PO01 Vectorborne Infections (Malaria, Dengue, etc)

PO01.01

**Safety and tolerability of a short higher-dose primaquine regimen for terminal prophylaxis in healthy subjects**

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In an open-label terminal prophylactic study, we compared the safety and tolerability of primaquine administered as a standard (30 mg/d x 14 d) and short higher-dose (30 mg twice daily x 7 d) regimen in 25 and 203 Australian Defence Force personnel serving in East Timor, respectively. When comparing the 2 regimens there were no significant differences in the participants' laboratory blood chemistries. The incidence of some adverse events such as nausea, abdominal pain, headache, and rash was higher in the short higher-dose treatment group, but the differences were not statistically significant. The incidence of moderate adverse events was 20% (5/25) in the standard treatment group and 16% (32/203) in the higher-dose treatment group. Two subjects (1%) experienced severe gastrointestinal adverse events on the higher-dose regimen. These findings suggest that for most individuals the short higher-dose primaquine regimen is safe and reasonably well tolerated, which could improve primaquine compliance and effectiveness.

PO01.02

**Subcutaneous Nodule Caused by Dirofilaria repens**

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Human dirofilariasis is an emerging zoonotic disease caused by infection with any of several species of worms belonging to the genus *Dirofilaria*, with most cases attributed to *D. repens*. Dogs and also other carnivores are the reservoir for this infection and people are accidental hosts in which the life cycle is not completed. Mosquitoes of the genera *Aedes*, *Anopheles*, and *Culex* all are suitable intermediate hosts and vectors. *D. repens* in dogs and humans is being reported at an increasing rate from endemic European countries and from European countries where dirofilariasis was previously not known; partly because of global climate changes and the increase of pet travel and their effect on *Dirofilaria* transmission.

Among endemic European countries Italy is the one with the highest prevalence of human dirofilariasis (66%), followed by France (22%), Greece (8%) and Spain (4%). The disease is also endemic in Slovenia. We present a case of subcutaneous dirofilariasis in a Slovenian patient from the coastal region which has the highest prevalence of canine dirofilariasis in Slovenia. Our patient had never travelled abroad but she had contact with local dogs and recalled insects bites.

The aim of this report is to emphasize the importance of considering subcutaneous dirofilariasis in the differential diagnosis of subcutaneous inflammatory nodules in travellers returning from Slovenia.
PO01.03
African Tick-bite Fever Infection in Travellers Returning from South-Africa
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Introduction: African tick-bite fever (ATBF) is frequently diagnosed amongst travellers returning from South Africa. It is the only tick-transmitted rickettsiosis in which several inoculation eschars are observed in a high proportion of cases. ATBF is caused by Rickettsia africae, a tick-borne gram-negative bacterium, belonging to the spotted fever group of the genus Rickettsia. The principal vector for ATBF is the Amblyomma hebraeum tick, which transmits R. africae in southern Africa. The diagnosis of ATBF is based on the travel history and clinical presentation, but is confirmed by detecting antibodies in serum directed against rickettsiae of the spotted fever group. However, antibodies typically occur late in the course of the disease and early antibiotic treatment or a mild course of the disease may diminish antibody production.

Objectives: To describe four patients returning from South Africa with African tick-bite fever and to prospectively search for an alternative method of confirming this diagnosis.

Methods and Results: Four male travellers presenting independently from each other with (sub)febrile temperatures and eschars several days after returning from South-Africa, were suspected of having contracted African tick-bite fever. Initial serology yielded no IgG/IgM antibodies against rickettsiae of the spotted fever group. However, 2 mm skin biopsies from the eschars of the patients were taken. The 16s rRNA gene of rickettsia species was amplified in all patients by PCR. The HotStarTaq master mix (Qiagen, Hilden, Germany) and generic Rickettsia-specific primers (forward primer: AGAGTTTGATCCTGGCTCAGAAC, reverse primer: CCTACGGCTACCTTGTTACGACTT) were used. Sequencing revealed PCR products that were 100% similar to the R. africae sequences present in Genbank (L36098 and CP001612). Results were obtained within one week. After several weeks serology in the convalescent phase proved positive for spotted fever group rickettsiae.

Conclusions: ATBF should be considered in travellers returning from southern Africa with (sub)febrile illness and multiple skin lesions. The diagnosis can be confirmed by (paired) serology, however amplification of the 16s rRNA gene by PCR and sequencing on skin biopsies could be an alternative confirmatory test. This will have to be validated in larger studies. Advantages of molecular methods over serology are exact determination of the infectious agent and the shorter time frame within which the diagnosis can be confirmed.

PO01.04
Mass blood Sampling of Malaria Cases, Gulyial Union Council District Attock .2010
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Background: Malaria is endemic in all part of country (Country malaria index .02%). Malaria continues to be a major health problem in Pakistan. Pakistan is included in high risk malaria transmission area. Extensive agricultural practices, a vast irrigation network and monsoon rains have considerably added to the malarial potential in many areas of Pakistan. Both Plasmodium falciparum and vivax are widely distributed. The parasites are transmitted by the bite of an infected female Anopheles species mosquito. The primary vector are Anophiles culicificies and stephensi. Malaria in Pakistan has a seasonal pattern. In most parts of country the transmission season in post monsoon, occurring from July through November.

Methods: Health department authorities selected a Gulyial union council in District Attock beside others for Mass Blood Sampling (Active Malaria Surveillance) conduction to identify episodes of local transmission and to guide prevention recommendation. This survey covered post monsoon period from 15 July to 15 October, 2010. This was a door to door cross sectional survey of population 24,500 of union council of Gulyial in 25 kilometer diameter. This union council consist of rural population. Peripheral Blood Film test for malaria (Thick and thin film slides) were taken for suspected cases of malaria. Suspected cases of malaria is already defined. Malarial parasitemia was confirmed by microscopy after Giemsa staining.

Results: 17(9.1%) peripheral blood film on microscopy positive for malarial parasites out of 185 (n==185) with mean age 24 year. In this study male female ratio is 2:1 and children to adult ratio 1:3. The effected predominant group was young adult male.

Conclusion: The continued incidence of malaria cases suggests that malaria surveillance system (Passive case
detection and Active cases detection) should be strengthened and used more proactively to help identify appropriate preventive measures those are applicable in local customs and setting. The key intervention to control malaria includes early diagnosis and prompts treatment of cases and decrease mosquito index by reducing their breeding sites, spraying homes with insecticide and fogging of outdoor areas. Other personnel interventional measures such as wearing of full sleeve cloths, sleep under nets in outdoor and use of mosquito repellants also recommended.

PO01.05

Effectiveness of artemether/lumefantrine for the treatment of *Plasmodium vivax* malaria in young children in Papua New Guinea

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**Objectives:** Accurate *Plasmodium* species identification is often difficult in returning travellers because of suboptimal microscopy. A common treatment for both vivax and falciparum would be welcome. Three trials investigated the *in vivo* efficacy of artemether/lumefantrine (AL) for *Plasmodium vivax* (*Pv*) in endemic populations. Results show a good initial clearance of parasites but clinical recurrences over 10% within 42 days. We investigated the effectiveness of AL to treat *Pv* infections in children aged < 2 years living in a highly endemic country for *Pv* and *Pf*. This population has low level of immunity and may act as a proxy for non-immune travellers.

**Methods:** Making use of the passive morbidity surveillance of a randomized controlled trial on malaria prevention (IPTi), we investigated the treatment failure rates and outcomes within 7, 28 and 42 days of children aged < 2 years presenting with fever and treated with 3 days of AL without primaquine for a vivax malaria episode confirmed by blood slide (BS).

**Results:** 865 vivax malaria episodes were recorded among 1605 children (mean age 12 months). Within 7 days, 2%(16) re-attended the clinic with fever; 0.1%(1) had a BS positive for *Pv*. Within 28 days, 17%(145) re-attended with fever; 3%(30) had a BS positive for *Pv*. By day 42, 31%(265) re-attended with fever; 12%(106) had a BS positive for *Pv* and one vivax malaria was admitted. None of the children died. By comparison, clinical treatment failure rate (PCR uncorrected) for *Pf* infections was 1% by day 28 and 3% by day 42.

**Conclusions:** In this population with low level of acquired immunity, the clinical treatment failure rate for *Pv* infections was low by day 28(3%) but higher by day 42(12%). This confirms that AL is highly effective to clear the initial vivax episode but clinical recurrences (due to recrudescence, relapse or new infection) are significant. Using an AL to treat *P. vivax* may also help to overcome the problem of raising *P. vivax* chloroquine resistance. AL appears to be a good option for the treatment of any malaria in travellers but an additional full regimen of primaquine is necessary to prevent recurrent vivax and ovale infections.
Dengue fever outbreak in Dar es Salaam and Zanzibar in May-July 2010. Background: Up till recently dengue fever was not a common infectious disease in Tanzania and East Africa. This report describes a small outbreak of dengue suspect cases seen in April-July 2011, during a heavy rainy season, in a private clinic in Dar es Salaam Tanzania.

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Objective: A description of symptoms and laboratory results of all cases suspect for dengue fever in April-July 2010 in travelers and residents visiting the above mentioned clinic.

Methods: Data for more than 60 patients suspect for dengue fever were collected. Tests used in the field: Rapid Dengue test testing for IGG / IgM, and PCR testing by the Tanzanian Ministry of Health. DNA sequencing for detecting the serotype of dengue virus.

Results: Of the more than 60 patients suspect for dengue in the mentioned period, 45 cases were confirmed serologically. In the same period, at least 35 patients with malaria were diagnosed. Initially it was not easy to differentiate malaria from dengue as laboratory tests for both can be negative at an early stage and daily follow up tests were needed. 2 patients suffered both malaria and dengue at the same time or shortly after each other.

Some statistics about the 45 serologically proven cases:

- Total nr of patients tested positive blood for dengue at IST clinic May-July 2010: 45
- Male : 18 (40 %) Female: 27 (60%)
- Children below 13 : 4, all others adults ( mean age 40)
- 3 travelers, all others: residents in Tanzania
- From Europe/USA/Australia : 34 From Asia: 4 From Tanzania/Uganda : 4 From South Africa : 3
- Average days of being ill : 12
- Skin rash : 40 (88%)
- Headaches and fever : all (100%)
- Laboratory : 90 % had low platelet count, 98% had low white blood count, 69% had raised liver functions.
- All patients recovered, only 2 cases of (mild)dengue haemorrhagic fever, those 2 had other infections (malaria) as well.

Discussion and conclusion: This was the first time a small outbreak of suspected dengue fever was experienced in our population. Fortunately, dengue haemorrhagic fever or dengue shock syndrome were not seen (only 2 in milder version). Patients who also suffered from malaria or a bacterial infection, conditions that lowered their immunity, were more serious and took longer to recover.

Very recent results from DNA sequencing indicate that we are dealing with dengue virus serotype 3. The theory about a stronger reaction with a re-infection with the same dengue virus has been questioned. The importance of a co-infection like malaria or a bacterial infection might be a stronger trigger for a more serious dengue infection, as also seen in our patients.
Abstracts – Poster Presentations

PO01.07

TBE and Travellers: Obstacles and Misconceptions of Prevention and the Role of Vaccination
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Introduction: TBE for a long time was considered a threat for the local population, only - thus neglecting other people like travellers. Furthermore even experts underestimated the risk outside forests. Of course vaccination is the best way of prevention. Nevertheless unvaccinated people could and should utilize other ways of prevention (even if providing limited protection, only).

Obstacles: Basically there is only low awareness of TBE in (travel medicine) doctors as well as in travellers. This is due to little recognition in (mass) media and the tourism industry, a small lobby (mostly - if ever - continental European people) and the impact of vaccination rates on incidence figures in endemic areas, respectively. Although TBE has the same attack rate as compared to typhoid fever in endemic areas and it’s area of endemicty has about the same size as Japanese encephalitis the level of awareness is different as is the approach to vaccination which is also reflected in statements of official bodies (like the CDC / USA or the RKI / Germany). Furthermore fear of side effects and green thinking show substantial impact on the decision whether or not vaccination is accepted.

Misconceptions: In general the likelihood of being bitten by an infected tick is judged as minimal. Unexperienced doctors believe that the transmission is limited to spring and summer, to forests, to low altitude, to tick bites and to local people, and protection depends on vaccination, only. The risk of short-term travellers with outdoor activities (which might be true for event and business travel as well) is mostly neglected. Sometimes TBE even gets mixed up with borreliosis or other VBDs. Although proven otherwise vaccination outside the strict time schedule is still thought to be useless.

Conclusions: Not only travel medicine experts but tour operators and media representatives as well should raise the awareness in lay people, esp. in travellers. Vaccination should be offered to those at risk if a vaccine is available. In addition travellers should always be reminded of insect/tick bite prevention even when travelling to regions commonly classified as “safe” (like Europe).

TBE has a manifestation index of about 1:500, a likelihood of persisting (neurological) sequelae in up to 58% (according to WHO) and a CFR up to 2% (maybe 10% with the Siberian subtype) - therefore all available options of prevention should be utilized in people at risk to combat this nasty disease.

PO01.08

A 5-year itch
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We present a case report of a 34-year old Nigerian male, who, in 2009 had requested asylum in The Netherlands and had lived there since that time. In sepember 2010, he was referred to the department of tropical diseases of the Academic Medical Center (AMC) in Amsterdam, under suspicion of filariasis. Earlier, in january of 2010, he had been treated with ivermectin, due to a positive serology for filariasis. In the month before admission, serology was repeated and still found positive, with a IgG-titer that had barely changed.

On his first visit, he complained of itching that waxed and waned, on different parts of his skin, that he described as a “pepperish body”. Furthermore, he often felt movements in his throat and oesophagus. These complaints had started 5 years earlier. He had no skin defects and never experienced movements in his eye. Laboratory investigations showed no eosinofilia, but in the QBC, that was requested to rule out trypanosomiasis, microfilariae were found. On further examination, it was determined to concern an infestation with loa loa.

In this case report general considerations in the differential diagnosis of filariasis are discussed, with an emphasis on possible co-infection with onchocerciasis. Furthermore, the approach to treatment is described. Finally, all considerations will be related to our patient and the clinical follow-up will be discussed.
Abstracts – Poster Presentations

PO01.09  
Yellow Fever Vaccination Centres in Canada and the Relevance to Canadian International Travellers  
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Background: Yellow fever is currently the only disease under the International Health Regulations 2005 (IHR) for which proof of vaccination may be required as a condition of entry into a country. As a signatory of the IHR (2005), Canada is required to designate specific Yellow Fever Vaccination Centres (YFVC) where the yellow fever vaccine is administered. The Public Health Agency of Canada is responsible for designating YFVC in Canada.

Objectives: To summarize the status of YFVC in Canada and to highlight the relevance of yellow fever vaccination to Canadian travellers and health care providers.

Methods: A descriptive analysis of data available on Canada’s YFVC was performed. Statistics Canada data were used to describe patterns of travellers from Canada to countries with yellow fever vaccination entry requirements and risk of yellow fever transmission as defined by the World Health Organization’s International Travel and Health 2010.

Results: As of January 15, 2010, there were 454 clinics designated as YFVC in Canada. Four of 13 provinces and territories accounted for 86% of the Canadian population, 93% of international trips in 2009, and 91% of all YFVC. Between 2000 and 2009, there was a significant increase in the proportion of Canadians visiting countries with yellow fever vaccination entry requirements compared to other countries (98% compared to 70%, p=0.03); there was a 87% increase in the proportion of Canadians visiting countries with a risk of yellow fever transmission compared to a 74% increase to other countries however this difference was not statistically significant (p=0.2).

Conclusions: It is important for health care professionals to be aware of the relevance of the yellow fever vaccine and the process for designating YFVC in Canada due to the rising trends of Canadians travelling to countries with yellow fever vaccination entry requirements and with risk of yellow fever transmission.

PO01.10  
Prognostic Relevance of *P. falciparum* Malaria Thrombocytopenia in Adult Travelers  
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Thrombocytopenia is a common biological finding in malaria. Considered as a marker of choice for the diagnosis of malaria, its prognostic relevance has not been assessed yet in adults presenting with imported *P. falciparum* malaria.

Objectives: First, describe the characteristics of thrombocytopenia in adults presenting with *P. falciparum* malaria. Second, determine its prognostic significance.

Methods: We conducted a retrospective study from January 2002 to December 2009 at Bégin military hospital (Saint-Mandé, France). All adults hospitalized with *P. falciparum* malaria-related thrombocytopenia were included. They were divided into three groups: those presenting with mild malaria, those with severe malaria (at least one criterion from the WHO 2000 severity criteria) and those admitted in the intensive care unit (ICU). Severity was assessed according to index gravity score 2 (IGS 2), use of major therapeutic acts (transfusion, assisted ventilation, dialysis, hemodynamic support), ICU admission and hospitalization duration. The association between thrombocytopenia level and malaria severity was evaluated using univariate and multivariate analysis (logistic regression).

Results: Three hundred and sixty patients (119 women, 241 men) were included. Median-age was 34.5 years. Two hundred fifty (41%) had mild malaria and 110 (30.6 %) severe malaria. Thirty three (8.6 %) were admitted to the ICU. The median diagnosis delay was similar in all groups. Median platelet count was significantly lower among severe cases than in mild cases. There was no association between thrombocytopenia and abnormal bleeding. IGS2 and hospitalization duration were significantly associated with thrombocytopenia. In multivariate analysis, adults presenting with a thrombocytopenia less than 53 000/mm³ were more likely to have severe malaria (odds ratio = 6) and to be admitted to the ICU (odds ratio = 25).

Conclusion: Our findings suggest an association between thrombocytopenia and either the severity or the prognosis of imported *P. falciparum* malaria in adults. Further prospective studies are needed in order to confirm these results.
PO01.11
Imported cases of Dengue Fever diagnosed in metropolitan France: Protective measures, health care itinerary and outcome
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Dengue is the first arbovirosis in travelers. In metropolitan France, due to the increasing incidence of imported cases and presence of potential vector (Aedes albopictus) in the South, it is under close epidemiological surveillance.

Objectives: Describe characteristics of imported dengue cases in adults and assess the impact of health care itinerary in the management and outcome.

Methods: Retrospective study of all confirmed dengue cases (serology, PCR) in adults admitted in Bégin military Hospital (Paris) from 2002 to 2009.

Results: Fifty five patients (30 males, 25 females) with a 33 year median age were included. Four groups were represented: tourists (n=29), military (n=10), expatriates (n=11), migrants (n=5). Only 16 patients had a pre-travel consultation before departure. Travel destinations were: French Caribbean (n=29), Asia (n=10), Africa (n=3), South America (n=5), the Pacific (n=5). Symptoms occurred during travel in 10 cases and three were repatriated. Ten patients living in an endemic zone experienced symptoms during their stay in France. Mosquito nets and repellents were used by respectively 1/5 and 1/3 of the patients. Median time between return date and the onset of symptoms was 3 days (range: 1-12). Consulting a general practitioner led to a 2 day diagnosis delay. Five patients had bleeding signs. Thrombocytopenia was reported in 90% of patients. Thirty eight cases (70%) were hospitalized for a 5 day (range: 3-17) median length of stay. Four patients had a severe form (Idiopathic Thrombocytopenic Purpura, severe thrombocytopenia, hepatitis) that did not meet with the WHO hemorrhagic dengue criteria. Outcome was favorable in all cases.

Comments: Our results are similar to the series of imported cases in Europe. They confirm that dengue is most often benign in travelers. They also suggest a bad perception of the risk and a lack of use of individual protective measures by travelers. Lastly, its early diagnosis is more easily made by consulting in a reference center.

PO01.12
A severe and late Plasmodium ovale Infection in an Adult returning from Cote d'Ivoire
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Malaria respiratory complications are well known complications of P. falciparum severe infections. We report an exceptional observation of acute respiratory distress associated with Plasmodium ovale primary infection.

A 23 year old soldier was hospitalized in Quimper (France) in March 2010 with a two day history of fever and dry cough. He reported a deployment in Kosovo in November 2009 and a 4 month tour in Cote d'Ivoire (May to September 2008). Upon admission, he had a 38.5 °C temperature. The rest of clinical examination was normal. Biological investigations showed an isolated thrombocytopenia with 64 000 platelets/mm³, elevated liver enzymes three-fold higher than normal values, acute renal failure and a 65 mg/L C Reactive Protein. Chest X-ray was normal. A/H1N1v influenzae virus PCR was negative. Ciprofloxacin antibiotic therapy was initiated. The course of the disease was marked by a worsening dyspnea then a hypoxemia (PaO2: 50 mmHg) on the 7th day associated with acute respiratory distress syndrome (ARDS) images on the chest radiograph. No pulmonary infection was found. Blood stain showed P. ovale trophozoites (0.01% parasitemia). P. falciparum Hrp2 specific antigen was negative. Patient was then transferred to the intensive care unit. Outcome was favorable after parenteral quinine and non invasive ventilation.

Apart from rare splenic complications, P. ovale is considered a benign plasmodial species. This acute lung injury observation illustrates the possibility of P. ovale severe respiratory infections as recently reported twice in literature. It confirms the difficult diagnosis when facing late and atypical presentations occurring during influenza pandemic period. Lastly, even though late diagnosis and fluid resuscitation probably contributed to the development of ARDS, the role of individual susceptibility (genetic polymorphism) should be considered.
PO01.13
Two cases of Late *Plasmodium ovale* Acute Primary Infection in Travelers
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**Introduction:** *Plasmodium ovale* is a plasmodial species which is mainly responsible for simple paroxysms of fever. Like *Plasmodium vivax*, it is characterized by possible relapses occurring in 9 to 10% of cases. Due to extended latency after a stay in an endemic zone as well as low specificity of clinical signs and low parasitemia, its diagnosis can be difficult.

**Objective:** We describe two cases of *P. ovale* acute primary infection occurring more than 46 months after returning from an endemic zone.

**Results:** These cases occurred in two healthy 36 year old servicemen, 47 and 59 months respectively after a stay in Ivory Coast. Both were compliant with the doxycycline prophylaxis. They presented with tertian fever associated with thrombocytopenia. Time to diagnosis was 7 and 10 days respectively. Species diagnosis was confirmed by PCR. Outcome was favorable following chloroquine therapy then primaquine anti relapse regimen. In the absence of new malaria exposure, the infection was imputed to their stay in Ivory Coast.

**Comments:** *P. ovale* is endemic in Center and Western tropical Africa and in some areas of the Pacific. Complicated forms, mainly splenic ruptures, are exceptional. Incubation period is 15 days minimum, but can last up to four years. Due to identification problems using optical microscopy as well as a frequent confusion with *P. vivax*, its prevalence is underestimated. This fact is confirmed by the molecular biology-based studies that observed a higher prevalence than classic microscopic techniques. In France, *P. ovale* yearly represents 5% of imported malaria cases in travelers. Acute primary infection occurs within a median period of 99 days after the return. Only a few late cases were reported in literature (44 and 45 months after return). These observations, which are similar to ours, emphasize the relevance of considering *P. ovale* malaria when investigating a fever long after a stay in an endemic area. In these situations, the chemoprophylaxis compliance and the initial blood stain negativity do not rule out this diagnosis which justifies the use of molecular biology tools (PCR) in order to detect *P. ovale*.

PO01.15
Malaria Risk Area Traveller’s, with Prior Stays Oporto’s International Vaccination Centre
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**Background:** Between 10 thousand to 30 thousand imported malaria cases are annually reported in Europe. Malaria affects about 40% world’s population (WHO), representing an important public health problem and a potential risk for endemic areas travellers. Malaria is a serious parasitical disease caused by *Plasmodium* and transmitted to humans by *Anopheles* mosquito bite. No prevention is 100% effective. Several approaches are available and can be combined. Protective measures against mosquito bites and chemoprophylaxis are essential and should be highlighted in traveller’s medical consultation recommendations.

**Objectives:**
- Characterization of malaria risk area traveller’s with previous stays and individual environmental protection measures adopted by travellers of Oporto’s International Vaccination Centre during 2010;
- Evaluation of individual and environmental malaria protection measures towards these traveller’s population.

**Methodology:** Descriptive study based in a questionnaire built for this purpose, and applied to a 840 traveller’s sample, during the year 2010. Inclusion criteria: travellers ≥ 18 years old and with previous stays in malaria risk areas (regardless of prior stays length). Data processed with Microsoft Office Excel®.

**Results:** Results reveal that the population was mostly composed by males (83%). The education level was distributed like university education level 45%, elementary level 28% and high school level 27%. The most frequent average stay length was between 1 week and 1 month. The main purpose of these trips was professional (70%). 47% of travellers had more than five trips to risky areas. 77% never had malaria and 14% had it at least once. The use of repellents for 62% travellers and the existence of air conditioning (80%) where the most signifying individual and environmental protecting measures.
Conclusion: This study concludes that the prevention for malaria is higher in individuals more educated as well as those who had had the disease before. Although chemoprophylaxis increases with education level and the fact of having had the disease before it adversely decreases with trip numbers. It is common that travellers use alternative preventive measures like intake of beverages with quinine and vitamin B. these measures are usually advised by local population.

PO01.16

Malaria among patients consulting a primary healthcare center in Leogane, Haiti

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Objectives: Falciparum malaria is endemic in Haiti. Epidemiological data from Haiti is scarce, and WHO estimates the risk of malaria in most part of Haiti as low. The effects of the 2010 earthquake and the severe flooding that followed the 2010 hurricane on malaria incidence are unknown. This study aims to assess the risk of malaria among patients in a primary-care setting.

Methods: The study was conducted in two newly established primary healthcare clinics in the Ouest Province of Haiti. One clinic was situated in the town of Leogane, 30 kilometers west of Port-au-Prince, and the other in Magandou, a rural village. Malaria incidence among symptomatic patients was assessed using a rapid diagnostic test. The clinical and epidemiological features of all cases of malaria are described.

Results: Between 1 November 2010 and 10 January 2011 a total of 47 cases of malaria were diagnosed among 1420 patients who attended the clinic in Leogane. All malaria patients reported a febrile disease, although upon presentation only 34 had a fever higher than 37.5°C. Altogether about 50% of the patients with undifferentiated fever upon admission were diagnosed with malaria. The average age of the patients was 20.5 (range 3 to 63 years) with twenty cases occurring in patients younger than 16. All malaria cases were acquired in Leogane itself. Most patients (44/47) were treated with Chloroquine; three others were treated with artemeter/lumefantrine. One case of severe malaria which necessitated evacuation was diagnosed in a three-year-old girl. No cases of clinical failure were recorded.

No cases of malaria were found among 125 patients examined in the village of Magandou which is situated 941 meters above sea-level.

Conclusions: In Leogane the incidence of malaria among febrile patients was higher than expected. On the other hand, no cases of malaria were found in Magandou, suggesting significant regional variations in the incidence of malaria within relatively small areas in Haiti. It is not known whether the high incidence of malaria in Leogane was underreported in the past, or whether the natural disasters that have recently affected the country caused an increase in malaria incidence.
PO01.17
Attitudes and practice in malaria prevention in a Public Travel Medicine Clinic in Brazil.
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Malaria is one of the most prevalent parasitic diseases in the world and represents a threat for travelers visiting endemic areas. In Brazil, 99\% of malaria cases are acquired in the Amazon region with a predominance of \textit{Plasmodium vivax}.

**Objectives:** To describe the recommendations of malaria prevention and the criteria used for prescription of chemoprophylaxis (QPX) in Institute of Infectious Diseases Emilio Ribas (IDER).

**Methods:** Retrospective and descriptive analysis of the recommendations for prevention of malaria between January 2005 and December 2008. Travelers were analyzed according to demography, details of itinerary, activities, accommodation and QPX recommendations.

**Results:** A total of 1,173 travelers going to endemic areas were studied. Out of the total, 51.1\% were male, with a mean age of 37 years; trips were almost evenly split between work (46\%) and tourism (45.1\%). The main destinations were: Africa 462 travelers (39.4\%), Brazil 249(21.2\%), Asia 186 (15.9\%) and other areas 273(23.5\%). The median duration of travel was mostly between 10 to 30 days (41\%) while 27.3\% of travelers stayed more than 90 days. QPX and stand by treatment were recommended for a total of 271(23.1\%) travelers, of whom 139(30\%) were destined for Africa, 36 (19.3\%) for Asia and 34 (13.6\%) for the Amazon region in Brazil. Doxycycline, the only currently available option in Brazil, was the most suitable drug for 200 (73,8\%) travelers. The self-administered treatment was prescribed for 71 (26,2\%) travelers and individual protection recommended in all cases.

**Conclusion:** Criteria used for the recommendation of QPX for travelers requires detailed knowledge of the destination, length of stay, conditions of lodging and disease incidence in the target location. Recommendations to take QPX were aligned with those adopted by the World Health Organization (WHO) and the National Program for Malaria Control (NMCP) of the Ministry of Health in Brazil. Although the guidelines are basically the same in different countries, at IDER we still recommend much less chemoprophylaxis than would be typical in Europe and North America. This discrepancy may be explained by a lower perception of risk in developing countries in which malaria is endemic on the part of the medical profession and travelers. As travel medicine is still a growing discipline in developing countries, practices may converge with those witnessed in the developed world, implying a greater use of chemoprophylaxis.

PO01.18
Dengue in Korea, all imported in relation to international travel
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**Objectives:** Dengue virus infection continues to occur in tropical regions and is considered as one of the world’s major emerging infectious diseases. Korea is not known for endemic area of Dengue. However, the number of patients has a tendency to increase in relation to increasing number of international travelers, especially tropical and subtropical countries.

**Methods:** Korea Centers for Disease Control and Prevention (KCDC) have collected reports of all dengue cases in Korea by the investigation of Epidemiologic Intelligence Service (EIS) officer in every district from 2003. These reports about dengue which had reported to KCDC between 2003 and 2010 were reviewed retrospectively. We analyzed focusing on the travel history and the day of symptom onset.

**Results:** Total number of cases was 376; males are 239 and females are 137. Their mean age was 36.8. This survey revealed that symptoms of all patients have occurred during international travel or within 14 days after international travel (within dengue incubation period). Their travel countries were dengue endemic areas such as Philippines, Indonesia, India, Thailand, Cambodia, and Vietnam, in order of frequency. All cases were diagnosed by dengue specific IgM ELISA except 1 case by dengue virus. There was no case of death and most of patients recovered with conservative care.

**Conclusion:** All Dengue cases in Korea came from outside of country in relation to international travelers from dengue endemic areas. Considering this aspect, Korea itself is a safe country to travel in the matter of dengue infection. However, pre-travel advice about destinations in high risk of dengue infection and mosquito protection methods should be provided to travelers going abroad from Korea.
PO01.19
Chikungunya fever in Brazilian travellers returning from Asia: The role of travelers as sentinel population for importation of emerging diseases in Brazil. Report of two cases
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Chikungunya is caused by Alphavirus virus, transmitted by Aedes mosquitoes. After a hiatus of 20 years, the disease reemerged as an epidemic in Africa, Asia, Southeast Asia, and Europe. The disease is characterized by the triad: fever, incapacitating arthralgia and skin rash. Case 1: Brazilian, male, 55 years old, returning after a 15-day trip to Indonesia. Seven days into the trip, he presented high fever (39°C) and malaise for three days followed by rash with subsequent desquamation of skin. He presented severe arthralgia (wrists, metacarpals) and signs of inflammation in his ankles and difficulty in walking and writing. On returning to Sao Paulo, he sought medical assistance and received symptomatic treatment and parenteral corticosteroids. He attended the Travelers’ Clinic HCFMUSP 53 days after this return, with arthralgia in his ankles, wrists and fingers. Physical Examination: difficulty in writing. Laboratory Tests: AST: 1177U/L, ALT: 179U/L, C-reactive protein = 27.8 mg/L; Plasmodium sp., serology for dengue, cytomegalovirus, Toxoplasma, Hepatitis C and HLA-B27 were negative. IgM antibodies to Chikungunya virus (ELISA) POSITIVE. Case 2: Brazilian, female, 25 years old. She traveled to India for a month, working as a teacher. On the way back to Sao Paulo, she developed fever of 39°C and malaise. She went to the Emergency Unit of the IIER with symptoms of recurrent high fever, myalgia, headache, malaise, numbness in her hands and joint pain in her ankles and metatarsals and a halting gait. Physical Examination: dehydrated, conjunctival injection, fever, facial flush, mild rash in her trunk and pain in her hands with hyperaesthesia in palms. Laboratory Tests: thrombocytopenia and leucopenia. Plasmodium sp., Dengue serology and blood culture were negative. Chikungunya virus serology testing was conducted for a specific immunoglobulin (Ig) of IgM antibodies was positive. It was carried out at the National Reference Center for Arboviruses, Evandro Chagas Institute. On her second visit, she still presented fever, arthralgia in her knees and ankles and difficulty in walking. She was treated with NSAIDs. She developed desquamation in her palms and soles. Vector controls were adopted after the notification of suspected case. No secondary cases were reported.

Discussion: The expansion of areas infested with Aedes and the constant journeying of travelers between affected and non-affected areas increase the risk of wider dissemination of the disease in Brazil where the entire population is susceptible.
PO01.20
Use of Intradermal (ID) Rabies Pre-exposure Prophylaxis (PrEP) in a Canadian Travel Clinic.
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Objectives: Since replacement of older nerve tissue Rabies vaccine with safer and more effective cell culture vaccines or CCV (e.g., HDCV, PCECV, PVRV); cost of newer vaccines has been an issue for providers and travelers. Starting in late 1970s, studies of HDCV (and later other CCV) have shown that providing PrEP by ID administration is as effective as intramuscular (IM), but using about 1/10 of IM dose. In 2002, CATMAT provided Canadian travel medicine providers with guidance on administration of Rabies ID PrEP. The purpose of this paper is to describe our clinical experience over a 5-year period of providing ID PrEP to travelers.

Methods: A review was conducted on more than 200 client charts, where travelers received Rabies ID PrEP from 2005 to 2010. Demographic, medical and immunization data was extracted from files; and analyzed using Filemaker Pro database. All clients were obliged to obtain post-series Rabies Serum Neutralization Assay (i.e., RFFIT) to confirm adequate seroconversion (i.e., antibody titers of 0.5 IU/mL as per WHO, or complete virus neutralization at a 1:5 serum dilution by RFFIT as per ACIP). The National Microbiology Laboratory for Canada conducted all tests.

Results Summary: Nearly all clients seroconverted to an acceptable threshold, either ACIP (1:5 or about 0.1 IU/ml) or WHO (0.5 IU/ml). Children typically produced substantial immune responses likely due to relatively greater skin surface exposed to antigen. A majority of poor responders (i.e., < 0.5 IU/ml) developed adequate levels after a fourth ID dose. Clients with a remote PrEP primary series and currently low titers (< 0.5 IU/ml) responded to a booster administered ID. Few local adverse reactions were self-reported by clients.

Conclusions: We describe successful immunization using ID Rabies PrEP among a majority of travelers in our practice. A primary series appears to induce immune memory, as illustrated by strong booster responses in clients, who received PrEP several years earlier. As more practice-based data on use of ID PrEP becomes available in Canada, CATMAT may consider removing the need for post-series testing. The use of the ID route also ensures that highest-risk travelers (e.g., VFR children) are able to afford protection against Rabies exposure.

PO01.21
Surveillance in pediatric and adult patients with Plasmodium falciparum malaria in the USA: Effectiveness and safety of artemether-lumefantrine
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Objectives: To date, most studies evaluating the safety and efficacy of artemether-lumefantrine (AL) have been conducted in malaria endemic regions, mainly in Southeast Asia and sub-Saharan Africa. However, limited data are available in non-immune patients; the largest clinical data available so far was in 165 non-immune patients from Europe and non-malarious areas of Colombia demonstrating that AL was effective (PCR corrected 28-day parasitological cure rate of 96.0%) and well tolerated. In April 2009, AL received marketing approval from the US Food and Drug Administration (FDA), who requested that a “descriptive study of the use of AL in non-immune travelers” be conducted as a post-marketing requirement.

Methods: This surveillance study for a period of 5 years was designed by Novartis in partnership with the US Centers for Disease Control and Prevention (CDC) to assess, pediatric and adult patients (US and foreign residents) diagnosed with malaria and treated with AL.

Results: As malaria is a reportable disease in the US, the evaluation was designed to assess public health surveillance data reported to CDC using the 'Malaria Case Surveillance Report' form. It will capture data such as demographics, malaria immune status, treatment effectiveness, and adverse events (AEs). This form was recently adapted to capture additional information including AEs and serious AEs. Data collection and reporting methods will be described.

Conclusions: This will be the first evaluation of effectiveness of AL in malaria in the US and should provide important insights in the prevalence, diagnosis, and treatment of the nonimmune travelers in the US. This evaluation will also provide a unique opportunity to gather data in elderly patients as well as in patients with a BMI ≥25 kg/m².
PO01.22

Investigation of candidate mutations of *Plasmodium falciparum* artemisinin resistance by a Brazilian reference setting

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**Objective:** This study was performed to better understand the genetic diversity of known polymorphisms in *pfatpase6* and *pfmdr1* genes before the introduction of ACT in Brazil, in order to get a genotypic snapshot of *Plasmodium falciparum* parasites that may be used as baseline reference for future studies.

