining in popularity (StatsCan, 2002, 2006). There is also an increase in volunteer work (in general for longer trips) and more immigrants who return to visit their families and friends (VFRs).
Objectives: To describe the epidemiology of malaria acquired during travel for Quebec (Canada), and to identify high-risk groups of travellers.
Method and data sources: We performed an analysis of 289 malaria cases notified in the provincial database of reportable diseases from January 1st 2004 to December 31st 2007 and for which detailed information was available through an epidemiological questionnaire filled out by the regional department of public health. Total number of trips by region from Statistics Canada was used as denominator.
Results: 189 cases (62.3%) were related to travel outside of Canada and the US. The most frequently observed type was *Plasmodium falciparum*, representing 72.3 % of the files that were obtained. Sub-Saharan Africa is by far the region with the most cases (87.2 %), giving us a ratio of 1 case of malaria for 692 trips in this region. VFRs represent more than half of notified cases. The second highest risk group are those who travelled for either work, study or volunteering, accounting for 34.4% of cases.
Conclusions: The majority of malaria cases were acquired during a trip to Africa. VFRs and workers are the two highest risk groups. We need to develop better strategies in order to reach these groups of travellers and to ensure their adherence to malaria chemoprophylaxis.
Key words: Travel, Infectious diseases, Malaria, VFR, Quebec

PO19.04

Primaquine Use as the Anti-Malarial Relapse Drug in Japan - Possible Relevance of Body Weight-adjusted Doses to the Drug Efficacy

S. Shimizu[1], T. Kikuchi[1], M. Koga[1], H. Maruyama[2], M. Kimura[3]
[1]Department of Infectious Diseases and Applied Immunology, Research Hospital of the Institute of Medical Science, University of Tokyo, Tokyo, Japan, [2]Department of Infectious Diseases, Division of Parasitology, Faculty of Medicine, University of Miyazaki, Miyazaki, Japan, [3]Department of Internal Medicine, Shin-Yamanote Hospital, Japan Anti-Tuberculosis Association, Tokyo, Japan

Background: The Research Group on Chemotherapy of Tropical Diseases, Japan, imports medicines for tropical and parasitic diseases that are not licensed in our country, including primaquine. Previously, we analyzed data on primaquine use, mainly focusing on its efficacy as the anti-relapse treatment by country of disease acquisition. Here, we analyzed more recent data, intending to clarify appropriate dosages of the agent as well as its safety profile especially among Japanese patients.
Methods: Patient records formulated by our research group and were filled by the physicians in charge after drug use were analyzed. Patients who were treated with primaquine during 2003-2011 were enrolled in this study.
Results: Records of 133 cases including 96 Japanese cases were analyzed. Among those, 119 developed *P. vivax* and 14 *P. ovale* malaria. Sixty-seven cases received primaquine 15 mg base/day for 14 days (lower dose regimen), while 53 cases received 30 mg base/day for 14 days (higher dose regimen). Relapse was reported in 7 *P. vivax* cases, among which the total dose per body weight could be calculated in 5 cases. All the 5 relapsed cases had received the total dose of 2.41-3.62 mg/kg primaquine base with a median of 2.96 mg/kg, while non-relapsed cases (n=45) received 2.56-5.25 mg/kg with a median of 3.44 mg/kg ($p < 0.05$). Three out of 19 cases (16%) of *P. vivax* malaria contracted in Papua New Guinea (PNG) experienced a relapse, while none out of 27 cases contracted in India did so. Adverse events were reported in 3 Japanese cases, one with the lower dose and the other 2 with the higher dose regimen, none of which being severe.
Conclusions: The anti-malarial relapse drug primaquine appears to be used safely in Japan, and its licensure would greatly benefit Japanese travelers. To achieve maximal efficacy of the agent, body weight-adjusted doses should be considered, in addition to the well-described country of disease acquisition, eg, PNG. This may mean that the higher dose regimen, which is increasingly practiced worldwide, is not indicated in patients with a low body weight.

PO19.05

Efficacy and Tolerance of 420 mg Primaquine Radical Cure in *Plasmodium vivax* Relapses in a Series of Adult French Travelers

C. Rapp[1,2], S. Ngo[3], C. Ficko[3], C. Flateau[3], N. Cardon[3], O. Aoun[3], D. Andriamanantena[3], M. Borne Pons[3]

[1]Begin Military Hospital, Infectious and Tropical Diseases, Saint-Mandé, France, [2]Ecole du Val de Grâce, Paris, France, [3]Begin Military Hospital, Saint-Mandé, France

Background: *Plasmodium vivax* malaria represents 5 to 6 % of imported malaria cases in metropolitan France. It is characterized by possible relapses responsible for underestimated morbidity. Since October 2008, the French High Committee of Public Health (HCPH) recommends a radical cure consisting of 30 mg/day primaquine (PQ) for 14 days (420 mg total dose) for a primary *P.vivax* infection, right after the intra-erythrocytic schizonticide treatment.
Objectives: Assess the efficacy and tolerance of a 420 mg PQ radical cure in imported *P.vivax* malaria in adults.
Methods: Prospective study of adults treated with PQ (requiring a nominative temporary use authorization (TUA)) for documented *P. vivax* infection, in the infectious diseases unit of the Bégin military hospital from October 2008 to December 2011. Glucose-6-phosphate dehydrogenase deficiency was routinely ruled out. All patients were followed up for at least six months.
Results: Eighty-seven PQ cures were delivered to 84 patients (82 males, 2 females) with an average age of 30 years (range: 18-59). The travelers' profile was the following: 81 servicemen, two expatriates, and one tourist. 98 % of cases were contracted in French Guiana. The mean duration of stay was 112 days. Seventeen patients had a primary infection during the stay. The rest had a 46-day average latency upon return (25-75% IQ range: 27-51). Eighteen (21 %) patients had at least one relapse (range: 1-4). Average time between schizonticide treatment and PQ radical cure was 42 days. Eighty-six patients received 30 mg/kg/d PQ for 14 days. One patient had a 525 mg total dose. Three treatment failures were observed with relapses occurring between 85 and 112 days after the cure. Global efficacy was 97 % in the 81 PQ-naïve patients. It was respectively 96 and 94.5 % in primary infections and relapses. PQ clinical tolerance was excellent, no case of anemia was observed in the 72 patients who undertook a blood count check at the end of the therapy.
Conclusions: The 420 mg PQ radical cure seems efficacious and well tolerated in imported *P. vivax* malaria in adult patients. The reduction of relapses-related morbidity is limited by the lack of knowledge of this molecule and the regulatory constraints (restrictive nature of TUA, ruling out a G6PD deficiency). These results suggest the relevance of improving the spread of the French HCPH recommendations among primary care providers.

PO19.06

Hemolytic Anemia Complicating Intravenous Artesunate Treatment in Severe *Plasmodium falciparum* Malaria: Stay Alert!

C. Rapp[1,2], C. Ficko[3], C. Flateau[3], D. Andriamanantena[3], O. Aoun[3], J. Henard[3]
[1]Begin Military Hospital, Infectious and Tropical Diseases, Saint-Mandé, France, [2]Ecole du Val de Grâce, Paris, France, [3]Begin Military Hospital, Saint-Mandé, France

Background: Intravenous (IV) artesunate is the first line treatment in severe *Plasmodium falciparum* malaria recommended by WHO. Compared to quinine, artesunate differs by a higher efficacy and a better tolerance.
Objective: We report a case of hemolytic anemia in a traveler treated by artesunate for severe malaria.
Case: A 43-year-old male was hospitalized for a febrile jaundice occurring 2 days after his return from an 18 month stay in Côte d'Ivoire. Blood stain confirmed a *P. falciparum* infection (2 % parasitemia). Hemoglobin was 13.6 g/dL, platelets were 28 000 /mm^3 and total bilirubinemia was 71 µmol/L. IV artesunate treatment was initiated for 48 hours then replaced by atovaquone-proguanil association. Apyrexia was obtained in 48 hours. Parasite clearance was achieved in 72 hours. The disease course was complicated by aregenerative hemolytic anemia (72 000 /mm^3 reticulocytosis) on D3 with a 7 g/dL hemoglobin nadir (WHO grade 3) on D7 contrasting with the control of parasitemia and normalization of platelets on D3. Outcome was spontaneously favorable with normalization of hemoglobin on D27 but persistance of hemolysis signs (high lactate dehydrogenase). Coombs test was negative. Screening for hemoglobinopathy, glucose-6-phosphate dehydrogenase or pyruvate kinase deficiency was negative. There was no coinfection. Imputation to artesunate was considered and the side effect reported to the drug monitoring center.
Discussion: In France, artesunate is available only after aquiring nominative temporary use authorization. The French malaria national reference center has also established a management plan for artesunate-related risks. Efficacy data contrast with the occurrence of a large number of anemias. This side effect, unobserved during the studies carried out in endemic zones, was reported in 12 (13 %) out of 93 treated patients since 2005 in Europe. In France, out of the 113 first treated patients, 25 (22 %) cases of anemia were seen in 18 months. The most common profile is a late-occurring and persisting hemolytic anemia, which mechanism is unknown to this day.
Conclusion: The occurrence of this unexpected side effect highlights the relevance of a management plan for artesunate-related risks in France. In practice, treatment duration should be limited (48 to 72 hours) and hemolysis features should be monitored during a month. In case of anemia, a complete etiological checkup is mandatory.

PO19.07
Severe Imported Adults *P. falciparum* Malaria: Clinical Spectrum and Outcome in 119 Cases

C. Rapp[1,2], A. Reggad[3], C. Ficko[3], C. Flateau[3], O. Aoun[3], C. de Moreuil[3], S. Merat[3]
[1]Begin Military Hospital, Infectious and Tropical Diseases, Saint-Mandé, France, [2]Ecole du Val de Grâce, Paris, France, [3]Begin Military Hospital, Saint-Mandé, France

Background: Few data are available on severe imported malaria in non endemic industrialized countries. Despite high quality healthcare availability, in France mortality is still estimated over 10 %. The aim of this study was to describe epidemiological features, clinical spectrum and outcome of severe imported P. *falciparum* malaria in French adults.
Methods: Retrospective study among all adults hospitalized for severe P. *falciparum* malaria (one or more WHO 2000 severity criteria) in the 3 military hospitals from Ile de France from 2002 to 2011. Patients were classified into two groups : ICU malaria and infectious ward malaria.
Results: One hundred and nighteen patients (96 men, 23 women), median age 38 years, were included, representing 17,6 % of malaria *P. falciparum* cases admitted in the same period. 59 % of patients were non immune whites, 94 % acquired *P. falciparum* in sub-saharan Africa, and 83 % had taken inadequate antimalarial chemoprophylaxis. At the time of admission, jaundice (86%), hyperparasitemia (35%), impaired consciousness (21 %), acute respiratory distress (15%), shock (9%), renal failure (9%) and acidosis (9%) were the most frequent findings. Forty nine (41%) patients had only one severity criteria like jaundice or hyperparasitemia. Forty one (34 %) patients were admitted to the intensive care unit (ICU). In the ICU group, patients were older, had a higher median parasitemia (9,7 % vs 1,8), and a higher total hyperbilirubinemia. IGS II score was higher (31,2 vs 13), hospital stay was longer (18 vs 5 days). Curative quinine treatment was used in 77 % of patients and a loading dose was performed in 22%. Case rate fatality (3 deaths) was 2,5 % and 7, 3 % in ICU. Two patients had community acquired infection. Eight (7%) patients had nosocomial infections.
Conclusion: Severe imported *P. falciparum* malaria remains one of the rare causes of death in travellers. In France, earlier diagnosis and widespread use of parenteral artesunate may reduce this mortality.

PO19.08

Prognostic Relevance of Conjugated Hyperbilirubinemia in Adults Presenting with Imported *Plasmodium falciparum* Malaria

C. Rapp[1,2], C. de Moreuil[3], C. Verret[4], C. Ficko[3], O. Aoun[3], D. Andriamanantena[3], C. Flateau[3], P. Imbert[3]

[1]Begin Military Hospital, Infectious and Tropical Diseases, Saint-Mandé, France, [2]Ecole du Val de Grâce, Paris, France, [3]Begin Military Hospital, Saint-Mandé, France, [4]CESPA, Paris, France

Background: The relevance of WHO criteria for severe imported *Plasmodium falciparum* (PF) malaria is not well known. Among them, the impact of jaundice is controversial. And yet jaundice in malaria is due to various mechanisms primarily hemolysis and hepatic failure.
Objective: Assess the prognostic relevance of conjugated hyperbilirubinemia in adults suffering from imported PF malaria.
Methods: Retrospective study concerning all adults hospitalized for PF malaria infection with jaundice (bilirubin ≥ 50 µmol/L) in the three military hospitals of Ile de France (Paris and its suburbs) from January 2002 to August 2011. Patients were classified into three groups: hemolytic jaundice, jaundice with conjugated hyperbilirubinemia (group 2) and mixed jaundice. The severity of the three groups was compared using the Simplified Acute Physiology Score II (SAPS II), admission in intensive care unit (ICU), need for major therapeutic interventions (MTI = ventilation, fluid resuscitation, transfusion, dialysis) and hospital stay duration.
Results: One hundred and two patients (86 males, 16 females) with a mean age of 36.7 years, were included: 45 with hemolytic jaundice, 37 with conjugated hyperbilirubinemia, 20 with mixed jaundice. In univariate analysis, Group 2 patients had a significantly more severe condition, with more neurological and respiratory failures (32.4% for both), more hyperparasitemia (48.7%), renal failure (24.3%) and acidosis (13.9%), SAPS II was higher (26.7), admission in ICU was more frequent and hospital stay was longer (14.1 days). In multivariate analysis, Group 2 was associated with an increased risk of MTI, with an OR of 36.1 (IC95%: 4.1-318.5; p=0.001). Age ≥40, SAPSII ≥23, platelets < 50 000/mm^3 and hemoglobin ≤7g/dl were also associated with an increased risk of MTI. Moreover, group 2 was associated with a longer length of stay (OR= 2.8; IC95%: 1.5-5.4; p=0.002).
Conclusion: Our findings suggest an association between conjugated hyperbilirubinemia and severity of the infection in adults presenting with imported PF malaria.

PO19.09

Detection of Antimalarial Drug Resistance: A Novel and Simple Real-time Sensitivity Assay for *Plasmodium falciparum*

M. Rebelo[1], C. Tempera[1], C. Sousa[1], M.P. Grobusch[2], T. Hanscheid[1]
[1]Instituto de Medicina Molecular, Lisboa, Portugal, [2]Center for Tropical Medicine and Travel Medicine Department of Infectious Diseases, Division of Internal Medicine Academic Medical Center, University of Amsterdam, Amsterdam, Netherlands

Background: Antimalarial-drug resistance is a threat for malaria control. Resistance has been described for many drugs, including the first-line treatment with artemisinins. *In vitro* antimalarial sensitivity testing is crucial to detect and monitor drug resistance. Currently available sensitivity assays have many limitations in detecting resistance in field isolates (e.g.: none detects artemisinin resistance) and in providing important information for the development of novel compounds (e.g.: speed of action). New and better sensitivity assays are needed.
Objective: The development of an alternative sensitivity assay for *Plasmodium* spp., based on the detection of hemozoin inside parasitized red blood cells (pRBC). Hemozoin is a crystal and causes depolarization of light, which can be detected by flow cytometry. As the parasite matures the content of hemozoin increases, thus constituting an optimal maturation indicator.
Methods: A common flow cytometer was easily modified to detect light depolarization caused by hemozoin. Samples from continuous cultures of sensitive (3D7) and resistant (Dd2) *Plasmodium falciparum* were incubated with different antimalarial-drugs, for 48-hours and analysed by flow cytometry for hemozoin content, in 6-hour intervals.
Results: By analysing the percentage of hemozoin-containing pRBCs (depolarizing events) overtime parasite maturation and antimalarial-drug inhibitory effects were detected already after 24-hours of incubation.
Moreover, this assay allowed to determine the stage specific activity of different drugs. Chloroquine showed inhibition only if added up to 12h, thereafter no inhibitory effect was detected. On the other hand, pyrimethamine inhibited growth even if added as late as 24h. Finally, artesunate inhibited completely further parasite development if added until 18h, after which a partial inhibition could still be detected.
Conclusions: These results suggest that this new approach could be developed into a simple (no added reagents), rapid (24-hour) and objective sensitivity test, which could be used for rapid resistance testing in returning travelers.
It could also become a valuable tool for investigating new compounds, since it allows to determine the drug's stage specificity, crucial to predict the speed of parasite clearance in patients.

PO19.10

Outbreak of *Plasmodium falciparum* and Ovale Infections in Belgian Military Personnel during and after Deployment in Kindu, DRC

P. Soentjens[1,2], A. Wauters[1], P. Andries[1], B. Damanet[1], W. Heuninckx[3], M. Van Esbroeck[4], A. Aerssens[1]

[1]Military Hospital Queen Astrid, Polyclinic Department, Brussels, Belgium, [2]Institute of Tropical Medicine, Clinical Sciences, Antwerp, Belgium, [3]Military Hospital Queen Astrid, Lab Department, Brussels, Belgium, [4]Institute of Tropical Medicine, Department of Clinical Sciences, Antwerp, Belgium

Background: Belgian military troops are regularly deployed to the DRC. Due to an outbreak of 14 possible Plasmodium (P.) falciparum cases, an active screening of all personnel after return was performed in our Travel Clinic at the Military Hospital in Brussels.
Methods: A cohort of 200 Belgian soldiers, deployed in Kindu, in the DRC, was targeted for screening. Diagnosis of P. falciparum and P. ovale was based on thick and thin smear, rapid diagnostic tests, specific PCR for P. falciparum and P. ovale and on serology testing.
Results: In total, 150 soldiers were screened after deployment to the DRC, of which 22 cases had one or two proven P. infections; 6 cases of isolated P. falciparum infection, 12 cases of P. ovale, and 4 cases of mixed infection with in each subject two different clinical events. Diagnosis was mainly based on thick smear. Six cases of P. ovale had a negative thick smear, and diagnosis was based on positive serology for P. ovale with clinical, haematological and biochemical findings supporting the diagnosis. One subject met the criteria of severe malaria with a parasitemia of 7%. During the deployment itself, 10 additional clinical P. falciparum infections during deployment were classified as possible clinical cases, without microscopic or serological proof. Two other possible P. ovale infections, based on clinical, haematological and biochemical markers were diagnosed more than six months after deployment. All cases were successfully treated with oral treatment, of which three required short hospitalisation. Malariaprophylaxis with mefloquine, doxycycline or atovaquone/lumefantrine was taken in 76.5 %, 17.5% and 2%, respectively. Of all subjects, 20% admitted not having been compliant with prophylaxis; non-compliance was highest in patients with P. falciparum (80%).
Conclusions: Malaria remains in the top 3 diagnoses of travel-related morbidity and can kill quickly if not diagnosed in time. An outbreak of 22 proven and 12 possible cases of P. falciparum and P. ovale infections during and after deployment to DRC highlights a high attack rate (22.5%) in military personnel and emphasis the need for compliance to Personnel and Unit Preventive Measures. Monitoring of compliance should be stricter in future deployments.