**Methods:** Parasites from *P. falciparum* samples collected at 2002, 2004 and 2006-2007 were genotyped using PCR and DNA sequencing at codons 86, 130, 184, 1034, 1042, 1109 and 1246Y for *pfmdr1* gene, and 243, 263, 402, 431, 623, 630, 639, 683, 716, 776, 769, and 771 for *pfatpase6* gene.

**Results:** A *pfmdr1* haplotype NEF/CDVY was found in 97% of the samples. In the case of *pfatpase6*, four haplotypes, wild-type (37%), 630S (35%), 402V (5%) and double-mutant 630S + 402V (23%), were detected.

**Conclusion:** Although some polymorphism in *pfmdr1* and *pfatpase6* were verified, no reported haplotypes in both genes that may mediate altered response to ACT was detected before the introduction of this therapy in Brazil. Thus, the haplotypes herein described can be very useful as a baseline reference of *P. falciparum* populations without ACT drug pressure.

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PO01.23

Imported Malaria in Portugal in Travelers Returning from Angola

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Portugal maintains with Angola a strong relationship, with > 100 000 portuguese workers in the field and close trade. Health issues related with this situation deserves attention.

**Main:** a study about the incidence, the epidemiology and severity of malaria among travelers returning from Angola, in order to prevent the morbidity and mortality associated with the disease.

**Methods:** malaria in-patients charts from 2005-2010 were reviewed, concerning demographic, clinical aspects and outcome. The World Health Organization criteria for malaria diagnosis and severe malaria were applied.

**Results:** 40 (66%) out of the 63 cases of malaria that were admitted returned from Angola, mostly Luanda, and concerns 38 patients (pts) as 2 pts had 2 episodes of malaria; 38 (95%) episodes were in men, 36 (90%) were caucasian, age varied from 28-59 years-old, median 43 ± 9. The reason for traveling was: business in 35 (88%), 1 visiting friends and relatives (VFR), 4 (10%) were Angola residents. From the 36 episodes (excluding 4 residents) 6 (17%) travel for ≤30 days; 23/36 had been prescribed chemoprophylaxis but none took it. For 17 (43%) pts this was the first malaria episode. Median time between getting ill/hospital admission: 5 days (5±4). *P.falciparum* was identified by imunocromatography and/or microscopy in 35(88%) episodes, *P.malariae* and *P.ovale* was identified in one each and in 3 the Plasmodium identification was not possible. Malaria was severe in 15 (38 %) pts: 6 had 1 criteria, 3 two, 1 tree, 4 four and the one who died had 5 criteria. Eleven/15 (73%) severe malaria pts were admitted in the Intensive Care Unit (ICU); median stay in ICU=10 days. All pts were treated with quinine (per os/ e.v.) +doxycycline or clindamycin e.v.; alithiasic cholecystitis was diagnosed in 2. The median days of total hospital stay was: 8± 6. All but one were discharged well; 1 patient was readmitted with a malaria post neurological syndrome but recovered.

**Conclusions:** malaria is a concern in those returning from Angola, being affected essentially men in the productive years of life. Severe malaria is reported in 38% of this series, and this consumes days of hospital stay, intensive care and has mortality (2.5%). Investment in prevention is essential, namely pre-travel advise and chemoprophylaxis whenever it is justified.
**PO01.24**

**Diagnostic and prognostic potential of inflammatory cytokines in adult travelers with imported malaria.**

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Both tourism and travel medicine have been developing rapidly in Poland, after several years of historical constraints. Imported malaria in our country is rare, nevertheless serious clinical problem, with case fatality ratio as high as 4.8%. Inappropriate prophylaxis along with diagnosis and treatment delays are responsible for most malaria deaths in Poland. Insight into immunological mechanisms of the disease may lead to new diagnostic tools development. Cytokines are supposed to be involved in malaria pathogenesis, however, few studies describe their clinical significance in travelers with imported infections.

The aim of this research was to describe the relations between clinical course of malaria and the serum levels of pro- and anti-inflammatory cytokines as well as to assess their potential as severity markers in non-immune adults.

The research was performed at Interfaculty Institute of Maritime and Tropical Medicine in Gdynia. Serum concentrations of interleukins: IL-6, IL-10, IL-12, IL-13 and IL-18 were determined on admission in 94 travelers with imported malaria. 46 patients were followed up and measurements were repeated. 47 individuals without history of travel to tropical regions were studied as controls.

Significant differences in IL-6, IL-10, IL-12 and IL-18 concentrations were noted between severe and uncomplicated malaria patients, defined according to WHO criteria. Serum levels of measured cytokines decreased after treatment, but they were still higher compared to the values seen in healthy individuals. The ROC curves analysis revealed that the levels of IL-10 and IL-18 discriminate severe and uncomplicated malaria with sufficient diagnostic performance. Estimated AUROC values proved that IL-18 may serve as useful laboratory marker of disease severity. The NPV value calculated for the optimum IL-18 threshold level (90.9%) may allow the use of this parameter to exclude severe malaria in patients with negative result.

This study supports the hypothesis that malaria clinical picture is associated with "cytokine storm" - described as excessive, systemic inflammatory response against *Plasmodium*. The diagnostic performance of IL-10 and IL-18 justify further research of immunological parameters value in clinical practice. The common access of ELISA laboratory techniques may improve malaria diagnostics in non-endemic settings with little experience in microscopic examination.
PO02 Immunizations

PO02.01

Intradermal rabies pre-exposure vaccination experience within an occupational health clinical setting.
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Goal: Demonstrate the application of the Canadian National Advisory Committee on Immunization (NACI) recommendations for pre-exposure intradermal(I.D.) rabies vaccine in travellers.

Objectives: 1) Demonstrate seroconversion rates of I.D. rabies pre-exposure vaccination in travellers. 2) Discuss feasibility of such measures.

Method: Retrospective study of adult travellers who received the I.D.rabies vaccine, as per NACI guidelines, between April 2008 and August 2009, due to a shortage of vaccine in Canada. 0.1 ml of human diploid cell culture vaccine (HDCV) or purified chick embryo cell vaccine (PCECV) with 2.5 IU/ml rabies antigen was administered at day 0, 7 and 21 or 28. Preferred interval of serology titre was 4 weeks post vaccination, the minimum interval being 2 weeks. Positive seroconversion was ≥ 0.5 IU/ml. All vaccines and serology testing were administered at the clinic.

7 doses were obtained per 1 ml vial. An open vial is stable for 8 hours. Specific rabies clinics were provided twice a week to minimize wastage. Predetermined schedules were set up with clients who could respect the required protocol. Follow up communication with clients for titre results and advice where done by telephone and email communication.

Summary of results: Of the 20 men and 30 women who were vaccinated, 48 had titres done of which 46 seroconverted (95.8% seroconversion rate). 2 did not respect the vaccination schedule but did serovonvrt. 2 did not return for post vaccination titre. 2 did not meet criteria for positive tires. Age range was 26 - 62 yrs. Age average was 42.8 yrs with a median of 41 yrs.

Adherence in obtaining post immunization titres was good at 96%. However, interval ranged from 14 - 91 days (average: 27.2 days, median:27 days). Clients had difficulties respecting the 4 week interval for serology testing. The protocol also required additional measures by clinic staff to coordinate the group vaccinations in addition to the follow-up communication of titre results.

Conclusions: I.D. rabies vaccination demonstrated 95.8% seroconversion rate in this sample. Although, adherence to follow-up serum titre was good, travellers had some difficulty in respecting the timing of the titre. Lines of communication with clients post serum titre collection is paramount to ensure that the clients are aware and have written confirmation of their status in the event of need for post exposure management.

PO02.02

Current Trend of Pre-travel Vaccination in Nara Seibu Hospital of Japan
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Background and Objective: Our hospital has provided travelers vaccinations since the time when certificates for smallpox and cholera vaccinations (Yellow Card) were required for traveling abroad after World War II. However, these vaccinations became no longer mandatory 30 years ago, and travelers have paid less attention to pre-travel vaccination since then.

Under these circumstances, few have visited our hospital for pre-travel vaccination since this change. In recent years, the lack of vaccination awareness among Japanese travelers has been pointed out by authorities and professionals outside Japan. In the meantime, our hospital has received many inquires on vaccination. Thus, we established the “Travel Clinic” in October, 2005.

In this presentation we’d like to report the current trend of pre-travel vaccinations in our hospital.

Methods: Analysis of the 1141 visitors in our travel clinic from Oct. 2005 to Dec. 2010,(Male to Female ratio: 58:42, the total number of visitors: 2663, the total number of vaccines: 6046)

Results:

Age Male; 30s,20s 25%>40s 21%, Female 30s 31%>20s18%>infants under 10 15%

Purpose of travel: Business 64%>Leisure19%>Study abroad10%>Volunteering4%
65% of the vaccinees traveled to Asia. The number of the vaccinees who visited U.S.A. ranks third following those who visited China and India. This is probably because those who went to study abroad, especially in the USA, are required to receive additional vaccinations to meet the country's standard before joining the school. We import vaccines against typhoid fever, meningococcal, cholera, TBE and IPV to meet their need.

**Conclusions:** It may be said that many people traveling abroad are still ignorant of the importance of vaccinations, even when they are visiting regions with high risk of diseases, probably due to a lack of information. In fact, after we explained the necessity of the vaccination to the visitors to our hospital, they understood it well and became willing to receive the imported vaccines as well. Therefore, we believe that further education regarding pre-travel vaccination is urgently needed. Furthermore, combined vaccines, which are commonly provided outside Japan, would help reduce vaccinees' expenses and burdens if approved in Japan.

**PO02.03**

**Meningococcal vaccination patterns of travelers from Greece visiting developing countries**

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**Objectives:** To identify patterns of meningococcal vaccination of travelers visiting developing countries where meningitis is endemic.

**Methods:** A prospective study was conducted from 01/01/2008 to 15/06/2010 in all (57) health departments. Tetravalent meningococcal vaccine is only available at these departments which are the official travel medicine providers in Greece. Data were collected using a standardized individual form per traveler including demographic characteristics, travel variables and travel counseling information from travelers seeking pre-travel medical advice.

**Results:** 3488 travelers attended the health departments during the study period. Information of meningococcal vaccination was available in 3205 of them. Of those 65.6% were men. Meningococcal vaccine was recommended to 23.4% (751) of all travelers. According to destination, meningococcal vaccination was recommended to 89.5% (316), 26% (254), 58.5% (73) and 7% (21) of travelers who traveled to Middle East countries, Sub-Saharan Africa, Central and Latin America and Indian subcontinent, respectively. Of all those to whom vaccination was recommended 42% (316), 33.8% (254), 9.7% (73) and 2.7% (21) traveled to Middle East countries, Sub-Saharan Africa, Central and Latin America and Indian subcontinent respectively. 93% (333) of those traveling to Middle East the destination was Saudi Arabia. 55.4% (416) traveled for recreation, 26.8% (201) traveled for work, 8.5% (64) for religious reasons (pilgrims), and 3.7% (28) for visiting friends and relatives. According to duration of travel 63.4% (476) stayed < 1 month, 24.2% (182) stayed 1-3 months, 4.9% (37) stayed 3-6 months, and 5.2% (39) stayed > 6 months. According to area of travel, 76.8% (577), stayed in urban areas, 16.5% (124) stayed in urban and rural areas, and 1.6% (124) stayed in rural areas. According to place of residence, 76% (571) stayed in hotels, and 13% (98) stayed at local people's home.

**Conclusions:** The main destination of a large number of travelers who received meningococcal vaccine was Saudi Arabia where the vaccine is required. 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 correct recommendations of meningococcal vaccine for travelers seeking pre-travel advice.
Abstracts – Poster Presentations

**PO02.04**
Modelling the antibody decline following a booster dose of the inactivated Japanese encephalitis vaccine IXIARO®, IC51
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Introduction: IXIARO (IC51), a recently approved inactivated Japanese encephalitis (JE) vaccine, is immunogenic and safe in a 0/28 Day primary immunization schedule. Comparable to other inactivated vaccines, JE neutralizing antibody titers decline with time and booster doses have been shown to enhance persistence of immunity.

Objectives: To model the long-term antibody persistence based on neutralizing JE antibody titers measured up to 12 months after a booster dose.

Methods: In a phase III trial, 198 subjects, who had received primary two dose immunization in a preceding randomized trial, were boosted with IXIARO 15 months after the primary immunization. Neutralizing antibody titers were assessed by plaque-reduction neutralization test (PRNT) up to 12 months after booster. Based on the observed decline of titers further antibody decline was estimated by applying a statistical log-linear model with structural break.

Results: Prior to the booster dose, 69.2% (137/198) of subjects had PRNT50 titers ≥1:10. One month after the booster, the rate of subjects with PRNT50≥1:10 (recognized as a protective titer) was 100%. This rate remained high at 98.5% at 6 and 12 months; GMTs were 22.5 before the booster and 900, 487 and 361 at 1, 6 and 12 months after the booster, respectively. Results of the statistical model suggest that the majority of vaccinees will maintain protective levels of antibodies against JE virus for at least 4 years after the booster dose, assuming that long term antibody decline remains log-linear.

Conclusion: A booster dose of IXIARO at 15 months after primary immunization was highly immunogenic with GMTs >3-fold higher than those seen immediately after primary immunization, and remained at high levels for at least 12 months after the booster. Estimation of JE antibody decline after booster indicates that longer intervals for re-boosting of more than 4 years may potentially be sufficient to maintain protective titers.

**PO02.05**
Process and outcome accuracy of Hepatitis A and B combined vaccination in travellers: a clinical audit
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Objectives of the study: International guidelines recommend immunizing susceptible travellers against hepatitis A and B viruses. However little is known about the compliance of Hepatitis A and B (HepA/B) combined vaccination and its impact in travellers. The aim of our study was to evaluate the compliance of HepA/B combined immunization schedule and its effects on patient outcome.

Methods: A retrospective clinical audit of HepA/B immunization in travellers who attended the Royal Free Travel Health Clinic between 1995 and 2010 was undertaken. Descriptive and bivariate analysis were performed, and logistic regression variables identified and were found to be independently associated with hyporesponsiveness based on an intention to treat analysis.

Results: The majority of travellers who had received the HepA/B combined vaccine had been primed (92.1%), and in a licensed schedule (86.9%) of either three (38.7%) or four doses (61.3%). In the three doses arm the accuracy of timeliness between doses (0, 1, 6 months) and to the serology was appropriate as well as in the four doses arm (0, 7, 21 days and 12 months). Only 59.7% and 89.8% finished the schedule, and 33.6% and 30% had serology performed respectively. The development of seroprotective antibodies was smaller in the three doses arm, as a responder rate (98%) or hyporesponder (90%) at titres of the response (759.0, 95%CI 649.5-868.6), than the four doses schedules (100%; 95.8%; 838.2, 95%CI 764.0-912.3 respectively), which was statistically significant (p>0.05). Hyporesponder rates were shown to be independent of age, gender, schedule or compliance to the specific schedule (three or four doses).

Conclusions: The compliance and outcome of the Hepatitis A/B combined vaccination in travellers was good. The 4 dose vaccination schedule was associated with a statistically significant improved response compared to the 3 dose schedule,
in addition it was associated with greater compliance. More studies are needed to evaluate the effectiveness of the combined HepA/B vaccination schedules in travellers.

PO02.06

Rabies pre-exposure prophylaxis for travelers seen in the Boston Area Travel Medicine Network

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Objectives: To determine characteristics and destinations of travelers receiving vaccine for rabies pre-exposure prophylaxis.

Methods: Boston Area Travel Medicine Network (BATMN) is a research collaboration of 5 travel clinics in the Boston area; these clinics see ~7,500 travelers/year. We used chi-square and Wilcoxon rank sum testing to compare trip characteristics and demographic information for travelers who received and did not receive pre-travel rabies vaccine. For unvaccinated persons traveling for ≥1 month, we compared different reasons for travel.

Results: During March 2008-July 2010, 15,442 travelers were enrolled; 630/15,055 (4%) for whom data were available received rabies vaccinations. Top destinations and proportion of visitors to those countries who received rabies vaccine were India (18%), China (12%), Thailand (12%), Vietnam (8%), and Cambodia (7%). Compared with unvaccinated travelers, vaccine recipients were more likely to be female (60.8% vs. 57%; p=0.03), white (78% vs. 68%; p< 0.0001) and younger (median age 25 vs. 35 years; p< 0.0001). Vaccine recipients traveled longer than unvaccinated travelers (median 75 vs. 15 days; p< 0.0001), with 48% of vaccine recipients traveling 1-4 months and 27% >4 months. More rabies vaccine recipients than nonrecipients traveled for education/research (26% vs. 8%; p< 0.0001), or missionary/volunteer work (17% vs. 10%; p< 0.0001) and fewer for tourism (33.3% vs. 46%; p< 0.0001) or to visit friends or relatives (VFR) (7.6% vs.18.5%; p< 0.0001). More vaccinated (98%) than unvaccinated (89%) travelers received counseling on rabies and/or animal bites (p< 0.0001). Among 3,577 persons traveling for ≥1 month, 3,103 (87%) were not vaccinated. The purpose of travel of these unvaccinated persons included VFR (28%), tourism (27%), education/research (18%), and missionary work (10%).

Conclusion: Few travelers received pre-exposure rabies prophylaxis, though most were advised about rabies/animal bites. Compared with unvaccinated travelers, vaccine recipients were more likely to be younger, white, have longer trip duration (≥1 month), and to be traveling for education/research/missionary/volunteer work rather than as tourists/VFRs. Given that few travelers receive pre-exposure prophylaxis, travel medicine providers should continue to provide advice about rabies and/or animal bites to all at-risk travelers, especially those traveling to high-risk destinations and those who are not immunized.
PO02.07
Characteristics of travelers to countries with endemic typhoid, yellow fever or Japanese encephalitis who were not vaccinated at the pre-travel visit: results from the Boston Area Travel Medicine Network
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Objectives: To compare characteristics of vaccinated and unvaccinated travelers visiting destinations with moderate-high risk of vaccine-preventable diseases.

Methods: Boston Area Travel Medicine Network is a research collaboration of five travel clinics that sees ~7,500 travelers per year. We used CDC and WHO classifications of country-specific risk for typhoid, yellow fever (YF), and Japanese encephalitis (JE). We evaluated characteristics of travelers who traveled to endemic countries and did not receive these vaccines.

Results: During March 2008-July 2010, 15,442 travelers were enrolled; 15,153 (99%) visited countries with medium or high risk for typhoid, 4464 (29%) visited YF-endemic countries, and 3283 (21%) visited JE-endemic countries. Among persons with no history of typhoid immunization, 3052/3837 (80%) visiting medium- or high-risk countries received typhoid vaccine (oral or IM). Among unvaccinated persons, 98% received food and water counseling. Compared with vaccinated persons, those who did not receive the typhoid vaccine were more likely to be traveling to visit friends and relatives (VFRs) (10% vs. 73%; p< .0001). Among those not previously immunized for YF, 1084/1418 (76%) of travelers to countries with any YF risk and 813/1083 (78%) of those going to holoendemic countries received YF vaccine. Compared with vaccinated persons, those who did not receive the YF vaccine were more likely to be VFR travelers (14% vs. 43%; p< .0001).

Age, race and trip duration were not significantly associated with receipt of typhoid or YF vaccine. Among those not previously immunized for JE, 110/1313 (8%) of travelers to countries with any JE risk were given JE vaccine. Compared with vaccinated persons, those who did not receive the JE vaccine were more likely to be older (median 23.5 vs. 36 years; p< .0001), Asian (6% vs. 16%; p=.005), VFRs (3% vs. 12%; p=.003), or traveling on shorter trips (median 98 vs. 17 days; p< .0001). Among persons who did not receive YF and JE vaccines, 95% and 92%, respectively, received vector-avoidance counseling.

Conclusions: Travel to countries with risk of typhoid, YF and JE is common, but many persons do not receive these vaccines. VFRs were less likely to receive each of the three vaccines; age, race, and travel duration also affected receipt of JE vaccine. These data point to the need to reach travelers who are at risk for disease but are not being vaccinated.
PO02.08
Cross-reactive immune response against Salmonella paratyphi after live oral Ty21a typhoid (Vivotif®) vaccination
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Objectives of the study: There are no vaccines in clinical use against paratyphoid fever caused by Salmonella enterica serovar Paratyphi A, B and rarely C (S. paratyphi A, B or C). We investigated at a single-cell level whether a cross-reactive immune response is elicited against S. paratyphi in volunteers vaccinated with oral Ty21a vaccine. We also studied the homing profile of these crossreactive plasmablasts.

Methods: Volunteers immunized with live attenuated S. typhi Ty21a (Vivotif®) were investigated for S. typhi and S. paratyphi A/B-specific newly activated plasmablasts in their circulation. Peripheral blood mononuclear cells (PBMC) were collected before and 7 days after vaccination. PBMC were sorted by their expression of intestinal homing receptor (HR) a4b7, peripheral lymph node HR, L-selectin and skin HR, CLA, with immunomagnetic cell sorting and typhoid and paratyphoid specific Ig(A+G+M)-plasmablasts were enumerated with ELISPOT.

Results: Before vaccination no specific plasmablasts were found in any of the vaccinees. On day 7 all of the Ty21a-vaccinated volunteers had plasmablasts reactive with both S. typhi, S. paratyphi A and B. Analysis of homing receptors revealed a homing profile consistent with intestinal homing of these cells.

Conclusions: Ty21a-vaccine elicits a significant cross-reactive immune response against S. paratyphi. These data are consistent with data from field trials showing protective efficacy and provide further evidence for the benefits of Ty21a-vaccine in protection against paratyphoid fever.

PO02.09
Strengthening country-specific recommendations for pre-travel typhoid vaccination
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Objectives: To develop a country-specific risk-assessment model for acquiring typhoid fever during international travel.

Methods: Country-specific data were collected and analyzed from a variety of sources, including the World Health Organization, international ministries of health, and U.S. government databases outside the public domain. Using these data, we stratified countries into low- (< 10/100,000 cases/year), medium- (10-100/100,000 cases/year), and high-incidence (>100/100,000 cases/year) categories. These categorizations were compared with imported cases from the U.S. typhoid/paratyphoid database to assign a final risk level by country. Country-specific recommendations for pre-travel typhoid vaccination were updated on the CDC Travelers' Health website (www.cdc.gov/travel) to reflect new risk classification.

Results: The CDC Travelers' Health website encompasses a total of 238 country-specific webpages, divided into 19 regions worldwide. Previously assigned typhoid vaccine recommendations were removed from 24 countries in the Eastern European region and two countries in the Middle Eastern region. These 26 countries had an aggregated incidence rate of 0.11/100,000 cases/year. A total of four imported cases were potentially linked to these countries from 1999 through 2008, but three of these travelers reported visiting more than one country of potential exposure. Recommendations did not change for the remaining 212 countries featured on the CDC Travelers' Health website. Typhoid vaccination continues to be recommended for travel to 175 of these countries.

Conclusion: Typhoid fever remains a concern in many parts of the world, but the risk appears to be decreasing for travelers visiting parts of Eastern Europe and the Middle East. Examination of data from a number of sources encouraged CDC to change its recommendations for travel to these areas; however, during the pre-travel consultation health-care providers should consider how these recommendations apply to the specific circumstances of individual travelers. CDC recommends that travelers take food and water precautions, regardless of the specific risk of typhoid fever. Consideration should be given to developing risk assessment models for other travel-related diseases in order to improve and update country-specific guidelines.
Abstracts – Poster Presentations

PO02.10
Analysis of US CDC Web-Based Registry of Yellow Fever Vaccine Clinics and Stamp Owners
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Objectives: To analyze data from the CDC online registry of yellow fever (YF) vaccine stamp owners and clinics in the US by profession and geographic distribution, to inform targeted outreach and to identify gaps in information collected in the registry. A stamp owner is a clinician who is granted a Uniform Stamp Number (USN) by their state health or territorial department (STHD) to validate a YF vaccination.

Methods: Registry data entered from March 2004 through August 2010 and US Census Bureau 2009 population estimates were analyzed with SPSS 18 and Microsoft Excel 2007.

Results: The registry contains 5490 YF clinics and 5118 stamp owners. Among stamp owners, 414 (8%) hold more than one stamp, including 20 with stamps in more than one state. Most stamp holders are physicians (90%). Pharmacists (4%), nurse practitioners (1.5%), physician assistants (0.7%), and registered nurses (0.7%) also hold YF stamps. YF clinics are present in all 50 states, 3 US territories (Guam, Puerto Rico, US Virgin Islands), and the District of Colombia. California has the most YF clinics (n=863; 15.7%); Guam has the fewest (n=1). The highest prevalence of YF clinics is in Alaska (7.7/100,000 people); Puerto Rico has the lowest (0.1/100,000 people).

Conclusions: US YF clinics are geographically widespread and stamp owners are primarily physicians. Eight percent of stamp owners oversee multiple clinics, and in some cases, in multiple states. Further investigation is needed to determine if this trend affects the quality of YF vaccination practices. This study was unable to determine the medical specialty of YF clinics (e.g., primary care, infectious disease) because the registry does not contain a field to collect these data. Adding this capability will yield valuable information to form a more complete description of the medical specialties administering YF vaccine and, by extension, giving travel medicine consultations in the United States. This will inform targeted outreach to a more comprehensive group of clinicians practicing travel medicine in the US.

PO02.11
Surveillance of adverse events following immunization of travelers vaccinated at a travel health clinic, Regina, Saskatchewan, Canada.
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Background: Monitoring of adverse events following immunization (AEFI) is an integral component of the travel immunization program at the Regina Qu’Appelle Health Region (RQHR).

Methods: We conducted an analysis of data of all reported adverse events following 97,207 vaccinations given to travelers attending a travel health clinic from 2000 to 2008. An AEFI was defined as any adverse event that was temporally associated with immunization but not necessarily causally associated with immunization. Case information, event category, complaint and symptoms of the case were recorded on the national AEFI Reporting form. All reported AEFI were assessed by the Medical Health Officer and entered into an access database. The distribution of AEFI records was analyzed by age. The reporting rates per 100,000 were calculated using the number of doses administered as denominator. The number of administered doses of each of the vaccines was obtained from the travel immunization database.

Results: There were 36 reported AEFI for vaccine administered over the eight year period from 2001 to 2008. The reporting rate of AEFI for the period 2001-2008 was 37.0 per 100,000 administered doses. There were no reports of serious adverse events. All reported AEFI were classified as mild or moderate. The most commonly reported AEFI were severe pain and swelling (27.8%), rashes (25.0%) and other allergic reactions (22.2%). There were 163.5 events per 100,000 administered doses of yellow fever vaccine, 84.3 per 100,000 administered doses of typhoid vaccine, and 40.9 per 100,000 administered doses of combined hepatitis A and hepatitis B vaccine. The number of reported events was highest in 20-44 years olds. Two cases were seen in the emergency room and three cases received medication at home.

Conclusion: There is a consistently low reporting rate of serious AEFI among travelers vaccinated at the travel clinic. The reporting rates may not be a true estimate of the incidence of AEFI due to under-reporting and incomplete denominator information provided.
PO02.12
Detection of Yellow Fever Immunoglobulin M Antibodies at 3-4 Years Following Yellow Fever Vaccination
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Objectives: Yellow fever (YF) vaccine is recommended for persons living in or traveling to YF-endemic areas. The duration of YF virus immunoglobulin M (IgM) antibodies following vaccination is not known. Therefore, interpretation of positive YF virus IgM serology in vaccinated returning travelers or residents of YF-endemic areas can be difficult. We evaluated the frequency and predictors of positive YF virus IgM antibody results at 3-4 years following YF vaccination.

Methods: Sera collected from 40 persons at 3-4 years following YF vaccination were tested for YF virus IgM antibodies by enzyme linked immunosorbent assay; a positive to negative ratio of ≥3 was considered a positive result. Potential predictors of a positive YF virus IgM antibody result were examined, including vaccinee demographics, exposures, and initial immune response determined by YF virus neutralizing antibody titers at 1 month post-vaccination. Categorical variables were compared using chi square or Fisher's exact tests and continuous variables using the Wilcoxon rank sum or Student's t-test.

Results: Of the 40 participants, 22 (55%) were female; the median age was 32 years (range: 22-44) and the median time between YF vaccination and serum collection was 3.6 years (range: 3.1-4.0). YF virus IgM antibodies were identified in 29 (72.5%) participants. Persons with a positive YF virus IgM antibody result had a higher neutralizing antibody geometric mean titer at 1 month post-vaccination (3843 vs. 1060, P=0.04). No other variables tested were predictive of a positive YF virus IgM antibody result, including age, sex, time since vaccination, receipt of Japanese encephalitis vaccine, or travel to a YF-endemic country following vaccination.

Conclusions: YF virus IgM antibodies were detected in more than two-thirds of young adults tested at 3-4 years post YF vaccination. The presence of YF virus IgM antibodies was associated with a stronger initial immunologic response to YF vaccination. A positive YF virus IgM antibody result was not associated with travel to a YF-endemic area, suggesting these findings did not result from subsequent wild-type YF virus exposure. Detection of YF virus IgM antibodies among returning travelers or residents of a YF-endemic area may reflect a history of previous vaccination rather than recent infection with wild-type YF virus.

PO02.13
Immunogenicity of Two Doses of Investigational HEPLISAV™ (HBsAg-ISS) Compared to Three Doses of Licensed Hepatitis B Vaccine (ENGERIX-B®)
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Travelers to areas endemic for hepatitis B virus are at higher risk for infection and commonly present to travel clinics in need of pre-travel immunization and rapid protection against hepatitis B.

Objectives: A multicenter, observer-blinded, phase 3 study was conducted among 2428 persons 11-55 years of age, comparing two doses of HBsAg-ISS (20μg HBsAg combined with 3000μg 1018 immunostimulatory sequence, a Toll-like receptor agonist) given at 0 and 4 weeks (placebo at 24 weeks) to Engerix-B given at 0, 4 and 24 weeks.

Methods: This study was randomized in a 3:1 ratio, HBsAg-ISS to Engerix-B. The aim of this study was to determine if the immunogenicity of 2 doses of HBsAg-ISS at Week 12 is non-inferior/superior to 3 doses of Engerix-B at Week 28 by comparing seroprotection rates (SPR = anti-HBs ≥ 10mIU/mL). SPR was also measured at Weeks 4, 8 and 24.

Results: Of the 2101 subjects in the overall per protocol study population (1566 HBsAg-ISS; 535 Engerix-B), the SPR was 95% at Week 12 in the HBsAg-ISS group and 81% at Week 28 in the Engerix-B group (p< 0.001), indicating non-inferiority/superiority of HBsAg-ISS. SPR after one dose at Week 4 was 24% for HBsAg-ISS and 4% for Engerix-B and 89% versus 26% at Week 8 for HBsAg-ISS and Engerix-B, respectively.

Conclusion: HBsAg-ISS given as 2 doses over 4 weeks demonstrated superior seroprotection compared to Engerix-B given as 3 doses over 24 weeks. Vaccination with HBsAg-ISS could provide more rapid protection against hepatitis B for travelers.
Abstracts – Poster Presentations

PO02.14

Yellow Fever Immunization for the Solid Organ Recipients Travellers
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Objectives: Progress in transplantation technique offers to recipients the opportunity to travel to tropical areas as tourist or as family and relative visitors. But, because of the post-transplantation immunosuppressive therapy, the immune response to vaccines is weakened. Based on theoretical concerns, in immuno-compromised patients, as solid organ recipients, live attenuated vaccine, such as yellow fever, should be avoided. So, we have studied 4 such patients.

Methods: 4 patients, solid organ recipients, who have planned a travel in Africa, came to the vaccination center to receive the yellow fever vaccine. 2 patients (M, 10y old and F 35 y old), with a renal transplantation and an immunosuppressive therapy, since respectively 5 and 6 years, were vaccinated with the yellow fever vaccine (17D-204 strain, Pasteur-Vaccins), before a travel to Togo and Cameroon. 2 other patients, with a liver transplantation and an immunosuppressive therapy since 10 and 20 years, were vaccinated with the same yellow fever vaccine before a travel to Ivory Coast. No side effects occur. One year after, the level of yellow fever antibodies was 20 (neutralisation, Pasteur Institute, Paris).

Results and discussion: When it is possible, live attenuated vaccines should be administered prior to transplantation to obtain a better immune response. But, as the yellow fever is a severe arboviral disease, transmitted by mosquitoes which provokes a lethal hepato-renal failure, without specific treatment, the immunization is the only mean of protection against this disease. In the same time, injections of some other inactivated or conjugate vaccines are possible. So, without side-effects and a adequate immune response, routine and specific vaccine for solid organ recipients should be considered during a pretravel medical consultation according to the risks of acquiring a severe disease.

PO02.15

Effectiveness of WC/rBS cholera vaccine in preventing travelers diarrhea
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Objectives: The traveler’s diarrhea (TD) is the most frequent disease among travelers, affecting 20-60% of people traveling abroad. The most common bacteria causing TD are enterotoxigenic Escherichia coli (ETEC). WC/rBS cholera vaccine has been shown to induce cross-protection against ETEC, by means of the B subunit of the cholera toxin. Incidence and associated factors of TD, as well as WC/rBS protection against TD has been assessed among travelers to cholera risk countries.

Methods: This prospective cohort study, carried out between May and September 2007; included subjects seeking pre-travel advice in ten international vaccination centers in Spain that met the following criteria: 18 years of age or older; living in the EU, USA or Canada; travelling to Sub-Saharan Africa, Bangladesh, India or Indonesia for at least 7 days; free from any severe pathology (including gastrointestinal disease and/or diarrhea); not being treated with immunosuppressive agents; and giving written informed consent for the study. The following data were collected by phone interviews in the 7-14 days following travel: Countries visited, type of travel, pre-travel vaccinations, anti-malaria drugs, food and water precautions observed, details regarding diarrhea (presence during travel or seven days after returning, day of onset, duration, number of stools per day, fever, need for medical assistance and/or drugs, and effect on daily activities).

Summary of results: A total of 1074 individuals were included in the sample; 544 (50.7%) were vaccinated with WC/rBS cholera vaccine and 530 (49.3%) were not vaccinated. The cumulative incidence rate of TD during or after the trip was 1.8 cases/100 person-days (95%CI: 1.7-2.0), 1.6 (95%CI: 1.4-1.9) in the vaccinated and 2.1 (95%CI: 1.8-2.4) in the non-vaccinated. The adjusted incidence rate of TD during or after the trip was 40% higher in non vaccinated travelers [IRR=1.39 (95% CI: 1.13-1.72)].

Conclusions reached: The use of the WC/rBS cholera vaccine prevents 1 out of 4 travelers from suffering TD (preventable fraction: 25.9%). The number needed to vaccinate (NNV) to prevent 1 case of TD is ten.
PO02.16
Immunity to Japanese encephalitis and booster vaccine efficacy in Japanese travelers
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Background: Japanese encephalitis (JE) is endemic in Asian countries. In Japan, mouse brain-derived JE vaccine was approved in 1954 and was provided in the three-series-recommendation vaccination program after 1976. In particular, the special vaccine program of 1967 to 1975 provided for the vaccination of children against JE. The vaccination recommendation was suspended by the Ministry of Health, Labour and Welfare of Japan from May 2005. In 2009 the inactivated cell culture-derived JE vaccine was approved and routine vaccination was resumed. At present, few JE cases are reported in Japan and as a consequence, most adults have not received the recommended booster doses. Thus, we measured neutralizing antibody titers (NTAb) in Japanese adults to investigate protective JE immunity and determine whether one booster shot offers sufficient immunity.

Methods: From October 2009 to September 2010, we recruited 55 people who received JE vaccinations at the National Center for Global Health and Medicine, Tokyo, Japan. Vaccination history was determined by interview or from the immunization record in the mother-child handbook. Pre-immunization NTAb of JE virus was measured in each patient by focus reduction neutralization test. Post-immunization NTAb was measured after 3-5 weeks. Twelve patients were found to have received the mouse brain-derived JE vaccine; 43 had received the inactivated cell cultured-derived vaccine.

Results: Fifty-five cases were identified. The mean age was 37.6 years (20-29 years: 21.8%, 30-39 years: 38.2%, 40-49 years: 27.3%, ≥50-years: 12.7%). Three cases (5.5%) were never vaccinated against JE. Ten cases (18.2%) were identified by previous vaccine record. Twenty-nine (52.7%) were identified by interview. Twenty-eight (50.9%) were not immune against JE. The NTAb titers of 22 cases changed to positive after one booster dose. Six negative cases were younger than 40 years. In total, 40 cases (72.7%) NTAbs were elevated after one booster dose.

Conclusion: Although half of the cases were not immune against JE, NTAb titers were increased in most people with one booster dose. In 10% of cases, particularly in those aged under 40, the booster dose did not have effect.

PO02.17
Low response rate in diabetes patients but not in chronic obstructive pulmonary disease patients after vaccination with hepatitis B vaccine (Engerix B®).
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Background: Hepatitis B vaccination plays a key role in preventing hepatitis B infection and its complications. Most persons develop a protective antiHBs titer (≥10 IU/L) after a standard 3-dose regime but underlying chronic disease may hamper effective response Therefore, we assessed vaccin efficacy in healthy employees with diabetes mellitus (DM), chronic obstructive pulmonary disease (COPD) and immunoincompetent employees.

Methods. Retrospective cohort study among 11374 healthy employees and three affected groups: 214 with COPD, 43 with DM and 13 immunoincompetent employees. Groups were classified according to self reported disease and medication. All subjects received vaccination according to the standard three dose schedule with the hepatitis B recombinant vaccine Engerix B®, using optimal vaccination conditions and optimal time intervals and serum sample taken 4-8 weeks after the third vaccination. Blinded serum samples were tested for quantitative hepatitis B antibodies (antiHBs) with AXSYM micro particle enzyme immunoassay (MEIA-test, Abbott, Chicago, USA), defining response. We compared response rates in the four population groups using univariate and multivariate multinomial regression analysis.

Results. Compared to healthy employees (antiHBs≥10: 96.0%), response rate was similar in COPD patients (95.3%) but lower in DM patients (81.4%; p< 0.001) and in immunoincompetent patients 69.2% (p< 0.001). Of responders, 77% reached antiHBs ≥1000 in the former two groups, while only ~51% and 44% reached this in the latter two groups (p< 0.01). Adjusting for age and sexe did not change results.

Discussion. DM and immunoincompetent employees had less protective vaccin response and also lower titers than healthy employees and those with COPD. When vaccinating with hepatitis B vaccine in these groups, recommendations should include testing for seroprotective antiHBs titres to identify non-responders and to apply effective follow-up actions.
In April 2009, a new re-assorted influenza A virus occurring causing the ‘swine flu’ pandemic. Within a few months, monovalent vaccines against this new variant (A/H1N1sw) were developed. The previously circulating A/H1N1 virus disappeared and the pandemic strain was subsequently integrated into seasonal influenza vaccines for the season 2010/11. We intended to assess whether or not the herd immunity threshold was reached in a reference population after pandemic influenza as well as pandemic and current seasonal influenza vaccines.

We assessed specific antibody levels against previous seasonal and currently circulating (swine flu) A/H1N1 influenza in a representative sample for the population of Hamburg, the second largest city in Germany. Samples were obtained from randomly selected adults. In addition, a questionnaire was completed to obtain information on influenza disease, previous vaccinations, and concomitant diseases.

A total of 353 samples were obtained. The median age was 39 years (range 18-78), 169 subjects were male (48%). Two subjects (0.6%) reported that they were diagnosed with pandemic influenza and 8 (2%) said they were treated with neuraminidase inhibitors since April 2009. Forty-nine (14%) reported that they received pandemic vaccination and 40 (11%) were vaccinated against seasonal influenza 2010/11. Accordingly, eighty subjects (23%) had evidence for either of the above suggestive for immunity against the currently predominant seasonal influenza strain A/H1N1sw. According to serologic analyses, 61 (17%) subjects had protective levels against influenza A/H1N1sw (titre ≥1:40). Only 23/49 (48%) and 8/40 (9%) of those subjects that received 2009-pandemic and/or 2010/11-seasonal influenza vaccination showed protective antibody levels.

Adjuvanted monovalent influenza vaccine seems to provide better protection compared to trivalent non-adjuvanted seasonal vaccination. Assuming a basic reproduction rate (R0) of 1.5, the calculated herd immunity threshold of 33% was clearly not reached. The population of a city like Hamburg is still vulnerable against the new influenza A/H1N1 strain.

**PO02.19**

**Acceptance and attitude towards H1N1 influenza vaccination among Health Care Personnel (HCP) - a report from India**

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**Background and Objective:** World Health Organization (WHO) recommends all countries should immunize their healthcare workers against H1N1 influenza as a first priority in order to protect the vital health infrastructure during H1N1 pandemic. The expected benefits of this policy include reduction of nosocomial influenza infection among high-risk patients and reduction of infection and absenteeism among HCPs. Although few HCPs have been reported to elect influenza immunization, little is known about baseline immunization rates and their attitude towards vaccination. Hence the study objectives were to determine the rates of immunization with H1N1 influenza vaccine among HCP and to identify reasons for electing and declining immunization.

**Methods:** The cross sectional study was conducted to a convenient sample of 160 (80 doctors and 80 nurses) in a large referral teaching hospital in India, using structured, self-administered, anonymous questionnaire. Data was collected and analyzed using EpInfo 2000 software; Rates of different parameters were calculated.

**Results:** One hundred (62.5%) of the 160 distributed questionnaire were returned from the participants. The response rate to the questionnaire between physicians and nurses were 60% and 64.44% respectively. The vaccination status was 64.28% among physicians and 72.41% among nurses. Both for physicians (74.07%) and nurses (80.95%) felt self protection was the most important motivation to get vaccinated against H1N1 influenza. Lack of effectiveness of the vaccine was the predominant reason (26.6%) for physicians and lack of access to vaccination (37.5%) was the main reason for nurses for not getting vaccinated against influenza. An adverse effect to vaccine was not in the consideration of HCP against influenza vaccination.

**Conclusion:** In the year 2010, Indian HCP were vaccinated against H1N1 Influenza. The attitude of self protection against
H1N1 influenza was the principle reason behind the high rates of immunization. Improved facilities for nurses and education programs for physicians will improve further vaccination rates among the HCP in the future.

PO02.20

Double-Dose Hepatitis B Vaccine Administration Among Previous Nonresponders
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Objectives: As more baby boomers travel to developing countries, many are receiving a series of Hepatitis B vaccine for the first time. Medical literature suggests that increasing age (over 30-years-old) is an independent risk factor for not developing antibodies (nonresponse) or inadequate antibodies (hyporesponse) following a routine or accelerated Hepatitis B vaccine series. Moreover, patients with chronic diseases are increasingly able to travel abroad. Specific groups (e.g., renal dialysis patients) have a high rate of nonresponse to normal-dose vaccine, and are routinely provided double the antigen dose (“double-dose”) in primary vaccine series as a means to induce protective immunity (> 10 IU/ml). The purpose of this paper is to describe clinical experience of providing double-dose Hepatitis B vaccine among travelers, who did not respond to a primary series of normal-dose Hepatitis B containing vaccines.

Methods: Over a three-year period (2007-2010), we described a case series of 10 clients immunized using double-dose vaccines. Since 2007, all clients over 40-years-old were routinely tested for Anti-HBs about 1-4 months following a primary vaccine series. Those who did not respond (i.e., no detectable antibodies) were offered a trial of double-dose vaccine, once HBsAg and Anti-HBc (total) were tested negative. Again, Anti-HBs was tested about 1 month after each double-dose until the arbitrary protective level of 10 IU/ml was reached or no detectable antibodies were found after the first or second double dose. The persistent nonresponders were provided additional counseling on the need for HBIG following significant Hepatitis B exposures in the future.

Results Summary: A majority of clients developed evidence of adequate protective immunity with few, who were true nonresponders. No serious adverse effects were self-reported by clients following the use of double-dose vaccine. Future serologic follow-up is planned at 5 years post-immunization to determine persistence of immunity among this group of clients.

Conclusions: We describe the successful immunization using double-dose Hepatitis B containing vaccines among a majority of travelers, who did not initially respond to a routine primary series. As a result, our clinic has developed clinical guidelines to offer double-dose Hepatitis B vaccine to nonresponders traveling to high-risk destinations.
PO02.22

A Penny Saved is a Penny Earned, Estimated Cost Avoidance of International Travel Vaccines
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Background: In 2009, United States residents spent $99.2 billion dollars on travel to international destinations (US Department of Commerce International Trade Administration). When travelers establish their budgets for these trips, they often forget to include funds to insure that they remain healthy while traveling abroad. However, travelers do invest money in insurance policies against cancelled flights or inclimate weather. Travelers see the estimated cost avoidance associated with these travel insurance plans but do not realize the importance of receiving all the necessary vaccines for their travel destination. Patients included in this study presented to the pharmacy thinking they only needed one or two vaccines. After consulting with a pharmacist it was found that these patients had indications for additional travel vaccines as well as routine immunizations. If these patients had not received a pre-travel consult, they could have incurred additional healthcare costs and complications from vaccine-preventable disease.

Objective: Determine the estimated cost avoidance provided by a pharmacist-run international travel medicine clinic (PRITMC).

Methods: Estimated cost avoidance (ECA) will be calculated individually for 50 patients who have been seen at a PRITMC. Each patient’s ECA will be calculated using a model that compares the cost of the vaccine versus the possible cost associated with contracting the disease. Factors to be considered by the model will be the epidemiologic data associated with the traveler’s destination (data from the CDC), effectiveness of vaccine (established from clinical studies), cost of treatment (medications and hospital admissions), and loss of productivity. The ECA calculated for each disease will then be applied to the individual patient. Descriptive statistics will be used to evaluate the results.

PO02.23

"I´m Leaving Tomorrow" - The Potential Use of Partial Vaccine Series and/or Double Dosing in Adult Travellers Who Present for Late Consultation
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It is not uncommon for travellers to seek travel health consultation very close to their departure time. Late consultation reduces the potential to mitigate some vaccine preventable disease risks, especially when the vaccine schedules require more than one dose to induce reliable immunity, e.g. hepatitis B (HB), Tick Borne Encephalitis (TBE), Japanese Encephalitis (JE), cholera and rabies vaccines. For TBE and HB, there is an approved "accelerated schedule" but there may even be insufficient time for the use of such schedules. For most vaccines, early trials, often Phase II, include the use of differing schedules and doses and, as such, may inform the time-constrained use of vaccines. Examples include: JE vaccine (IXIARO®) which induces a satisfactory antibody response (SAR) in 30% and 40% of vaccinees at 10 days and 28 days respectively after a single dose and in 60% at 10 days after a single double dose; HB vaccine which induces SAR in 30-55% after one dose; and TBE vaccine which induces an SAR in perhaps 50-75% after one dose. The travel health consultant could consider using fewer doses of vaccine and/or increasing the dose of vaccine to try to offset the "late consultation" situation. Pros for this approach include: some probability that the traveller will actually either develop (serologic) immunity; or the incomplete series will "prime" the immune system so that, if natural infection is encountered, the immune system will respond more quickly. Cons include: inducing a misplaced sense of protection on the part of the traveller; off label use; complicating post-exposure measures (e.g. for rabies); and balancing the timing of the induction of immunity against the potential time of exposure while travelling. In our view, the use of partial vaccine series and/or increasing the dose for some vaccines is a viable and potentially useful measure in some travellers who present with late consultation.
PO02.24

Yellow Fever Vaccine Seroconversion in Travelers

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Objective: The yellow fever (YF) 17D live-attenuated vaccine, developed in 1936, provides protection when anti-YF antibody titers have a log10 neutralization index (LNI) ≥0.7. Determined by plaque reduction neutralization test (PRNT50), antibody titers of >1:10 or >1:20 are believed to provide protection from YF infection. Past studies have shown rapid seroconversion in adults from nonendemic regions with antibody titers peaking 21-31 days after vaccination followed by declining titers. We aimed to assess seroconversion following YF vaccination in healthy adult travelers and the antibody level maintained at 8 months.

Methods: YF-naïve subjects aged 18-49 years who were evaluated pre-travel at the Mount Auburn Hospital and needed YF vaccination were recruited prospectively. Serum samples were obtained on days 0, 21 (±1 day), and 8 months (±30 days) following vaccination with YF-VAX®. Subjects were excluded if they had prior YF vaccination, resided in a YF endemic country, served in the US military, or received Japanese encephalitis vaccine within the previous 30 days. Serum samples were analyzed by a fully qualified PRNT50 for anti-YF antibodies (Focus Diagnostics, Cypress CA).

Results: Thirty subjects were enrolled with a mean age of 30.5 years (range 18-49 years). Sixty percent of the travelers were female. All subjects provided serum samples on day 21, and 26 (86.6%) provided sera at month 8. All subjects had traveled between day 21 and month 8 to YF endemic countries. On day 0, all subjects had an antibody titer < 1:10. By day 21 post-vaccination, 100% of subjects had seroconverted with over 90% of subjects having an antibody titer ≥1:5120 and the remainder ≥1:1280. Geometric mean titer (GMT) on day 21 was 6451. At month 8, GMT declined to 1246.

Conclusion: All YF-vaccine naïve subjects seroconverted by day 21 after vaccination, and all achieved antibody titers (≥1280) far in excess of seroprotective levels, confirming that YF 17D is one of the most immunogenic vaccines in use. Past studies have found 90% seroconversion by day 10 and >99% by day 28 post-vaccination. Our study similarly found high rate and levels of seroconversion. These results supplement existing data on YF vaccine immunogenicity in travelers from nonendemic regions and provide comparison for future YF vaccine development.

PO02.25

Viscerotropic Disease After Yellow Fever Vaccination. First report from Argentina

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Introduction: More than 500 million people have been vaccinated with yellow fever vaccine with a favorable safety profile. However, since 2001, 57 cases of what is today known as viscerotropic disease with a high fatality rate were reported. It is intriguing getting to know why such a complication was not diagnosed and notified before. There seem to be some risk-factors that predispose to its occurrence (age, thymus disease, immunosuppression, among them). We describe the first recorded case in Argentina.

Clinical Description: A 67 year-old previously healthy male was due to fly to Kartoum, Port Sudan and rural areas, for business purposes. He would stay 21 days. He assisted Stamboulian Travel Medicine Division for pre-travel advice in May, 2008. As yellow fever vaccine was recommended and required (among many other preventive measures) he was thoroughly explained about the higher risks of viscerotropic disease at his age. He decided to be vaccinated. He received a dTa booster, inactivated polio, meningococcal and typhoid fever vaccines (he had a positive IgG for hepatitis A) and 17 DD vaccine (Bio-Manguinhos/FIOCRUZ, Brazil). Ninety-six hours after vaccination the patient developed a flu-like syndrome, plus several bouts of watery diarrhea. As symptoms worsened he consulted the emergency department of Sanatorio Otamendi, where he was admitted under the suspicion of severe viscerotropic disease, and transferred to ICU thereafter. He developed subsequently multiorgan failure, with respiratory, renal and hepatic involvement, of which he finally died. A post-mortem liver biopsy was performed. 17DD virus could be sequenced at INEVH.

Conclusions: Short-term travel to endemic regions warrants yellow fever vaccination. Thus, risks and benefits should be
carefully considered, especially in people older than 60 years, where viscerotropic disease rate can be as high as 1 case per 55,000 doses. Some authorities have begun to stress the need for inactivated vaccines to avoid this adverse event, particularly in travelers. The International Health Regulation put the Travel Medicine practitioner in a difficult position in certain scenarios, and we relieve it should be revised, since many countries use it as a barrier to give the visa to enter them.

PO02.26

Comparison of the efficacy of intradermal pre-exposure rabies vaccination using Merieux Human Diploid Cell Vaccine & Purified Chick Embryo Rabies Vaccine

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Background: We have used intradermal (ID) pre-exposure rabies immunisation (PrEP) for our travellers since the early 1990’s, using Merieux Human Diploid Cell vaccine (HDCV). It is our protocol that we check post-immunisation rabies serology 2 - 4 weeks after the completion of ID PrEP. In Australia, for more than 2 decades, the only rabies vaccine available was HDCV, until Rabipur Purified Chick Embryo Rabies vaccine (PCEC) was registered in May 2007. Between 2007 and 2009, HDCV was not available in Australia for a period of about one and a half years. We switched to administering ID Rabipur for PrEP from October 2007, using the same protocol as with ID HDCV PrEP.

Method: We compared the post PrEP immunisation serology patterns between using 0.1ml ID HDCV and 0.1ml ID Rabipur, in travellers attending the Melbourne Travel Doctor Clinic. The 3 doses was given on Days 0, 7, and 21 - 28 respectively.

Result: Among the 1,532 travellers who received 3 ID doses of 0.1ml of PrEP HDCV up to May 2007, only seven (0.46%) failed to reach the protective antibody level of 0.5 IU/mL on testing 2 - 4 weeks after the third final dose. However, among the 273 travellers who received 3 ID doses of 0.1ml Rabipur using the same protocol as with HDCV, 7 (2.56%) failed to reach the protective antibody level of 0.5 IU/mL. If we included the blood testing results up to 5 weeks after the third final 0.1ml ID Rabipur dose, there were 8 failures (2.75%) among 291 travellers. The GMT of the rabies serology for the travellers having received ID HDCV PrEP is 4.96 IU/mL, whereas that for those being given ID Rabipur PrEP is 2.47 IU/mL.

Conclusion: We incidentally noted that in Australia, there is evidence that ID Rabipur PCEC is less immunogenic compared to ID HDCV, when used for PrEP. In a paper written by Jaijaroesup W et al. and published in the Journal of Travel Medicine in 1999, the authors also expressed reservations regarding the efficacy of PCEC when given as PrEP, particularly using the ID approach. We have now exclusively used HDCV for ID PrEP since December 2009.
**PO03.01**

**Loperamide is beneficial in the treatment of travelers’ diarrhea regardless of severity of clinical presentation**

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**Objectives:** We previously documented the significant benefit of adding loperamide to the treatment of travelers’ diarrhea with azithromycin (J Travel Med 2007; 14:312-19). In this post hoc analysis we explored how the benefit of loperamide might be impacted by limiting its addition to azithromycin to those with more severe clinical symptoms.

**Methods:** 101 subjects with acute diarrhea were treated with azithromycin alone and 56 received azithromycin plus loperamide. Analysis outcomes included duration of diarrhea and, in the 24 h period after beginning therapy, average number of unformed stools passed and the proportion of subjects still experiencing 3 or more, or 6 or more, unformed stools.

**Results:** Whether subjects presented with as few as 3 or as many as 6 or more unformed stools in the 24 h preceding therapy, the differences in durations (hours) of diarrhea favored the addition of loperamide (Table). Likewise the benefits of loperamide were apparent regardless of degree of cramps at presentation (Table).

<table>
<thead>
<tr>
<th># unformed stools at presentation,</th>
<th>Azithromycin (n)</th>
<th>Azithromycin + loperamide (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:</td>
<td>34 (26)</td>
<td>16 (20)</td>
</tr>
<tr>
<td>4:</td>
<td>28 (23)</td>
<td>10 (8)</td>
</tr>
<tr>
<td>5:</td>
<td>19 (16)</td>
<td>6 (10)</td>
</tr>
<tr>
<td>6 or more:</td>
<td>34 (36)</td>
<td>10 (18)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cramps at presentation,</th>
<th>Azithromycin (n)</th>
<th>Azithromycin + loperamide (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent or mild:</td>
<td>30 (48)</td>
<td>10 (29)</td>
</tr>
<tr>
<td>Moderate or severe:</td>
<td>31 (53)</td>
<td>13 (27)</td>
</tr>
</tbody>
</table>

Regarding the severity of diarrhea or cramps the average number of unformed stools passed in the first 24 h and the percents of subjects still passing 3 or more, or 6 or more, unformed stools in the first 24 h post therapy were consistently less in the loperamide-treated groups.

**Conclusion:** When treating travelers’ diarrhea with azithromycin, limiting the addition of loperamide to patients presenting with moderate to severe diarrhea or cramps would deny clinical benefits to patients with less severe disease. These data support adding loperamide to azithromycin in the treatment of travelers’ diarrhea regardless of its clinical severity upon presentation.
PO03.02
A double-blind, placebo-controlled, randomized human study assessing the capacity of a novel galacto-oligosaccharide mixture in reducing travellers' diarrhoea
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Background/Objectives: Prebiotics have attracted interest for their ability to positively affect the colonic microbiota composition, thus increasing resistance to infection and diarrhoeal disease. This study assessed the effectiveness of a prebiotic galacto-oligosaccharide mixture (B-GOS) on the severity and/or incidence of travellers’ diarrhoea (TD) in healthy subjects.

Subjects/Methods: The study was a placebo-controlled, randomized, double blind of parallel design in 159 healthy volunteers, who travelled for minimum of 2 weeks to a country of medium or high risk for TD. The investigational product was the B-GOS and the placebo was maltodextrin. Volunteers were randomized into groups with an equal probability of receiving either the prebiotic or placebo. The protocol comprised of a 1 week pre-holiday period recording bowel habit, while receiving intervention and the holiday period. Bowel habit included the number of bowel movements and average consistency of the stools as well as occurrence of abdominal discomfort, flatulence, bloating or vomiting. A clinical report was completed in the case of diarrhoeal incidence. A post-study questionnaire was also completed by all subjects on their return.

Results: Results showed significant differences between the B-GOS and the placebo group in the incidence (P< 0.05) and duration (P< 0.05) of TD. Similar findings occurred on abdominal pain (P< 0.05) and the overall quality of life assessment (P< 0.05).

Conclusions: Consumption of the tested galacto-oligosaccharide mixture showed significant potential in preventing the incidence and symptoms of TD.

PO03.03
No need to prescribe prophylactic or stand-by antibiotics for travelers diarrhea to short-term immunocompetent travelers: a prospective study.
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¹Public Health Service Amsterdam, Infectious Diseases, Amsterdam, Netherlands, ²Academic Medical Centre, Infectious diseases, Tropical Medicine and Aids, Amsterdam, Netherlands, ³National Coordination Centre on Travelers’ Advice, Amsterdam, Netherlands

Objectives: Travelers diarrhea (TD) is the most common infectious disease among travelers. In the Netherlands, prescribing stand-by or prophylactic antibiotics is not part of the standard travel advice. This study prospectively assessed the incidence rate, risk factors and (self) treatment of TD.

Methods: Immunocompetent persons who attended a travel clinic in 2006/2007 before 1 to 13 weeks travel to (sub)tropical countries, were invited to participate. A questionnaire on socio-demographics and purpose of travel was administered. Participants were asked to keep a structured travel diary, recording itinerary, symptoms and (self) medication or consultation of a doctor. Participants were asked to enter details daily. A TD episode was called severe when containing blood or mucus.

Results: Of 1202 recruited travelers, 93% were born in a western country, 43% were male and the median age was 38. The median travel duration was 3 weeks. Purpose of travel was tourism (86%); work (8%) and VFR (6%). 47% traveled to Asia; 28% to Latin America and 25% to Africa.

The characteristics of 757 episodes of TD reported by 597 subjects are shown in table 1.

<table>
<thead>
<tr>
<th>Travelers diarrhea: episodes</th>
<th>1st episode</th>
<th>2nd episode</th>
<th>&gt; 2 episodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total n=757</td>
<td>597/1202 (50%)</td>
<td>130/1202 (11%)</td>
<td>21/1202 (2%)=total 30 episodes</td>
</tr>
<tr>
<td>Incidence rate (per 100 travel days)</td>
<td>2.60 (95%CI: 2.40-2.82)</td>
<td>2.49 (95%CI: 2.09-2.94)</td>
<td>not calculated</td>
</tr>
</tbody>
</table>
Abstracts – Poster Presentations

<table>
<thead>
<tr>
<th>Median duration (days)</th>
<th>3 (range 1-63)</th>
<th>2 (range 1-15)</th>
<th>1 (range 1-11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st week</td>
<td>269</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2nd week</td>
<td>178</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>3rd week</td>
<td>93</td>
<td>51</td>
<td>0</td>
</tr>
<tr>
<td>≥ 3 weeks</td>
<td>57</td>
<td>63</td>
<td>30</td>
</tr>
</tbody>
</table>

[Table 1: Characteristics of TD episodes]

The attack rate of TD was 50%, the median duration of a first TD episode was 3 days and 45% of these were in the first travel week. Fever, abdominal cramps and vomiting were reported in 14%, 5% and 11% respectively, and 4% were severe TD. The incidence rates for first and second episodes were comparable. Independent risk factors for first episode were: female sex, born in a Western country, travel to the Indian subcontinent, Middle America and North-West-Middle Africa and tourism. Elder travelers had significantly more often severe TD. In total 35 (5%) used antibiotics, 32 for mild diarrhea, and 16/35 (46%) were prescribed by a doctor (table 2).

<table>
<thead>
<tr>
<th>Travelers diarrhea: treatment</th>
<th>Total episodes</th>
<th>1st episode</th>
<th>2nd episode</th>
<th>&gt; 2 episodes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mild</td>
<td>severe</td>
<td>mild</td>
<td>severe</td>
</tr>
<tr>
<td></td>
<td>757</td>
<td>575 (96%)</td>
<td>22 (4%)</td>
<td>125 (96%)</td>
</tr>
<tr>
<td>ORS</td>
<td>116</td>
<td>(15%)</td>
<td>92 (16%)</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>Antimotilic agent</td>
<td>231</td>
<td>(31%)</td>
<td>180 (31%)</td>
<td>7 (32%)</td>
</tr>
<tr>
<td>Antibiotic</td>
<td>35</td>
<td>(5%)</td>
<td>30 (5%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Alternative antidiarheal drugs</td>
<td>19</td>
<td>(3%)</td>
<td>15 (3%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Visited doctor</td>
<td>42</td>
<td>(10%)</td>
<td>27 (5%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>No treatment</td>
<td>445</td>
<td>(59%)</td>
<td>327 (57%)</td>
<td>11 (50%)</td>
</tr>
</tbody>
</table>

[Table 2: TD treatment]

**Conclusion:** TD is common among travelers. Born in a non-Western country seems to protect for TD. The incidence of a second episode is comparable to the incidence of a first episode. Given the mild nature of TD there appears to be no need to prescribe prophylactic or therapeutic antibiotics to short term healthy travelers, for elderly travelers to remote areas this could be considered.
PO03.04
Typhoid fever in returning travelers and immigrants seen at a Bronx municipal hospital, 2005-2010
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Background: Typhoid is a leading cause of fever in returning travelers. The prevalence is highest in immigrants visiting friends and relatives (VFRs) in the Indian Subcontinent, where reports of resistance have been of particular concern. The present study is a retrospective analysis of patients with typhoid seen over a 5 year period in a tertiary center that serves a large immigrant population.

Methods: Patients with blood cultures positive for S. typhi were identified between 2005-2010 and compared to 11 patients with a recent history of travel and fever due to causes other than typhoid or malaria (controls). Charts were reviewed for demographic data, travel history, treatment and clinical course.

Results: Seventeen patients were identified with S. typhi. The median age was 7 years (2-47) and 94% (16/17) required hospitalization with a median stay of 7 days; two were admitted to the ICU. Fourteen patients (82%) had a history of recent travel. Twelve were VFR's in Bangladesh and Pakistan and two had recently immigrated. One seven year old boy developed osteomyelitis, despite 8 days of IV ceftriaxone. Typhoid patients had lower eosinophil and platelet counts, lower Na levels and higher transaminases compared to controls (p=0.004, p=0.01, p=0.008, p<0.005 respectively). 76% (12/17) of all isolates were resistant to nalidixic acid, 23.5% (4/17) were resistant to ampicillin and co-trimoxazole and one was resistant to ciprofloxacin. All isolates were susceptible to 3rd generation cephalosporins. Of significance, none of our patients had been vaccinated or formally educated about preventive measures.

Conclusions: None of our patients received pre-travel vaccination. Although the vaccine is only 70% effective, it may have prevented some of the hospitalizations and morbidity. Younger VFR's seem to be at greater risk for acquiring infection and developing complications. Absolute eosinopenia, low platelets and increased liver tests could be useful early diagnostic clues in a returning traveler with fever, once malaria is ruled out. There was a high rate of decreased susceptibility to fluoroquinolones, confirming that the use of 3rd generation cephalosporins in patients from the Indian Subcontinent is most appropriate. Prevention in this group of travelers is critical and efforts should be targeted at better education and immunization.

PO03.05
A Double-blind, Randomized, Crossover trial of Novel Site-Activated Botanical Metabolites with Oral Rehydration Therapy for Short-Term Diarrhea in Adults
Dover A.S.1
1APTOS Travel Clinic, Watsonville, United States

Background: Natural plant solutions for gastrointestinal health have long been accepted worldwide. This study evaluates an innovation in botanical health solutions that adapts an injury/pathogen-activated chemistry within live plant cells to act specifically on infected or damaged cells of the human digestive tract. This “Botanical Immunity Transfer” utilizes metabolites from food plants with broad evidence of safe human use at levels far above those used in this study. Extensive testing in pigs demonstrates reduction in scour with no negative effects.

Objective: Evaluate the effects of a novel compound extracted from common food plants on short term diarrhea.

Methodology: 54 adults (18-60 years) with acute short term diarrhea were evaluated for participation in a double-blind randomized cross-over study to compare this novel/active compound against placebo. Subjects with parasites, high fever, vomiting or bloody stools were excluded. 43 subjects met the study criteria. Following medical examination, subjects received a single liquid dose of either active product or placebo in oral rehydration solution on day 1 and opposite on day 2. All patients were given sufficient oral rehydration solution (without the active compound or placebo) to last three days. Outcome measures were: time to cessation of symptoms defined as elapsed time between initial administration of study solution and the last loose stool rated ≥ 4 on the Bristol Stool Scale; the number of stools during two day observation period following initial administration of study solution;

Results: Adults given the active solution on day 1 reported lower mean time to cessation of symptoms than controls (7hrs 30min vs. 23hrs 49min, p<.001); lower mean number of loose stools (3.6 vs. 6.2, p<.05). In addition, 11 of 21 adults
given the active compound on day 1 reported immediate cessation of symptoms while no adult given placebo on day 1 reported such result.

**Conclusion:** Results indicate that a novel solution from common food plant metabolites may reduce the burden of short term diarrhea in adults. Replication in a larger sample is underway.

**PO03.06**

*A Double-blind, Randomized, Crossover trial of Novel Site-Activated Botanical Metabolites with Oral Rehydration Therapy for Short-Term Diarrhea in Children.*

Dover A.S.¹

¹APTOS Travel Clinic, Watsonville, United States

**Background:** Natural plant solutions for gastrointestinal health have long been accepted worldwide. This study evaluates an innovation in botanical health solutions that adapts an injury/pathogen-activated chemistry within live plant cells to act specifically on infected or damaged cells of the human digestive tract. This “Botanical Immunity Transfer” utilizes metabolites from food plants with broad evidence of safe human use at levels far above those used in this study. Extensive testing in pigs demonstrates reduction in scour with no negative effects.

**Objective:** Evaluate the effects of a novel compound extracted from common food plants on short term diarrhea.

**Methodology:** 58 children (2-18 years) with acute short term diarrhea were evaluated for participation in a double-blind randomized cross-over study to compare this novel/active compound against placebo. Subjects with parasites, high fever, vomiting or bloody stools were excluded. 43 subjects met the study criteria. Following medical examination, subjects received a single liquid dose of either active product or placebo in oral rehydration solution on day 1 and opposite on day 2. All patients were given sufficient oral rehydration solution (without the active compound or placebo) to last three days. Outcome measures were: time to cessation of symptoms defined as elapsed time between initial administration of study solution and the last loose stool rated ≥ 4 on the Bristol Stool Scale; the number of stools during two day observation period following initial administration of study solution;

**Results:** Children given the active solution on day 1 reported lower mean time to cessation of symptoms than controls (6hrs 32min vs. 16hrs 21min, p< .01); lower mean number of loose stools (3.8 vs. 5.9, p< .015). In addition, 9 of 23 (38%) children given the active compound on day 1 vs. 3 of 20 (15%) reported immediate cessation of symptoms.

**Conclusion:** Results indicate that a novel solution from common food plant metabolites may reduce the burden of short term diarrhea in children. Replication in a larger sample is underway.

**PO03.07**


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¹Infectious Diseases Institute Emilio Ribas, Travel Medicine Division, Sao Paulo, Brazil

The *Salmonella sp* infection is endemic in some countries with low hygiene conditions. Case 1: Brazilian, female, 23 years-old, returning after 30 day trip to Peru. Into the trip she presented fever, diarrhea with color change and numerous daily evacuations, headache, retroorbital pain, myalgia and abdominal pain for 7 days. She sought medical assistance and was diagnosed as tonsilitis and hepatitis, without improvement she went to the Emergency Unit of the IIER. She was admitted in the IDIER with signs of septic shock with transfer to ICU. Laboratory Tests: Hb:11,4; Ht:31,WBC:5900; platelets:32,000; potassium:3,0mmol/L, urea:29mcg/dL; creatinine:1,3mg/dL; Parasitoligic: negative; stool culture: negative; blood culture: Salmonella typhi. Abdominal Ultrasonography:hepatomegaly,splenomegaly homogeneous, bilateral effusion and small ascites. She received ceftriaxone with clinical improvement and discharged to travel clinic monitoring for four months. Case 2: 59 years-old male, Brazilian, admitted in the IDIER with fever for 4 weeks, sweating, sporadic abdominal pain and diarrhea for 4 days. He travelled to India and stayed there for 20 days where the symptoms began. He went to many hospitals, being treated with ciprofloxacin without improvement. He sought medical assistance in IDIER. Physical examination:febrile, dehydrated. Laboratory Tests:Hb:10,9; Ht:31,7; WBC:8,600; creatinine:1,6mg/dL; urea:55mcg/dL; potassium:4,7mmol/L; Stool parasitologic:negative; stool culture:negative. Abdominal CT scan:hepatomegaly and hepatic cyst; Abdominal Ultrasonography:moderate ascitis, increase lymphonodes in retro pancreatic and bilateral pleural effusion. Partial result of the blood culture:Gram negative growth. It was introduced
PO03.08
Combination therapy with ceftriaxone and azithromycin for *Salmonella paratyphi* A bacteremia among Israeli travelers to Nepal

Meltzer E.1, Leshem E.1, Stienlauf S.2, Ostfeld I.3, Weiner-Well Y.3, Megged O.3, Potasman I.4, Schwartz E.1

1Sheba Medical Center, The Center for Geographic Medicine and Internal Medicine C, Ramat Gan, Israel, 2Rabin Medical Center, Petah Tikva, Israel, 3Shaare Zedek Medical Center, Jerusalem, Israel, 4Bnai Zion Medical Center, Haifa, Israel

Introduction: Enteric fever is still a common cause of fever among travelers returning from the Indian subcontinent. *Salmonella paratyphi* A accounts for the majority of recent cases and often shows extensive drug resistance. Ceftriaxone, the current drug of choice is often associated with a slow clinical response.

Outbreak description: An outbreak of *Salmonella paratyphi* A occurred among Israeli travelers to Nepal during October 2009. Overall, 36 patients with *paratyphi* A bacteremia were hospitalized in Israel. The epidemiological curve was typical for point source infection, probably acquired at Chabad House in Pokhara. Pulsed-field gel electrophoresis (PFGE) on several isolates showed a single bacterial strain. All had the same antibiotic sensitivity pattern and all were resistant to ciprofloxacin

Therapeutic intervention: Patients were hospitalized in several Israeli hospitals, with different therapeutic regimens; we were therefore able to compare the response to two major therapeutic regimens: 12 patients were treated with ceftriaxone monotherapy for 14 days, and 17 patients received ceftriaxone for 14 days with azithromycin for the first seven days. All the patients recovered uneventfully. However, time to defervescence was significantly shorter in cases treated with combination ceftriaxone and azithromycin than for patients treated with ceftriaxone monotherapy: (3.2±1.7 days and 6.3±1.7 days respectively, p=0.0006).

Conclusion: this outbreak illustrates the significant risk *S. paratyphi* A poses for travelers to the Indian subcontinent. This risk is not likely to decrease in the near future since no vaccine for this pathogen is available. The treatment of choice for Enteric fever in the era of ciprofloxacin resistance is not established yet. Our findings suggest that combination therapy with azithromycin and ceftriaxone may provide an improved regimen compared with the currently recommended monotherapies (ceftriaxone or azithromycin alone). These results should be further explored in additional trials.