PO19.11
A Study of the Biting Pattern within *Anopheles gambiae sensu latu* (*s.l.*)

S.A. Pi-Bansa[1,2], M. Appawu[1], S. Dadzie[1], K. Frempong[1], J.H.N. Osei[1,2], M. Wilson[1], O. Danso[2], D.A. Boakye[1]
[1]Noguchi Memorial Institute for Medical Research, Parasitology, Accra, Ghana, [2]Kwame Nkrumah University of Science and Technology, Theoretical and Applied Biology, Kumasi, Ghana

Background: The recent evidence indicating a modification in the biting pattern of vector populations could pose a challenge to the increased use of Insecticide treated bed nets as a malaria vector control strategy. This modification in the biting pattern includes adaptation to biting humans when they are out of bed that is early evening and dawn together with increased outdoor biting. This change in biting pattern could be due to behavioural adaptation or to selective pressure against mosquitoes biting when bed nets are in use.
Objective: To determine if there are discrete biting populations within the *Anopheles gambiae s.l.* population that bite at specific time periods of the night and can be selected to provide lines for future genetic studies on biting behaviour.
Method: Mosquitoes collected from 6pm-6am in the field were pooled into four categories based on their biting times; 6pm-9pm, 9pm-12am, 12am-3am and 3am-6am. They were raised to produce several generations on which feeding experiments and selection were performed. Non anophelines were separated from anophelines and PCR run on *A. gambiae s.l.* for species identification and molecular forms.
Results: Different numbers of F_1 progeny were obtained and used for feeding experiments for the different time points. The percentages for the F_1 groups that fed at the same time periods their parents fed in the field (compared with feeding at other time points pooled together) were 90.5% (P = 0.013) for 9pm-12am, 66.3% (P = 0.029) for 12-3am and 62.3% (P = < 0.0001) for 3-6am. However, irrespective of the period F_1s from different collection times were exposed to feed, a high proportion was found to take a blood meal. PCR run on 134 *Anopheles gambiae s.l.* showed 100% *A. gambiae s.s.* Further molecular forms which were determined using restriction enzymes gave 94.8% S forms and 5.2% M forms.
Conclusion: Vector behaviours such as host preference, biting pattern and resting have been linked to genetic influence. It was therefore hypothesized that populations with distinct biting times could be selected from field populations. The feeding times observed for the F_1s do not validate the hypothesis. However, this is expected because other extrinsic factors may play a role in feeding hence field-collected samples will include a mix of different genetic types and F_1s will mimic this mix. Studies are on going to assess F_2 generation and how their feeding times correspond with F_1 and parent feeding times.

PO19.12
Malaria Advice for India: Rational Use of Evidence With a Precuationary Approach

C.A. Redman[1], L. Boyne[1], F. Genasi[1], M. Jones[2], A. Macconnachie[3], F. Marra[3], C. Doherty[4], C. Smith[1], H. Sutton[1], M. Umeed[5]
[1]Health Protection Scotland, Glasgow, United Kingdom, [2]Western General Hospital, Edinburgh, United Kingdom, [3]Gartnavel General Hospital, Glasgow, United Kingdom, [4]Yorkhill Hospital, Glasgow, United Kingdom, [5]General Practice, Glasgow, United Kingdom

Introduction: TRAVAX has been an important resource for health professionals in the UK since 1989 providing evidence-based recommendations and advice on a range of travel medicine topics. An important aspect for users is the inclusion of detailed recommendations for malaria with accompanying maps to aid interpretation. Recently the Scottish Malaria Advisory Group (SMAG) was set up to provide governance around this process. Here we report on how malaria advice for India was revised in 2012 by SMAG.
Aim: To review the most up-to-date evidence on malaria epidemiology and prophylaxis for India in order to produce clear recommendations for TRAVAX users.
Methods: Epidemiological data from India´s National Vector-Borne Diseases Control Program for 2008-2011 was collated as 3 year averages per 1000 population. GIS software was used to present incidence data at State level. The data was interpreted to best reflect endemicity and risk according to predefined criteria. In addition, data from the HPA Malaria Reference Laboratory on malaria imported from India into the UK and recommendations from WHO were used to help interpret how endemicity may be correlated with risk for travellers. The literature was reviewed to inform on extent of chloroquine resistance being reported from India.
Results: Data show an overall decline in malaria in India although not observed in all states. *Plasmodium falciparum* and *P. vivax* distribution were very different with 40 - 50% of cases of malaria in India due to *P. falciparum.* Based on this data SMAG drew up three possible sets of recommendations:
Set 1. Recommending prophylaxis for States which were endemic (API $\geq$ 1) for *P. falciparum* only; risk across the central belt of India.
Set 2. Recommending prophylaxis for States identified in Set 1 plus additional areas identified by WHO as being high risk; risk across India.
Set 3. Recommending prophylaxis for States highly endemic for *P. falciparum* (API > 10); risk in the north east of India.
Conclusions: SMAG recommended using the map and advice from Set 1. They felt that adopting the more expansive Set 2, or the more restricted Set 3, recommendations was not justified given the profile of UK travellers. They decided to follow the WHO advice and recommend prescription only antimalarial chemoprophylaxis as first line choice for the higher risk areas. SMAG recognised that other authorities may come to different conclusions but following a precautionary approach this was the consensus of the group.

PO19.13
Syndrome of Inappropriate ADH Secretion (SIADH) in Severe Falciparum Malaria: Treatment with Vasopressin Receptor Antagonist (Vaptan)

S. Schmiedel[1], G. Burchard[1]
[1]*University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany*

Hyponatraemia (serum sodium < 135 mmol/L) has long been recognized as a complication of falciparum malaria and is common in imported cases. It is associated with disease severity. The precise pathophysiological mechanisms remain incompletely understood and the role of inappropriate secretion of antidiuretic hormone (ADH) has been controversial. We present a case with severe hyponatraemia without hypovolaemia who was sucessfully treated by the ADH antagonist tolvaptan - indicating an "inappropriate" release of ADH.
The patient was admitted because of hyperparasitaemic falciparum malaria (5%). Serum sodium level was 115 mmol/L upon admission. Based on clinical and laboratory analyses the patient was euvolemic and had not taken diuretics. Serum creatinin was - mg/dl, uric acid was - mg/dl, plasma osmolarity was < 275 mosnol/kg), urine sodium was > 20 mmol/L. Shortly after starting antiparasitic treatment he developed an epileptic status, then facial nerve palsy, dystonia of the limbs and gait abnormalities developed. Serum sodium levels remained low (< 120 mmol/L) and did not return to normal levels during and after antiparasitic therapy. Since fluid restriction alone did not normalize serum sodium we introduced hyperosmolar sodium infusions, but these also failed. We then added tolvaptan and after 7 days serum sodium level and osmolarity had returned to normal values and the patient stabilized clinically. However, even after normalisation of all laboratory parameters, facial palsy, dystonia and gait abnormalities persisted.
Conclusions:
- There is evidence for "inappropriate" vasopressin release in severe falciparum malaria
- Severe hyponatraemia in falciparum malaria can be managed by the controlled use of the ADH antagonist tolvaptan
- Neurological symptoms related to hyponatraemia in patients with severe malaria can persist even when all laboratory parameters have normalized.

PO19.14
Standby Emergency Treatment (SBET) for Presumptive Malaria: Use in U.S. Clinics Employing Nurse Educators

G. Rosselot[1]
[1]*Travel Well of Westchester, Inc., Briarcliff Manor, United States*

Background: In some European countries (Germany, Austria, Switzerland) Standby Emergency Treatment (SBET) is a recognized component of pre-travel malaria protocols. There are no reports in the nursing literature that describe U.S. SBET use.
Objectives: The purpose of this study was to describe the use of SBET in U.S. clinics that employ nurses as pre-travel educators. It was designed to determine 1) the frequency of SBET recommendations, 2) the circumstances under which SBET is recommended, 3) SBET practices and policies, and 4) patient outcomes with SBET use.
Method: 116 members of the American Travel Health Nurses Association (ATHNA) were invited to complete a 26 item electronic questionnaire using Surveymonkey.
Results: Overall response rate was 48% (84% RNs / 15% Advanced Practice Nurses / 1% Other). 71% of respondents have practiced travel health for 5 years or more. 58% provide pre-travel services only and 34% provide pre and post-travel care. Slightly more than half of respondents work in either college health or occupational health (26%, 29%). 93% of clinics offer malaria chemoprophylaxis to patients. 27% of clinics currently offer SBET and 34% would consider offering SBET. Among those offering SBET: 31% could not accurately define the term and 82% have no written policy for its use. 73% provide SBET along with a malaria chemoprophylaxis prescription "all or most of the time" and 81% also provide a written handout . No clinic provides RDTs and no clinic tracks the use of SBET outcomes. 9% report “frequent” use of SBET with travelers while 36% use it "less than once per year". Clinics gave 7 reasons for using SBET with 45% of clinics "following recommendations of their subscription search service."
Conclusions: This study demonstrates that SBET use in U.S. clinics employing nurse educators is not wide spread. Lack of SBET knowledge and preference for travel assistance insurance were cited by non-users. However, approximately 1/3 of clinics expressed interest in possible future use. SBET practices differ somewhat from WHO and European guidelines. Approximately 3/4 of clinics provide SBET along with malaria chemoprophylaxis. Reasons for recommending SBET vary; nearly 1/2 of clinics offer it based on recommendations from a subscription service such as Travax or Tropimed. Survey responses suggest 3 opportunities for SBET quality improvement in U.S. clinics: more clinician education, consistent written policies, and tracking of SBET outcomes.

PO19.15

Factors Associated with Imported Malaria Give Support to a State of 'Long-Term' Semi-immunity to Malaria in Sub-Saharan African Migrants Living in France

T. Pistone[1], A. Diallo[1], M. Mechain[1], M.-C. Receveur[1], D. Malvy[1,2]
[1]University Hospital Center of Bordeaux, Travel Clinic and Division of Clinical Tropical Medicine, Department of Tropical Diseases, Bordeaux, France, [2]Victor Segalen University, Centre René Labusquière, Center for Tropical Medicine, Bordeaux, France

Background: Short-term semi-immunity to malaria in sub-Saharan African migrants who have recently arrived in non-endemic countries results in less severe imported malaria.
Objective: Our aim was to investigate the factors associated with imported malaria that would favour the hypothesis of a 'long-term' semi-immunity to malaria in adult travellers of sub-Saharan origin living in France and visiting family or relatives in their country of origin (VFR group).
Methods: The epidemiological, clinical and biological characteristics of imported *Plasmodium falciparum* malaria in VFR were compared with those of travellers of European origin (TEO). Newly arrived African migrants and European expatriates were excluded.
Summary of results: This retrospective study included 106 adult VFR (30%) and 244 adult TEO (70%) with imported *P. falciparum* malaria treated at the University Hospital Center of Bordeaux between 2000 and 2007. The main regions visited were West Africa (50%) and Central Africa (40%). *P. falciparum* was associated with severe malaria in 8% of patients, of which two TEO died. In univariate analysis, the factors associated with *P. falciparum* malaria in VFR vs. TEO were: female sex, younger age, less frequent use of mosquito nets, poor compliance with chemoprophylaxis, less severe malaria without death, less severe thrombocytopenia and a tendency towards a lower level of parasitaemia and higher haemoglobinaemia. In multivariate analysis, the only factor to be independently associated with *P. falciparum* malaria in VFR compared to TEO was less frequent severe malaria.
Conclusion: Our results support the hypothesis of a state of 'long-term' semi-immunity to malaria in VFR.

PO19.16
Multidisciplinary I.C.U. Management of Severe *Plasmodium falciparum* Malaria (S.P.F.M)

M.A. Saio[1], F. Mwongera[1]
[1]*Nairobi Hospital, Nairobi, Kenya*

Background: S.P.F.M. is a systemic, rapidly progressing disease with multi organ involvement. It constitutes a medical emergency, the outcome often decided in the first 72 hours.
Objective: We seek to demonstrate that early I.C.U. admission under a multidisciplinary team of a malariologist, a nephrologist and an intensivologist can improve tremendously the outcome.
Method: 33 cases of S.P.F.M. were admitted in I.C.U. Nairobi Hospital in the period of 2009 to 2012. 6 died. All data, investigations and treatment are tabulated.
Criteria for I.C.U. admission are examined, from clinical observation (pallor, jaundice, level of consciousness, respiratory status) to systems evaluation (cardiovascular, G.I, respiratory, renal, neurological).
A list of mandatory investigations is provided: PO_2 Sat, blood gases, platelet, D-Dimer, creatinine, LFT, Na^+, lactic acid and CRP. Values and variations throughout the course of treatment are analyzed.
Useful prognostic indicators are CRP, lactic acid, D Dimer level, Chest X-ray and Glasgow coma scale.
Anti-malarial treatment used by our group was I.V. Artesunate, switched to oral ACT as soon as possible. All patients routinely received prophylactic antibiotics.
Contrary to earlier reports, Hydrocortisone was found useful in correcting thrombocytopenia, D.I.C and hypoadrenalism and hyponatremia. It may also prevent or ameliorate inflammatory response especially in the lungs.
CRRT, instituted on admission for toxic patients with multi organ failure, irrespective of renal status, might be life saving.
Use of Prognanil/ Atovaquone, during or immediately after i.v. Artesunate in hyper-parasitemic patients can reduce morbidity and rebound parasitaemia
Results: Following analysis of data collected we noted that clinic deterioration and worse outcome were due to diagnostic or therapeutical errors: Delayed diagnosis in 15 cases, Failure to recognize gravity of infection in 9, Non adherence to I.C.U. admission criteria in 9, Inappropriate or irrational therapeutical intervention in 13. These errors are discussed in attempt to reach a consensus on management.
Conclusion: Therefore we conclude that appropriate initial assessment according to the criteria suggested and consequent immediate I.C.U. admission under multidisciplinary team can improve tremendously outcome and survival.

PO19.17
Malaria Prophylaxis Documented in 100 Expatriate Children in Western Africa - A Preliminary Report

M. Felfernig[1], R. Ruthvin[2]
[1]*International SOS, Dubai, United Arab Emirates,* [2]*International SOS, Lagos, Nigeria*

Background: Beside neonatal causes and diarrhea, malaria is still one of the three most frequent causes of death among children under 5 years in Nigeria.
Poor hygiene standards, poor awareness and the fact that malaria preventive measures are unaffordable for most nationals are contributing to a high prevalence and fatality rate.
Due to increased industrial activities and a more stable political situation more expatriate families throughout Western Africa can be noted.
Objective: Aim of our study was to evaluate the degree of preventive antimalaria measures done by parents to protect their children in Nigeria.
Method: In this prospective descriptive study we used a questionnaire to collect data from parents living long term in Nigeria.
Beside demographic data we asked after anti malaria measures such as chemoprophylaxis but also whether nets, anti malaria sprays/lotions, permethrin washed cloth, or anti mosquito plugs would be in place. We also asked about the extent of information people received about this topic from their doctor in their home countries.
Results: Data collected from 100 parents of children between 4 month and 19 years (median 5 years) were included in this study.14 children (14%) were under malaria prophylaxis. 55% parents use lotions/sprays, 44 % spray their children rooms. 35% of the informants use mosquito nets, 24% use antimalaria plugs and 13% treat the kids cloth with permethrin. 40 interviewees expressed that they felt not adequately informed by their doctors prior going to Nigeria.
Discussion: Our findings underline a negligence of the malaria problem in parents mainly due to the lack of information about preventive malaria measurements for children. There are only a small numbers of trials about chemoprophylaxis and its side effects under long term use in children living in endemic countries available.
Also the lack of drugs available in paediatric friendly formulation(gel) and not tasting bitter is very limited.
Furthermore reports which documents decreased development of natural immunity after stopping intervention leading in these areas for example to a higher susceptibility of these children (rebound malaria) has led to insecurity.

PO20 Other Vector-borne Infections

PO20.01
Detection of *Leishamnia siamensis* DNA in Saliva by Polymerase Chain Reaction

A. Phumee[1], K. Krivichian[2], S. Chusri[3], N. Noppakun[4,5], A. Vibhagool[5], V. Sanprasert[2], H. Wilde[4], P. Siriyasatien[2,6]
[1]*Faculty of Medicine, Chulalongkorn University, Medical Science Program, Bangkok, Thailand,*
[2]*Faculty of Medicine, Chulalongkorn University, Department of Parasitology, Bangkok, Thailand,*
[3]*Faculty of Medicine, Prince of Songkla University, Department of Medicine, Songkhla, Thailand,*
[4]*Faculty of Medicine, Chulalongkorn University, Department of Medicine, Bangkok, Thailand,*
[5]*Bumrungrad International Hospital, Bangkok, Thailand,* [6]*King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Excellence Center for Emerging Infectious Diseases, Bangkok, Thailand*

Background: *Leishmania siamensis* is a novel *Leishmanis* species recently has been documented in Thailand. Polymerase Chain Reaction (PCR) was used to detect *L. siamensis* DNA from clinical sample which were collected from six leishmaniasis patients (Thai and Myanmar) during 2011-2012. The samples used in this study including bone marrow, blood, buffy coat, saliva, urine and tissue biopsies. Saliva was showed to be a good source for *L. siamensis* DNA for PCR. Levels of *L. siamensis* DNA in saliva was also decreasing until undetectable after appropriate treatment, therefore it could be used as a marker to evaluate the efficacy of the treatment of *L. siamensis* infection.
Objective: To determine the sensitivity of PCR for detection of *L. siamensis* DNA from various sources of sample.
Method: Clinical samples were collected from suspected *Leishmania* infection patients. Blood, saliva and urine were collected from all cases; other specimens such as bone marrow and tissue biopsies were collected from some cases where appropriate for diagnosis and management. Blood and bone marrow specimens were used for microscopic examination and culture for the *Leishmanis* parasite. All samples were used for DNA extraction and PCR for amplying the ITS2 region. The positive PCR products were cloned and sequenced.
Results: PCR was able to detect *Leishmania* DNA from bone marrow, blood, buffy coat, tissue, saliva and urine. Amplified PCR products from all samples were sequenced and were confirmed to be the *L. siamensis* ITS2 gene. *L. siamensis* DNA was detected in saliva samples from all cases. Interestingly, in an asymptomatic leishmaniasis patient, which were unable to demonstrate the *Leishmania* parasites by microscopic examination and culture, but the *Leishmania* DNA was detected in saliva and a buffy coat.
Conclusion: In conditions such as Thailand and Myanmar where incidence of *L. siamensis* infection is low, routine immunological diagnostic tests are not readily available. Diagnosis of *L. siamensis* infection relies on PCR and nucleotide sequencing. These techniques are more sensitive than other techniques, more over they can be performed in provincial hospitals. PCR can be used to survey for leishmaniasis including asymptomatic patients. Our report demonstrated that saliva is a good source for *L. siamensis* DNA, which also that can be found even in an asymptomatic case. Therefore PCR of saliva samples could be used for diagnosis and epidemological study of *L. siamensis* infection.