PO03.09
Toxin-Producing Non-*Escherichia coli* Enterobacteriaceae as Potential Causes of Travelers’ Diarrhea

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Travelers’ diarrhea is a common disease affecting up to 50% of visitors from developed to developing nations. Enterotoxigenic *E. coli* (ETEC) is the most common causative agent for travelers’ diarrhea, producing either a heat-stable (ST) or heat-labile (LT) enterotoxin or both, and has been identified in approximately half of the cases of travelers’ diarrhea. In a previous study, lactose fermenting *E. coli*-like colonies obtained from diarrheal stool samples were tested for the presence of ST and/or LT genes, and colonies positive for either or both of the toxins have been classified as ETEC. However, a recent study showed that other *Enterobacteriaceae* strains including *Citrobacter* species may produce ETEC-like toxins. The goal of the current study was to test a large number of presumed ETEC isolates to identify other enterobacteriaceae that may have contributed to diarrhea in the patients tested. As part of the previous study, we have
identified 522 strains as ETEC by virtue of having *E. coli* colony morphology and being lactose positive on MacConkey Agar plates and by demonstration that they were positive for ST or LT toxin-encoding genes by DNA probe or PCR. The study isolates were cultured onto MacConkey agar plates and incubated at 35ºC for 18-24 h. Lactose positive, *E. coli*-like colonies were picked and inoculated to a set of TSI, LIA and SIM tubes for preliminary biochemical testing. The media was then incubated at 35ºC for 18-24 h. If the biochemical screening did not fit the pattern of an *E. coli*, definitive biochemical testing was performed using commercial API-20E testing. Five percent of organism originally diagnosed as ETEC were shown to be non-*E. coli* Enterobacteriaceae including *Citrobacter*, *Klebsiella*, *Shigella*, *Enterobacter*, *Salmonella* and *Morganella* spp. These toxigenic non-ETEC bacteria may be potentially important as causative agents of travelers’ diarrhea.

<table>
<thead>
<tr>
<th>Species</th>
<th># Identified</th>
<th>Percentage (%)</th>
<th># different API codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli</td>
<td>492</td>
<td>95</td>
<td>98</td>
</tr>
<tr>
<td>Citrobacter</td>
<td>10</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Klebsiella</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Enterobacter</td>
<td>4</td>
<td>0.7</td>
<td>4</td>
</tr>
<tr>
<td>Shigella boydii</td>
<td>1</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>Salmonella sp.</td>
<td>1</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>Morganella morganii</td>
<td>1</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>Kluyvera sp.</td>
<td>1</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>Mixed colonies</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

*Results from 518 tested enteric colonies*
PO03.10
Evaluation of Available Transport Systems for Identification of Enteric Bacterial Pathogens and an Examination of Optimal Temperature for Transportation
Jiang Z.-D., Dupont H.L.¹,², Sistrunk J.¹
¹University of Texas Medical School at Houston, Houston, United States, ²Baylor College of Medicine, Houston, United States

Bacterial pathogens such as enterotoxigenic Escherichia coli, Salmonella, and Campylobacter spp. are associated with up to 80% of diarrheal illness to travelers from industrialized countries to developing countries. In order to study acute gastrointestinal diseases, it is necessary to transport samples to a qualified reference laboratory for processing. This has been done by our certified enteric laboratory by the use of transport media systems. There are few commercially available transport media systems for the transport of viable enteric bacteria. We evaluated the three commercial available transport media systems, two gel swabs (Swab A and Swab B) and one liquid vial (Vial A) to determine the most appropriate for the maintenance and recovery of common enteric bacterial pathogens. Thirteen enteric bacterial pathogens were observed at 25°C and 4°C for up to 21 days. Each sample was streaked onto 7 selective medium for enteric bacterial pathogens identification. We found improved pathogen survival when the transport systems were maintained at 25°C. All systems performed approximately equally in the recovery of bacterial pathogens. We recommend the use of swab transport systems since they are easy to transport (small, easy to pack and resist leakage) and they perform similarly to liquid vial systems in later organism recovery.

<table>
<thead>
<tr>
<th>bacterial pathogens</th>
<th>4°C</th>
<th>25°C</th>
<th>4°C</th>
<th>25°C</th>
<th>4°C</th>
<th>25°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeromonas hydrophila</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Plesiomonas shigellosa</td>
<td>21</td>
<td>21</td>
<td>2</td>
<td>21</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Vibrio parahaemolyticus</td>
<td>14</td>
<td>21</td>
<td>14</td>
<td>21</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td>14</td>
<td>21</td>
<td>14</td>
<td>21</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Shigella flexneri</td>
<td>14</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Salmonella enterica</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Enterotoxigenic E. coli</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>15</td>
<td>21</td>
</tr>
</tbody>
</table>

[Results]
Abstracts – Poster Presentations

PO03.11
Typhoid fever in the global world
Pereira B.I.¹, Seixas D.¹, Crespo P.¹, Malcata L.¹, Serra J.E.¹, Oliveira J.¹, Saraiva da Cunha J.¹
¹University Hospital of Coimbra, Portugal, Infectious Diseases Department, Coimbra, Portugal

Introduction: Typhoid fever is a multisystemic illness caused primarily by Salmonella enterica serotype typhi. Most of the 22 million new cases that occur annually are confined to the developing world, with the greatest burden being the Indian Subcontinent and Southeast Asia. In developed countries, enteric fever is an imported disease mainly in returned travellers.

Clinical Case: The authors describe a clinical case of a 35-year-old male patient who was admitted in the University Hospital of Coimbra, Portugal, with history of fever and abdominal pain 12 days after returning from India. Before travelling he was observed in our Travel Medicine Consultation and was vaccinated against typhoid fever (injected Vi capsular polysaccharide vaccine), poliomyelitis and prescribed malaria chemoprophylaxis with Atovaquone + Proguanil. Lab results excluded malaria and dengue, and blood cultures revealed infection with S. typhi, resistant to ampicillin and trimethoprim - sulfamethoxazole but susceptible to quinolones. He was discharged 5 days later with no fever and with indication to maintain therapy with ciprofloxacin till completion of 14 days. Four days later fever relapsed and he was re-admitted to our hospital. New blood cultures were collected and still revealed S. typhi, but we asked for nalidixic acid resistance, which was positive. Treatment was changed to cefotaxime and azithromycin and after 2 days we remained afebrile. After completion of 14 days of this therapy he was discharged and observed 3 and 6 months later, with no evidence of asymptomatic carriage.

Conclusions: Typhoid vaccination is recommended for most travellers to moderate to high-risk countries. Currently, there are 3 typhoid fever vaccines available but efficacy of both vaccines only reaches 50-70% of protection. Emergence of drug resistance is a major concern, specially resistance to quinolones that is spreading specially in the Indian subcontinent. Many of these quinolones-resistant strains are found to be resistant to nalidixic acid by in vitro testing, although MICs of quinolones remain in the susceptible range according to widely used criteria. These quinolone-susceptible, nalidixic acid-resistant strains may be associated with clinical failure or delayed response to quinolones. It’s thus recommended to test for nalidixic acid resistance in all extra-intestinal Salmonella isolates.
PO04 Special Needs Travelers

Travelers visiting friends and relatives (VFRs) seen in the Boston Area Travel Medicine Network (BATMN): Risks of malaria and yellow fever and intention to use anti-vector measures.

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Objectives: To describe among VFRs: 1) personal characteristics (foreign-born (FB) vs. US born); 2) frequency of visiting countries where there is malaria or yellow fever (YF) risk; and 3) intention to use anti-vector measures during travel.

Methods: Travelers seen in 5 Boston area travel clinics from 3/2008-7/2010 who identified purpose of travel as visiting friends and relatives (VFR) were grouped by their country of birth and that of their parents. Country-related risk for malaria and YF was based on CDC and WHO classifications. Questionnaires from travelers seen during January- November 2010 were used to identify the intention of VFR and non-VFR travelers to practice anti-vector measures. Prevalence ratios (PR) and 95% confidence intervals (CI) were calculated.

Results: Of 15,442 travelers, 2,812 (18%) selected VFR as purpose of travel; traveler/parent countries of birth were available for 2,460. Ages ranged from < 1-92 years; 43.5% were male. Traveling to malaria-risk areas (PR 1.51, 95% CI 1.43-1.58), and YF-endemic countries (1.56, 1.48-1.64) was undertaken more often by VFRs compared to non-VFRs (Table 1). Traveling to malaria-risk areas (1.79, 1.56-2.04) and YF-endemic countries (1.62, 1.42-1.85) was undertaken more frequently for VFRs with two FB parents than VFRs with one or no FB parents. VFRs with two FB parents traveled for a mean of 16.3 (range 12.5-20.1) days longer than VFRs with one or no FB parents.

Of 802 travelers completing surveys of intended travel practices, 114 (14%) selected VFR as purpose of travel. VFRs were less likely than non-VFRs to plan to use insect repellent (0.89, 0.81-0.97) or a bednet (0.77, 0.69-0.93).

<table>
<thead>
<tr>
<th>VFR travelers with both foreign-born parents</th>
<th>VFR travelers with one or no foreign-born parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign-born patient/Both foreign-born parents</td>
<td>US-born patient/Both parents Foreign-born</td>
</tr>
<tr>
<td>Foreign-born patient/1-2 US-born parents</td>
<td>VFR travelers (TOTAL)</td>
</tr>
<tr>
<td>High Risk for Malaria</td>
<td>709/1265 (56%)</td>
</tr>
<tr>
<td>High Risk for Yellow Fever</td>
<td>652/1265 (52%)</td>
</tr>
</tbody>
</table>

[Demographic Data of VFR traveler in BATMN Database]

Conclusions: This study shows that VFRs, especially those with 2 FB parents, are more likely to travel to malaria and YF risk countries. VFRs intended to use anti-vector measures less frequently than non-VFRs. VFRs, particularly those with two FB parents, are at increased risk of vector-borne diseases and therefore need enhanced outreach and travel-health education.
PO04.02

Health Status and Challenges of Youth Travelers Aged ≤ 21 Years: Comparison of Those Visiting Friends and Relatives with Those Traveling for Other Purposes

Han P.1, Yanni E.2, Jentes E.S.1, Hamer D.H.2, MacLeod W.B.2, Pfaff M.2, Karchmer A.W.3, Kogelman L.4, Ooi W.W.5, Chen L.H.6, Wilson M.E.7, Barnett E.D.8

1Centers for Disease Control and Prevention, Atlanta, United States, 2Boston University School of Public Health, Boston, United States, 3Beth Israel Deaconess Medical Center, Boston, United States, 4Tufts Medical Center, Boston, United States, 5Lahey Clinic Medical Center, Burlington, United States, 6Mount Auburn Hospital, Cambridge, United States, 7Harvard School of Public Health, Boston, United States, 8Boston Medical Center, Boston, United States

Objective: To assess the differences in demographics and travel health risks between Boston-area youths ≤ 21 years old traveling internationally to visit friends and relatives (VFR) compared with those traveling internationally for other purposes (non-VFR).

Methods: The Boston Area Travel Medicine Network consists of five clinics collecting anonymous data from international pre-travel consultations. Records were extracted from the database for travelers ≤ 21 years old who visited the clinics during January 2008-July 2010. Travelers who listed their purpose of travel as visiting friends and relatives were compared to non-VFRs on demographics, trip characteristics, travel vaccinations, and malaria prophylaxis. Analyses were done by using chi-square and Wilcoxon rank sum tests.

Results: Among the 2688 travelers, 701 (26%) were VFRs. VFRs were younger than non-VFRs (mean 9 v. 17 years, p< 0.01). A higher proportion of VFRs than non-VFRs were under 2 years old (23% v. 2%). Of those with at least one FB parent, US-born VFRs were younger than FB VFRs (mean 7 v. 14 years, p< 0.01). VFRs planned to travel for a longer duration (median 30 v. 19 days, p< 0.01) and more likely to Africa (49% v. 31%, p< 0.01). More VFRs than non-VFRs planned travel to yellow fever (YF) holoendemic (42% v. 22%), high-risk malaria (37% v. 16%), and high-risk typhoid (26% v. 17%) countries (p< 0.01, all comparisons). Typhoid IM/oral (49%/17%), YF (41%), and influenza (9%) vaccines were the most frequently given to VFRs. Of those traveling to YF holoendemic countries, VFRs were less likely than non-VFRs to have the YF vaccine given (73% v. 84%, p< 0.01). Among VFRs, mefloquine (24%) and atovaquone-proguanil (16%) were the most frequently prescribed antimalarial medications. Of those traveling to high-risk malaria countries, VFRs were more likely than non-VFRs to be prescribed mefloquine (34% v. 21%, p< 0.01).

Conclusion: Youth VFRs travel for longer durations, at younger ages, and to destinations with higher YF, typhoid, and malaria risks than non-VFRs, which might place them at a higher risk of exposure to these infectious diseases during international travel. To reduce travel-related morbidity, healthcare providers should be prepared to give travel advice to parents of infant and child VFRs, in particular those US-born with FB parents, regarding alternative measures for preventing YF and typhoid, as well as the appropriate antimalarial medications.

PO04.03

Menstrual cycle abnormalities amongst South African female Hajj pilgrims during 2008 and 2009

Parker S.1, Omar S.2

1SASTM (South African Society of Travel Medicine), Johannesburg, South Africa, 2University of Witwatersrand, Intensive Care Unit, Johannesburg, South Africa

Objective: Lately about 1.5 million females performed Hajj annually. Though only one of the Hajj rituals requires the absence of menstruation, menstruation cycle problems (MCP) due to hormonal menstrual manipulation (HMM) were noted to be one of the more frequent presentations at a South African (SA) clinic over the last decade. Surveys were done in 2008 and 2009 to ascertain the extent of HMM and the incidence of MCP.

Method: Voluntary surveys: 1000 questionnaires addressing the above issues were circulated in the female tents housing SA females at Mina on the last day of Hajj in 2008 and over the last three days in 2009. There were a total of 2458 SA ladies in 2008 and 2318 in 2009.

Results: 460 and 470 responses were received in 2008 and 2009 respectively (18.7% and 20.2% of the total SA female pilgrims for respective years) and a questionnaire response rate of 46% and 47%. All questions were not answered by every respondent.

For 2008, 396 of 418 (94.7%) knew that the absence of menstruation was not essential for performing most of the Hajj, the figures were 386/439 (88.0%) for 2009. Yet 211 of 310 ladies (68.0%) preferred not to menstruate in 2008, and 266/377 (70.6%) in 2009.
A total of 147 were post menopausal or had hysterectomies in 2008 and 147 in 2009 and were thus excluded. HMM was attempted by 197 out of 308, with 46 experiencing MCP in 2008 and 194/323 in 2009, with 44 having MCP. 14 ladies out of 111 who did not attempt HMM experienced MCP in 2008 with the 2009 figure being 11/129. The overall incidence of MCP during 2008 was 19.5% and 17% in 2009. The absolute risk of MCP was 23% for those who chose HMM for both years. The attributable risk of MCP from HMM was 46% in 2008 and 62% in 2009. The odds ratio with 95% confidence intervals for MCP in HMM was 2.11 (1.11–4.01) in 2008 and 3.2 (1.56–6.36) in 2009.

**Conclusion:** Most ladies preferred not to menstruate during the Hajj, even though they were aware that its absence was not required for most rituals. Up to 19.5% experienced MCP during the Hajj. Women who chose HMM to prevent MCP increased their risk two to threefold.

**PO04.04**

**Analysis of returned humanitarian aid and mission workers seen at InterHealth, UK**

Boddington N.L.1

1InterHealth, London, United Kingdom

**Objectives:** To analyse the demographics, travel patterns and spectrum of morbidity in humanitarian aid and mission workers seen post-travel at InterHealth, a specialist travel medicine centre which provides medical and psychological support to international humanitarian aid agencies. To further understand the health risks faced by this understudied, but potentially high risk group of travellers.

**Methods:** Clinician-based data was extracted from the InterHealth clinical database between 1 October 2007 and 31 September 2010 and exported into Microsoft Excel® for analysis. Data was extracted for all returned humanitarian aid and mission workers who had travelled within six months of visiting InterHealth, and who presented for asymptomatic screening or illness.

**Results:** 2889 patients were seen at InterHealth during the study period. The majority of patients were female (55.0%), UK born (73.1%) and had a median age of 37. 60.9% were classified as “risk” travellers who had lived in conditions similar to that of the local population. The most popular visited countries within the study population were Kenya (6.9%), Sudan (3.7%) and Uganda (3.7%). The most common primary region of exposure was Sub-Saharan Africa (35.8%), of which Sudan and Uganda were the most common individual countries of exposure.

59.0% of patients were confirmed “healthy” on return. However 41.0% were “ill” on return with a total of 1646 final diagnoses. The most common ill diagnoses were stress (13.9%), post-infectious irritable bowel syndrome (9.8%) and schistosomiasis (6.9%). 13 case of dengue and 5 cases of malaria were diagnosed during the study period.

**Conclusions:** This review represents a large cohort of aid and mission workers and highlights a significant number of workers return unwell from assignment with an array of health issues. An understanding of the health risks faced by this population enables evidence based services to be delivered and awareness generated amongst the sending organisations.

**PO04.05**

**Yellow Fever Vaccine Given to Travelers Living With Autoimmune Disorders**

Zimmer R.1, Lalonde J.1, Fonseca K.2

1Odyssey Travel + Travel Clinic, Calgary, Canada, 2Provincial Laboratory for Public Health, Calgary, Canada

**Objectives:** As more patients with chronic diseases such as rheumatoid arthritis or inflammatory bowel disease are successfully managed with immunosuppressive therapy, such clients are planning trips to destinations with risk of Yellow Fever (YF) infection. Currently, there is little published literature on the subject. The purpose of this study is to describe clinical experience providing a primary dose of live attenuated 17D Yellow Fever vaccine among travelers living with autoimmune disorders during the period (2008-2010).

**Methods:** Following established guidelines from the British Society of Rheumatology, we described a case series of 5 clients electively immunized for the first time, including pre- and post-vaccine serology for YF and related arboviruses (e.g., Dengue Fever). The National Microbiology Laboratory of Canada conducted all arboviral serologic testing. Prior to January 2010, specific antibody results were reported as dilutions (e.g., 1:80). After January 2010, results were reported
as Immunoglobulin G (IgG) IFA positive or negative. Though there is no standardized interpretation of YF serology results following immunization, an obvious rise in antibody titers (e.g., from < 1:10 to 1:80 or higher) or appearance of IgG (e.g., from negative to positive) following vaccine was considered an indicator of successful immunization.

**Results Summary:** All 5 clients developed evidence of adequate antibody response following a primary YF vaccine dose. No serious adverse effects were witnessed by providers or self-reported by clients. One client had delayed seroconversion, where she tested negative at 1 month but positive at about 4 months following immunization. As none of the clients had an extensive travel history, other arbovirus markers were negative pre- and post-immunization (i.e., no evidence of cross-reaction with YF specific tests). Among this group of travelers, serologic follow-up is planned in 5 years to determine persistence of YF immunity while remaining on immunosuppressive therapy.

**Conclusions:** We describe the successful primary immunization of 5 travelers living with autoimmune disorders, using the live attenuated YF vaccine. Experience providing YF vaccine to additional travelers living with other chronic conditions such as HIV infection, post-chemotherapy, and bone marrow transplantation is also discussed.

PO04.06

**Pre-travel preparation and travel-related morbidity in patients with inflammatory bowel disease**

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¹Leiden University Medical Center, Department of Infectious and Tropical Diseases, Leiden, Netherlands, ²University Medical Center Utrecht, Gastroenterology and Hepatology, Utrecht, Netherlands

**Background:** No studies have systematically assessed travel-related morbidity in patients with inflammatory bowel disease (IBD). To improve pre-travel care we assessed travel related morbidity and pre-travel preparation among patients with IBD.

**Methods:** A web-based questionnaire on travel experiences in the past 5 years with more detailed questions on the most recent journey abroad. Participants were recruited from the IBD outpatient clinic and via the website of the Dutch IBD patient's organization.

**Results:** 300 participants (188 Crohn's disease, 112 ulcerative colitis) filled out the questionnaire. Respondents' mean age was 42 years, mean duration of IBD 14 years and 41% underwent bowel surgery in the past. At the time of the survey 54% used an immunomodulator and 27% a TNF-α inhibitor. The majority (190/300) answered that IBD limited their choice of a travel destination. This was more so for those on a TNF-α inhibitor (OR 0.7, 95% CI 0.5-0.8) and for those who underwent bowel surgery in the past (OR 0.6, 95% CI 0.4-0.7). During the past 5 years 92% (277/300) had traveled abroad of whom 43% (120/277) to countries where hepatitis A is endemic. Of this group 76% (91/120) had obtained pre-travel advice from a qualified source. An antimicrobial agent for self-treatment in case of infectious diarrhea was only prescribed to 48% (44/91), and 30% were not protected against hepatitis A; 3 of 11 participants who received live attenuated yellow fever vaccine should not have been vaccinated as they used immunomodulators. Fecal urgency and incontinence were mentioned most frequently as the main IBD-related inconvenience during travel. Onset of a new episode of diarrhea was reported by 32% (90/277); 28% (25/90) thought that the episode was due to an enteric infection of whom 56% (14/25) used an antimicrobial agent. In total 5% (15/277) consulted a local physician while abroad, of whom 5 were admitted to hospital; 19% (54/277) had an exacerbation of IBD within two months following travel; 24% (13/54) attributed the onset to the recent travel. The chance of an exacerbation within a 2-month period after travel, using the number of self-reported exacerbations in a 5-year period for reference, was not increased (MH-OR 1.1, 95% CI 0.7-1.8).

**Conclusion:** Pre-travel advice for patients with IBD was often deficient. Although most travel related morbidity was not severe, IBD did cause much inconvenience. Travel was not associated with an increased risk of an exacerbation of IBD.

PO04.07

**Causes of Medical Attention among Travelers with Pre-existing Health Conditions Visiting Havana**

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**Background:** Many people with a variety of pre-existing health conditions travel abroad which can result in complications or exacerbations of them due to factors related to travel, medication and poor diet. Traveling abroad is possible for all people with pre-existing health conditions as long as they are reasonably stable and have obtained approval from their
Contact Lens Safety and Eye Health in Travelers - Risks and Recommendations

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Objectives: To increase awareness among travel medicine consultants about eye health, to determine the frequency of contact lens use in a Boston-area travel clinic, and to educate travelers about eye health and specifically, contact-lens wearers, of potential risks for developing contact lens-associated ocular disease.

Methods: All patients seen for pre-travel advice by a single infectious diseases physician at an academic community hospital in the Boston area over a 20-month time period were prospectively queried about their eye health and contact lens usage. Patient information included age, gender, destination, duration of travel, contact lens wear, type of contact lens, contact lens cleaning solutions and methods, and general awareness about contact lens safety. Any special eye health concerns and relevant recommendations were provided. Soft contact lens users were given specific advice related to eye safety and contact lens care.

Results: Of 1128 travelers seen, 286 were determined to be contact lens wearers (25.9%). Of the contact lens users, 225 (79.7%) were extended wear soft contact lens users, 50 (17.5%) were daily wear soft contact lens users, and 11 (3.8%) were hard contact lens users. A total of 7 patients had LASIK (laser-assisted in situ keratomileusis) surgery. There was a general lack of awareness about fresh and tap water safety among contact lens users traveling to developing countries.

Conclusions: In our travel population, we found the frequency of contact lens use surprisingly high. This may reflect the location of this travel clinic near major universities and an academic eye and ear specialty hospital. The risk of eye infections to travelers is unknown and reports about eye infections remain limited. Soft contact-lens wearers have a 20-fold increase risk of infectious keratitis compared to non-contact lens wearers; this risk most likely increases in warm and humid climates. Optimizing eye hygiene in contact lens wearers and patients who have had recent eye surgery is important in those who live in or travel to the tropics. We encourage providers to counsel about eye health and contact lens safety for travelers going to environments at risk for eye-related infections and other diseases.
PO05 Migrants and Refugees

PO05.01
Analysis of Clinical Contents of Foreign Outpatients in University Hospital
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Background: Development of Korea’s economy and the mass transit system enabled many foreign emigrants to visit. This study takes a look at the records of an university hospital international clinic to analyze the medical conditions of expatriates.

Methods: Records of foreign patients during the period of January 1st, 2006 to July 31st, 2007 from the international clinic and other departments in the Soonchunhyang university hospital were analyzed according to gender, age, nationality, medical department and disease. Cause of visits were classified according to the Korean Standard Classification of Diseases(KSCD) which is based on the ICD-10, and grouped into chapters, blocks and tabular lists.

Results: Of a total of 10,168 cases, 5,030(49.5%) were male and 5,138(50.5%) female. Children(2870, 28.2%) and adult patients(20-50 years-old, 5233, 51.4%) visited the hospital the most. Numbers of countries were 101, with United States numbering 1488 cases (14.6%). Diseases of the respiratory system and factors influencing health status and contact of medical services numbered the most. Blocks of diseases showed that acute respiratory infection(14.6%), vaccination(7.5%), prenatal care(4.5%) and health checkup(3.9%) numbered the most. Case according to departments showed that the international clinic, with 2 family medicine specialists, had the most patients with 6119 cases(60.2%).

Conclusion: Children and adult patient in their 20s to 40s visited the most, with the causes being acute respiratory infection, vaccination and health checkup and family medicine specialists treating the majority. This shows the importance of family medicine doctors in treating foreign patients.

PO05.02
Socio-demographic Characteristics of the Immigrants Entering Hatay Province of Turkey Through Illegal Ways
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¹Çukurova University Faculty of Medicine, Public Health, Adana, Turkey

Objectives: Every year, thousands of immigrants enter our country through illegal ways, from different regions. This study aims at determining the socio-demographic characteristics and health conditions of the immigrants entering Hatay province which is located on the southern border of Turkey.

Methods: When these immigrants are caught by security force, they are first taken to health center for a health check. This study, which was designed as a cross-sectional study, was performed during January 1, 2009- December 31, 2010, on the base of the examinations made in the health centers on these illegal immigrants entering Hatay province. Data was collected from the records of age, gender, arrival date, country of origin, diagnosis made. The data collected was evaluated on SPSS 10 program.

Results: In the last two years, 209 people, including 165 male (79.0%) and 44 female (21.0%), illegally immigrated to Hatay province. The mean age of migrants were 24.3(1-55). Twenty people of them were children under the age of 18. Their distribution according to country of origin is as follows: 71 from Somali, 34 from Syria, 22 from Bangladesh, 16 from Palestine, 10 from Iraq and 10 from Sri Lanka, in total 19 countries. The month with highest prevalence of immigration is July and the one with lowest immigration rate is June. As a result of the health examinations made in the health centers, it was reported that 97.1% was healthy and 2.9% had some sort of health problem.

Conclusions: The study revealed that many immigrants from different age groups, different countries, in each month of a year enter our country illegally. For this reason, it is necessary that health staff and security forces should be trained accordingly.
PO05.03

Level of Knowledge About Breast Cancer of Immigrant Women in Fertile Years Old
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Objective: Breast cancer incidence has increased in recent years. This study was performed to determine level of knowledge about breast cancer of fertile immigrant women in Adana city.

Methods: In this study, district of Adana Havutlu, emigrated from Syria 70 years ago, 15-49 years old randomly selected from among 150 women, between August - October 2010, was carried out. Face-to-face survey including socio-demographic characteristics of women (age, education, smoking status, number of births) and information levels of breast cancer was applied. The collected data were evaluated using SPSS 11.5 statistical programme.

Results: The mean age of 150 woman who participated in the study was 28.5. 46% of women were married. Average number of children who were married was 3.4. 13.4% of women had a history of breast cancer their mother, sister or aunt. 1.7% of them had breast cancer itself. 99.0% of the women had knowledge about breast cancer and this knowledge had reached by TV, the family physician, or specialist doctor. Breast examination was performed by self-examination in 95.3% of the women, by a doctor in 62.7% of women, by breast ultrasound in 27% of women, by mammogram in 9.3% of women. Recommended breast examination had not made due to fear in 27.2% of women, due to not to be considered important in 24% of women. 38% of women had not applied to clinic for screening of breast cancer. 9 out of 19 women with breast cancer in their family were just done the breast control regularly.

Conclusions: Because of our research area was in the city of Adana, women’s education levels were high, income was good, level of knowledge about breast cancer was high, but incidence of control was low. Training by the family physician for elimination of women’s fears, and to explain the importance of early diagnosis was offered.

PO05.04

Imported Infectious Disease by Immigrants in Spain: Results from the Spanish Network on Imported Infectious Diseases by travellers and Immigrants (+Redivi).


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Objectives: In the latest years immigration has significantly increase in Spain, currently representing 12.2% of Spanish population. Almost half of those immigrants are from developing countries. Local series about imported infections, even in specialized centres, often disclosed a partial view while countrywide networks provide a more representative picture. Our objective was to describe imported infections by immigrants based on ad-hoc national network.

Methods: +Redivi is composed by 9 medical centres (primary and hospital care, specialized and non-specialized in tropical medicine) who attend travellers and immigrants throughout different representative regions in Spain. This network shares a common database for data registry and analysis on imported infections. We report on data collected from January 2009- December 2010.

Results: Data were available from 1829 immigrants, who attended +Redivi centers for first time: 50.2% were male with a median age of 31 years (range 24-39) and 6% were immunodepressed mostly due to HIV infection (93.6%). Most frequent countries of origin were Bolivia (38.5%), followed by Equatorial Guinea (9.1%), Ecuador (5.6%) and Senegal (5.1%). Median time elapsed between arrival and medical consultation was 38 weeks (range 11-64). Main reasons for consultation were: health exam in asymptomatic subjects (55.3%), laboratory test alterations (18.1%, mainly eosinophilia), gastrointestinal symptoms (6%) and febrile syndrome (4.7%). Selected final diagnosis are summarized in Table 1.

<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>Nº PATIENTS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eosinophilia</td>
<td>348</td>
<td>23.6</td>
</tr>
</tbody>
</table>


Abstracts – Poster Presentations

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chagas Disease</td>
<td>301</td>
<td>20.4</td>
</tr>
<tr>
<td>Healthy</td>
<td>269</td>
<td>18.2</td>
</tr>
<tr>
<td>Latent/Active Tuberculotic infection</td>
<td>169/31</td>
<td>11.5/2.1</td>
</tr>
<tr>
<td>Strongyloidias</td>
<td>105</td>
<td>7.1</td>
</tr>
<tr>
<td>Giardias</td>
<td>51</td>
<td>3.5</td>
</tr>
<tr>
<td>HIV infection</td>
<td>33</td>
<td>2.2</td>
</tr>
<tr>
<td>Chronic HBV/HCV</td>
<td>32/14</td>
<td>2.2/1</td>
</tr>
<tr>
<td>Malaria (P. falciparum)</td>
<td>18</td>
<td>1.2</td>
</tr>
</tbody>
</table>

[Selected final diagnoses in Immigrants]

More than 1 diagnosis was made in 32.2% cases. In 78.3% of asymptomatic patients an imported disease was detected.

**Conclusions:** Imported infections are common among immigrants in Spain, either geographically restricted (Chagas’ disease) or cosmopolitan infections (Tuberculosis, HIV or HBV infection). Up to one third of immigrants had more than one concurrent diagnosis, which reflects the complexity of these patients. It is advisable to implement standardized protocols for the screening of imported infections in immigrants.

**PO05.05**

**Strongyloides in migrant population in NY**

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**Objectives:** For the past 20 years, there has been a significant increase in the number of migrants from Central and South America settling in Peekskill, NY, a town located 30 miles north of NYC, along the Hudson River. Our community health center is the principal site for many of the migrants in our area to seek health care. This particular population of migrants does not have the benefit of health screening before entering the United States (USA). The objective of this retrospective study was to look at the prevalence of positive strongyloides IgG serology in patients who had been found to have eosinophilia. Additionally, our aim was to raise awareness among the health care providers in this setting concerning this common helminthic infection, that can persist for years, and have potential sequelae, including hyperinfection after immunosuppression.

**Methods:** We reviewed charts of patients whose serology for strongyloides had been submitted to the Division of Parasitic Diseases, Reference Diagnostic Laboratory at the Centers for Disease Control and Prevention. The tests had been submitted after identification through routine complete blood counts (CBC) of eosinophilia. If serologies were IgG positive for strongyloides, patients were treated with Ivermectin. We noted the patients’ countries of origin, age, sex, years in the USA, and degree of eosinophilia before and after treatment with Ivermectin.

**Summary of Results:** Countries of origin of migrants with eosinophilia: Ecuador (22), Guatemala (6), El Salvador (3), Honduras (1), Kenya (3). The average time that patients had been in the USA was 10.5 years. Of 36 patients with eosinophilia, 28 (78%) were IgG positive for strongyloides. After treatment with Ivermectin, all 36 patients had a decrease in the absolute count of eosinophils, with a mean decrease of 9%.

**Conclusions:** Among migrants with identified eosinophilia who had serology tested for strongyloides, the large majority (78%) tested IgG positive. It is important that health care providers who take care of populations from areas of the world endemic for this helminthic infection, in spite of the length of time since immigration, are aware of the possibility of this lifelong infection, which can easily be treated when identified.
PO05.06
Vivax Malaria Outbreak in Eritrean Refugees, Israel, 2010
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Objectives: Malaria, once endemic in Israel, was eradicated almost 50 years ago, although its vectors, several malaria-transmitting species of Anopheles mosquitoes, still exist in various parts of the country. As of the beginning of 2010, there has been an outbreak of relapsing Plasmodium vivax malaria among Eritrean refugees in Israel. An epidemiologic investigation was initiated by the Israel Ministry of Health and its results are hereby presented.

Methods: The case definition was laboratory-confirmed malaria, excluding returning travelers. Among the investigation measures were species identification by thick and thin smears, with confirmation by real-time reverse-transcriptase PCR. Medical records of these patients were obtained from hospitals. Oral interviews were conducted with 4 of them by a native speaker of Tigrinya.

Results: Since the beginning of 2010, 120 patients with malaria, who met the case definition, have been identified nationwide, 111 were males (92.5%). Median age was 23.1 years (interquartile range [IQR], 21.2-28.1 years). This represents a 5.5-fold increase in the incidence rate of non-traveler malaria; the incidence of malaria among migrants entering Israel from the Egyptian border in 2010 (as at October 31, 2010) was 4.82 per 1000 migrants, compared to 0.87 per 1000 migrants during 2009 (Graph).

Complete medical records were available for 27 patients, who were all Eritrean, and had laboratory-confirmed Plasmodium vivax malaria. Of these patients, 16 were found to have had a previous attack of malaria, with 7 having had the previous attack in Sudan, while traveling to Israel, and 4 upon arrival to Israel. There were no data for the remaining patients. The median time interval between the attacks was 4 months (IQR, 2-6 months). A possible place of exposure was found to be the region of the Eritrean refugee camps in eastern Sudan.

Conclusions: The observed increase of human reservoir of malaria in the region may potentiate the risk for the re-emergence of locally acquired mosquito-transmitted malaria in Israel and neighboring countries. This warrants tight national surveillance for new cases, proper clinical management as well as follow-up of current cases, and effective control measures of the local Anopheles vectors. In addition, it highlights the need for increased malaria surveillance in the refugee camps of eastern Sudan.
PO05.07  
Screening for *Trypanosoma cruzi* and other transmissible infections in a cohort of pregnant Latin American women, Madrid, Spain  
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1Ramón y Cajal Hospital, Tropical Medicine-Infectious Diseases, Madrid, Spain, 2Ramón y Cajal Hospital, Gynecology Department, Madrid, Spain, 3La Paz Hospital, Pediatrics Department, Madrid, Spain  

**Objectives:** The number of Latin American female immigrants has grown in recent years in Spain. Currently there are no official national guidelines for screening pregnant women at risk for *T. cruzi* infection.  

**Methods:** Pregnant Latin Americans at the obstetrics out-patient clinics of the Ramón y Cajal Hospital, Madrid, were offered screening for *T. cruzi* infection (ELISA and IFAT) (November 2009-December 2010). Screening for *Treponema pallidum* (RPR), *Toxoplasma gondii*, rubella, HIV, hepatitis B (HBV) and hepatitis C virus (HCV) also performed routinely.  

**Results:** 310 women were offered screening for *T. cruzi*: the majority were from Ecuador (n=157), Peru (n=46), Bolivia (n=36), Colombia (n=32), and Paraguay (n=15), median age 30 years (IQR 26-33yrs). One patient from Bolivia diagnosed with *T. cruzi* infection (1/290, 0.3%) (neonatal screening pending), 12 patients had low reactive titers for either ELISA or IFAT (not confirmed) (20 patients: results not available/NA). For HBV: 282 patients negative (282/294, 95.9%), 11 past infection (11/294, 3.7%) and 1 patient had chronic infection (HBsAg +) (1/294, 0.3%) (16 patients NA). For *T. pallidum*: 290 patients negative RPR (290/292, 99.3%) 2 positive (2/292, 0.7%) (referred for further management) (18 NA). For rubella: 264 IgG+ (264/295, 89.5%), 25 negative (25/295, 8.5%), 6 borderline titers (6/295, 2.0%) (15 results NA). For *Toxoplasma*: 159 IgG+ (159/301, 52.8%), 138 IgG negative (138/301, 45.8%), 4 borderline results (4/301, 1.3%) (9 NA). Only one patient was IgG+ and IgM+ (1/301, 0.3%), strong IgG avidity test (referred). No cases of HIV or HCV infection.  