PO20.02

Occurrence of Chikungunya Virus in Field-caught Mosquitoes, *Aedes albopictus*, and Virological Feature of Patients with Suspected Chikungunya Fever in Thailand

U. Thavara[1], J. Chompoosri[1], A. Tawatsin[1], P. Bhakdeenuan[1], A. Phumee[2], S. Anantapreecha[1], S. Naemkhunthot[1], S. Sangkitporn[1], P. Siriyasatien[2]
[1]National Institute of Health, Department of Medical Sciences, Ministry of Public Health, Nonthaburi, Thailand, [2]Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Background: The outbreak of chikungunya fever in Thailand was first reported in 1958 with Asian strain of the virus and it re-emerged with new viral strain, East/Central African (ECA), in the southern region in 2008. After this resurgence, the disease has spread across the country; however the epidemic has principally circulated in the southern provinces where *Aedes albopictus* acts as primary vector.
Objectives: This study aimed to determine the relative infection rate of chikungunya virus in vector mosquitoes, *Ae. albopictus* and chikungunya-suspected blood specimens collected in various parts of Thailand and to watch on genomic change of the virus in particular areas.
Methods: Vector mosquitoes and chikungunya-suspected blood specimens were collected from patients in various parts of Thailand between 2009 and 2012. These specimens were detected for chikungunya virus by RT-PCR and the relative infection rate was then determined. The nucleotide sequencing of chikungunya virus was also investigated.
Summary of results: Chikungunya virus was detected in mosquitoes and blood specimens collected in 2009, 2010, 2011 and 2012. In the mosquitoes, the infection rates determined each year were 20.6% (78/379), 6.1% (219/3,613), 8.4% (125/1,496) and 4.8% (32/671), respectively. The infection rates obtained in the blood specimens in the same years as that determined in vector mosquitoes were 52.1% (601/1,153), 7.7% (3/39), 0% (0/10) and 8.9% (4/41), respectively. The data showed that the highest infection rates of chikungunya virus in vector mosquitoes and the blood specimens were found in the first year of specimen collection and they decreased dramatically in the latter years. Nucleotide sequences of the virus obtained from this study were confirmed as ECA strain.
Conclusion: The ECA strain of chikungunya virus was still found in *Ae. albopictus* and most of Thai people had no experienced with this strain. Therefore, chikungunya fever cases have been reported annually. Existence of chikungunya virus in the endemic areas might cause infection in new-born population, new immigrants and travelers. Currently, there is no vaccine against the virus.Thus, control measures have emphasized on management of vector breeding sites and self protection. The data obtained from this study are valuable for surveillance of chikungunya outbreak, inspection of new virus strains introduced into endemic areas and improvement of control programs.

PO20.03
Severe West Nile Virus Encephalitis in a Patient Repatriated from Djibouti

C. Rapp[1,2], C. Ficko[3], I. Leparc Goffard[4], D. Andriamanantena[3], C. Flateau[3], O. Aoun[3], C. Bigaillon[3]
[1]Begin Military Hospital, Infectious and Tropical Diseases, Saint-Mandé, France, [2]Ecole du Val de Grâce, Paris, France, [3]Begin Military Hospital, Saint-Mandé, France, [4]CNR Arbovirus, Marseille, France

Background: West Nile virus (WNV) is an emerging flavivirus with epidemic and neurotropic capabilities. We report a case of meningoencephalitis in a patient repatriated from Djibouti.
Results: A 61-year-old male, originating from Djibouti, was hospitalized in Djibouti for a febrile confusion. He had a medical history of diabetes mellitus and khat addiction. Malaria screening was negative. Lumbar puncture showed a 180 cells/µL hypercellularity (80% neutrophils, 20% lymphocytes), high protein level (1.1 g/L) and normal glucose value. Cerebrospinal fluid (CSF) direct examination and cultures were sterile. Cerebral CT scan was normal. Intravenous cefotaxime and amoxicillin antibiotics were then initiated. In the absence of recovery, the patient was evacuated by plane, four days later, to our unit in France. Upon admission, patient was apyretic and had obnubilation and nuchal rigidity. He had no focal signs. Laboratory findings were: 131 mmol/L hyponatremia, 25 mg/L, C-reactive protein (normal < 3 mg/L), procalcitonin was normal. CSF analysis showed a 69 cells/µL pleiocytosis with 95 % lymphocytes. CSF protein was 1g/l. CSF glucose was normal. Molecular and serologic testing of serum and CSF samples were negative for herpesviruses, enteroviruses, dengue, chikungunya, HIV, rift valley fever virus, mycobacteria, *Borrelia* spp., *Toxoplasma gondii*, *Chlamydia* spp., *Leptospira* spp., and *Mycoplasma pneumoniae*. Blood cultures remained sterile. Chest X-ray and brain magnetic resonance imaging were normal. IgM and IgG Flavivirus antibodies were detected in serum by ELISA. A second serological test performed three months later showed specific IgM antibodies to WNV. WNV Western-blot was positive. Outcome was favorable with complete recovery
Discussion: WNV infection is a potentially lethal mosquito-borne infection, which was first discovered in Africa. However, few data are available on the current circulation of WNV in the Horn of Africa. Since 2000, only five cases have been reported in Africa. The first evidence of autochthonous WNV circulation in Djibouti was found in horses showing a 9 % seroconversion rate in 2004-2005. A recent study showed that *Culex quinquefasciatus* is the vector of WNV in Djibouti. Thus, WNV should now be considered endemic there. Clinical presentation can mimic bacterial meningitis and Dengue encephalitis which is circulating in Djibouti.
Conclusion: Physicians should be aware of the WNV infection risk among travelers returning from Djibouti.

PO20.04

Heart Transplantation in Patient with Dilated Cardiomyopathy and *Trypanosoma cruzi* Positive Serology, in Bergamo, Italy

A. Raglio[1], R. Fiocchi[2], M. Verges[3], F. Vailati[1], M. Arosio[1], G. Bargiggia[1], A. Tebaldi[4], C. Farina[1]
[1]AO Ospedali Riuniti, USC Microbiologia e Virologia, Dipartimento di Medicina di Laboratorio, Bergamo, Italy, [2]AO Ospedali Riuniti, Dipartimento Cardiovascolare, Bergamo, Italy, [3]Universidad de Barcelona, Departamento de Parasitologia, Barcelona, Spain, [4]AO Ospedali Riuniti, USC Malattie Infettive, Bergamo, Italy

Background and Objective: There is an increasing risk of imported Chagas´ disease in Europe and medical doctors are unfamiliar with this disease. Moreover, there have been many concerns with regard to the usefulness of heart transplantation in Chagas' disease heart failure.
We present the first case report, in Italy, of an orthotopic heart transplant in an immigrated patient with Chagas disease.
Case report: The patient , born in Ecuador on 18-03-1965; underwent an orthotopic heart transplant on 3-05-2007 at the Cardiac Surgery Department of Ospedali Riuniti, Bergamo, Italy.
In 2005 she was found to be symptomatic for dyspnea, an echo scan showed a left ventricular dysfunction (ejection fraction EF 40%) and, at that time, a primary dilated cardiomyopathy was diagnosed.
In march 2007 the patient had an episode of acute heart failure with sinus tachycardia and right bundle brunch block. The echo showed a progressive left ventricular dysfunction (EF 25%).
The first serologic ELISA test (Cypress) for Chagas was found positive on 24-04-2007.
The patient was transplanted on 03-05-2007. The histologic examination of the explanted heart no relieved any evidence of Chagas disease.
The patient has always been in stable haemodynamic condition. The patient had 2 episodes of myocardial rejection (21-06-2007 and 28-06-2007) treated with bolus of solumedrol without any complication and with histologic resolution.
Two PCR test (homemade) for *T. cruzi* were performed at Barcelona University: the first on 21-05-2007 negative, the second on 24-07-2007 positive in the EDTA blood, negative in the heart biopsy.
The Cardiovascular Department doctors decided to avoid any therapy for *T. cruzi.*
On November 2007, the echocardiogram showed a normal EF 64%.
Although the immunosuppressive treatment, after five years the patient is in good condition without any sign of reactivation. On 31-05 2012 a PCR test (Diapro) and the buffy coat smears resulted negative.
Conclusion: The patient is well without specific treatment. This case teach us a lot, but, still, we have some doubts:
does she risk a reactivation?, should we must treat?, should we follow her with other diagnostic methods?