**Conclusions:** The low frequency of Chagas disease observed may reflect implementation of preventive programs in endemic countries especially as the median age of the cohort is young (30 years). However, screening for Chagas disease should be considered in Latin American pregnant women (especially Bolivians) as cases of vertical transmission may be treated successfully. An important proportion of patients (up to 10%) remain susceptible to rubella (systematic vaccination in some Latin American countries was only introduced in the last few decades). Other cases of transmissible infections were also detected. Screening and vaccination efforts should target risk groups, such as women of child-bearing age, in the immigrant population.  

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PO05.08  
Primary health-care center in post-earthquake Haiti: preliminary data  
Neuberger A.1,2, tenenboim S.1,3, Oshri Z.1, Racheli P.1, Urman M.1,4, Karen H.1,5, Spencer V.1, Katerina G.1, Eli S.1,3,6  
1IsraAID primary healthcare clinic, Leogane, Haiti, 2Rambam Medical Center, Unit of Infectious Diseases, Haifa, Israel, 3The Center for Geographic Medicine and Tropical Diseases, Sheba Medical Center, Ramat Gan, Israel, 4Shaare Zedek Medical Center, Jerusalem, Israel, 5University of Toronto, Department of Family and Community Medicine, Toronto, Canada, 6Tel Hashomer & Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel  

**Objectives:** In 2010 Haiti was devastated by an earthquake, and subsequently hit by a hurricane and a cholera epidemic. Some parts of Haiti were practically left without a functioning public health care system. Herein we report the data from our health center which opened recently in Haiti.  

**Methods:** Primary-care clinics were set up by an Israeli NGO in the town of Leogane, and in the village of Magandou, both situated in the Ouest Province of Haiti. The clinics were supplied with basic primary care equipment, and rapid diagnostic kits for common infectious diseases. Healthcare and medications were provided free of charge. We present data collected during the first 10 weeks after the clinics were set up.  

**Results:** A total of 1638 patients were examined in the clinics. The average age was 27.6±20 years, with 33.2% of the patients under the age of 18, and only 17% older than 60. Females constituted 66.7% of all patients. Infectious diseases were the most common reason for seeking medical advice (572 patients, 34.9%). Of all infections sexually transmitted diseases (STD) were the most common (27.3%). Most patients with STD were female, had recurrent disease, and had not been treated concomitantly with their partners. Other infectious diseases included upper respiratory tract infections (23.1%), malaria (8.4%), and undifferentiated fever (7.9%). Although the clinic opened during the cholera epidemic only three patients had suspected cholera. Gastrointestinal symptoms, obstetric problems, pain syndromes, diabetes and hypertension each accounted for 5% to
15% of total visits.
Comparing the patient profile in the city of Leogane versus the village of Magandou we noted significant differences, including the absence of malaria cases in Magandou, and significantly more cases of STD in Leogane.

**Conclusions:** Infectious diseases represented a major health problem in patients attending our clinic. Implementation of an STD prevention program is necessary, including screening and treatment of sexual partners. The prevalence of malaria among patients with undifferentiated fever in the area of Leogane is high. Efforts in primary-care should also concentrate on follow-up of pregnant women, and on treatment of chronic diseases such as diabetes and hypertension.

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**PO05.09**

**Parasitic diseases imported by immigrants in a tropical diseases reference hospital: 4636 cases.**


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2Hospital Carlos III, Service of Microbiology, Madrid, Spain

**Objective:** The aim of this study is to analyze the spectrum of imported parasitic diseases in immigrants that have been treated at the Tropical Medicine Unit of Hospital Carlos III of Madrid (Spain) during a period of 18 years (1993 -2010).

**Methods:** A retrospective analysis of medical records of immigrants (>15 years old) attended at our hospital was made. Isolated positive serology was not considered diagnostic for malaria nor filariasis. Malaria was diagnosed by microscopy and/or PCR; diagnosis of filariasis was made based on microfilariaemia and/or clinical data. Gnathostomiasis was diagnosed by positive serology and compatible clinical characteristic. The diagnosis of Strongyloidiasis or schistosomiasis was made by parasite visualization and/or positive serology. Chagas disease was considered when PCR and/or two serologic tests were positive. Diagnosis of intestinal parasites was made by demonstration of eggs, larvae or adult parasites in stools.

**Summary of results:** 4636 immigrants were analyzed. Sex female was predominant (60.2%). Mean age (± SD) was 39.65 ± 14.65 (range: 16-93). Continents of origin were Africa (Af) 3768 (82.1%); Central, South America and the Caribbean (CSAC) 805 (17.5%); and Asia (As) 17 (0.4%).

Malaria was reported in 577 cases: 97.57% from Af, 2.07% from CSAC and 0.34% from As (p < 0.001).

All filariasis were acquired in Africa. There were 1262 cases reported in 1007 patients: Mansonella perstans was the most frequent isolated (651), followed by Onchocerca volvulus (410). Loa loa (166), Mansonella streptocerca (32) and Wuchereria bancrofti (2). Intestinal parasitic diseases from Africa or CSAC were as following (cases from Af/ cases from CSAC): Trichuris trichiura 535 cases (532/3. p < 0.001), Ascaris lumbricoides 348 (341 / 7. p < 0.001), Strongyloides stercoralis 162 (75/87. p < 0.001 ), Giardia intestinalis 150 (124/26. p > 0.05), Hookworms 65 (58 / 7. p > 0.05), Entamoeba histolytica vs dispar 403 cases (368/35. p < 0.001). All amebic liver abscess (12 cases) were from Af.

Chagas disease was diagnosed in 199 cases. 70 cases of Hyperreactive malarial splenomegaly syndrome were found, all of them from Africa.

**Conclusions:** Parasitic diseases are common in immigrants. The parasitic etiology may vary considerably depending on the procedence. Malaria is the most frequently diagnosed parasitic disease. Few known parasitic diseases can be difficult to diagnose if patient is not referred to a Tropical Medicine Unit.
PO06 Returning Travelers

PO06.01
Tuberculosis conversion in New Zealand Police personnel deploying overseas: A retrospective review.
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Wellington School of Medicine & Health Sciences University of Otago, General Practice & Primary Health Care, Wellington, New Zealand, The Travel Doctor, Wellington, New Zealand, University of Otago, Wellington, New Zealand

Background: Travellers from a country with low tuberculosis prevalence to one with high tuberculosis prevalence are at risk of tuberculosis infection. Deployment destinations for the New Zealand Police are primarily to moderate and high prevalence countries. Documented tuberculosis conversions during travel have been recorded to occur at a rate of 1.3/1000 volunteer months in Peace Corps Volunteers, 3.5/1000 person months of travel in Dutch travellers (2.9/1000 when health care workers were excluded) and as high as 10% in pilgrims attending the Hajj. This study looks at a unique group of travellers, police men and women deploying overseas. Given the nature of their work and the length of their deployments (average 6 months); they might be expected to be at higher risk of contracting tuberculosis than the “average” traveller.

Objective: To measure the rate of tuberculosis conversion in New Zealand Police (NZP) personnel deploying overseas.

Methods: Routine baseline and post deployment testing for tuberculosis is mandatory for all NZP personnel deploying overseas. A retrospective review of seven years (2003-2010) of testing was conducted. Data was extracted from medical files and collated.

Summary of results: In NZP personnel with baseline negative tuberculosis testing (N= 569) deploying overseas during the study period, 1.76% (95% CI 0.85-3.21) had a documented tuberculosis conversion. (A conversion was defined as either an increase of 10mm or more using the Mantoux tuberculin skin test or a change from a negative to positive Quantiferon TB Gold interferon-gamma assay). The rate of tuberculosis conversion was 2.9/1000 (95% CI 1.48-5.37) person months of deployment. Baseline pre deployment testing uncovered latent tuberculosis in 10.4% (95% CI 8.07-13.08) of those tested.

Conclusions: The rate of tuberculosis conversion in this group of travellers confirms that travel is a risk for tuberculosis infection. It contributes to the knowledge base in this area, allowing us to better quantify this risk in this group and for travellers in general.
The amount of latent tuberculosis uncovered by baseline testing was surprising and has both personal and public health implications. Also, had baseline testing not been done, many of these cases would have been incorrectly assigned as having occurred during the deployment.

PO06.02
Strongyloidiasis Incidence (New Zealand Police International Services Group) - A Three Year Retrospective Review
Campbell B.K., Visser J.T., Narayanan A.
The Travel Doctor, Wellington, New Zealand, Wellington School of Medicine & Health Sciences University of Otago, General Practice and Primary Health Care, Wellington, New Zealand, University of Otago, Dunedin, New Zealand

Objective: To establish the risk to New Zealand Police (NZP) personnel of exposure to Strongyloides stercoralis while on overseas deployments.

Background: Strongyloidiasis, caused by the nematode S. stercoralis has two unique features; a free living state and an auto-infection parasitic phase of a human host. Auto-infection can result in persistent disease for several decades and carries a risk for hyper-infection in immuno-compromised individuals. Since the 1960's NZP personnel have been deploying overseas with a primary focus in the Western and South Pacific. Early in 2007 a number of RAMSI (Regional Assistance Mission to Solomon Islands) personnel presented to in-country medical support services with abdominal symptoms. Policy was then implemented to screen all returning NZP personnel.

Methods: A three year retrospective review (Dec 2007 - Dec 2010) of all NZP personnel who were screened for evidence of S. stercoralis infection was undertaken. All medical files were reviewed, all positive cases analysed and demographic and destination data extracted and collated.
**Results:** 346 NZP personnel returning from overseas deployments were screened. 39 returning staff (11.3%) were found to have evidence of *S. stercoralis* infection based on serological testing. Of these, 21 returned clear positive results (54%) and 18 equivocal results (46%). If positive and equivocal results are combined, NZP personnel have been infected at a rate of 16.7/1000 (11.9-22.8) person months. Those with evidence of infection had deployed to a range of countries; female personnel and personnel deployed to the Solomon Islands represented proportionally more cases, however the numbers were too small to note any statistically significant trends.

**Conclusions:** The positive cases of *S. stercoralis* confirm there is a significant risk for NZP personnel deploying off-shore which appears to justify on-going screening. Results may be an overestimate as it was assumed all NZP personnel were negative pre deployment (New Zealand is a non endemic region for *S. stercoralis*) and no baseline serology was performed. Some however may have been exposed through prior travel to or residence in endemic areas.

**PO06.03**

**Clinical features of imported cases of dengue fever in Japan**

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**Objectives:** Although an estimated 50 million dengue virus (DENV) infections occur annually and approximately 2.5 billion people live in dengue endemic countries, domestic transmission has not been reported in Japan since 1946. Current reports of imported dengue cases have been limited to a relatively small number of cases: 89 in 2007, 104 in 2008, 92 in 2009. The aim of the present study is to identify clinical features of imported dengue cases among Japanese travelers in order to provide useful information to establish diagnosis.

**Methods:** Clinical information was obtained from patients with laboratory-confirmed dengue obtained at the travel clinic of the National Center for Global Health and Medicine (NCGM) during the periods 2005-2010. The NCGM is a hospital with the largest travel clinic in Japan, and is also one site of the GeoSentinel network.

**Results:** Patients were 24 men and 16 women (mean age, 32.9 years). The majority of these patients were infected in Southeast Asia or East Asia, however a few patients were infected in Oceania and South America. The number of patients seems to increase from July through October in accordance with the rainy season of the endemic areas in Southeast Asia. The mean time from onset of fever to the first clinic visit was 4.7 days, and 45% of patients had a skin rash at the time. Major initial clinical manifestations were fever (97.5%; mean duration, 5.7 days), headache (57%), arthralgia (42.5%), and gastrointestinal symptoms such as abdominal pain and diarrhea (7.5%). Laboratory features were thrombocytopenia (platelet count< 100,000/µL) (85%; mean, 69,000), leukopenia (leukocyte count< 3,000/µL) (77.5%; mean, 2,327), and half of the patients presented with liver damage. No cases of severe dengue illness (according to the dengue guidelines in 2009) were reported. The DENV genome was detected in 77.5% of these cases, and both this and NS1 antigen detection was useful methods for early diagnosis of probable cases of DENV infection.

**Conclusions:** It is possible that a substantial number of dengue cases remain undiagnosed, especially in non-endemic areas. Therefore, an initial assessment combining clinical and laboratory features in the patients will help travel health practitioners to accurately diagnose dengue in febrile returned travelers.
PO06.04
Imported Malaria in Auckland, New Zealand
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**Background:** Rates of malaria have fallen in a number of endemic countries recently and a corresponding drop in the number of imported cases has been seen in several developed countries.

**Objectives:** We aimed to describe the current malaria situation in Auckland (population 1.3 million), New Zealand.

**Methods:** A twelve month period of enhanced surveillance involving all hospital and community hematology laboratories in the region was performed. The laboratories were requested to notify the principal investigators or treating infectious diseases physician whenever a case of malaria was diagnosed. Study participants were interviewed. Their New Zealand residency status, travel history, use of anti-malarial chemoprophylaxis, symptoms and treatment were determined. Laboratory data was reviewed.

**Results:** From 1st Oct 2008 to 30th Sep 2009, 36 cases of malaria were diagnosed in Auckland. Consent could not be obtained in 2 cases. Data collected described 34 episodes of malaria diagnosed in 32 patients (24 male, 8 female). One patient was initially diagnosed with *P. falciparum*, and presented 5 months later with *P. vivax*. Another was diagnosed with *P. vivax*, but did not take primaquine and re-presented. Of the 34 episodes of malaria, *P. falciparum* was diagnosed in 18 and *P. vivax* in 16. Of the 32 patients, 11 were New Zealand residents: 3 missionaries/aid workers, 8 had returned to their country of origin to visit friends and relatives (VFRs), 10 were “new migrants” - i.e. people who had recently moved to New Zealand to study or work, and 11 were African refugees. Prophylaxis was taken by 6 of 11 New Zealand resident travelers with poor compliance by all who took it. Quinine and doxycycline or clindamycin was used to treat *P. falciparum* and chloroquine followed by primaquine *P. vivax*.

**Conclusions:** Malaria remains a significant issue in Auckland in the 21st century. Those presenting with it are VFRs, “new migrants” and refugees from endemic regions. No tourist travelers or military personnel presented with malaria during the study period.

PO06.05
Diagnosis of travel-related *Schistosoma haematobium* acquired in the Dogon Valley in Mali
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**Background & Objectives:** The Dogon valley in Mali, is known to be a source of schistosomiasis in travellers. Most travel-related schistosomiasis is diagnosed serologically, without detection of ova. We performed prospective post-travel screening of two cohorts of Belgian travellers to this area with the aim of determining the incidence and clinical characteristics of schistosomiasis in recently exposed tourists.

**Methods:** Two separate groups (9 and 7 persons, respectively) visited the Dogon valley in summer 2010. Both groups had a relative short exposure to fresh water. Serum, urine and stools 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 indirect hemagglutination assay (IHA).

**Results:** In total, 14 of 16 patients (87.5%) of the two screened groups tested positive for a one or more tropical pathogen. In the first group, nine of 9 (100%) persons tested positive for schistosomiasis. All 9 members developed symptoms of which 9/9 with cercarial dermatitis, 5/9 with other skin problems (papules (100%), rash (60%), angio-œdema (20%)) in later stages of the disease, 4/9 with respiratory symptoms, 4/9 with fever, 4/9 with fatigue, 4/9 with gastrointestinal complains, 3/9 with headache and palpitations, 2/9 with micturaltie and 1/9 with terminal hematuria. Diagnosis was made by detection of *Schistosoma haematobium* ova in stools in 7/9 (78%) and/or in urine 2/9 (22%), and by a positive serology by IHA 4/9 (44.5%) and ELISA in 1/9 (11%) after three months. Four more patients (44.5%) seroconverted by IHA after 4 months. Hypereosinophilia was detected in 5 cases. Leucocyturia and hematuria was identified in 6/9 and 5/9 patients, respectively. All 7 members in the second group developed similar symptoms than in the first group. In contrary, *Giardia lamblia*, was the most frequent diagnosis in five patients 5/7 (71%). Only one patient (1/9) had a positive serology for IHA.

**Conclusions:** Clinical aspects and laboratory tests findings of travel-related schistosomiasis are very heterogenous related to the specific disease stage.

We report a cluster of nine cases of *Schistosoma haematobium* in the first group with a high egg detection rate at
In this study, we also want to emphasize the importance of screening for tropical parasitic infections in short-term adventurous travellers to high-risk areas.

**PO06.06**

**Skin disorders among international travelers: a retrospective analysis of 4,158 cases**

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**Background:** More than 10% of travelers returning from international travel and who consult travel health clinics suffer from skin disorders resulting from a wide spectrum of causes.

**Objective:** The present study evaluates the causes and risks for skin disorders among travelers.

**Methods:** Data of 4,158 travelers returning from tropical and non-tropical countries, presenting at the University of Munich, Germany, was analyzed. The analysis included epidemiology of study population, data on travel history (destination, duration and type of travel), causative agents resulting in skin disorders and common skin diseases.

**Results:** The main regions visited were Asia (39.8%), Africa (26.6%) and Latin America (21.1%). Tourism in the form of backpacking (47.2%) and package holidays (23.1%) was the most common purpose of travel. The leading causes that resulted in dermatologic symptoms were of arthropodal (22.6%), bacterial (21.6%), helminthic (11.2%) and protozoal (6.0%) nature. Cutaneous larva migrans (8.0%), mycoses (4.6%), lyme borreliosis (3.4%), scabies (2.9%), cutaneous leishmaniasis (2.8%) and erysipelas (2.1%) were among the most frequently diagnosed defined skin diseases. Subsaharan countries (except Southern Africa) represented the subregions with the highest risk for acquiring a skin disorder.

**Conclusions:** Arthropods and bacteria remain the most common causative agents for skin disorders seen in travelers returning from tropical and non-tropical destinations. Certain tropical diseases such as cutaneous larva migrans, dengue, malaria, filarial disorders and many others show typical risk factors regarding sex, age, and travel history (destination, duration, type of travel).

**PO06.07**

**Travel related health problems - A 6 years study in Tokyo -**

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**Objectives:** In spite of increasing number of international travelers, there are few epidemiologic data on travel related health problems in Japan. We analyzed health problems of travelers who visited to our travel clinic by evaluating medical records retrospectively. The object of this study is to understand epidemiology of travel related health problems and to recommend important contents of travel clinic.

**Methods:** We collected data of travelers with health problems who visited our travel clinic (National Center for Global Health and Medicine, Tokyo, Japan) during the period from January 1 2005 trough December 31 2010.

**Summary of results:** We made 1494 diagnoses for 1465 patients who are included in this study. Male-to-female ratio was 5-4 (815 men and 650 females). Mean age was 33 years (0-90 years). 36.7% of travelers belonged to age group of 20-29 years and 4.9% belonged to age group of over 60 years. Popular destinations were South-east Asia (40.2%) and South Asia (19.5%). Common reasons for travel were tourism (44.3%) and business (24.5%). Common diagnoses was traveler's diarrhea (29.7%), respiratory infection (12.4%), viral infection (8.2%) and animal bite (7.9%). Animal were dog (78.0%), cat (17.8%) and monkey (16.1%). Frequency of Dengue fever was 6.1% and Malaria was 6.0%.

**Conclusion:** Age distribution of travelers with health problems who visited our travel clinic was different from that of overseas aid report from ministry of foreign affairs of Japan. In this report about 30.0% of travelers who visited foreign diplomatic missions for their health problems belonged to age group of over 60 years and about 10.0% belonged to age group of 20-29 years. On the other hand largest group of patients who visited our travel clinic belonged to age group of 20-29 years and age group of over 60 years was small. In Japan, it is not common to visit travel clinic before travel yet. Therefore many travelers do not have enough knowledge about prevention of travel related diseases in general. We think
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one of the important roles of post-travel clinic is to educate patients and recommend visiting pre-travel clinic before their travel.

PO06.08

Fever in returning travelers: a systematic review of incubation periods for the main imported tropical diseases
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Objectives of the review: Fever upon return from the tropics in travelers and migrants is a common problem and remains a diagnostic challenge. The differential diagnosis is wide, symptoms and signs are non-specific, and tropical diseases may be rapidly fatal when not recognized and treated immediately. Diagnostic assessment relies on many factors such as travel destination, clinical parameters, and incubation period among others. Given the importance of the latter to include or exclude a particular diagnosis, the objective of the study was to provide evidence-based information on minimum and maximum (rather than only the average) incubation periods for the main imported tropical diseases.

Methods: Information on incubation periods for the main imported tropical diseases was systematically extracted from 582 articles retained in a systematic review (SR) of the literature (search terms “incubation or day or week or month or year”). Publications in all languages published between 01.01.2001 and 25.05.2010 were extracted from a Medline search using the Medical Subject Headings terms and keywords ‘fever + travel or migrant’ (or derivates) and ‘travel or migrant + name of the disease’. The research strategy was adapted for the Cochrane Database of Systematic Reviews, Embase and Web of Science. For the period from 1966 up to 2000, we used articles on incubation periods identified and published by D’Acremont and colleagues in a previous SR.

Results: From the 582 articles retrieved, 46 included information on incubation periods. After cross-referencing, 10 additional articles were found. 10 articles were added from the previous SR performed by D’Acremont and colleagues. For 34 articles the level of evidence was 4, for the remaining 32 it was 5. When missing information on incubation periods was also extracted from two textbooks (Manson and Mandell). All information on incubation periods is summarized in figure 1.

Discussion: For a particular diagnosis to be considered in the differential diagnosis of imported fever, the time between the shortest and the longest incubation periods ever described for this diagnosis needs to overlap with the time between the minimum and maximum possible incubation periods of the patient’s disease. If there is no overlap, this particular diagnosis can be excluded in this patient.
PO06.09
Travel-related Hepatitis A infection in a Previous Non-responder to the Vaccine
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Objectives: it is common pre-travel practice to screen for natural Hepatitis A (HAV) immunity in VFR travelers, who were born and raised in countries where the infection is endemic. Seroepidemiologic studies suggest that a majority of such travelers should be naturally immune to HAV usually before adulthood. Those found to be Anti-HAV (Total) negative are usually offered a HAV-containing vaccine, which is considered one of the most immunogenic vaccines available. Cases of nonresponse to HAV vaccines are rarely reported. The purpose of this study is to report a case of nonresponse to HAV-containing vaccine following pre-travel screening. Following vaccination, this traveler returned to her country of origin, where she contracted a mild form of Hepatitis A infection.

Methods: A chart review of pre-travel visits, laboratory reports, and post-travel consultations including a detailed exposure assessment was conducted. In addition, the patient's son, who was provided a HAV vaccine for an unrelated trip, was also tested for Anti-HAV (Total) to confirm immunity. Other unrelated clients who received the same HAV-containing vaccine at the same time and from the same lot as the patient, were also tested for Anti-HAV (Total) to rule out vaccine product failure.

Results Summary: The patient was Anti-HAV (Total) negative prior to receiving a full series of HAV-containing vaccine, but subsequently developed a mild form of Hepatitis A infection immediately after returning from a 21-day trip to her country of origin. She became Anti-HAV IgM positive and then Anti-HAV Total (IgM+IgG) positive within the usual 15-50 day incubation period post-travel. Immunity has persisted for at least 2 years following infection without clinical sequelae. Her son developed a normal immune response to his vaccine series, as did two other unrelated clients who received the same vaccine lot in the same time period as the patient.

Conclusions: Any VFR client who is Anti-HAV (Total) negative on pre-travel screening should consider being tested for immunity following the provision of a HAV-containing vaccine to rule out nonresponse. However, the clinical severity of a Hepatitis A infection in a nonresponder may be attenuated by a poor host immune response to the virus.

PO06.10
An Outbreak of Schistosomiasis in an Irish School
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Objective: Investigation and treatment of a group for schistosomiasis following their school trip to Uganda in June 2010

Background: A group of 29 Irish school children travelled to Uganda during June 2010 to take part in a cross-cultural programme. They were divided into 3 groups and during this time many of them (from groups 2 and 3) had fresh water contact on a number of occasions but most particularly at the Hairy Lemon Island Resort, situated close to Kampala, close to the end of their trip. Some from group 1 had only minimal fresh water contact while white water rafting on the Nile and at the Sepi Waterfalls.

A few weeks following their return to Ireland one student from Group 2, who would have had significant fresh water exposure, was seen with reported symptoms suggesting malaria. However on discussion his symptoms included pyrexia, headache, lethargy, myalgia and a very pronounced diffuse urticarial rash covering his torso. His initial blood work up at that time showed an eosinophilia of 19% and no malaria parasites. Blood screening was carried out for schistosomiasis but this proved negative on this occasion.

The patient related that another of his group had been admitted to hospital while abroad in Europe following his return from Uganda with a diagnosis of ´viral liver infection´. Subsequently when this individual was screened in Ireland he was shown to have an eosinophil count of 51% and ova of schistosomiasis in his stool.

Results: Over the next months the total group was regularly screened and assessed for schistosomiasis and the possibility of other illnesses associated with their travels. 29 individuals have presented for screening. Of the 20 serologically confirmed cases, 8 had symptoms suggestive of Katayama fever, 6 were asymptomatic, and the remainder had varying non specific symptoms. Those with confirmed disease have been treated with high dose praziquantel (1200mg bd for 2 days, repeated in one month), which was well tolerated.

Their clinical presentation and response to treatment will be presented.
PO06.11
Clinical and Epidemiological Characteristics of the Fever from the Tropics Cases Hospitalised in a Specialized Unit in a University Hospital.
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Objectives: To describe the cases of fever after a stay in a tropical area hospitalised in the Unit of Infectious and Tropical diseases of Brescia, Italy, since January the 1st 2008 up to December the 31st 2009.

Methods: Retrospective study of all patients hospitalized in the Unit of Infectious and Tropical Diseases of the University Hospital of Brescia, having fever and having travelled in a tropical or subtropical area in the previous six months.

Results: The patients included in the study are 255: 168/255 (66%) are males, 167/255 (65.5%) are foreigners, 119/255 (46.6%) are VFR. The median age is 34.3 yr, 68/255 (26.6%) under the age of 25yr. 52 are the visited countries. The mean of stay is 48.5 days (157.7 for the patients with a final diagnosis of malaria). 51% of patients had fever within 15 days after the return. Most common syndrome were just systemic symptoms (77/255; 30%), gastrointestinal (64/255; 25%), respiratory (46/255; 18%). The median time from the fever onset to contact with health care professionals were 6.3 days (3.09 days for patients who had fever in first 15 days after return, 3.9 for patients who had malaria). The first medical evaluation was made in an A&Es for 162/255 (63.5%) of the patients, by a physician for 54/255 (21.2%) and by an infectivologist for 26/255 (10.2%). Most frequent diagnosis were malaria 100/255 (39.2%), hepatitis (A/B/E) 10/255 (9.8%), tuberculosis (8.3%). The patients there was an etiological diagnosis for were 188/255 (73.7%). In 21% (21/100) of the malaria cases, patients meta n interruption of the care management before the malaria diagnosis was made.

Conclusions: 50% of observed diagnosis were preventable diseases by vaccinations, chemoprophylaxis or hygienic measures. The most at risk group is the VFR whom we should address additional prevention strategies.

PO06.12
Clostridium difficile in returning travelers
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Objective: Clostridium difficile (C. difficile) is an emerging infectious disease. Recently a novel more virulent strain has been identified in North America and an increase in community acquired infections has been reported. Travelers are often given antibiotics to treat travelers’ diarrhea which is usually caused by bacterial pathogens other than C. difficile. Currently there is no literature regarding the epidemiology, clinical presentation or outcome of C. difficile among U.S. travelers. There is one report of chronic diarrhea in four travelers returning to Spain. We hypothesize that C. difficile infection in returning travelers can present as acute or chronic diarrhea, may be underdiagnosed and can have significant delays from presentation to diagnosis. We also postulated that travelers using ciprofloxacin would have a higher risk for acquiring C. difficile

Methods: A retrospective chart review was conducted of the GeoSentinel database for the patients seen at the University of Utah International Travel Clinic between 01/01/2000 to 12/31/2010. Inclusion criteria were age > 18 years, a positive C. difficile assay, and international travel within previous 6 months.

Results: 10 patients met inclusion criteria; 1 of whom was excluded due to illness being related to prolonged hospitalization. 5/9 (67%) patients had antibiotic exposure during travel; ciprofloxacin (2), ciprofloxacin + TMP/SMZ (1), amoxicillin (1), metronidazole (1). The most common presenting symptom was diarrhea (100%) followed by abdominal pain (78%), 5/9 (56%) patients had an acute incubation time of < 16 days. The time from presentation to diagnosis varied from 3-28 days. 4/9 (44%) patients required an ER visit, none were hospitalized and all patients recovered after being treated with either metronidazole or vancomycin.

Conclusion: This data represents the largest series of returning travelers with C. difficile. This highlights that C. difficile infection may be an under recognized pathogen and should be considered in the differential diagnosis of travelers with diarrhea. Ciprofloxacin was the most common antibiotics used in patients with C. difficile. No-one with C. difficile had been taking azithromycin or rifaxamin. This topic could be an important area for further research.
PO06.13
Parasitic Imported Diseases in a tropical diseases reference hospital: 9,303 travelers attended.
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Objective: The aim of this study is to analyze the spectrum of imported parasitic diseases in travelers from tropical areas that have been treated at the Tropical Medicine Unit of Hospital Carlos III of Madrid (Spain) during a period of 18 years (1993 -2010).

Methods: A retrospective analysis of medical records of travellers (> 15 years old) attended at our hospital was made. The etiology and the localization of the illnesses (mainly skin diseases) were reported. The diagnosis was made using either direct methods (microscopy, PCR, biopsy), serological methods, or sometimes based on clinical data (e.g., Calabar swellings).

Summary of results: 9,303 patients were analyzed. Sex distribution was similar (47.2% male, 52.8% female). Mean age (+SD) was 37.41 ± 12 (range: 16-88). Travel destinations were Africa 55.5%; Central, South America and the Caribbean 28.7%, Asia 14.9% and 0.8% other.

Systemic parasitosis: malaria (794 cases), filariasis (128 cases), and Gnathostomiasis (23 cases). It was also found a case of Chagas disease.

Parasitic skin diseases: Cutaneous larva migrans (188 cases), Tunga penetrans (63), scabies (62), myiasis (41) and cutaneous leishmaniasis (15).

Main intestinal and/or urinary parasitosis: Entamoeba histolytica vs dispar 392 cases (14 amebic liver abscess reported), Giardia intestinalis (327), Schistosoma (88), Strongyloides stercoralis (83), Trichuris trichiura (73), Ascaris lumbricoides (64), Cyclospora cayetanensis (44). Other: 88. The main etiologic agent of filariasis was M. perstans (56 cases) followed by Loa loa (44), O. volvulus (19) and W. bancrofti (3). It was also reported mixed parasitization: (M. perstans and Loa in five cases, and M. perstans, Loa loa and O. volvulus in one patient). Malaria and filariasis are more common in Africa, 733 and 126 respectively (p < 0.001).

Conclusions: Parasitic diseases are common in travelers. The parasitic etiology may vary considerably depending on the duration and location of travel. Malaria is the most frequently diagnosed parasitic disease. Few known parasitic diseases can be difficult to diagnose if patient is not referred to a Tropical Medicine Unit.

PO06.14
Health Problems of Spiritual/Heritage Tourists and Christian “Hajji” Pilgrims Upon Returning from the Middle East
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Objectives of the study: We investigated the health status of Greek returnees who sought out spiritual upliftment travel to the Middle East -that is also an increasing tendency worldwide- or traveled to region's sacred destinations within the framework of planned itinerary over Orthodox Easter period in spring 2009.

Methods: On their return, travelers from Athens, Greece who received pretravel consultations before visiting Middle East spiritual/heritage sites or religious places filled out a postravel questionnaire on travel and traveler characteristics and health problems experienced during their trip.

Statistical analysis was made using Fisher’s exact test. A p value less than 0.05 was considered statistically significant.

Summary of the results: A total of 95 travelers (average duration of travel, 9 days) completed postravel questionnaires. Among them, 50 (average age, 46 years) were travelers returning to Greece from spiritual and heritage journey to the Middle Eastern region, while 45 (average age, 57 years) belonged to the Greek Christian “hajji” group. Fourteen (28%) of returnees from Middle East spiritual heritage tour and five (11.1%) Orthodox Christian “hajji” pilgrims complained of health problems (Graph 1).
Cough and colds were found to mostly affect spiritual and heritage tourists in the region (10/50; 20%), while diarrhea was the most common health problem among those who made their Christian “hajj” pilgrimage (4/45; 8.9%). Only 3/95 (3.2%) minor injuries such as sprains were reported.

There was a difference in health state described by the Greek travelers after their trip to spiritual and heritage sites in the Middle East as opposed to those of the Greek Christian “hajji” group (p=0.003).

**Conclusions:** In this study, spiritual and heritage travelers seemed more prone to minor upper respiratory infections acquired in the community, while more “hajjis” encountered traveler’s diarrhea, a food and water borne illness considered to be a major health problem in the Middle East, on their pilgrimage. Our finding corroborate the notion that secular tourists with spiritual needs are more willing to interact with the host community. By remaining within the confines of security, the small Christian “hajji” group appeared less likely to assimilate in the community and disperse microorganisms in contrast to Muslim Hajj pilgrims gathering en masse at Mecca.
PO06.15

Travel-related imported infections in Europe, EuroTravNet 2009

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Objectives of the study: To investigate travel associated morbidity in European travelers in 2009, in comparison to 2008, with a particular emphasis to emerging infectious diseases with potential for introduction in Europe.

Methods: Analysis of electronic medical records from ill returning travelers to 12 core EuroTravNet sites from January 1st to December 31st, 2009, was made using SPSS v16.0®. Proportionate morbidity compares the number of cases of a specific diagnoses or syndrome to all cases of ill returned travelers seen during the same time period. Differences in proportionate morbidity between 2009 and 2008 were tested using Pearson Chi-square or Fisher exact tests. T-tests were used for continuous variables. A p-value < 0.01 was chosen to adjust for the large number of statistical tests performed. The Main Outcome Measures considered were diagnosis with demographic, clinical and travel related predictors of disease.

Results: A total of 6392 patients were seen at EuroTravNet core sites in 2009. VFRs were more represented and more patients were treated as inpatients in 2009 than in 2008. Regions of exposure are reported in figure 1. Compared to 2008, dermatological conditions and respiratory illnesses, in particular pandemic A(H1N1) influenza, flu-like syndromes and tuberculosis, were observed more frequently. Two deaths were recorded, both in Norway. A significant increase in reported dengue cases was observed (n=172, 2.7% versus n=131, 1.90%) (p=0.002). Malaria and Chikungunya cases were also reported more frequently than in the previous year, highlighting the potential risk for introduction of these diseases in Europe where competent vectors are present. Incident Chagas infection was reported less often than in 2008.

Conclusions: Our study is a large study of travel related illness in Europe in 2009 compared to 2008. A significant increase in vector-borne diseases was observed. Travellers' deaths are probably underestimated. The possible role of the travelers in the emergence of infectious diseases of public health concern, especially for respiratory and vector-borne diseases, is highlighted.
A 54-year-old woman presented in July 2009 with a history of two weeks of chills and fever up to 40°C, with no further complaints reported. Because of her job, she had traveled, in March 2009, to Indonesia (Bali, Sulawesi and Papua) taking atovaquone-proguanil for malaria chemoprophylaxis. On a recent trip to the USA in June, she had visited Boston, the Niagara Falls area, and Cape Cod. We saw a moderately ill, febrile lady. Except for an erythematous skin lesion of five cm diameter on her right shoulder, no physical abnormality was detected.

Initial laboratory tests yielded an ESR of 52 mm, haemoglobin - 7.4 mmol/L, WBC - 5.3 x 10⁹/L with atypical lymphocytes, thrombocytes - 135 x10⁹/L and CRP - 146 mg/l. Liver enzymes were elevated (ASAT 118 U/L, ALAT 183U/L, AF 314 U/L, GGT 165 U/L, LDH 516 U/L). Bilirubin and creatinin were within the normal range. All other tests including CXR, urinalysis, ECG and Coombs-test were normal.

Because of earlier visits to tropical areas malaria was to be excluded. Scanty parasites were observed by quantitative buffy coat fluorescence microscopy, Giemsa-stained thick, and thin blood smears, morphologically resembling Babesia spp., but malaria could initially not be excluded. The next day, the initial skin lesion had developed into a classic erythema migrans. A repeated thin smear demonstrated Babesia spp. A multiplex RT-PCR for malaria proved positive using a generic probe, but species-specific probes remained negative. Sequence analysis of the PCR amplicon showed identity to 18S rDNA sequences of Babesia microti, suggesting cross reaction with the plasmodial primer/probe set. The diagnosis was confirmed by amplification and sequence analysis of a 238 nucleotide sequence of the same target using Babesia-specific primers.

A biopsy of the skin lesion was taken for Borrelia culture and PCR, and a serum sample for serological tests. The biopsy was positive for Borrelia burgdorferi by culture and PCR. Serological tests proved positive for Babesia and Borrelia.