PO20.05
One Spray for All Biting Bugs? a Literature Review of Repellent Efficacy

E. Lupi[1], C.F. Hatz[1], P. Schlagenhauf[1]
[1]*University of Zürich, Centre for Travel Medicine, Zürich, Switzerland*

Background: Travellers are confronted with a variety of vector borne threats such as malaria, dengue, Japanese Encephalitis, tick-borne disease. Is one type of repellent effective against all these biting vectors or do repellents need to be tailored to the profile of vector borne disease at the destination?
Objective: The aim of this review is to examine the literature, up to December 31st, 2012, regarding repellent efficacy .
Methods: We seached PubMed for relevant publications for papers published in English, Italian, German, French and Spanish. As vectors, we considered the mosquito species *Anopheles*, *Aedes*, and *Culex* as well as the tick species *Ixodes*.
The search terms used were 'repellent efficacy', 'mosquito repellent', 'mosquito repellents', 'tick repellent' and 'tick repellents'. Mosquito repellents of interest were DEET, Picaridine as well as other piperidine-derived products (SS220), Insect Repellent (IR) 3535 (Ethyl-Butylacetyl- amino-propionat) and all the plant-derived products, including Citriodora (para-menthane-3,8-diol).
We selected only studies evaluating the protective efficacy of mosquito repellents on human skin with particular focus on 'Arm-in-cage' studies and 'field trials' for mosquitoes.
Results: The search results for the different terms were: 'repellent efficacy' 267 results 'mosquito repellent' 643 results , 'mosquito repellents' 886 results , 'tick repellent' 132 results and 'tick repellents' 197 results. Compound concentration, application dosage and formulation often differ between studies and not all repellents are tested against all mosquitoes/ticks. There was considerable variation in study design. Arm-in-cage is a standard laboratory bioassay for testing the repellence of substances against mosquitos, however the variables are multiple. The size of laboratory cages differs between studies as do the number of human volunteers as well as the mosquito density, body size, age and nutritional state. We entered the results of each publication into a chart ordered by substances that shows the vector they were tested on, the study design, the repellent form as well as the application dosage and concentration, the efficacy [%] and the repellency duration [min, h].
Conclusion: Our chart shows that choice of repellents can be tailored according to the profile of biting vectors at the travellers' destination.

PO21 Older

PO21.01
Characterisation of Immune Responses to Primary Japanese Encephalitis Vaccination in Elderly Compared to Young Vaccinees

A. Wagner[1], E. Garner-Spitzer[1], J. Jasinska[1], M. Paulke-Korinek[1], M. Hofer[1], H. Kollaritsch[1], F.X. Heinz[2], U. Wiedermann[1]
[1]Medical University of Vienna, Institute of Specific Prophylaxis and Tropical Medicine, Vienna, Austria, [2]Medical University of Vienna, Department of Virology, Vienna, Austria

Background: Immunosenescence includes reduced B and T-cell responses in elderly vaccinees. It has been shown that booster vaccination is less effective in the elderly compared to the young. Few data exist concerning primary vaccination of the elderly.
Objective: In a monocentric, open label, phase IV study we investigated humoral and cellular immune responses to primary Japanese Encephalitits (JE) vaccination in a study group of >60 versus 18-40 year old participants.
Methods: Both study groups (n=30 each) received a primary course of a vero-cell based adjuvanted JE vaccine (d0 and d28). Serum samples were taken before vaccination (d0), as well as one and five weeks (d35 and d70) after the second vaccination to analyse neutralising antibody titers (NT). PBMC´s were taken before and one week after the second vaccination (d0 and d35) to analyse different T- and B-cell subsets and cytokine production upon JE antigen restimulation.
Results: Preliminary data (n=50) show that in elderly participants JE-NT´s were significantly lower than in the younger participants. Furthermore 40% of the elderly compared to 12% of the young participants were non-responders not mounting measurable JE-specific antibody levels. Reduced humoral immune responses were associated with CMV-seropositivity and higher numbers of regulatory T cells in the elderly study population. Higher IFN-g levels in unstimulated PBMC´s of the elderly vacinees may be attributable to inflammaging, a phenomenon that has been linked to reduced vaccine efficacy in the elderly. Final humoral and further cellular analysis are currently performed.
Conclusion: In our study humoral immune responses to a novel vaccine antigen were significantly reduced in the elderly. Therefore primary vaccination in the elderly may require different vaccination strategies to ensure sufficient immunity (modified vaccination/booster schedules, careful selection of adjuvants and if possible encouraging primary vaccination before the age of 60).

PO22 Immunocompromised

PO22.01
Yellow Fever Virus Neutralizing Antibodies Persist Despite Longstanding Immunosuppression

L.G. Visser[1], A.W. de Visser[2], E.F.F. Jonker[2], D.K. Aaftink[3]
[1]Leiden University Medical Center, Travel Clinic, Department of Infectious Diseases, Leiden, Netherlands, [2]Leiden University Medical Center, Department of Infectious Diseases, Leiden, Netherlands, [3]KLM Health Services, Schiphol Oost, Netherlands

Background: Live attenuated vaccines, such as 17D yellow fever vaccine, are contraindicated in severely immunosuppressed travelers. However, neutralizing antibodies against 17D yellow fever virus (YF-17D) may persist for many decades after vaccination. Therefore, travelers who were vaccinated many years ago may still be protected despite receiving longstanding immunosuppressive treatment.
Objectives: To determinate neutralizing antibody titers against YF-17D in 9 immunosuppressed travelers who were vaccinated more than 10 years ago.
Methods: Neutralizing antibodies (NA) against YF-17D were determined by constant virus - varying serum dilution, plaque reduction neutralization test (PRNT). A ≥0.7 log 10 difference in plaque reduction between 1:10 serum dilution and normal serum was taken as endpoint, as this corresponds to the definition of protection.
Results: The study group consisted of 5 men (median age 58, range 39 - 60) and 4 women (median age 52, range 33 - 60) who were planning to travel to a high endemic yellow fever area. The median interval between yellow fever vaccination and PRNT was 12 years (range 10 to 37). All but one traveler had protective level of NA despite treatment with methothrexate (MTX) and adalimumab (1); adalimumab (1), rituximab (1), MTX (4), azathioprine (1) or glatiramer acetate (1). The traveler who was not protected was vaccinated 12 years before at the age of 47, and received MTX because of rheumatoid arthritis at the age of 58.
Conclusion: Eight out of 9 travelers who were vaccinated more than 10 years ago were still protected despite receiving immunosuppressive treatment. Determination of PRNT in previously immunized immunosuppressed travelers is helpful in determining if travel to a high endemic yellow fever area is feasible.

PO22.02

Risk Perception about Yellow Fever and Other Infectious Diseases among Travelers with HIV Followed at Hospital for Infectious Diseases Emilio Ribas, in Sao Paulo, SP, Brazil

L. Vieira[1], J. Alves[1]
[1]*Hospital for Infectious Diseases Emilio Ribas, Travel Medicine, Sao Paulo, Brazil*

Background: Individuals with HIV have been traveling ever more often after the change of their life quality with HAART. However, this group has specific needs in terms of pre-travel advice. In general, patients with a CD4 count lower than 200 should not receive live attenuated vaccines. At the same time, the Brazilian Ministry of Health has reported an increase in the area at risk of yellow fever, whose spread put HIV patients at more risk.
Objectives: To evaluate the perception among HIV patients seen at ER Hospital in SP, Brazil of their risk of acquiring travel-related illnesses.
Method(s): Evaluation of HIV outpatients of more than 18 years. Completion of a questionnaire during an agreed consultation, collection of demographic data, perception of risk of acquiring infectious travel diseases, immunological status of the patient, yellow fever vaccination status, and information regarding trips made during the last six months and plans for the next six months.
Results: 153 patients were seen of whom 115 (75,1%) had traveled in the last six months or had plans to do so in the next six months. Of the 146 patients with a HAART prescription, 94,5% said they were following the regime and 5,5% said they were not. The viral load was undetectable (less than 50 copies/mL) in 79,7% patients and detectable in 14,3% patients. Of the 115 patients who had traveled, 15 said that their HIV diagnosis had altered their travel patterns. Motives given included fear of falling sick in another city, chemotherapy treatment for lymphomas and fear that the medication might be seen by family members. Of the 115 who traveled or would travel, 55 had an accurate perception of the risk of YF (in line with the areas of risk as defined by the Ministry of Health). Just 11 patients had already had a yellow fever vaccination, of whom 7 within the stipulated vaiidity. One third, or 40 patients, visited or were planning to visit municipalities at risk of yellow fever without adequate vaccination? Of these, at least 20 could be vaccinated without risk as they had CD4 counts of more than 350.
Conclusions: The high number of patients, totalling one third of the total sample, who had already or were planning to travel to areas at risk of yellow fever without adequate vaccination highlights the urgency of education, both for patients and for healthcare professionals

PO22.03

Immunocompromised Travelers from the U.S.: Demographic Characteristics, Travel Destinations, and Pre-travel Health Care from the U.S. Global TravEpiNet Consortium

B. Schwartz[1], J. Rosen[2], P. Han[3], N.A. Hynes[4], S.R. Rao[5], E.S. Jentes[3], R.C. LaRocque[6], E.T. Ryan[6], Global TravEpiNet Consortium

[1]Travel Medicine and Immunization Clinic, University of California, San Francisco, Division of Infectious Diseases, San Francisco, United States, [2]Infectious Diseases and Travel Medicine Clinic, Georgetown University, Division of Infectious Diseases, Washington, United States, [3]Centers for Disease Control and Prevention, Division of Global Migration and Quarantine, Atlanta, United States, [4]Johns Hopkins Travel and Tropical Medicine Clinic, Johns Hopkins School of Medicine, Division of Infectious Diseases, Baltimore, United States, [5]University of Massachusetts Medical School, Department of Quantitative Health Sciences, Bedford, United States, [6]Traveler's Advice and Immunization Center, Massachusetts General Hospital, Division of Infectious Diseases and Harvard Medical School, Boston, United States

Background: The pre-travel care of immunocompromised travelers (ICTs) is complex due to an increased risk for travel-related illness, concerns around safety and efficacy of vaccines, and potential drug interactions. There are limited data on the epidemiology of ICTs. We assessed demographic, travel and health characteristics, and pre-travel health care of ICTs.
Methods: Global TravEpiNet (GTEN) is a consortium of U.S. clinics that provide pre-travel health care to international travelers. We collected data from January 2009--June 2012. Based on review of clinical data, three travel medicine specialists classified included travelers as immunocompromised. Random intercept models with correction for small numbers of clusters were used for analyses.
Results: Of 32,099 GTEN travelers, we identified 486 (1.5%) as immunocompromised. Their median age was 46 years (interquartile range [IQR], 34-59 years), with median intended travel duration of 14 days (IQR, 10-23 days). The most common conditions of the 486 ICT were HIV/AIDS (23%), use of tumor necrosis factor (TNF) inhibitors (15%), and solid organ transplant (13%). One-hundred thirty-eight (28%) of ICTs traveled to regions with a low UN human development index; India was the most frequent destination country. A higher proportion of ICTs were traveling for leisure (59% vs. 54%, [p=0.01]) and were more frequently traveling on cruise ships (8% vs. 4%, [p< 0.001]) when compared with non-ICTs. ICTs were also more likely than non-ICTs to engage in home stays with relatives (19% vs. 14% [p=0.05]). Significantly fewer ICTs were prescribed malaria chemoprophylaxis when compared with non-ICTs (62% vs. 69%, p< 0.001) when visiting countries where malaria occurs. Among ICTs, typhoid (75%) and hepatitis A (43%) were the most frequently administered vaccines. Of 149 (31%) ICTs visiting yellow fever (YF)-endemic countries, 51 (28%) received the vaccine (compared with 63% of non-ICTs visiting YF-endemic countries [p< 0.001]).
Conclusion: Immunocompromised travelers in GTEN are a diverse group visiting low-income countries, with almost one-third traveling to higher-risk countries. Many ICTs may be self-selecting lower-risk itineraries when traveling to malaria and YF-endemic countries. An improved understanding of travel and health characteristics, in addition to pre-travel health care of these travelers will help optimize risk-reduction strategies for this specialized group.

PO22.04

Trends and Characteristics in HIV-infected and Diabetic Travelers Attending a Travel Clinic before Traveling to the (Sub)Tropics

F. Elfrink[1,2], A. van den Hoek[1,3], G. Sonder[1,2,3]

[1]Public Health Service (GGD), Department of Infectious Diseases, Amsterdam, Netherlands, [2]National Coordination Centre for Traveller's Health Advice (LCR), Amsterdam, Netherlands, [3]Department of Internal Medicine, Division of Infectious Diseases, Tropical Medicine and Aids, Academic Medical Center, Amsterdam, Netherlands

Background: Due to better treatment options for HIV-infected and diabetic travellers, their quality of life has improved. We wondered whether this resulted in more travel to (sub)tropical countries.
Objective: To study trends of these travellers who attended our travel clinic (annually more than 25,000 visitors) over the last 11 years. To compare the characteristics of HIV-infected travellers with CD4cells >500cells/mm3 with those with < 500cells/mm3, and of non-insuline dependent with insuline dependent diabetic travellers.
Methods: We retrospectively analysed our database with consultative charts of HIV-infected and diabetic travelers who attended the travel clinic of the Public Health Service of Amsterdam between January 2001 and December 2011.
Results: A total of 564 HIV-infected travelers visited our clinic, including 262 (46.5%) with a CD4 count < 500cells/mm3. Of these travellers, the mean age was 41 years, 86% were male, the mean trip duration was 29 days and 43% visited a yellow fever endemic country. The proportion of HIV-infected visitors increased significantly over the years. Also, the proportion of travelers with low CD4 count relative to travellers with higher CD4 counts increased significantly. Compared to travellers with high CD4 cell counts, travellers with lower counts significantly more often travelled to visit friends or relatives (VFR), and they were significantly older.
In the same period, a total of 3711 diabetics visited our travel clinic, of whom 1334 (36%) were insuline dependent. Of these diabetics, the mean age was 55 years, 52% were male, the mean trip duration was 30 days and 27% visited a yellow fever endemic country. A significantly increasing proportion of both insulin and non-insulin dependent diabetics came for pre-travel consultation over the years.
Significantly more insuline dependent travellers were travelling for work, and significantly less insuline dependent travellers were VFR. Insuline dependent travellers were significantly younger than non-insuline dependent diabetic travellers.
Conclusion: The proportion of HIV-infected and diabetic visitors has increased significantly, indicating that people with more vulnerable health indeed travel more often. Travel medicine becomes more complicated and thus adequate guidelines for immunocompromised travellers and adequately trained and qualified travel health professionals are of increasing importance.

PO23 Infants/Young Children

PO23.01
Preparing Children for Travel to Developing Countries: A Survey of ISTM Pediatric Interest Group Members

J.C. Christenson[1], P.R. Fischer[2], S. Hagmann[3], E. Leshem[4,5], W. Stauffer[6], E. Barnett[7], ISTM Pediatric Interest Group
[1]Indiana University School of Medicine, Pediatric Infectious Diseases, Indianapolis, United States, [2]Mayo Clinic Children's Center, Rochester, United States, [3]Albert Einstein College of Medicine, Bronx-Lebanon Hospital Center, New York, United States, [4]Sheba Medical Center, Department of Internal Medicine C, Tel Hashomer, Israel, [5]Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel, [6]University of Minnesota School of Medicine, Division of Infectious Diseases and International Medicine, Minneapolis, United States, [7]Boston Medical Center, Maxwell Finland Laboratory for Infectious Diseases, Boston, United States

Background: Travel medicine specialists frequently provide pre-travel services to children.
Objectives: To determine consistency of recommendations and guidance provided for children by travel medicine specialists.
Methods: Clinicians from the International Society of Travel Medicine Pediatric Interest Group were queried regarding recommendations for children traveling under 9 clinical scenarios.
Results: Ninety-three (34%) of 273 members completed the survey; 78% were physicians (73% pediatric or family medicine, 64% of whom “practiced travel medicine”), 22% nurses and 10% nurse practitioners. Purposes of travel of patients seen by participating clinicians were visiting friends and relatives (33%), tourism (30%), studying abroad (18%) and humanitarian/parental work (31%).
In clinical scenarios with clear-cut answers: 1) 81% would recommend an antimalarial to a 2-month-old going to Nigeria; 2) 70% would provide malaria chemoprophylaxis to a 13-year-old attending school in Mali for a year; 3) 55% would recommend DEET (< 30%) repellent for a 6-month-old going to Nigeria. 4) 38% would recommend ciprofloxacin for treatment of travelers' diarrhea in a 2-year-old going to Mexico. For scenarios requiring considering non-standard use of vaccines, and for which the vaccine use may be appropriate in some circumstances: 1) 70% would recommend meningococcal vaccine to a 6-month-old going to Burkina Faso; 2) 21% would give hepatitis A vaccine to a 6-month-old going to El Salvador; 3) 9% would give typhoid vaccine to a 1-year-old going to India for 3 months. Trip postponement was recommended by 46% for a 2-month-old going to Nigeria and by 32% for a 2-month-old going to Bolivia.
Conclusion: Knowledge deficits exist among travel medicine professionals with self-declared interest in pediatric travel medicine. For common scenarios requiring decisions outside the purview of standard recommendations there are significant variations in advice; the survey could not distinguish lack of knowledge from recognition of need for a careful risk assessment leading to possible use of vaccine for these situations. Recommendation of trip postponement is common, potentially placing children at risk if this is not an option and no advice is provided. Travel medicine experts must address knowledge deficits among providers and develop additional guidance to address common scenarios that fall outside “official” recommendations.

PO23.02
Characteristics of Pediatric Travelers Visiting a Travel Clinic at a University Hospital in Tokyo

S. Fukushima[1], Y. Mizuno[1], Y. Yamaguchi[1], T. Hirohata[1], S. Masuyama[1], A. Hamada[1]
[1]*Tokyo Medical University Hospital, Travellers' Medical Center, Shinjuku, Japan*

Background: With an increase in the number of Japanese travelers generally, there has also been an increase in the number of Japanese pediatric travelers. We opened a travel clinic named the “Travellers' Medical Center” at the Tokyo Medical University Hospital in September, 2010. Our clinic, offering medical care from Monday to Saturday, is staffed by six clinicians, including two pediatricians. We provide immunizations, prescriptions for prophylactic medicines, health check-ups before and after travel, issuance of medical certificates, and post-travel management, as well as pre-travel advice regarding mountain sickness.
Objective: We analyzed the characteristics of pediatric travelers who visited our clinic, seeking to clarify their requests.
Methods: In total, 1,677 Japanese travelers, including 308 pediatric travelers (18.4%), visited our clinic between September, 2010 and August, 2011. We investigated the age, sex, destination, reason, length of stay abroad, and purpose of visiting our travel clinic.
Results: Of 308 pediatric travelers, 154 were male and 154 were female. Most were ≤ 6 years old (54.2%).The popular destinations were Southeast Asia (27.9%), East Asia (19.5%), USA (15.3%), and South Asia (10.1%). The most common reasons for travel were business (85.4%) and leisure (4.5%). Most of the subjects stayed abroad for more than one year (81.8%).
The most frequent request was for immunizations (85.4%), but we also provided pre-travel health check-ups (3.4%). Regarding vaccinations, the inoculation rates were high for rabies, hepatitis B, hepatitis A, and typhoid fever for the subjects who stayed in developing countries. For the subjects who stayed in developed countries (USA and Western European countries), the rates were high for polio and hepatitis B because of the routine vaccination requirements for those countries.
Conclusion: Immunizations were the most frequent requests for pediatric travelers in our clinic. It is necessary to provide proper vaccines for them according to the prevalence of each infectious disease and routine vaccination requirements for the country of destination.