Treatment was initiated with atovaquone and azithromycin with good result. Both infections were confirmed by amplification and sequence analysis of the PCR amplicon showed identity to 18S rDNA sequences of Babesia microti, suggesting cross reaction with the plasmodial primer/probe set. The diagnosis was confirmed by amplification and sequence analysis of a 238 nucleotide sequence of the same target using Babesia-specific primers.

A biopsy of the skin lesion was taken for Borrelia culture and PCR, and a serum sample for serological tests. The biopsy was positive for Borrelia burgdorferi by culture and PCR. Serological tests proved positive for Babesia and Borrelia.

Treatment was initiated with atovaquone and azithromycin with good result. Both infections were possibly acquired by one bite from Ixodes scapularis. Finding borreliosis and babesiosis concomitantly in acutely ill patients is only infrequently described in the literature.

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PO06.17
Tuberculin Skin Test Conversion Rate among Short Term Health Care Workers Returning from Gaborone, Botswana

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**Background:** International travel by health care workers (HCWs) traveling from low incidence countries to areas of the world where tuberculosis (TB) is highly endemic places the HCW at an increased risk of acquiring TB. This increased risk has not been well quantified. The present study was designed to calculate this risk in short term HCWs performing clinical tasks in Botswana, a Sub-Saharan country where TB is highly endemic.

**Objectives:** To determine the tuberculin skin test (TST) conversion rate of HCWs with previously negative TST traveling to and working in a health care setting in Gaborone, Botswana, an area where TB is endemic.

**Methods:** We performed cross-sectional survey among HCWs affiliated with the University of Pennsylvania School of Medicine who participated in patient care in Botswana between July 1st 2004 and June 30th 2009. We recruited individuals after returning from Botswana who had a documented negative TST in the year prior to travel, who spent at least 2 weeks but not more than 1 year and who had a documented TST 2 to 3 months post travel. The main study outcome was a positive TST 6-12 weeks after returning from Botswana, defined by an area of at least 10 mm induration 48 to 72 hours after placement of the TST

**Results:** Among the 96 subjects who participated in the study there were 4 individuals with TST conversions. The rate of...
TST conversion in our study population was 4.2% for the entire group studied, or 6.87 per 1000 person weeks (95% CI, 1.87-17.60).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Overall (n=95)</th>
<th>Negative TST (n=91)</th>
<th>Positive TST (n=4)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean+/-.SD</td>
<td>30+/-.6</td>
<td>30+/-.6</td>
<td>27+/-.3</td>
<td>.188</td>
</tr>
<tr>
<td>Sex: Male/ Female</td>
<td>39(41%)/ 56(59%)</td>
<td>37(41%)/ 54(59%)</td>
<td>2(50%)/ 2(50%)</td>
<td>.710</td>
</tr>
<tr>
<td>Status: Student/Resident-Fellow/Faculty</td>
<td>57(60%)/ 31(33%)/7(7%)</td>
<td>54(59%)/ 30(33%)/7(8%)</td>
<td>3(75%)/ 1(25%)/0</td>
<td></td>
</tr>
<tr>
<td>Duration of stay in Botswana (days)</td>
<td>43+/-.25</td>
<td>41+/-.19</td>
<td>95+/-.69</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Duration of time in inpatient medical setting (days)</td>
<td>28+/-.17</td>
<td>26+/-.7</td>
<td>77+/-.68</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Use of respiratory protection (N95 mask) (% yes)</td>
<td>49(52%)</td>
<td>48(53%)</td>
<td>1(25%)</td>
<td>.277</td>
</tr>
</tbody>
</table>

[Baseline demographic characteristics of subjects]

Conclusions: We documented high rates of TST conversion among HCWs with short-term travel to a region where TB is endemic. The TST conversion rates are higher than reported conversion rates for those not working in a healthcare setting. This study gives some approximation of the risk of acquiring tuberculosis for health care workers on short term assignments to developing countries.

PO06.18

Imported cutaneous leishmaniasis in travellers (1981-2009) Experience in Argentina
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Introduction: Cutaneous leishmaniasis (CL) is primarily a disease of tropical and subtropical areas of the Old World (OWCL) and New World (NWCL). The worldwide increase in cases of CL is attributed to changes in vector habitat, secondary to deforestation, urbanization, migration and civil conflicts. CL is also a common dermatosis in travellers returning from the tropics.

Materials and methods: A retrospective, cross-sectional and descriptive analysis was performed based on medical records of travellers with clinical, parasitological and epidemiological diagnosis of imported cutaneous leishmaniasis assisted from 1981 to 2009.

Results: 760 international returning travellers were assisted. Dermatosis were the main reason for consultation (N=298, 39.21%) and CL was the third diagnosis in frequency (10.73%).

32 cases of CL were recorded, 24 (75%) males with age ranged from 20 to 62 years. 22 (68.75%) patients were residents of Argentina and 10 (31.25%) were foreigners in transit.

All patients except one acquired the disease in America. The reason for travel was tourism in 18 (56.25%), work in 12 (37.5%) and to visit family and relatives (VFR) in 2 (6.25%).

NWCL was acquired in: Bolivia, 13 (40.62%) cases; Peru 7 (21.87%); Brazil 3 (9.37%), Costa Rica, Ecuador and Paraguay 2 (6.25%), respectively, Panama and Guyana French 1 each (3.12%). OWCL was acquired in Angola. Estimated average time of exposure in risk area was 20 days.

23 patients (71.87%) had single lesions. 87.5% were ulcers and 78.12% of the lesions were located in extremities.

The diagnosis was made by direct microscopic examination of skin scraping in 24 (75%), and in 8 (25%) by biopsy. No species identification was made.

31 travellers received treatment; 29 (93.54%) received meglumine antimoniate as first treatment schedule, 90.62% of them cured.
Discussion: In the last years there is an increase in imported cases of CL attributable to the growing international tourism in highly endemic regions. CL is often misdiagnosed initially, but diagnosis can be made at least in 75% of patients using skin scrapings of lesions. CL is a threat for travellers to Latin America, specially the “hot areas” (Bolivia, Peru, Brazil, Costa Rica) and should be considered in all patients presenting with slow-to-heal ulcers.

PO06.19

Cutaneous leishmaniasis in local and international travelers in Peru
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Universidad Peruana Cayetano Heredia, Medicine, Lima, Peru

Objectives of the study: The aim of the present study was to describe the clinical and demographic characteristics of cutaneous leishmaniasis (CL) in local and international travelers who sought treatment in Leishmaniasis Center at the Institute of Tropical Medicine Alexander von Humboldt (IMTAvH), of the Universidad Peruana Cayetano Heredia (UPCH).

Methods: We retrospectively evaluated the medical records of 64 patients diagnosed with cutaneous leishmaniasis (CL) and treated in the Leishmaniasis Center in IMTAvH / UPCH from 2008 to 2010. We included only patients exposed to leishmania during their travels.

Results: The mean age was 36.34 +/- 23 years, 39 (89%) were males, 57 (89%) were workers and businessmen and only 12 (19%) were tourists. Thirty seven patients come from Lima (capital) and 8 from Loreto (jungle), the place of exposure were Madre de Dios in 13 (20%) and Loreto in 11 (17%) patients. Only two were international travelers (from Colombia and England) and two were Peruvians who traveled to Morocco. Fifty two patients had a time of exposure of more than six months. Nineteen (30%) had a positive past medical history and five patients had prior episode of cutaneous leishmaniasis. Forty nine patients presented only one lesion (77%), and 59 (92%) presented with an ulcer. Fifty three patients (83%) developed selvatic CL, five (8%) andine CL and two (3%) Lesihmaniais major. In twenty eight of thirty patients the diagnosis was made by leishmanina test, 36 of 52 by a direct test, 23 of 34 by culture and 23 of 25 by PCR. The most frequent occupations were petroleum and gas in 21 patients, wood industry in three patients and research in five patients.

Conclusion: Amazonic LC was the most common presentation in our travelers and a single ulcer was the most frequent sign. CL is an exposure related disease; our data suggests that proper advice about insect bite prevention should be provided to people who travel to CL endemic places.
PO07.01
Cerebral Spinal Fluid (CSF) lactate (using a hand-held monitor) as a tool in the diagnosis of meningitis in patients admitted with clinical suspicion of meningitis on the medical ward in Mbarara Regional Referral Hospital.

Majwala A, Moore C.C, Muzoora C, Wilson T

Background: In many facilities in sub-Saharan Africa, there is a delay in the management of bacterial meningitis due to lack of human and diagnostic resources. Furthermore, the clinical and laboratory features between septic and aseptic meningitis overlap creating a diagnostic challenge.

Objectives: I studied the ability of CSF lactate obtained by a handheld lactate monitor to diagnose bacterial meningitis in patients admitted with suspicion of meningitis to Mbarara Regional Referral hospital, Southwestern Uganda.

Methods: During a period of 7 months, 145 patients with clinically suspected meningitis were enrolled. Demographics, presenting symptoms, history of antibiotic use, past medical history, and HIV serostatus data, were recorded. Each patient received a physical examination which included an assessment of vital signs and a thorough neurological examination. Blood and CSF samples were obtained for laboratory analysis. The ability of CSF lactate to diagnose bacterial, cryptococcal, and tuberculous meningitis was assessed by the creation of receiver operating characteristic (ROC) curves.

Results: A CSF lactate concentration of ≥ 7.7mmol/L provided 94% sensitivity and 90% specificity for the diagnosis of bacterial meningitis [AUROC = 0.95, 95% CI (0.9-1.0), p < 0.001]. The same value provided 100% sensitivity and 88% specificity for the diagnosis of culture positive bacterial meningitis [AUROC = 0.96, 95% CI (0.91-1.0), p < 0.001]. CSF lactate was not helpful in the diagnosis of cryptococcal meningitis [AUROC = 0.48, 95% CI (0.39-0.58), p = 0.73]. As the CSF lactate values increased, the likelihood of a tuberculous meningitis diagnosis decreased [AUROC = 0.338, 95% CI (0.24-0.44), p = 0.005]. CSF lactate had a better AUROC and diagnostic accuracy than microscopy for culture positive bacterial meningitis [Difference in AUROCs = 0.15, 95% CI (0.026-0.26); p = 0.017]. Cryptococcal (24.1%) and tuberculous meningitis (22.1%) were the most common causes of meningitis, whereas bacterial meningitis accounted for 11.7%. Streptococcus pneumoniae (29.4%) was the most frequent cause of culture positive bacterial meningitis.

Conclusion: A CSF lactate concentration of ≥ 7.7mmol/L differentiated bacterial meningitis from other causes of meningitis with high sensitivity and specificity in a quick and easily obtainable manner. Use of Point-Of Care CSF lactate testing may improve management of patients with suspected meningitis where laboratory infrastructure is limited.

PO07.02
An epidemiological study of cutaneous leishmaniasis in the province of Osmaniye, Turkey, between 2008 and 2009

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We Aimed to determine the status of cases of Cutaneous leishmaniasis (CL) is an infectious disease caused by the leishmania in Osmaniye

This research is a descriptive epidemiological project which was conducted between 2008 and 2009 in the province of Osmaniye, Turkey, under the auspices of the Health Ministry's 'Infectious diseases Monitoring Program', and was designed to study the locations of cases, persons affected and seasonal variations in the incidence of CL within the region. The results of the study were obtained from figures compiled by the Osmaniye Health Authority. For many years the morbidity rate of CL has been increasing, and in the province of Osmaniye it has become an important social disease. In 2008, 221 cases of CL were identified, whilst in 2009, 409 cases were reported. When the location of these cases was studied, 59 cases (9.37%) were in the city of Osmaniye and 571 cases (90.63%) were in small towns within the province. According to the years of the study, the morbidity rates were identified as 4.76 cases per ten thousand in 2008 and 8.67 cases per ten thousand in 2009. During these two years, the highest number of cases, 270 (42.86 %), were children between 0 and 14 years old (p < 0.05). During the same period, 129 cases (20.48%) were aged 15-29, 87 cases (13.81%) were aged 30-44, and 144 cases (22.86%) were aged 45 or above. In terms of gender, the cases were divided into 316 (50.16%) males and 314 (%49.84) females; therefore it was established that there was no statistically significant
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difference in infection rates between genders. (p > 0.05)
Dividing up the 409 cases detected in 2009 according to the seasons, no cases occurred in the autumn. The next least number of cases occurred in the winter (31 cases or 7.58%), followed by the summer (164 or 40.10%). The highest frequency was in the spring (214 cases or 52.32%).
In conclusion, cutaneous leishmaniasis is endemic in the province of Osmaniye. This disease affects all age groups and both genders, and special measures are needed to bring it under control. Modern transportation means that this disease needs to be controlled effectively as it is able to spread rapidly from rural areas to towns and cities. The public needs to be educated in individual preventative measures. If rapid diagnosis and treatment is made more available in the region, the spread of the disease will be slowed.

PO07.03
Evaluation of measures used to prevent respiratory illness among US Travelers to the 2009 Hajj in Mecca
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7Ministry of Health, Kingdom of Saudi Arabia, Riyadh, Saudi Arabia,
8Centers for Disease Control and Prevention, Division of Global Migration and Quarantine, Detroit, United States

Introduction: Every year, millions of Muslims, including thousands of Muslim Americans, make the Hajj pilgrimage to Saudi Arabia. Mass travel events such as Hajj present unique public health and infection control challenges.
Objectives: This study evaluated infection control practices related to communicable respiratory disease prevention during and after the 2009 Hajj.
Methods: US residents from Minnesota and Michigan completed anonymous surveys before and after travel to the 2009 Hajj. Surveys assessed demographics, knowledge, attitudes and practices (KAP) about H1N1 influenza, use of recommended protective behaviors during Hajj, and Hajj-associated illness. Respiratory illness was defined as illness that included at least one of the following: coughing, sneezing, congestion, sore throat, breathing problems, bronchitis or pneumonia. Chi-square tests, Pearson correlations and ANOVAs were used to compare proportions.
Results: Pre-travel surveys were completed by 221 participants; 186 (84%) also completed post-travel surveys. Analyses were conducted on the 186 pilgrims who completed pre- and post-travel surveys. Respiratory illness was reported by 32 (17%) pilgrims during Hajj, and 53 (29%) reported respiratory illness after their return. The most common signs and symptoms were cough, fever, sneezing, sore throat, and fatigue. When asked whether they engaged in protective behaviors during Hajj, 144 (78.7%) pilgrims responded that they engaged in one or more behaviors including: hand hygiene (washing hands often) (86%, n=125), wearing a face mask (63%, n=91), cough etiquette (covering coughs and sneezes) (59%, n=86), social distancing (staying away from sick people) (44%, n=64), and contact avoidance (not touching objects touched by sick people) (31%, n=45). Pilgrims who reported illness during Hajj reported practicing fewer protective measures than those who did not report illness (m = 3.0 vs. 2.6 behaviors; F = 3.818, p=.012), shorter duration of illness during Hajj (Pearson r²=-.329, p=.125), and shorter duration of post-Hajj illness (Pearson r²=-.311, p=.073).
Conclusion: To our knowledge, this is the first prospective cohort study of US Hajj pilgrims. The results indicate that protective behaviors currently recommended by CDC for community mitigation of influenza might be effective at mitigating respiratory illness during extremely large and densely crowded mass gatherings such as Hajj.
PO07.04
The Incidence of Upper Respiratory Tract Infections and Influenza-like illness amongst South African Hajj Pilgrims in 2010
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1SASTM (South African Society of Travel Medicine), Johannesburg, South Africa, 2University of Cape Town, Medicine, Cape Town, South Africa

Objectives: Upper respiratory tract infection (URTI) is the commonest medical presentation at the Hajj. Prior and subsequent to 2009, influenza vaccination was on the list of recommended vaccines, but was mandatory for 2009 during the H1N1 pandemic. The H1N1 strain was not present in the southern hemisphere vaccine for 2009, but was in 2010. Our objective was to compare the proportion of URTI in a group of South African (SA) pilgrims attending the 2010 Hajj with previous years, and the proportion of influenza-like illness (ILI) in 2009 and 2010 bearing in mind the change in influenza vaccine recommendations.

Methods: The principal investigator accompanied a group of 800 SA pilgrims, similar in number to preceding years. There were 999 consultations between 26th October & 19th November 2010. URTI was recorded when coryza, pharyngitis, and other ENT conditions with mild constitutional symptoms were reported. ILI, as per 2009 CDC and Saudi pandemic case definition, was defined as pyrexia of >38.0°C PLUS sore throat and/or cough.

Results: URTI accounted for 54.9% (2005), 61.0% (2006), 52.4% (2008) 45.2% (2009) and 46.8% (2010) of presentations for the respective years. Of the 735 pilgrims who responded, 318 (43.3%) received influenza vaccine in 2010. The remaining 417 (56.7%) cited unavailability of influenza vaccine in South Africa. There were 79/735 cases of ILI (10.7%) in 2010, 54/417 (12.9%) in the unvaccinated group and 25/318 (7.9%) in the vaccinated group. Attributable risk of contracting ILI if unvaccinated was 39.9%. Odds ratio for contracting ILI if unvaccinated was 1.74 (95% CI 1.06-2.87, p value=0.04). In comparison, only 43/1085 (3.9%) ILI cases occurred in 2009.

Conclusions: URTI proportions did not differ significantly between 2009 and 2010 in South African Hajj pilgrims, yet the proportion of ILI cases was significantly higher in 2010 when the influenza vaccine was not mandatory. Vaccination seemed to confer some benefit against ILI in 2010. A limitation of the study was that pathogens were not laboratory identified, limiting inference of the benefits of vaccination. Larger studies are required to assess whether mandatory influenza vaccination may protect pilgrims from ILI in future seasons.

PO07.05
Hand hygiene - gaps in knowledge and practice among medical students of a developing country, Pakistan.
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Objective: This study evaluated the medical students’ knowledge of hand-hygiene (HH), compliance perceived of themselves and other health workers, and their source of information.

Methods: This cross-sectional, self-administered, questionnaire-based study was conducted at Dow Medical College and Sindh Medical College, Pakistan, during the period of June’10 to Sept’10. Medical students from the clinical years were included. The questionnaire consisted of MCQs, grading-scales and true-false statements based on World Health Organizations’ (WHO) guidelines. Descriptive biostatistics was applied.

Results: Out of 662 students, 78.1% were females and 21.9% males. A few students (15.7%) knew the correct indication for alcohol-based-rubs and 42.9% knew when to use antimicrobial-soap. Most of the students (61.8%) knew the definition of HH. Majority (55%) did not HH between two procedures on the same patient. Only 45.6% did HH before wearing gloves and 60.6% after removing them. Many (68%) considered HH after touching an intact skin. For the rest of the indications, more than 70% agreed to HH. Regarding the source of information, 48% thought that they learnt HH by themselves and 46.2 learnt from the formal education. Some students (27.64%) claimed to have read the WHO’s guidelines and of those, 42.1% believed that they practice it. Generally, 80% of the students agreed on its significance but insisted on simplification.

Conclusion: Our study depicted an alarmingly low awareness and compliance about HH among the medical students; hence, it needs to be emphasized from the very beginning of their academic life.
PO07.06
Parasitic infections among Romanian institutionalized children and their medical staff
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Background: Intestinal parasitic infections are characterized by high prevalence and a variety of clinical manifestation, especially frequent in institutionalized children.
Objectives: The aim of the present study was to evaluate the prevalence of digestive parasitosis in a Romanian Pediatric Care Unit. We have also followed the clinical symptoms for the patients with parasitosis.
Methods: Complete physical and stool examinations were performed. Stool examinations were performed using the iodine staining for the identification of protozoan cysts and the Willis-Hung method for the identification of helminth eggs.
Results: We investigated 147 institutionalized children aged 2 to 10 years. Parasitic infections were determined in 25 cases (17%). Giardia lamblia (16.3%), Blastocytis hominis (3.4%), Entamoeba coli (0.7%) and Enterobius vermicularis (2.7%) were diagnosed. We have determined associations of two (28%) and more than two parasites (4%) in children. We have also evaluated 46 adults, members of the medical staff, working in this unit. Parasitic infections were diagnosed in 15 cases (32.6%). Giardia lamblia (26.1%), Blastocytis hominis (6.5%), Entamoeba coli (4.3%) and Enterobius vermicularis (2.2%) were identified in adults. Association of two parasites was observed in 20% of the positive cases among the medical staff. Clinical examinations were conducted to investigate the presence of symptoms in patients with parasitic infections. Respiratory infections (72%), weight loss (48%), nervous disorders (32%), diarrhoea (36%) and cutaneous manifestations (16%) were the most frequent symptoms in children. Abdominal pain (26.6%), diarrhoea (20%) and weight loss (13.3%) were observed in adults.
Conclusions: Parasitic diseases were diagnosed in children and their medical staff. Clinical signs and association of parasites were noted in both groups.

PO07.07
Trends in antimalarial prescriptions in Australia 2005-2008
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Background: Malaria continues to represent a significant risk for some travelers and malaria chemoprophylaxis has remained an important countermeasure for travel health prescribers. The aim of this study was to investigate the trends in prescription of antimalarial drugs, particularly those recommended for chemoprophylaxis in Australia, from 2005-2008.
Methods: In 2010, data were extracted from the online Australian Statistics on Medicines reports published by the Pharmaceutical Benefits Advisory Committee, Drug Utilization Committee, on antimalarials used in Australia for the period 2005-2008.
Results: Among the drugs solely used as antimalarial drugs from 2005-2008, atovaquone plus proguanil and mefloquine were the most commonly prescribed antimalarials. Mefloquine prescriptions have increased by 38%. The numbers of prescriptions for atovaquone plus proguanil have nearly trebled during the period. Proguanil alone was no longer reported to be prescribed. The diaminopyrimidines, pyrimethamine-containing antimalarials, have also all but disappeared. Prescriptions for chloroquine have reduced by 66%. Artemether plus lumefantrine combination has been used in relatively small quantities, but no data was reported for 2007-2008. Quinine prescriptions have reduced by 63%. Although a considerable quantity of doxycycline was prescribed, it was unknown how much was prescribed for malaria chemoprophylaxis.
Conclusions: Apart from the possible use of doxycycline, the most commonly prescribed antimalarials have been atovaquone plus proguanil and mefloquine, which have both increased during 2005-2008. The prescription of chloroquine has continued to decrease. Pyrimethamine plus sulfadoxine and proguanil alone are no longer recorded. The prescriptions of quinine may be becoming displaced by newer antimalarial drugs for treatment, but this needs further investigation. Trends in antimalarial use may be influenced by a number of factors, including the availability of antimalarials, increasing resistance, the issuing of updated guidelines for malaria chemoprophylaxis, and continuing education.
PO07.08
Leishmaniasis due to *Leishmania aethiopica* treated with liposomal amphothericin B in a traveler returning from Eritrea
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Cutaneous leishmaniasis (CL) due to *Leishmania aethiopica* is rarely encountered outside endemic areas and clinical trials evaluating its pharmacotherapy are missing. Under resource limited conditions antiparasitic treatment of *L. aethiopica* infection relies largely on pentavalent antimonials. Treatment failure, however, is frequent and their systemic application potentially harmful. Evidence for the efficacy of less adverse chemotherapeutics is needed. We describe the treatment of cutaneous leishmaniasis due to *L. aethiopica* using liposomal amphothericin B (LAmB) in an immunocompromised traveler returning from Eritrea. This is the first description of the treatment of CL due to *L. aethiopica* using LAmB and the first report of its treatment outside endemic regions at all.

PO07.09
Clinical syndrome, stage, and therapy in a cohort of travel-related *Schistosoma haematobium* acquired in the Dogon Valley in Mali.
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**Objectives:** Among a cohort with confirmed recent *Schistosoma haematobium* infection, we aimed to classify patients by specific clinical syndromes and stages, and evaluate response to an uniform treatment regimen.

**Methods:** A prospective post-travel screening study of a group of 9 Belgian travellers who visited the Dogon Valley in Mali in summer 2010. All, symptomatic and asymptomatic, patients were treated with praziquantel 2400 mg and methylprednisolone 32 mg a day during three days. They were retreated after six weeks with an additional single dose of praziquantel and corticosteroids.

**Results:** Nine of 9 patients were diagnosed with *Schistosoma haematobium* infection. Based on detection of ova in stool 7/9 (78%) or urine 2/9 (22%), and on a positive serology by indirect hemagglutination assay in 4/9 (88,5%) and enzyme linked immunosorbent assay 1/9 (11%). Elevated absolute eosinophilia was detected in 8/9 cases. Leucocyturia and hematuria was detected in 6/9 (66,5%) and in 5/9 (55,5%), respectively. Six of the 9 patients were symptomatic at the first consultation. We identified five cases (55,5%) of acute Katayama syndrome with a heterogenous clinical spectrum, one of whom with bladder involvement: all were negative for *Schistosoma* eggs in the urine, and 3/5 had ova in stool. One patient (11%) with only urinary symptoms (micturalgia and terminal hematuria) was staged as urinary schistosomiasis and had egg positivity in stools and urine. The remaining 3/9 patients (33,5%) were completly asymptomatic but had egg excretion in stool and, for 1 in these 3 in urine. They were also staged as urinary schistosomiasis. One month after a first 3-day treatment course, all patients with ova in stool or urine were ova-negative. One stool-positive patient, who received initial treatment two months after exposure, later yielded *Schistosoma haematobium* ova in urine and developed new hematuria. Only 2/8 cases presenting with elevated absolute eosinophilia remained so far after initial treatment. One seropositive patient reverted to seronegative. Dizziness for one day was the most frequent adverse effect.

**Conclusions:** The treatment of the nine cases of *Schistosoma haematobium* was successful in 89% after a first evaluation of ova excretion one month after a three day course of high dose of praziquantel and concomitant corticosteroids. Further follow-up screenings after the fourth treatment day are planned in the near future.
PO07.10
Melioidosis an Emerging Infectious Disease in India
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Background: Melioidosis is a severe community acquired infection caused by the Gram-negative bacillus Burkholderia pseudomallei. It is endemic in northern part of Thailand and Australia and has been reported sporadically elsewhere. Until 1990, 2 or 3 cases of melioidosis in returning travelers from India have been reported. But in recent years several cases of melioidosis has been increasingly reported from different parts of India. Here we are reporting the clinical and epidemiological profile of 27 culture proven cases of melioidosis from India.

Methods: 27 culture-proven cases of melioidosis were reported from Chennai, India during the period 2005 to 2010. We analyzed the cases with the respect to the following factors- demographic data, clinical presentation, duration of the illness, underlying risk factors and the final outcome of the disease.

Results: Age of the study group was varied from 4 years to 60 years with the mean age of 41.70 years. 22 patients were male, 4 were female and one was child. Predominant risk factors for melioidosis in the study group was residence in the rural areas (81.48%), diabetes (55.55%) followed by alcoholism (22.22%). In 60.86% of the patients the duration of the symptoms was more than 2 months before the diagnosis was considered. More than half of the cases (55.55%) presented as disseminated melioidosis than local disease. With proper antibiotic treatment, melioidosis was cured in (74.07%) cases.

Conclusion: Disseminated disease was the common presentation of melioidosis in India. Melioidosis had good prognosis, even when the diagnosis was delayed by 2 months. Adults, male sex, residence in the rural areas, diabetes and alcohol consumption were the predominate risk factors for the diagnosis of melioidosis in India.

PO07.11
Origins of Travel Medicine in an Exhibition on Old and New Epidemics
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Travel Medicine is a discipline that deals with promotion and protection of the health of international travellers, and over the last 20 to 30 years it has grown greatly in importance, given the enormous increase in the international mobility of persons and goods. As a discipline, however, Travel Medicine has its roots in the distant past, when single states adopted public health measures such as lazarettos, health blockades, the suspension of fairs and markets and the disinfection of letters to combat the threat of epidemic diseases. For many centuries, ports were the main point of entrance for epidemics and ports were therefore for many years provided with facilities like lazarettos, used for the isolation of the sick or of suspected disease carriers.

Human history has been frequently marked by epidemics. Some of them such as plague, smallpox, syphilis, cholera, tuberculosis, and the 1918-19 pandemic influenza have changed the history of mankind for their demographic, economic and social consequences. References to epidemics can be found in literature, art and throughout recorded history. Besides provoking anguish, fear, irrational feelings and behaviours, great epidemics originated important questions on man’s destiny and his ability to control it. Alongside irresponsible or unreasonable feelings and moral, social and institutional decay, epidemic diseases improved medical practice and encouraged researchers to seek treatments to stop the spreading of infections.

To explain the history of the main epidemic infectious diseases, an Exhibition on Old and New Epidemics has been created. It consists in 85 posters and a display of objects evoking humankind's struggle against epidemics. The Exhibition has been showed since 2009 in Ancona at the ancient Lazzaretto, in Rome at the main Hospitals, in Bologna at the Archiginnasio (the first University created in the world), in Modena and in Forlì. Colleagues are invited to contribute posters regarding epidemics both past and present in their countries of origin. The resulting exhibition will be itinerant, touring various countries in the world from 2011 to 2015.
Objectives: The main objective of the study was to describe the clinical features of rickettsial diseases acquired in sub-Saharan Africa and diagnosed in our hospital. The secondary objectives were to describe the implementation of malaria chemoprophylaxis (MC) and to review the comorbidity with other tropical diseases.

Methods: Travelers attended in our hospital from January 1993 to December 2010 were the study population. Patients with clinical and serological diagnosis of rickettsiosis were included. Patients with other diagnoses or without serological confirmation were excluded. Serological methods were unable to discriminate Rickettsia conorii from other species.

Summary of results: 9303 passengers were attended at our clinic in the study period; 52.8% had visited sub-Saharan Africa. In this group of patients, 115 cases of rickettsiosis were reported: 97.4% of cases were in Spanish people, and the rest (2.6%) occurred in individuals from other European countries. The mean age (± SD) was 41.41 ± 11.93 years. Most cases were in males (68.7%). South Africa (64.3%) and Zimbabwe (12.2%) were the countries where the disease was most frequently acquired. The main reason for travel (81.6%) was tourism. The main signs and symptoms described were: black spot (88.7%), fever (79.1%) and rash (62.6%).

Conclusions: Rickettsial diseases represent a relatively frequent cause of consultation in travelers from sub-Saharan Africa, mainly if the trip has been to savannah (for hunting). Malaria must be always ruled out. Malaria chemoprophylaxis with doxycycline should be first election in people visiting these areas.

Disparities Exist in the Availability of Antimalarial Medication in the United States

Background: Atlanta, Houston, and the Maryland suburbs of Washington, D.C. are major centers of imported malaria in the United States, with large Sub-Saharan Africa immigrant populations (SSA). Low prophylaxis use is a known risk behavior of this group. The impact of local demographics on availability at pharmacies of anti-malarial medication (AMM) is not well described. This study reports the availability of AMM in areas with differing demographic risk and socioeconomic profiles.

Methods: A blinded telephone survey of 278 pharmacies in 50 Zip Codes in 3 major metropolitan regions on in-stock availability of AMM. Zip Codes were selected based on income and ethnic composition, including % SSA, using U.S. Census data, and aggregated into high and low risk communities. Comparisons for each AMM and the availability of any 1st line therapy across risk groups and regions were completed with SPSSv18.

Results: Overall availability: atovaquone-proguanil (AP) 64%; mefloquine (MQ) 59%; chloroquine 37%; quinine (QN) 17%; artemether-lumefantrine (AL) 1%; any 1st line therapy (AP, QN, AL) 67%. In aggregate across regions, the Houston area has overall lower availability of AP (p=0.018), MQ (p< 0.001), and 1st line therapy (p=0.006). By risk group, except for higher availability of MQ in higher risk SSA communities of Maryland (p=0.006) there were no other disparities in Maryland or Atlanta. In Houston, disparities favoring more affluent, low SSA minority communities existed in the availability of AP (p< 0.001), QN (p=0.05), MQ (p=0.02) and any 1st line therapy (p< 0.001)

Conclusions: Availability of anti-malarial medications was uneven across regions and within the Houston metropolitan area, as compared to the Atlanta and Washington D.C. metro regions. AP, a dual use medication for prophylaxis and treatment is the most widely available. QN and especially AL are not commonly stocked at community pharmacies. We hypothesize this difference is influenced by differing rates of prophylaxis usage by local populations, physician prescribing practices, and the prevalence of outpatient therapy for malaria. Clinics and emergency departments should be aware of
the potential limited availability of first line therapy medications when considering outpatient therapy and ensure patients receive a full treatment course prior to discharge or availability at a local pharmacy is confirmed first.

PO07.15

Border Control Measures and Territorial Surveillance in American Samoa for the 2009 H1N1 Influenza Pandemic

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Objective: To describe the disease prevention, case identification, and treatment approaches of the American Samoan Unified Health Command during phase one of the 2009 H1N1 Influenza Pandemic.

Methods: A retrospective review of public health surveillance records, hospital infection control records, and event after-action reports was completed. Descriptive statistics were used to evaluate data.

Summary: Border surveillance measures were in effect from May 3 to June 8 when the first confirmed H1N1 case was documented in the territory. Health officials met all incoming aircraft and sea vessels at territory ports of entry. Surveillance forms were requested each passenger, and passive screening techniques for illness identification were employed. Cases of influenza-like-illness were further investigated at a local clinic and suspected travelers were placed in community isolation. Greater than 7000 man hours were documented during surveillance activities. Hospital surveillance data from May 3 to July 31, 2009 was collected. Ninety-nine influenza swabs sets were collected. On sight rapid testing demonstrated 19.2% (n=19) Influenza A+ samples, and 37.4% (n=37) H1N1+ samples by confirmatory testing off-island. An 11% true positive and 25% false negative complicated medical decision-making based on rapid testing alone. Eight percent of cases were suspected concomitant seasonal influenza A strains. No fatalities were reported.

Conclusions: A unified health command structure was effective in responding to this emergency. Response planning was appropriate and rapidly implemented. Border control surveillance efforts were largely ineffective. Case identification and medical treatment protocols were hindered by remote locale. Despite the challenges discussed, no fatalities were reported.
PO07.16
Experience from a new Travel Clinic in Lisbon, 2008-10
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With globalization and the increasing of international trips we have seen an increase in travel consultation. The main goal is the prevention of a travel-related illness, with the correct immunizations, the malaria prophylaxis if necessary and the advices to reduce the risk of travelers diarrhea.

Objectives: To review the data from the last three years consultations, in a new travel clinic from Lisbon.

Methods: We reviewed the main motivation, the epidemiological, co-morbidities, pre-immunizations and prophylatic data of our travellers, according to the destinations and the purpose or the duration of their trips.

Results: Between 2008-10 we found data from 2817 travellers, 51% were males, with a mean age of 40 years old. Healthy in 83% of our sample, with 2.6% of HIV positive. The most frequent travel destinations were Angola (26.6%), Mozambique (8.8%) and India (9.15%). In a quarter of travelers the main purpose of the trip was working abroad, half of them (56.3%) in Angola. The trips had a mean duration of 167 days for workers and 29 days for tourists. Regarding vaccination we had a total of 1.8 doses/person (typhoid fever 47.7%; yellow fever 41.4%; hepatitis A 21.8%). The malaria prophylaxis was applied in 74% of travellers, mefloquine in 82% and atovaquone-proguanil in 15.3%.

Conclusions: African countries, mainly the old Portuguese colonies, are the most important destinations. The significant proportion of workers who are planning to go abroad, with longer stays, reinforce the need for adequate prevention measures including vaccination and malaria prophylaxis and prove the need of a travel consultation.
PO08  Impact on Host Country

PO08.01
Designing an Assessment Tool for Tourism’s Health Impacts in Developing Countries. Step 2: Asking the Right Question - An Example from Peru
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Background: Although there are many examples of tourism’s positive economic, environmental and socio-cultural impacts, the severity of some of its negative implications has attracted the attention of academia and the industry for a long time. The focus on tourism’s impact on destination health is more recent and, so far, there is no tool that allows the prediction and monitoring of such impacts. Impact assessment tools in other disciplines have been lacking the crucial inclusion of community-validated indicators. A tourism health impact assessment tool (TOHIAT) must focus on locals’ concerns, values and views as it is they who bear the cost of a tourism development at their doorstep. Furthermore, the communities themselves should be able to use it rather than developers with vested interests.

Method: This poster presents Step 2 of the design process with Step 1 having been presented at the CISTM11 in 2009. Thirty-five residents from two villages close to the Cordillera Huayhuash trekking circuit in Northern Peru discussed their views on the most important aspects of a healthy community. These aspects are at the same time those that need particular protection from the ramifications of tourism projects.

Results: The six most discussed topics were: work, harmony, environment, individual health, education, and family. These concepts will form the basis of the TOHIAT with indicators, corresponding questions, and a visual summary tool allowing quick reference to current assessments results and to changes over time.

Conclusion: The collected local concerns were successfully transformed into a manageable number of concepts that form the basis for the TOHIAT. This allows the inclusion of specific indicators as they are of interest to local people rather than outsiders with their respective agendas. The next step will be to focus on the details per indicator, the user-friendliness, translation into Spanish and testing in the field.

PO08.02
Prevalence of respiratory viruses in ecotourists: Towards an understanding of risks of anthropozoonoses at wildlife tourism destinations
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Objectives: Wildlife-based tourism accounts for a growing proportion of international tourism activity, and is increasingly seen as a means to promote wildlife conservation, increase public awareness, and raise revenue for protecting endangered species. However, zoonotic and anthropozoonotic pathogen transmission may result from increasing demand from tourists to experience direct encounters with wildlife. To understand better these risks, we investigated prevalence of respiratory viruses in visitors to one of the largest primate-based tourism destinations in the world.

Methods: Throat swab, saliva and gargle samples in addition to a detailed questionnaire were collected/completed by 600 adult visitors at the Sepilok Orangutan Rehabilitation Centre in the Malaysian state of Sabah, northern Borneo. The questionnaire recorded demographics, travel history, recent animal contact, medical history, ecotourism opinions and knowledge/attitudes/practices of travel medicine. Nucleic acids were successfully extracted from 529 preserved samples and were processed using a multiplex system for simultaneous differential diagnosis of influenza (A, B, H1N1 Mexico 2009), parainfluenza (1-4), respiratory syncytial virus (A, B), metapneumovirus (A, B), coxsackievirus, rhinovirus, adenovirus (B, E), bocavirus and coronavirus (NL63, HKUI, 229E, OC43).

Results: 56% of respondents were traveling with an updated vaccination certificate, 25% reported symptoms of respiratory tract infection (cough, sore throat, congestion, sneezing) within the previous 24 hours, and 54% reported some symptom within previous 7 days. Viral prevalence was 6.24% (33 people infected with 9 unique viruses). Tourists who reported symptoms within the previous 24 hours were more than three times more likely to test positive for a respiratory virus.

Conclusions: Although our results do not account for early or late infections, or bacterial respiratory infection, we do
present the largest survey of ecotourist behavior and viral prevalence to date. Despite their interests in environmental protection and known travel to view endangered animals, tourists very likely create unnecessary risk of infection transmission to wildlife. Requiring tourists to present updated vaccination certificates, and providing masks to those who report symptoms may be future considerations for preventing infections.

PO08.03

Cross-border health in the European Union

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Cross-Border Cooperation (CBC) across European Union’s (EU) internal and external borders has been a fact during the last 50 years. The EU has promoted this territorial cooperation between regions and municipalities in all 27 Member States and neighbouring countries. Many fields have been covered but the provision of cross-border services, particularly healthcare, is still difficult because of imperative national logics. Despite of the freedom of movement of citizens, goods, services and knowledge enshrined in the European Treaties, Europeans are still far from sharing some basic services, adding real value to the European integration process. It is not only about travellers, businessmen and tourists, but also about a special population that counts for more than one third of Europeans: citizens living at border areas. These areas are in many cases rural and peripheral, sometimes with considerable handicaps when compared with their European or national standards. Bilateral agreements, European funding, political will, and many de facto solutions have solved many daily problems, but a European-wide regulation is still missing. In a growing “open borders” process, this debate creates more misunderstanding and stress in patients, health professionals and local authorities, than offering clear solutions. In fact, CBC in healthcare can be considered a tradition in many European border areas, in particular in the structures known as “euroregions”, as it was evidenced by the EUREGIO Project (Evaluation of cross-border activities in the EU) developed by the Institute of Public Health of North-Rhine-Westfalia (Germany) and other European organizations, like the Association of European Border Regions, which has created a specific Task Force to deal with Cross-Border Healthcare. An EU Directive on Cross-Border Healthcare and Patients’ Rights is on its way to be approved, probably in 2011. Concentrated on cost refund and prior authorization for certain services provided in a different country than the one of residence, it does not address the reality of border citizens. European institutions want to implement a real European e-health system and regulate quality and safety standards, but these will hardly be addressed at EU level, kept limited to cooperation between Member states. The latter’s sovereignties play a key role when dealing with healthcare, but it is the time for the EU to go one step forward in order to strengthen the integration of all European territories.
PO09 Long-Stay Travelers

PO09.01
Diseases among Japanese Children staying abroad
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Objectives: We investigated the diseases among Japanese children staying in developing countries.

Methods: The survey areas were Asia, the Middle East, Africa and Central and South America. The subjects were Japanese children under 16 years of age who received health consultations by the Japan Labour Health and Welfare Organization in 2006. Using the interview sheets, we asked them about the diseases they experienced during the stay. We analyzed 641 subjects who had been staying for 1-5 years (327 male, 314 female; average age, 8.1 years; average length of stay, 25 months). The diseases were classified according to the WHO International Classification of Diseases (ICD10).

Results: 391 (61.0%) had an outpatient, and 26 (4.1%) had a hospitalization. The most common category of diseases treated by outpatient was respiratory diseases (219), gastrointestinal diseases including dental diseases (111), and infectious diseases (76).

The diseases treated by hospitalization were pneumonia (5), dengue fever (4), gastroenteritis (4), and typhoid fever (2).

Conclusion: For Japanese children living in a developing country, it is essential to prevent common diseases, and also important to prevent infectious diseases specific to the areas where they were staying.

PO09.02
Health Issues in International Travelers on Extended Stay in Africa
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Objective: To study the level of pre-travel preparedness and health issues faced by healthy travelers on extended stays to various countries in Africa.

Methods: Pre and post-travel surveys were administered to US participants in an international cross-cultural program to Africa, (Operation Crossroads Africa) who were performing 2-month long, group-based, rural and urban projects at various destinations in sub-Saharan Africa. Pre-travel questionnaires were administered to participants during 2005-2008 orientation sessions in New York and post-travel questionnaires, carried along with the participants, were mailed back at the completion of the projects.

Results: Overall, there were 308 total pre-travel questionnaires completed, with 105 respondents returning their post-travel surveys (34%). Ghana, The Gambia and Kenya were the three most common destinations amongst participants. Most of the travelers were young, healthy females visiting rural settings (77%). Many travelers participated in medical outreach projects. Respondents reported knowledge of the importance of seeking medical care and health information prior to travel. Most travelers sought pre-travel health information from primary care physicians, about half of whom had training in travel medicine. Other sources of pre-travel health information used by travelers included books and online sources. Commonest health concerns prior to travel were those regarding acquiring diarrhea and malaria. From the post-travel evaluation, most participants (92%) reported taking malaria prophylaxis during their stay. Travelers primarily experienced only minor medical problems, such as diarrhea (76%), cold symptoms (44%), and fever (31%). Of those who reported some form of significant medical problems, two participants reported brief hospitalizations during their stay.

Conclusion: Despite concerns of international travelers regarding potential tropical health risks, our survey shows that travelers on extended stays in sub-Saharan Africa experience mostly minor medical problems. The survey also shows that with proper education and health management prior to and during travel, health risks and medical problems of travelers on extended stay in sub-Saharan Africa can be minimal.
PO09.03
Mantoux tuberculin skin test may be read in a travel clinic up to 7 days after administration of PPD
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Objective: Travellers who intend to spend lengthy period of time in countries endemic for tuberculosis (TB) usually require pre-exposure immunisation against rabies (PrEP), as well as pre-travel Mantoux tuberculin skin test (TST). For young children, BCG is also often indicated. By convention, TST is read 48-72 hours after administration of PPD. However, the second dose of PrEP rabies vaccine is scheduled for 7 days after the first dose. For travellers who have logistic constraints in attending the travel clinic, e.g. those who live far away &/or with very heavy work commitment, in terms of convenience, it is more practical for them to minimise the number of visits to the travel clinic. We evaluate the suitability of reading TST 7 days after administration of 10 units of PPD (MT10).

Method: For 30 adult travellers who had positive MT10, we compared their TST readings on Day 2 to 5 with Day 6 to 8, after administration of 10 units of PPD.

Result: 24 of the 30 travellers met the study criteria. Comparing the second readings (5 to 6 days) with the first (2 to 5 days), for most of the travellers, there were moderate reduction in size of the induration diameter. However, all those who had positive responses (>10 mm induration) at the first reading continued to have positive responses at the second reading.

Conclusion: TST is standardised for epidemiological purposes. There is considerable documentation in the medical literature, both past and present, which states that the optimal time for reading a TST is between 48 and 72 hours. This approach is the established benchmark. However, when doing pre-travel screening for TB exposure status for travellers, it is acceptable to read TST up to 7 days after the administration of PPD. A positive TST reaction (>10 mm induration) takes much more than a week to subside. It is very unlikely that a positive TST would be mis-interpreted as negative by delaying reading of the TST for only a few days.

In the context of screening before BCG immunisation, individuals particularly children, from regions with low TB endemicity would most likely have negative TST. We may, if necessary, bring them back for reading up to 7 days after the administration of PPD.
PO10.01

Pediatric International Travelers and Travel Health Preparations: Analysis from the U.S. Global TravEpiNet Consortium

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Objectives: Using the Global TravEpiNet database, we investigated the demographic features and travel characteristics of, and preventive interventions provided to children, ≤ 17 years of age, preparing for international travel.

Methods: Data reported to Global TravEpiNet, a multicenter database of U.S. travel clinics, from January 1, 2009 and September 30, 2010 were included in this analysis. χ²- and Wilcoxon rank-sum test were used for the comparison of categorical and continuous variables respectively.

Results: Children (n=1,070) (51% male, 93% U.S. born, median age [IQR] of 9 [3-15] years) accounted for 10% of all international travelers (n=10,567) evaluated; they traveled mostly for leisure (49%) or to visit friends and relatives (VFR) (44%). Most (85%) travel was to low- or low- to middle- income countries. Compared with adults, children disproportionately were brought to medical attention late (within 14 days of departure) (36% vs 29%, p<.01), traveled long-term (>28 days) (45% vs 19%, p<.01), and were VFR travelers (44% vs 7%, p<.01). Compared with all other reasons for travel, pediatric VFR travelers were younger (median age 5 vs 13 years, p<.01), more likely to present late (44% vs 29%, p<.01), travel long-term (69% vs 29%, p<.01), and travel to sub-Saharan Africa (56% vs 30%, p<.01). Among the pediatric travelers, 42% had a medical condition, with the most commonly reported conditions being seasonal allergies (25%) and asthma (9%). Destination-independent vaccines provided to children were mostly those to prevent hepatitis A (36%), and measles/mumps/rubella (14%). Destination-specific vaccines were mostly those to prevent typhoid fever (73%), yellow fever (35%) and meningococcal infections (8%). Of pediatric travelers, 78% reported planning to visit a malaria-endemic country; of these, 71% received a prescription for chemoprophylaxis (mefloquine [42%], atovaquone/proguanil [40%], chloroquine [15%] and doxycycline [2%]). Anti-diarrheal antibiotics for standby therapy were prescribed for 62% (azithromycin [84%], fluoroquinolones [8%], and other [8%]).

Conclusions: Children account for a relevant proportion of international travelers. These data suggest that the pre-travel care profile differs between children and adults. A better understanding of the demographic and clinical characteristics of children traveling internationally may help inform public health policy regarding pediatric international travelers.

PO10.02

Demographics, Destinations, and Yellow Fever Vaccine Usage Among US Travelers Visiting Countries with Risk of Yellow Fever Virus Transmission

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Objective: Prompted by the changing global epidemiology of yellow fever (YF) and recent concerns about serious adverse events related to YF 17D vaccine, we examined demographics, destinations, and itineraries of US travelers who were visiting countries with risk of YF virus transmission and who presented to Global TravEpiNet providers for pre-travel consultations.

Methods: We analyzed data from Global TravEpiNet from January 1, 2009, to September 30, 2010; Global TravEpiNet is a surveillance consortium comprising travel health clinics across the continental United States and Hawaii.

Results: Of 10,564 travelers, 4,030 (38%) were visiting countries with risk of YF virus transmission. Of these travelers, 56% were female and 73% were aged 19-59 years, 9% were ≤ 12 years, 6% were 13-18 years, and 13% were ≥60 years. Of the 4,030 travelers to destinations with YF risk, 59% were visiting Africa only; 40% were visiting South America only;
and 1% had mixed-continent itineraries. Eighty-one percent intended to visit one country; 19% reported \( \geq 2 \) countries on their itineraries. Common destination countries were Kenya (16%), Peru (16%), Tanzania (15%), Brazil (10%), Ghana (10%), Argentina (8%), and Ecuador (8%). The most common purpose of travel for travelers aged \( \geq 13 \) years was “leisure”; the most common for those \( \leq 12 \) years to Africa was “visiting friends and relatives” (VFR).

Of the 2,520 travelers visiting YF-holoendemic countries, vaccine was administered to 72%, 19% had pre-existing immunity to YF, 4% declined vaccination, vaccine was not indicated for 2%, and vaccine was medically contraindicated for 2%. Compared with 1,490 travelers with non-VFR itineraries, the 421 VFR travelers were more likely to decline vaccine (77% vs. 23%, \( p < 0.0001 \)). For the 342 travelers aged \( \leq 12 \) years, 41 (12%) of parents/guardians declined YF vaccination for their child; 37 (90%) of the 41 indicated a purpose of their travel as VFR and were traveling to Africa.

**Conclusions:** Preliminary results from these analyses suggest that purpose of travel, destination, and traveler age might influence the decision for YF vaccination. Although analyses are ongoing, further understanding of these data will aid health care professionals in providing effective vaccine recommendations, especially those tailored to the individual traveler.

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**PO10.03**

**Travel medicine in Bosnia and Herzegovina - first steps**

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**Introduction:** According to the data of the World Tourism Organization the number of tourists in almost all countries of the world evidently grows from year to year. The same situation is in Bosnia and Herzegovina which is often a destination for foreign tourist from all parts of the world because of its natural and cultural wealth. In the same time, a lot of tourists from Bosnia and Herzegovina are more often travelling to other countries. Every travel has different health risks and in order to prevent travelers diseases travel medicine developed as a new discipline in medicine.

On the area of Bosnia and Herzegovina any Clinic for travel medicine doesn’t exist, but some health centers implement vaccination for travelers with obligatory and recommended vaccines for the some countries.

The aim of this work is to show our previous expiriences in working with travelers in the Ambulance for facultative vaccination in Public Health Institute of Sarajevo Kanton

**Materials and methods:** Data about travelers (age, sex), types of applied vaccines, destinations of travelling, are taken from the protocol that is lead continually.

The work is done for the period 2005-2009 by analitical epidemiological model and retrospective method.

**Results:** In the five-year period 7377 travelers visited the Ambulance. Their number grew from year to year. There were travelers of all age groups, but the most of them were 20-64 years old. Men traveled more than women.

The most applied vaccine was vaccine against Meningococcal meningitis, mostly for Hajj pilgrims, followed by Yellow fever vaccine. The most often destinations were Asia and Africa.

More often the travelers that visit the Ambulance don’t need any vaccine, but they want to get advices about the health risks in the county they are travelling, the risks during the travel, how to dress and what to eat, etc.

**Conclusion:** Tourism became a very important activity in Bosnia and Herzegovina, and the number of tourists that travel to and from Bosnia and Herzegovina grows every year.

The common goal for all tourists is to stay healthy during the travel and after they come back For that reason the establishment of travel medicine in Bosnia and Herzegovina would have a great importance.
PO10.04
Characteristics of travelers to Brazil compared with those visiting other Latin American destinations: results from the Boston Area Travel Medicine Network (BATMN)

1Mount Auburn Hospital, Travel Medicine Center, Cambridge, United States, 2Harvard Medical School, Boston, United States, 3Harvard School of Public Health, Boston, United States, 4Boston University School of Public Health, Boston, United States, 5Cambridge Health Alliance, Medicine, Cambridge, United States, 6Beth Israel Deaconess Medical Center, Boston, United States, 7Lahey Clinic Medical Center, Burlington, United States, 8Tufts Medical Center, Boston, United States, 9Centers for Disease Control and Prevention, Atlanta, United States, 10Boston University School of Public Health, Center for Global Health and Development, Boston, United States, 11Boston Medical Center, Boston, United States

Objective: Brazil is a popular destination due to economic development, diverse attractions, and numerous immigrants overseas including ~64,000 in metropolitan Boston. Hosting the 2014 World Cup and 2016 Olympics will likely increase visitors to Brazil. Identifying characteristics of Brazil travelers vs. travelers to other Latin American countries (OLAC) may help to target recommendations.

Methods: Data for Boston Area Travel Medicine Network (BATMN) travelers were analyzed using prevalence ratios (PR) for Brazil travelers vs. travelers to OLAC including demographics, itineraries, and counseling/intervention.

Results: Among 15,442 travelers, 4,034 (26.1%) traveled to Latin America, including 599 (3.9%) to Brazil. Of those, 369 (61.7%) only visited Brazil; 230 (38.3%) visited multiple countries. 7.7% of Brazil travelers were born there, 21.2% were visiting friends or relatives (VFR) and 31.1% were staying in local homes. Mean trip duration was 15 days; 21% were planning to travel for >1 month.

Most (>95%) Brazil travelers and travelers to OLAC were counseled regarding food/water safety, vector avoidance, and diarrhea management. Commonly administered vaccines were yellow fever (YF) (71.2%), typhoid (57.8%), and hepatitis A (50.3%). Medications prescribed included ciprofloxacin (68.5%), atovaquone/proguanil (31.8%), azithromycin (14.6%), mefloquine (3.7%), levofloxacin (2.6%), chloroquine (2.5%), and rifaximin (0.2%). Compared with travelers visiting only OLAC (n=3,435), Brazil travelers were more commonly male (PR=1.19; 95% CI 1.08-1.30), born in Brazil (64.9; 23.44-179.7), staying in local homes (1.26; 1.10-1.43); VFR (2.57; 2.13-3.11), business travelers (2.71; 2.13-3.45), and planning longer trips (mean=15 vs. 12 days). YF vaccine was more common in travelers to Brazil than OLAC (2.61; 2.42-2.81); hepatitis A and typhoid vaccines were less common (0.82; 0.76-0.90, and 0.80; 0.74-0.86, respectively). Malaria prophylaxis was prescribed less frequently for Brazil travelers than for travelers visiting OLAC only (37.4% vs. 55.4%).

Discussion: Compared to travelers visiting OLAC, Brazil travelers were more likely male, born in Brazil, stay in local homes, VFR, and receive YF vaccine, but less likely to receive malaria prophylaxis. Given the sizable Brazilian population in metropolitan Boston, clinicians should specifically review itineraries for YF vaccination and malaria prophylaxis, and continue counseling on risk management based on anticipated activities.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Travelers to Brazil n=599</th>
<th>Travelers to Other Latin American Countries n=3435</th>
<th>Prevalence Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td>284 (47.4%)</td>
<td>1373 (40.0%)</td>
<td>1.19 (1.08-1.30)</td>
</tr>
<tr>
<td>Median age in years (IQR)</td>
<td>33 (23-52)</td>
<td>30 (23-48)</td>
<td>1.93 (0.46-3.39) *difference in means</td>
</tr>
<tr>
<td>Median trip duration in days (IQR)</td>
<td>15 (10-28)</td>
<td>12 (8-20)</td>
<td>7.58 (3.72-11.45) *difference in means</td>
</tr>
<tr>
<td>Travel to YF-risk country (%)</td>
<td>599 (100.0%)</td>
<td>1053 (30.7%)</td>
<td>3.26 (3.10-3.43)</td>
</tr>
<tr>
<td>Country of origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US origin (%)</td>
<td>413 (68.9%)</td>
<td>2674 (77.8%)</td>
<td>0.89 (0.84-0.94)</td>
</tr>
<tr>
<td>Brazilian origin (%)</td>
<td>45/587 (7.7%)</td>
<td>4/3388 (0.1%)</td>
<td>64.93 (23.44-179.86)</td>
</tr>
<tr>
<td>At least one parent of Brazil origin</td>
<td>68/444 (15.3%)</td>
<td>2/2585 (0.1%)</td>
<td>197.95 (48.69-804.78)</td>
</tr>
</tbody>
</table>

[Demographics of Travelers to Brazil vs OLAC]
### Accommodation: Hotel/hostel

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>354 (59.1%)</td>
<td>2164 (63.0%)</td>
<td>0.94 (0.87-1.01)</td>
</tr>
</tbody>
</table>

### Local residence/home

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>186 (31.1%)</td>
<td>849 (24.7%)</td>
<td>1.26 (1.10-1.43)</td>
</tr>
</tbody>
</table>

### Tent

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22 (3.7%)</td>
<td>259 (7.5%)</td>
<td>0.49 (0.32-0.75)</td>
</tr>
</tbody>
</table>

### Reason for travel: Tourism

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>307 (51.3%)</td>
<td>1999 (58.2%)</td>
<td>0.88 (0.81-0.96)</td>
</tr>
</tbody>
</table>

### Visiting friends and relatives

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>127 (21.2%)</td>
<td>283 (8.2%)</td>
<td>2.57 (2.13-3.11)</td>
</tr>
</tbody>
</table>

### Business

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>86 (14.4%)</td>
<td>182 (5.3%)</td>
<td>2.71 (2.13-3.45)</td>
</tr>
</tbody>
</table>

### Interventions: Hepatitis A vaccine

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>293/583 (50.3%)</td>
<td>2040/3343 (61.0%)</td>
<td>0.82 (0.76-0.90)</td>
</tr>
</tbody>
</table>

### Typhoid vaccine

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>337/583 (57.8%)</td>
<td>2425/3339 (72.7%)</td>
<td>0.80 (0.74-0.86)</td>
</tr>
</tbody>
</table>

### YF vaccine

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>415/583 (71.2%)</td>
<td>912/3342 (27.3%)</td>
<td>2.62 (2.42-2.81)</td>
</tr>
</tbody>
</table>

### Malaria chemoprophylaxis

<table>
<thead>
<tr>
<th></th>
<th>Pre-travelers</th>
<th>Post-travelers</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>224 (37.4%)</td>
<td>1548/2794 (55.4%)</td>
<td>0.68</td>
</tr>
</tbody>
</table>

**PO10.05**

**Comparison of travel clinic patients according to destination, in Kurume university hospital, Japan**

Hidaka H.¹, Watanabe H.¹, Gotoh K.²

¹Kurume University School of Medicine, Division of Infectious Diseases, Department of Infectious Medicine, Fukuoka, Japan, ²Kurume University School of Medicine, Department of Pediatrics, Fukuoka, Japan

**Background:** At present, the number of Japanese travelers to foreign countries is increasing. Travel clinic is not popular in Japan yet, although the number of clinic tends to increase in big cities. Most Japanese travelers to foreign countries do not necessarily collect any information concerning the infectious diseases and security related with their travel and hesitates to receive the recommended vaccines or prophylactic for malaria. We opened travel clinic in Kurume university hospital on April, 2007. To investigate the current situation of our travel clinic patients, we conducted the following study.

**Methods:** Seven hundred and ninety-nine pre-travelers (411 males and 388 females) and 14 post-travelers (10 males and 4 females) visited our clinic from April, 2007 to March, 2010. We investigated the duration of stay, purpose of visiting our travel clinic, purpose of a trip, and post-travel health consultation region by region.

**Results:** Long-term travelers stayed for more than one year measuring 64.3%, middle-term travelers stayed for one to 6 months measuring 17.9%, and short-term travelers stayed for less than one month measuring 17.8%. Most travelers to developing countries tended to visit our clinic for vaccination and their purpose of a trip were mainly business, whereas those to advanced countries tended to visit our clinic for medical certificate and their purpose of a trip were mainly studying abroad. We had 14 post-travel health consultations (8 in Southeast Asia, 3 in East Asia, 2 in Africa and one in Oceania) due to fever, diarrhea, post-exposure vaccination for rabies or tetanus, etc.

**Conclusions:** Our data indicates the purpose of a trip and visiting our travel clinic are different between developing and advanced countries, and most post-travel health problems occur in developing countries. Further education of travel medicine for travelers, travel agents and doctors is necessary in Japan.
PO10.06
Compliance with Vaccinations and Chemoprophylaxis in Slovenian Travelers to South East Asia Countries
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1Institute of public health Maribor, Maribor, Slovenia, 2Institute of public health Ljubljana, Ljubljana, Slovenia, 3Institute of public health Celje, Celje, Slovenia, 4Institute of public health Koper, Koper, Slovenia

Objectives: Number of Slovenians travelling to South-East Asia (SEA) countries is unknown. 37% of all travelers who visited the biggest pre-travel clinic in Slovenia traveled to this region. Our study aims were and to get insight in attitude towards recommended vaccinations and chemoprophylaxis and to monitor travel-related health events in Slovenian travelers to SEA countries.

Methods: In February 2010 we conducted a prospective study of travelers consulting pre-travel clinics in 4 out of 9 regional institutes of public health where pre-travel consultations, vaccinations and chemoprophylaxis are provided in Slovenia. Travelers completed questionnaire before travel and phone interviews were performed after the travel.

Results: In 4 months period, 89 travelers to SEA consulted participating pre-travel clinics and 63 were contacted post travel. Majority traveled to Thailand (62%), followed by Cambodia (27%), Vietnam (22%), Indonesia (16%) and less than 5% visited other SEA countries. 60% traveled for less than 1 month and only 29% traveled by travel agencies. 21% of travelers were already immunized against hepatitis A and 11% against typhoid fever. 96% of non-immunized accepted vaccination against hepatitis A, but only 31% against typhoid fever, majority because of perceived small risk of infection (57%) and only 6% because of cost of vaccine. 48% refused to take malaria chemoprophylaxis when indicated, almost half (45%) because of presumable small risk of infection and intended use of other protection measures against mosquito bites. Travelers with higher educational level accepted recommended chemoprophylaxis more often than those with basic school education (p=0.002). 18% of travelers experienced travel-related health problems; majority of them developed diarrhea and fever (64% and 45%, respectively). Only 61% have taken antimalarial drugs as prescribed. Absence of mosquitoes and no cases of malaria infections in travel destination were main reasons for non-compliance.

Conclusion: Despite the fact that our study has several limitations, refusal of recommended vaccines and chemoprophylaxis and relatively high proportion of incorrect or interrupted use of antimalarial drugs are worrisome. Better pre-travel education is needed. However, travel related health problems in this study group were rare.

PO10.07
Effectiveness of Pre-travel Consultation in the Primary Care Setting
Aab-Elfattah N.1, Ake J.1, Liaw W.1, Bazemore A.1, Travelers
1VCU - Fairfax Family Practice, Family Medicine, Fairfax, United States

Background: Approximately one out of five U.S. residents travelled abroad in 2009. Travel to developing countries where there are significant health risks makes up about half of international travel outbound from the U.S.1 Prior studies have shown that 38 percent of travel physicians trained in family medicine or general internal medicine in the United States.2 The objective of this study is to assess whether a standardized travel clinic setting results in higher levels of patient satisfaction and medically accurate counseling and interventions compared to pre-travel visits in facilities without a designated travel clinic focus in the primary care setting.

Methods: We will compare patients, over 18 years of age, seen in our designated travel clinic in Fairfax Family Practice versus those patients seen in practices with non-travel clinic based visits within the a period of 6 months. We will review charts from 1/1/2010 to 7/1/2010 with the diagnosis code V65.49 (Inquiry and Counseling: Travel outside of Insurance Network and Preventive Medicine Counseling about Travel), medication prescriptions, and vaccines. We will measure demographics, whether or not appropriate anti-malarials, anti-diarrheals and vaccinations were offered and/or given based on a specific geographic region. We will also assess for counseling on safety, travel insurance, and travellers diarrhea avoidance. Patient satisfaction will be assessed via telephone or mail with a survey modified from that presented in a recent travel clinic journal. We hope to obtain Institutional Review Board approval for this study.

Results: An analysis will be formulated based on the variables listed above and patient satisfaction, comparing the control group - patients seen in a non-travel clinic setting - and the experimental group - patients seen in a travel clinic based setting.

Conclusion: Based on preliminary data gathered from 10/1/2009 to 9/30/2009, results showed that the pre-travel consultation yielded more accurate guidance and prophylactic interventions in comparison to the non-travel clinic office visit in the primary care setting. In this study, we hope to confirm this conclusion on a larger scale with a goal of improving
the overall quality of the travel visit within the primary care realm.


PO10.08

Influenza prevention among travellers: beliefs and perceptions. A cross-sectional study
Masuet Aumatell C.1, Toovey S.2, Zuckermann J.N.2
1Hospital Universitari de Bellvitge, International Health Unit, Preventive Medicine department, l'Hospitalet de Llobregat, Spain, 2University College London Medical School, WHO Collaborating Centre for Reference, Research and Training in Travel Medicine, Royal Free Travel Health Centre, London, United Kingdom

Objectives of the study: Travellers compliance with measures to prevent influenza through the use of antivirals and influenza vaccine remains very poor, despite influenza being one of the commonest travel and vaccine-preventable diseases. As little is known about travellers’ understanding of influenza and its prevention and treatment, we undertook a study to assess travellers’ beliefs, perceptions and intentions to adhere to measures associated with the prevention of infection with influenza.

Methods: A cross-sectional survey (n=96) was undertaken in September 2009 of travellers who attended the Royal Free Travel Health Centre, London, UK to assess their beliefs, perceptions and intentions to comply with measures associated with the prevention of infection with influenza. A self-administered questionnaire was completed in advance of each traveller’s pre-travel health consultation. Logistic regression identified variables independently associated with compliance.

Results: Influenza vaccination uptake for the preceding five years was found to be 20.8%, being statistically significantly higher for older travellers and those with underlying health conditions (p< 0.005). The intention to comply with antiviral drugs on a preventive and therapeutic basis was 58% and 72% respectively, and varied markedly across age and with anti-malarial prophylaxis, prescription and compliance. In a multivariate analysis, intention to comply with a preventive measure was associated with a belief in vaccine efficacy, poor knowledge about influenza antivirals, and the availability of antiviral drugs during travel. Conversely, intention to comply with a therapeutic measure was associated only with some knowledge about the severity of infection with influenza.

Conclusions: This study identifies some beliefs and perceptions associated with an intention to comply with influenza antivirals as a therapeutic or preventive measure, and it underscores the importance of travellers receiving hemisphere appropriate influenza vaccination. The external validity of these study findings requires further corroboration involving other travel clinics and different cohorts of travellers. These findings could guide the development of future influenza prevention measures strategies in travellers.
PO10.09
Accuracy of Rabies Post-exposure prophylaxis according two different classifications: a retrospective cohort study in British travellers
Masuet Aumatell C.,1 Turner C.,2 Zuckermann J.N.2
1Hospital Universitari de Bellvitge, International Health Unit, Preventive Medicine department, l’Hospital de Llobregat, Spain, 2University College London Medical School, WHO Collaborating Centre for Reference, Research and Training in Travel Medicine, Royal Free Travel Health Centre, London, United Kingdom

Objectives of the study: International guidelines recommend the prompt administration of rabies post-exposure prophylaxis (PEP) to any potential rabid injury. Appropriate geographical risk assessment, classification of the nature of the exposure and assessment of rabies immune status defines the treatment recommended. The PEP could include Rabies immunoglobulin and Rabies vaccine. PEP should be started promptly and in the same country as the exposure occurred. In the UK the Health Protection Agencies guidance is based on the WHO animal contact classification and the type of animal species involved whereas the WHO classification is based upon type of contact alone.

Methods: A retrospective cohort study between 2008 and 2010 was undertaken to evaluate the appropriateness of rabies PEP in British travellers according to national and international guidelines, vaccination regimens and nature of animal exposure. Descriptive and bivariate analysis were performed in a per protocol analysis.

Results: Twenty-nine patients were identified, of whom 18 (62.1%) started PEP abroad and 11 (37.9%) returned to the UK early to be treated at the Royal Free Travel Health Centre. The majority were male (55.2%) presenting a moderate or severe injury in 96.4%. Dogs accounted for 39.3% of the cases with the site of exposure being in the hand in 37%, 82.7% of cases did not have rabies immunity. Where PEP was warranted abroad it was not received appropriately in 9 out of 19 cases, 67% of this was due to lack of awareness by the traveller or lack of vaccine availability. In our cohort PEP treatment for rabies exposure was achieved according to national guidelines in 65.5% of cases and international guidelines 44.8% (p>0.05) respectively. The agreement between two animal contact classifications was slight (kappa=0.186; 95%CI 0.182-0.554) but an overall agreement rate acceptable (59.3%).

Conclusions: The PEP for rabies in British travellers was conducted appropriately according to national guidelines on their return to the UK. More discussion is needed to clarify non human primate exposures which is responsible for the main discrepancy in our cohort of travellers according to the two main approaches (WHO and HPA) and consisted of 25% of animal species exposed. More health promotion to our travellers is needed to ensure that they seek medical advice after exposure whilst abroad to ensure they get appropriate PEP for this preventable disease.

PO10.10
A review of the current role of pharmacists in the provision of travel health services in Australia
Heslop I.M.1, Bellingan M.1, Speare R.2, Glass B.D.3
1James Cook University, School of Pharmacy & Molecular Sciences, Townsville, Australia, 2James Cook University, School of Public Health, Tropical Medicine & Rehabilitation Sciences, Townsville, Australia

Objectives: This study was designed to investigate the extent and range of travel health services offered by pharmacists in Australia and the level of formal training of pharmacists performing these services. An assessment of the perceptions of pharmacists regarding the level and types of services that are currently being offered, their limitations and how pharmacist-run travel health services could be further developed was also undertaken. Potential barriers to future service development were also investigated.

Methods: A survey instrument was designed, piloted and distributed as an electronic survey from March to June 2009 to all Australian pharmacists who are members of the Pharmaceutical Society of Australia. In addition a postal survey was also sent to a representative sample of 600 Australian pharmacies.

Summary of Results: A total of 311 pharmacists completed the questionnaire (31% male and 69% female), and it was found that 68% of participating pharmacists provide some level of travel health service to their patients. But this was not a significant workload for most pharmacists as 67% of respondents reported advising no more than 2 travellers per week. Pharmacists mainly advised travellers to destinations in South East Asia, Western Europe, Northern Asia and Oceania, and used a variety of assessment techniques to initially assess each traveller. Pharmacists commonly counselled patients on topics such as the treatment and prevention of diarrhoea and insect borne diseases, and infrequently counselled travellers on topics such as the risk and prevention of sexually transmitted diseases, accidents and personal safety issues. Few respondents had formal training and most agreed that further training was appropriate and should be
Conclusions: Australian pharmacists feel that they are currently underutilised in the area of travel health and are keen to have a greater role. They feel travellers also want more pharmacists to offer travel health services and greater availability of travel health advice from pharmacies will help to reduce the number of people who currently travel without obtaining pre-travel health advice.

PO10.11

Therapy of uncomplicated falciparum malaria in Europe: MALTHER - a prospective observational study


Introduction: Imported malaria is not a rare disease in developed countries and may be potentially lethal. Experience in using drugs mainly assessed in endemic areas is scarce as studies are few and with a limited number of subjects.

Patients and Methods: To describe and assess tolerance and efficacy of the different regimens in use in adults for the treatment of uncomplicated falciparum malaria imported into Europe. Participating centers were part of an European network. There was no randomization but a standardized data collection.

Results: 504 patients were included in 16 different centers from five European countries. Patients were mainly young male migrants (VFR) returning from West and Central Africa after a median journey of 1 month. Nineteen regimens were reported, the top 3 being atovaquone-proguanil, mefloquine and artemether-lumefantrine. The rate of hospitalization was 82% (median duration of 4 days) with differences between centers and countries. In 10% of cases, a second line treatment was necessary mainly due to vomiting. The shortest median parasite clearance time was observed with artesunate-mefloquine (36 hours; p < 0.0001) and the longest with atovaquone-proguanil (72 hours; p < 0.0001). Four relapses and 7 progressions to severe disease were observed. The rate of adverse event was overall 16% with differences between treatments; vomiting being the first one mainly due to atovaquone-proguanil (8%).

Conclusion: This study, the largest one in imported malaria to date, provides us with relevant information on the heterogeneity of the standards of care within Europe. Atovaquone-proguanil appears as a valuable option, but vomiting is limiting. A consensus discussion at the European level would be of interest to come closer to a harmonized management of imported malaria.

PO10.12

Gender Differences in Portuguese Travelers in the Pre-travel Medical Encounter

Abreu C., Coelho R., Cardoso S., Gomes A., Andrade P., Caldas C., Sarmento A.

Main: Pre-travel health consult is hampered by time constraints forcing to select information, focusing on what is most important. The advice needs to be personalized but may we address gender-specific intervention strategies on the pre-travel advice overcoming these constraints?

Methods: Data from 2018 consecutive adult (18 years or older) travelers medical consults from 2003-09 were reviewed
Abstracts – Poster Presentations

comparing male and female concerning demographic data and travel characteristics (time between the appointment and travel, duration, destination, reason for traveler), tetanus vaccination status and malaria chemoprevention. Bivariate analysis of pairs of categorical variables was performed using contingency tables and chi-square exact test. Numerical variables were compared using t tests. A level of significance of 5% was used; analyses were performed using SPSS version 15.0.