PO24 Other Special Needs Travellers

PO24.01
Evaluation of Bahaviour Influencing the Start of Malaria Chemoprophylaxis in 154 Travelers to Accra, Ghana

R.W. Wieten[1], P.M.M. Biemond[1], J.W.J. Kalule-Dusseldorp[1], B.J. Visser[1], P.P.A.M. van Thiel[1], C. Stijnis[1], A. Goorhuis[1], M.P. Grobusch[1], J. Harting[2], M. van Vugt[1]
[1]Academic Medical Center/ University of Amsterdam, Center of Tropical and Travel Medicine, Department of Infectious Diseases, Division of Internal Medicine, Amsterdam, Netherlands, [2]Academic Medical Center/ University of Amsterdam, Department of Social Sciences, Amsterdam, Netherlands

Background: Preventive measures against malaria are available but not optimally used in all traveler populations. Those traveling to visit friends and relatives (VFRs) are known to use chemoprophylaxis (CP) less often compared to tourist travelers. In the Netherlands, the last five years, imported malaria was most frequently acquired by VFRs traveling to Ghana. In order to target this problem, a better understanding of the decision to start CP is required.
Objective: To assess which behavioral factors influence the decision to start CP in VFRs traveling to Accra, Ghana.
Method: Following literature research and in-depth interviews with Ghanaians living in Amsterdam, we developed a survey to assess whether knowledge, attitude, risk perception, social influences, perceived behaviour control or other barriers influenced the initiation with CP. This survey was administered at the gate of departing flights from Schiphol Airport, Amsterdam (the Netherlands) to Accra (Ghana). Chi square tests and chi square tests for trend were used for nominal and ordinal data, respectively.
Results: One-hundred fifty four travelers were included in the analysis. Eighty-one (52.6%) were male, the mean age was 40.8, 95%CI [15.4-66.2]. Eighty-three travelers (53.9%) had started with chemoprophylaxis. Eighty-two (53.2%) travelers lived in North and Central America, 72 (46.8%) lived in Europe. The attitude toward malaria prophylaxis (having faith in CP: X^{2trend} (N=154) = 6.180, p=.013, the opinion that CP is effective: X^2 (3, N=154) = 15.26, p=.002) and social factors (friends/family who encouraged the use of CP: X^{2trend} (3, N=153) = 4.096, p=.043 or discouraged the use of CP: X^{2trend} (4, N=154) = 5.952, p=.015) were associated with having started CP. Knowledge of malaria was not found to have significant influence on having started CP.
Conclusion: In the Ghanaian VFR travelers at Schiphol Airport, social factors as well as the attitude towards the effectiveness of CP have an important influence of the start of CP. To prevent VFR travelers from contracting malaria, focus should be on increasing awareness and better access to pre-travel advice.

PO24.02
Characteristics of Israeli Travelers with Chronic Illness Traveling to Tropical Countries

S. Stienlauf[1,2,3], B. Streltsin[3,4], E. Kopel[1,2], E. Meltzer[1,2,3], E. Leshem[1,2,3], D. Kurnik[2,3], G. Segal[2,3], E. Schwartz[1,2,3]
[1]The Sheba Medical Ctr, The Travel Clinic & the Center for Tropical Medicine, Tel Hashomer, Israel, [2]The Sheba Medical Ctr, Departments of Internal Medicine, Tel Hashomer, Israel, [3]Tel-Aviv University, Sackler School of Medicine, Tel-Aviv, Israel, [4]The Sheba Medical Ctr, The Arrow Project, Tel Hashomer, Israel

Background: Data regarding travelers with chronic illness (TCI) to tropical countries are limited.
Objectives: To describe the characteristics of TCI compared to healthy travelers to the same countries, and to compare the prevalence of chronic illnesses among travelers to the tropics with that of the general Israeli population.
Method: A retrospective cohort study of travelers attending the Sheba Medical Center Travel Clinic from January 2005 to December 2007 was conducted. We analyzed demographics, travel destinations, travel dates and duration, as well as the medical history of the travelers. The prevalence of chronic illnesses in Israel was extracted from the National Health Survey 2003-2004.
Results: A total of 20,274 travelers attended the pre-travel clinic during the study period. Complete data were available for 18,666 travelers, 3,407 (18.3%) of whom were TCI. Compared to healthy travelers, TCI were older (mean age (±SD), 41.7±17.9 vs. 29.4±12.3 years ($p< 0.001$), more likely to be male (53% compared with 51%; $P< 0.04$), planned a shorter trip with mean planned duration of travel of, 74±131 vs. 100±165 days,; $p< 0.001$ (after adjustment for age, gender, date of departure, destination continent, and purpose of journey using multiple linear regression).
The predominant groups of pre-existing chronic illnesses were endocrine/metabolic (42%), cardiovascular (29%), and pulmonary illnesses (17%). Less common conditions were immune deficiency (3%), neurologic (4%) and psychiatric (5%) conditions. All diseases were significantly less common in TCI compared with the Israeli population.

Disease	Israeli population (%)	Travelers (%)
Hypertension*	20	3.9
Allergic diseases*	10	0.4
Heart diseases*	8.7	1.2
Anxiety/affective disorders*	8.2	0.9
Diabetes*	8.1	1.3
Thyroid disorders*	7.3	1.8
Asthma*	7.2	3.0
Renal disorders*	6.3	0.14
Chronic lung diseases*	5.9	0.02

[Comparison of the Prevalence of Chronic Illnesses]
*$p< 0.001$, chi-square test
Conclusions: A significant number of Israeli travelers to the tropics have chronic diseases. TCI were significantly older and planned to travel for shorter periods of time. The prevalence of chronic illnesses was significantly lower among travelers compared to the general population.

PO24.03
Health Risks & Travel Preparedness in Dutch Medical Students during an Elective in the Tropics

E.F.F. Jonker[1], N.S. Korse[1], E. Hack[2], L.G. Visser[1], D. Soonawala[1]
[1]Leiden University Medical Center, Department of Infectious Diseases, Leiden, Netherlands, [2]Leiden University Medical Center, Directorate Education, Leiden, Netherlands

Background: During medical electives in the tropics students are exposed to work- and travel related health risks. This well-defined group of travelers offers a unique possibility to study short and long-term travel-related risks, for example post-infectious irritable bowel disease. This study was designed to assess health risks among medical students during an elective abroad.
Methods: All Dutch medical students from Leiden University who planned to go on an elective abroad were invited by e-mail to fill out a web-based questionnaire at four time points: 2 weeks before departure and 2 weeks, 3 months and 6 months after returning home.
Results: The study is still ongoing. Not every student has progressed through all 4 questionnaires yet: 156 of 258 students (response rate 60%) have completed the 1st questionnaire, 117 of 156 students have completed the 2nd questionnaire (75% follow-up rate) and 81 students have completed all 4 questionnaires. Hundred-and-ten (94%) students obtained pre-travel advice. Sixty-two (53%) received a prescription for malarial prophylaxis (45 atovaquone/proguanil, 13 mefloquine, 3 other) and 45 (73%) used the prescribed prophylaxis. Seven (16%) students stopped prophylaxis prematurely, mainly due to side effects. None of these students visited a highly endemic area. Regarding blood-borne viral infections, at least 7 out of 117 (6%) students experienced a splash or needle-stick accident, of which one used post-exposure prophylaxis for HIV. Regarding diarrheal illness, 53 (45%) students experienced diarrhea (TD). Of these, 74% had watery diarrhea, which resolved within a week in 2/3rd of cases. There were no hospitalizations for diarrhea, however 28% had to take 1 or more days leave to recover. Students who had diarrhea did not have more chronic abdominal complaints after returning home. Twenty-one students (14%) were injured, including two with fractures and one with burn wounds. Two students were involved in a traffic accident.

	Travelers who had TD during the elective N (%)		Travelers who did not have TD during the elective N (%)	
Frequency of stomach ache or uncomfortable sensation in the past 3 months	Before departure	6 mo after returning	Before departure	6 mo after returning
Never	17 (33)	15 (42)	20 (31)	18 (40)
No more than 1 day per month	20 (39)	12 (33)	20 (31)	16 (36)
More than 1 day/month and less than 1 day/week	12 (23)	7 (19)	21 (33)	8 (18)
More than 1 day/week up to every day	3 (6)	2 (6)	3 (5)	3 (7)
Aggregate, ever	35 (83)	21 (58)	44 (69)	27 (60)
Aggregate, at least 2 days/mo	15 (29)	9 (25)	24 (38)	11 (24)

[Frequency of abdominal pain]

Conclusions: Substantial health risks are incurred by medical students during an elective abroad, mostly due to inadequate protective measures. These risks are preventable, and more intensive counseling is necessary to improve students' risk perception and adherence to preventive measures.