**Results:** 36% of the 2018 travelers were female, with a median age of 35 years, 3 years younger than male travelers (p < 0.01). There was no statistically significant difference for the time between appointment and travel for men and women (21±21 days and 22±18 days respectively, p=0.38). Men traveled on average for 65 days, 13 days longer than women (p<0.01). Women were more highly educated than men (odds ratio 4.84 [3.29-7.16], and travelled mainly for tourism; men traveled mainly for work, >75% of them for African countries, namely Angola. American and Asian countries were the destination for 22% and 21% of females and 14% and 15% of males respectively. Tetanus vaccine booster was needed for 22% of female and 28% of male; malaria chemoprophylaxis was prescribed for 73% of women and 83% of men, with 25% of the women and 16% of men using atovaquone/proguanil.

**Conclusions:** Female travelers are more likely to be younger, higher educated and travel for shorter periods of time than their male counterparts, doing so for tourism, and have higher vaccination compliance rates. Male travelers are more likely to travel for work purposes, namely to Africa. Pre-travel health advice should probably focus more emphatically for male travelers as they are exposed for longer periods of time, mostly in malaria endemic regions and are less compliant to vaccination strategies. Emphasis should be placed in both groups for the need to get medical pre-travel appointment earlier, as almost two fifths came a fortnight before travel.

**PO10.13**

**Infants, Altitude and Air Travel**

Neumann K.¹

¹Clinical Associate Professor of Pediatrics, New York Presbyterian Hospital–Cornell Medical Center, New York, New York, Pediatrics, Forest Hills, United States

Air travel is safe for healthy newborns. At the atmospheric pressure in commercial jet airliners the arterial blood oxygen saturation of healthy infants is generally between 92 to 94%. This is slightly higher than that of healthy older children and adults, likely because young infants have higher hemoglobin levels. However, infants born severely premature or who had significant neonatal cardiopulmonary issues, even if asymptomatic at home, may desaturate at cabin altitudes. Such infants may need supplementary oxygen during flights. As the length of non-stop flights increase, the physiology of air travel melds into that of acute mountain sickness (AMS). Young children with unrecognized and asymptomatic conditions have become symptomatic after 12 hours at elevations where atmospheric pressure corresponds to that in cruising aircraft. Examples include children with Down syndrome and seizure disorders, for example. Travel health practitioners should familiarize parents about AMS and be able to answer questions regarding air travel: sedating infants (not advised), in-flight dehydration (a myth); frequent feedings (counterproductive), flying with ear infections (OK); contracting infections (yes, but fewer than in daycare), use child restraint seats, (yes, but virtually never save lives or prevent serious injuries - commercial aviation is that safe), to mention just a few.

**PO10.14**

**Development of an online tool to aid clinical decision-making in malaria prevention**

Wilcox A.¹, Chera H.², Pabla J.², Ihsan M.², Guraewal R.²

¹A Talent 4 Health Ltd., Cheltenham, United Kingdom, ²Health Team Ltd., Solihull, United Kingdom

**Objectives:** Providing optimal advice on prophylactic medication to prevent malaria is complex. The itineraries of travellers, their preferences, medical conditions, and potential drug interactions all require careful consideration. Research and empirical evidence suggest that safe prescribing is not always achieved. The aim of knowmalaria™ is to provide a quick and easy online aid to safe clinical decision-making for anti-malarial prophylaxis.

**Methods:** Software was developed to enable professionals and travellers to enter key facts about the destinations, duration of stay and medical profiles of an individual traveller. knowmalaria™ filters the information and provides results on the suitability or otherwise of the different malarial drugs, flagging up contraindications and calculating the dosage and
correct quantity for dispensing recommended products. Advice and printable leaflets on other forms of malaria prevention are also supplied. knowmalaria™ is based on Advisory Committee on Malaria Prevention in UK Travellers (ACMP) recommendations. The concept and then the prototype model were tested on convenience samples of nurses working in UK general practice.

**Summary of results**: knowmalaria™ was feasibility tested on nurses using a structured questionnaire and the concept was strongly positively evaluated. The prototype model demonstrated that the development of an online aid to safe decision-making was possible. The tool was then tested on a further sample of nurses and this demonstrated that the online tool was preferable, with nurses in the sample showing a positive wish to use such a tool if it was available to them.

**Conclusions**: This study, and other research confirmed that an aid to safe clinical decision-making for malarial prophylaxis is both necessary and achievable. The current tool is based on guidelines for travellers from the UK but the potential exists for its adaptation to meet the different requirements of travellers from other countries. Separate interfaces can be developed to suit its use by health professionals and lay users. knowmalaria™ provides a standardised, reliable and evidence-based tool that can be rapidly updated. The next phase of development is to seek strategic partnerships to enable its dissemination to, and integration with existing travel medicine systems.

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**PO10.15**

**Standards of Yellow Fever Vaccination and Travel Medicine Practice in the Republic of Ireland**

Flaherty G.1,2,3, Hamza M.1, Noone P.3,4

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**Introduction**: Conformity to professional standards for the administration of yellow fever vaccination is required by International Health Regulations (IHRs). The current status regarding yellow fever vaccination centre (YFVC) activity in the Republic of Ireland is unknown.

**Objectives**: This is the first study to examine the approaches to yellow fever vaccination adopted by travel medicine practitioners in the Republic of Ireland. The objectives of the study were: (i) to describe levels of professional training of practitioners working in YFVCs; (ii) to investigate the extent to which standards of practice reflect those specified under IHRs; (iii) to identify professional training needs in relation to YFVCs.

**Methods**: A 27-item postal questionnaire was administered to licensed YFVCs in the Republic of Ireland. Respondents provided information on their practice type, professional training, storage and administration of vaccines, maintenance of patient records, activity levels, yellow fever vaccination policies, international certificates of vaccination, protocols for managing adverse events, information sources consulted, and resource and training needs.

**Results**: Responses were received from 246 healthcare professionals working in designated YFVCs, the majority of whom (91%) were engaged in General Practice. A minority of respondents had received formal training in travel medicine with 6% of those surveyed having completed a Diploma or Masters in the discipline. Ninety percent of respondents administered fewer than 50 doses of yellow fever vaccine annually. Deficiencies were identified in respect of vaccine refrigeration, record keeping, attendance at YFVC training sessions, and protocols for the management of vaccine-related adverse events. A variety of travel health information resources was used by practitioners to guide their travel medicine practice. A hierarchy of resource and training needs in relation to yellow fever vaccination was constructed from the responses received.

**Conclusions**: This study is the first of its kind to describe patterns of yellow fever vaccination in the Republic of Ireland and to highlight specific deficiencies in relation to yellow fever vaccine storage, administration and documentation therein. The expressed training needs of those surveyed should be addressed and the summary information obtained shared with the appropriate health service authority in an effort to standardise YFVC practices in this jurisdiction.
Abstracts – Poster Presentations

PO10.16
Mefloquine Failure for Malaria Prophylaxis Due to Suboptimal Dose in an “Oversize” Traveler?
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Background/Objectives: The recommended dosage of mefloquine (Mef) for Plasmodium falciparum malaria prophylaxis is 1 tablet weekly in adults, regardless the body weight.

Methods/Results: We report a case of malaria prophylaxis failure with mefloquine presumably due to suboptimal dosing. Male, aged 50, body weight 144 kg. Vaccinated against yellow fever, hepatitis A and B, and typhoid. Visit to Mozambique (11 days), prophylaxis with Mef one tablet weekly, correctly taken with no reported side effects. Six weeks after return, he developed a fever (39°C) with diarrhea and P. falciparum malaria was diagnosed (parasitemia 0.13%). The course was uneventful and the patient fully recovered after standard artemisinin combined treatment. Subsequent malaria tests were all negative.

Conclusions: We postulate that the dose of mefloquine was insufficient for the patient's body weight, also considering lipophilic behavior of this drug. Guidelines for malaria prophylaxis for adults should be probably reviewed in order to adjust dose indications for patients over a given body weight.

PO10.17
Mefloquine-Triggered Epilepsy in a Traveler
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Background/Objectives: According to current guidelines, mefloquine (Mef) remains a first-line drug in malaria prophylaxis in areas where chloroquine-resistant Plasmodium falciparum is prevalent. Nevertheless, the risk of neurologic and psychiatric adverse events has been known for years.

Methods/Results: We report a recent case of epilepsy following prophylaxis with mefloquine. Male, priest, aged 40 years, body weight 70 Kg, no alcohol/tobacco/drugs, previously healthy. Vaccinated against yellow fever, hepatitis A, and tetanus-diphtheria. Visit to Uganda (8 days), prophylaxis with Mef one tablet/week, correctly taken. Upon arrival in Kampala, after the second dose of Mef, two subsequent episodes of loss of consciousness with seizures: Mef withdrawn. During flight back (apparently recovered), seizures repeated onboard: disembarked in Addis Ababa, further episode in airport, followed by another one upon urgent admission to hospital. Transferred to Nairobi hospital under suspicion of meningitis or cerebral malaria (both ruled out). After repatriation, four other similar episodes. Patient still (one year after) on anticonvulsant treatment at full dose: attempts at dose reduction so far unsuccessful. Thorough diagnostic workup failed to diagnose other causes of epilepsy.

Conclusions: Although a causal relationship between the drug intake and a severe adverse event is usually difficult to demonstrate, it is well known that mefloquine is associated to a significantly higher risk of neurologic and psychiatric adverse events than the alternative regimens. We argue that available evidence should prompt withdrawal of mefloquine as a first choice for malaria prophylaxis.
**PO10.18**

**Pre-travel assessment in travelers to the 2010 South Africa Football World Cup**

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**Objectives:** To determine seroprevalence of measles, rubella, mumps, varicella and hepatitis A. To estimate vaccines administered and short interval regimen for hepatitis B and AB. To describe reasons for exemption from yellow fever vaccination. To assess indications for malaria chemoprophylaxis among travelers from Argentina to South Africa Football World Cup.

**Methods:** In a descriptive, cross sectional, retrospective study, we reviewed the medical records of travelers to the 2010 South Africa Football World Cup seeking consultation at Stamboulian Centers Travel Medicine Division, between April and June 2010. Serology status, vaccines administered and malaria chemoprophylaxis were assessed using SPSS statistics.

**Results:** A total of 476 medical records were reviewed: median age: 38.5 years (range 1-84), 84.5% males, mean time to consultation 31 days (range 1-187), mean length of stay 23 days (range 2-90). Reasons for traveling: tourism (79%) and business and job related (21%). Seroprevalence: measles 65% (214/328), rubella 86% (161/188), mumps 69. % (112/162) varicella 76% (90/118) and hepatitis A 22% (106/253).

A total of 1059 vaccines were administered: 20% of the population received MMR; 19.5%, dT; 28.5%, dTpa; 64%, yellow fever; 37%, influenza, 2%, pneumococcal; 19.5%, hepatitis A; 9% hepatitis B, (3% ultra accelerated schedule); 18% hepatitis A/B, (7% ultra accelerated schedule).

50 travelers received waiver of yellow fever vaccination because of : 12% immunocompromise, 82% > 60 years old, 6% other.

Malaria chemoprophylaxis was indicated in 281 travelers (59%), mefloquine 20.5% (n=97), doxicycline 3% (n=16), atovaquone/proguanil 35% (n: 168) according to itinerary.

**Conclusions:** Time to consultation was adequate allowing for prevention interventions. Susceptible population posed a threat for measles transmission in Argentina. Yellow fever vaccines were administered because of international health requirements; main reason for exemption was age > 60 years. It is mandatory for travel medicine divisions in our country to have International Certificate of Yellow Fever.

Our medical team showed appropriate training to indicate Malaria chemoprophylaxis

**PO10.19**

**Challenges of practicing Travel Medicine in a resource constrained country, Zimbabwe.**

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**Introduction:** Zimbabwe is a reckoned tourist destination boasting of one of the Seven Wonders of the World, The Victoria Falls. The multiplicity of health risks to travelers vis a viz, infectious diseases, (e.g. cholera), malaria, road traffic accidents and the limited and under resourced health facilities pose a significant risk to both local and international travelers. Lack of expertise in Travel Medicine, acute shortages of medicines and shortage of electricity present challenges in service delivery.

**Experience of the sole Travel health centers in Zimbabwe:** Experience obtained from the two sole Travel Health dedicated centers indicates an increased demand for such services. Since the inception of these two clinics in 2010, almost all travelers presented to the center specifically for Yellow Fever vaccination as mandated by the organizations taking them abroad. None have come specifically for a full travel health consultation outside the mandatory requirements of the organizations they represent.

**Challenges:** Lack of an organized structure for the practice of travel health as well as lack of formal training within the country presents a barrier to the growth and practice of Travel Medicine in Zimbabwe. This has had the effect of leaving most travelers more exposed than before. Malaria is one of the major risks in almost all major tourist destinations in Zimbabwe e.g. Victoria Falls, Lake Kariba etc. Lack of trained health professionals in travel medicine is also a major challenge. Frequent power outages have had a serious negative impact on the maintenance of the cold chain for...
vaccines. Lack of adequate medicines including vaccines also present a major challenge in the practice of travel medicine. The high cost of living has also left travelers only seeking travel health services just to fulfill mandatory requirements e.g. yellow fever, as opposed to seeking comprehensive services.

**Conclusion:** The growth of Travel Medicine in Zimbabwe requires a consented effort in training, resourcing by way of vaccines, refrigerators that do not use electricity and other relevant medicines as well as health promotion amongst travelers. More resources need to be channeled to the growth of travel medicine as a discipline.

**PO10.20**

**Managing attitudes of fever from tropics in the a&es of health district of brescia, italy**

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**Objectives:** To evaluate the approach, knowledge, practical management of the issue “fever at return from the tropics” among MDs working in the A&Es of the Health district of Brescia, Italy.

**Methods:** The objectives were studied through the delivery of a questionnaire to all the MDs working in the A&Es participating to the study. The formal request of participation was sent to all the Heads Physician of all the A&Es of the health district of Brescia, Italy. The questionnaires were delivered on January the 23rd and withdrawn on February the 5th, 2010.

**Results:** In 2008, there were 508072 consultations in all the 13 A&Es of the health district of Brescia. 367538 (72%) of these visits were carried out in the nine A&Es participating to the study. 72/92 (78%) MDs working in the participating centers filled the given questionnaires. The mean of working years after the Medicine university degree is 13.9. 11.1% (8/72) of the MDs achieved a post-graduate course/master related to infectious diseases or imported diseases. 53.5% (38/71) of MDs state that the impact of imported diseases on their routine job is low; 72.2% (52/72) affirm to observe less than one case/month; 82.8% (52/70) judge inadequate their own training to the management of feverish imported diseases. More than 80% does not know the world distribution of dengue, amebiasis, Hepatitis E, Leishmaniosis, Rickettiosis, Schistosomiasis and has never suspected malaria, amebiasis, dengue fever, leishmaniosis, schistosomiasis or tuberculosis. Approaching a case of fever from a tropical country more than 80% always asks for the following exams: creatinin, blood count, SGOT, SGPT, urine exam. One over two MD facing a case of fever from the tropics always asks for the consultation of a specialist in Infectious diseases (five times more often in the Hospitals where there is a Unit of Infectious Diseases), 36.8% (25/68) just in selected cases.

**Conclusions:** The questionnaire shows the need for MDs working in a A&E to have a support in managing the issue fever from the tropics, for example through related post-graduate courses or a better interaction with specialists working in the same health district.
Abstracts – Poster Presentations

PO10.21
The Development and Validation of a Patient Satisfaction Scale for Travel Clinic Services
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Objectives of the study: Patient satisfaction (PS) has become an important component of quality improvement in ambulatory care services. The correlation between PS and adherence makes it an essential measure in the travel clinic. However, PS is difficult to measure due to its subjective and complex psychological construct. The main objective was to develop, according to psychometric standards, a self-administered generic questionnaire exploring travelers’ opinion on quality of travel clinic services in Italy and provide its preliminary validation.

Methods: A qualitative phase was conducted to generate items and domains through a literature review. A list of easily comprehensible non redundant items was defined through expert review. The draft questionnaire, which included 5 negatively phrased items to avoid agreement bias, was pretested on 15 travelers and 5 health care professionals to ensure the readability and understandability of the items other than the user-friendliness of the instrument. The second step was a quantitative validation phase and comprised a multicenter study in 13 travel clinics throughout Italy and included 366 travelers. It was designed to select items, identify dimensions and scale reliability through principle component analysis (PCA) with a varimax rotation and psychometric testing for scale reliability.

Results: A 23 item questionnaire with 5 subscales (appointment making, facilities, waiting time, consultation and payment). The factorial structure was satisfactory (loading >0.50 on each subscale for all items). Interscale correlations ranged from 0.2 to 0.46, Cronbach α coefficients ranged from 0.68 to 0.91. Factors related to satisfaction level independent from travel clinics were age, and current reported health status.

Conclusions: The instrument appears to be reliable and valid. Good estimation of patient opinion on travel clinic consultation performance was obtained using this questionnaire. PS can be measured routinely without interfering in the travel clinic routine and augmenting the work load of travel clinic professionals. The results suggest minor changes on some items to improve the psychometric characteristics for the final version of the questionnaire. When comparing performances between travel clinics or the same travel clinic over time scores need to be adjusted on 2 variables that influence satisfaction independently from travel clinic - age of the traveler and current reported health status.

PO10.22
The Impact of an Electronic Medical Record on the practice of International Travel Medicine at a Large Academic Health System
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Background: The goal of an international travel preparation visit is to provide accurate high quality care while maximizing the efficiency of the experience for both the patient and provider. Electronic medical records (EMR) are an emerging technology with powerful possibilities and pitfalls. Recent data note providers spend up to 20% more time charting with an EMR compared to paper records. EMR are mandated in the US by 2014. The International Traveler's Health Clinics (ITHC) at the Cleveland Clinic (CC) have used the commercially available EMR, Epic© across its geographically scattered sites since 2003. A template note with drop-down menu choice and free-text input is used by all providers for pre-travel visits. All sites can access notes by all providers.

Objective: To explore perceptions of EMR impact at several sites within our large academic medical practice.

Methods: The question of EMR value in travel medicine practice was explored by a twelve-question, five-level Likert scale questionnaire of the ITHC health care providers. (5 = strongly agree) The questionnaire was followed up by a semi-structured interview to look for recurrent themes regarding EMR value in travel medicine practice.

Results: Average responses ≥ 4 of 5 on a Likert scale noted the EMR improved speed, accuracy, and overall practice impact compared to the paper record. Ease of medication refill ranked the highest positive response. Immunization records facilitated daily practice and eased yearly state vaccine audits for yellow fever, typhoid, and hepatitis A. Providers also feel the template note and EMR are valuable training tools. No element scored below an average of 3.5 indicating the EMR is helpful for travel medicine practice. In reference to non-travel EMR use, some elements rank below 3.

Conclusion: A flexible template note format and EMR facilitate travel medicine practice in our experience. Vaccine
records and electronic refill ability were deemed the most useful elements. Ease of EMR record access allows patients to start vaccine series in one location, and finish in another. The potential for research exists given consistent data records across providers and visits. The EMR can serve an educational role as well.

**PO10.23**

**Canadian trends of international travel and risk of malaria exposure**

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**Objectives of the study:** This study outlines characteristics of travel from Canada to overseas destinations in the past 10 years and analyzes the changing pattern of exposure to travel health related risks.

**Methods:** A descriptive analysis of Statistics Canada’s International Travel Survey of Canadian residents was conducted to outline trends in travel. Estimates of the risk of exposure to malaria were developed based on the World Health Organization’s International Travel and Health 2010.

**Summary of Results:** Canadians made over 10 million international trips other than to the United States, that lasted at least one night in 2009, a 75% increase from 2000. There appears to be a shift in the top destinations travelled to by Canadians over the past decade. From 2000 to 2009, there was a 40% increase in travel to Europe compared to a 186% increase to destinations in the Caribbean. Based on the malaria risk defined by the WHO, from 2000 to 2009, Canadians increased their travel to countries with a risk of malaria by 131% compared to 55% to countries with little to no risk of malaria.

**Conclusions reached:** The changing frequency and pattern of travel abroad indicate that more Canadians are travelling and they are going to destinations with an increased risk of exposure to travel health related risks. These results underscore the need to better assess the burden of travel-related diseases in Canada and get a better understanding of the knowledge, attitudes and practices of travelling Canadians. This will enable an improved knowledge translation in order to ensure that Canadians are prepared with appropriate preventive measures before they travel.

**PO10.24**

**Using Geospatial Techniques To Identify Target Populations of U.S. Foreign-Born Travelers**

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**Objectives:** global travel increases the potential for infectious diseases to emerge in new locations and spread very rapidly around the globe. One high-risk group of travelers is individuals who visit friends and relative (VFRs). CDC’s “Health Information for International Travel 2010” defines VFR as “an immigrant, ethnically and racially distinct from the majority population of the country of residence (a higher income country), who returns to his or her homeland (lower income country) to visit friends or relatives.” The objective of this analysis is to characterize the foreign-born population in relation to their proximity to international airports and travel medicine providers.

**Methods:** Data on the foreign-born population were obtained from the American Community Survey for 2006-2008 from the U.S. Bureau of the Census. Airports in the United States (excluding Alaska and Hawaii) that were listed as internation by the International Air Transport Association (IATA) were used as the basis for the destinations. Communities within 100 miles of these airports were examined for population demographics, socioeconomic status, and infrastructure. Clinics listed on the Internation Society of Travel Medicine’s Global Travel Clinic Directory in April 2010 were used in the analysis. Distance to the nearest international airport was determined for each provider clinic.

**Results:** Fifty airports in the United States were designated as international by IATA. The states with the largest number of international airports were California (8), Florida (5), and Texas (5), all 3 of which were in the top five states for the largest foreign born populations. Because the international airports are in larger cities in the states with large numbers of foreign born, it is not surprising that nearly 90% of the foreign born from the top 15 birth countries live within 100 miles of an international airport. Nearly 95% live within 50 miles of one of the 569 ISTM identified travel clinics.
Travel Medicine Providers

Airports designated as International by the International Air Transport Association. Travel Medicine providers are those listed by the International Society of Travel Medicine in April 2010.

[Travel_clinics_abs]
Conclusions: Geospatial techniques provide an effective way to identify specific subpopulations of travelers and to determine the proximity of specific travel health services to those populations. That information can guide the targeting of health information and services.
PO10.25
Pre travel advice: evaluation of 661 travellers assisted in a public travel medicine unit during 2009 in Buenos Aires, Argentina.
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Introduction: In Argentina, the "Hospital de Infecciosas F. J. Muñiz" was the first public institution to develop Travel Medicine from the end of the 80's, either in the pre-travel as in the assistance of returning travellers. During 2000 to 2009, 10541 travellers were assisted to obtain pre-travel advice. To know the characteristics of our population of travellers and to improve our daily work in the field we analyzed the clinical records of the pre-travel consults.

Materials and methods: A retrospective, cross-sectional and descriptive analysis was performed based on medical records of individual travellers (no corporate travellers) assisted for pre-travel advice during 2009.

The following data were analyzed: gender, age, destination, reason for travel, length of stay, time of consultation prior to travel, purchase of medical coverage for the trip, visit area of malaria transmission and chemoprophylaxis indicated.

Results: 1030 travellers were assisted and 661 clinical records could be analyzed, 337 (50.98%) females and 324 (49.01%) males with a median age of 26 years.

The most frequently destinations were: Latin America (LA) 411 (62.17%), Sub-Saharan Africa (SSA) 101 (15.27%), South-Central Asia (SCAS) 64 (9.68%), Southeast Asia (SOAS) 49, North Africa (NAF) 18 (2.72%).

368 travellers (55.67%) consulted less than 30 days prior to departure date. The length of stay was more than 21 days in 431 (65.20%).

The reasons for the trip were: tourism 474 (71.70%), work 91 (13.76%), other (religious, sports competitions, conferences, exhibitions) 44 (6.65%), to visit family and relatives 23 (3.47%), education 19 (2.87%), unscheduled 9 (1.36%) and 1 (0.15%) for international adoption.

363 (54.91%) travellers had purchase medical health coverage for the journey.

411 (62.17%) passengers were travelling to areas of malaria transmission. Chemoprophylaxis were indicated in 340 travellers and mefloquine was the drug more used (288 cases, 84.70%).

141 (21.33%) travellers had a history of pre-existing diseases.

Conclusions:
- Travellers consult with shortly time before the departure date which makes it difficult to comply with appropriate prevention measures.
- Most are young people, with prolonged voyages and visiting malaria areas which increases the risk for travel.
- It is important to improve the knowledge about pre-travel advice

PO10.26
Travel Medicine in an Emergency in Public Health: Traveler´s Clinic Experience as Rapid Response in Pre-Travel Medical Advice for Travelers to Haiti
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Natural disasters represent a threat to life and the minimum conditions of survival for millions of people can be compromised. On January 12, 2010 Haiti was ravaged by one of the largest and most devastating earthquakes throughout its history. Rescue teams from around the world arrive in the country for humanitarian aid.

Objective: To emphasize the importance of travel medicine in emergency situations in international public health care and to describe the pre-travel medical advice provided to the contingent of travelers that sought medical advice at Travellers´ Clinic of HCFMUSP.

Material and Methods: Retrospective analysis of records of travellers who sought pretravel medical advice at Travellers´ Clinic of HCFMUSP in January, 2010 with travel to Haiti for Humanitarian Aid. The outpatient clinic of the teaching hospital of travelers is the reference travel medicine. All the professional staff of the clinic were informed about the action,
and in 24 hours the group created a strategy to address the cluster of fast and efficient way without compromising the routine of the clinic. There were two rooms available for booster shots and one classroom was used to guide collective contingent on the risks of health problems that could occur during the mission. General information about the aspects: cultural, historical, political and economic on Haiti were discussed with all volunteers. In the guidance on the prevention of infectious diseases, were emphasized: the risks of disease through food and water, vectors, animals and air pollution.

**Results:** 98 professionals were attended, 78 male, the median age was 33 years old. Professionals categories: healthcare workers (29/29,6%); military personal (38/38,7%); phone technician (17/17,3%) and others professionals (14/14,2%). Recommended vaccines: hepatitis A (85doses/87%), typhoid fever (90d/92%), yellow fever (45d/46%), dT (35d/36%), hepatitis B (35d/36%), SCR (27d/28%) and others vaccines(12/12%). All preventive measures were recommended against malaria, chloroquine was the drug of choice for malaria chemoprophylaxis, and ciprofloxacin was the antibiotic of choice for diarrhea. A document with all the advices and adverse effects of recommendations was drafted and sent to the coordination of the mission.

**Conclusion:** The travel medicine is present every day between us and transcends barriers in unexpected situations such as emergency and rapid response in public health, as in the case of natural disasters.

**PO10.27**

**Implementation of Prescription Services using Medical Protocols in a Nurse-based Travel Clinic**

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**Objectives:** Comprehensive pre-travel medical services include providing preventive interventions against some of the most commonly encountered travel-related health risks. This includes chemoprophylaxis against malaria and high altitude illnesses (HAI), as well as stand-by self-treatment for travelers’ diarrhea (TD). This is in addition to immunizations and counseling based on the pre-travel risk assessment. In 2007, the Calgary International Travel Clinic hired a medical consultant to help develop, implement and monitor provision of such services by registered nurses directed by medical protocols. The purpose of this study was to assess the first year of implementation of the travel nurse prescribing function.

**Methods:** The first year of prescribing (March 1 2010 to February 28 2011) was assessed for strengths and weaknesses, including phases of development, implementation and continuous quality improvement (CQI). A review of key documents, key informants and a sample of travel clinic charts was conducted.

**Results Summary:** During the first year of implementing a prescription service, our travel nurses provided over 6,000 individual prescriptions to their clients, where 68% for TD self-treatment, 27% for malaria prophylaxis and 5% for HAI prophylaxis. Regardless of age (5 months to 93 years of age) or health status (e.g., pregnancy, chronic disease), all clients were provided recommended travel-related prescriptions. Few medical errors were identified by the medical consultant, receiving pharmacy or client.

Key topics identified during the development phase included the need for a detailed medication manual as the basis for all prescribing functions, and key senior on-site personnel for on-going educational and procedural support.

Key topics during the implementation phase included improvements in health assessments and documentation by nurses, and ensuring continuous medical consultant coverage (including verbal orders).

Key topics during the CQI phase included ongoing evaluation of individual nursing performance, and key revisions to the initial prescribing process.

**Conclusions:** During the first year of implementation, the process of providing prescriptions by travel nurses using detailed medical protocols under the supervision of a medical consultant appears to be safe and effective.
PO10.28
Is travelling or working in a touristic town a risk factor for Ischaemic Heart Disease?
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**Introduction:** Benidorm, located in the Spanish Mediterranean Costa Blanca, is a destination for millions of travellers, mostly Britons, demanding tourist service all year long.

**Objective:** To determine if either travelling or working in a crowded touristic town is a risk factor for presenting heart disease and mortality as previously suggested elsewhere.

**Methods:** The number of deaths during the 12-month-period of 2008 in Benidorm (Spain) is reviewed in comparison to the rest of the geographic area (Community of Valencia). On the other hand, data from different list of fatalities in British travellers is analysed, along with our own series of a 125-bed general hospital in Benidorm.

**Summary:** Deaths in the whole region of Valencia due to heart disease, in men (N:2,452 [11.8%]; 97.8 x 10⁵ [79.25 +/- 1.63]) are 28% fewer than in Benidorm (N:49 [18.1%]; 138 x 10⁵ [110.27 +/- 16.09]); whereas in women (N:1,959 [10.2%] 77.7 x 10⁵ [37.64 +/- 0.89] are 45% fewer (N:46 [24.9%] 132.3 x 10⁵ [68.44 +/- 10.36]. On average, between 2001/2006, there were 3,906 deaths in British nationals that required action by consular staff each year. These figures underestimate deaths abroad as many may not be notified. There are around 13 million British nationals living overseas and it is likely that more than 3,906 die each year. A crude, non-standardised, calculation of the death rate in England and Wales in 2005 was 9,600 per million population. It is therefore likely that a similar rate will occur in nationals living overseas. Spain is the most visited country by British tourists (16 million visits during this period). The death-related cases were 1,663.

**Conclusions:** Although the cause remains unclear, the mortality in residents due to heart diseases is much higher in Benidorm than in the rest of the town of the area in Spain. Rather than accidents or infectious diseases, preexisting conditions seem to be the leading causes of death among travellers visiting developed hostage countries. Prospective research is necessary to determine whether tourist activities involving both traveller and tourist service provider constitute a risk factor for ischaemic heart disease. If this suspicion is eventually proven true, careful pre-travel heart evaluation in selected patients might be necessary in the future.
PO11 Travel Advice-Approaches and Outcomes

PO11.01
OMAR: A Dutch approach to practical guidelines for repatriation of hospitalized or recently discharged patients.
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Each year approximately 10000 patients are transported to the Netherlands by ambulance or by air. These patients are admitted in or have been recently discharged from hospitals outside the Netherlands. In the process of making flight arrangements for admitted or recently discharged hospital patients, a so called MEDIF needs to be approved by the airline medical department which contains the itinerary and specified medical information of the patient and which provides indemnity to the treating physician in case of complications during the flight. However, for the safe and secure transport of these patients certain guidelines have been made:

Since 1989 a Dutch interdisciplinary organization called OMAR has been established in order to provide, discuss and review guidelines for the safe transport of patients on regular commercial airliners. OMAR is the result of a regular meeting between Cardiologists, Intensivists, physicians of all major Dutch medical assistance companies and the airlines. These guidelines not only provide in amount of time to be waited after a medical event before transport, they also advise in transport position, level of medical escorting, necessary equipment, special modules and ground support in case of repatriation by air. The guidelines are subject to regular review based on clinical experience of all members and the latest medical publications.

In this presentation we would like to give an overview of the system of making and implementing guidelines for international patient transport, in which all alarm centres in the Netherlands are involved, a system which unique in the world. Several examples of real cases will be given and it may be followed by a discussion in which OMAR guidelines are being compared with e.g. the system of guidelines being set by IATA.

PO11.03
Knowledge of Transmission, Prevention, and Treatment of Dengue Virus Infection in Travelers in the Boston Area
Travel Medicine Network (BATMN)
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Objective: To compare understanding of dengue virus transmission and prevention in different types of travelers.

Methods: Pre-travel surveys to assess patient knowledge regarding travel-related dengue risks and protective measures were administered to 802 travelers seen in the 5 BATMN travel clinics from January to November 2010. Differences in dengue fever awareness, prevention and treatment were described for patients based on their demographic characteristics and purpose of travel. Respondents who had not heard of dengue fever were instructed not to respond to subsequent questions and were removed from our analysis. Chi square statistics were used to test for differences between groups.

Results: Surveys were completed by 788 travelers who identified the following purposes of travel: tourism 50.8%, education/research/missionary/volunteer (EDU/VOL) 20.3%, business 15.7%, and visiting friends or relatives (VFR) 13.2%. Of 788 travelers, 273 (34.6%) had not heard of dengue; responses for questions about dengue knowledge for the remaining 515 travelers were analyzed. Most (65.3%) travelers knew that dengue virus was transmitted by mosquitoes. Tourists were more likely to have heard of dengue than other travelers combined (71.3% vs. 59.3%, p = 0.002).
Significantly more EDU/VOL travelers (46.7%) than other travelers (27.6%) knew that dengue was not prevented by medication (p < 0.001). EDU/VOL travelers also were significantly more likely to know that anti-mosquito measures would prevent dengue virus infection relative to all other groups (62.9% vs. 47.1%, p = 0.016). Most travelers (61.9%) did not know if a vaccine was available for dengue, and most (68.8%) did not know if specific treatment was available for dengue fever.

**Conclusion:** Most travelers have an incomplete understanding of how dengue virus is transmitted and what options are available for prevention and treatment. Health care providers may need to emphasize to travelers at risk for dengue that no prevention or treatment is available, and that measures to avoid mosquito bites are important in reducing their risk for dengue virus infection.

<table>
<thead>
<tr>
<th></th>
<th>VFR</th>
<th>Business</th>
<th>EDU/VOL</th>
<th>Tourist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heard of dengue</td>
<td>54/104 (51.9%)</td>
<td>73/124 (58.9%)</td>
<td>103/160 (64.4%)</td>
<td>285/400 (71.3%)</td>
</tr>
<tr>
<td>Knew dengue transmitted by mosquitoes</td>
<td>30/61 (49.2%)</td>
<td>40/71 (56.3%)</td>
<td>67/105 (63.8%)</td>
<td>152/269 (56.5%)</td>
</tr>
<tr>
<td>Knew dengue is not prevented by medication</td>
<td>11/61 (18.0%)</td>
<td>18/71 (25.4%)</td>
<td>49/105 (46.7%)</td>
<td>82/270 (30.4%)</td>
</tr>
<tr>
<td>Knew anti-mosquito measures useful for prevention</td>
<td>23/61 (37.7%)</td>
<td>32/71 (45.1%)</td>
<td>66/105 (62.9%)</td>
<td>134/269 (49.8%)</td>
</tr>
<tr>
<td>Did not know if vaccine was available</td>
<td>46/61 (75.4%)</td>
<td>44/70 (62.9%)</td>
<td>59/105 (56.2%)</td>
<td>164/270 (60.7%)</td>
</tr>
<tr>
<td>Did not know if specific treatment was available</td>
<td>45/61 (73.8%)</td>
<td>49/72 (68.1%)</td>
<td>68/105 (64.8%)</td>
<td>187/269 (69.5%)</td>
</tr>
</tbody>
</table>

[Table 1: Frequencies of Responses by Traveler Type]

Proportions were calculated as follows for each question: (# who gave response) / (total # of respondents within that group)

**PO11.04**

**Compliance with Malaria preventive measures in international travelers**

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**Background:** Although many people travel each year to countries where malaria is present, few data are available on their knowledge, attitudes, and practices for prevent malaria, specially the use of chemoprophylaxis, bed-nets and repellents.

**Objective:** To know the adherence to the malaria preventive measures advised at International Vaccine Center (CVI) of Granada.

**Methods:** A cross-sectional survey was conducted in April 2010. A telephone questionnaire was made to 269 travelers who had travel to malaria risk areas between February 2009 and February 2010. All of them had sought pretravel advice at CVI of Granada. They were asking about socio-demographic factors, adherence to recommended anti-malaria prophylaxis, and knowledge about malaria transmission. A bivariante analysis was made with the data.

**Results:** 92.5% agreed to participate in the study. 50.2% were male. Traveler mean age was 42, 5 years. 64% took the malaria chemoprophylaxis as indicated. 61% used bed-nets and repellents correctly. The factors associated with correct intake of chemoprophylaxis were: the travel purpose (74% of adherence in aid-programs travelers versus 43, 5% between those who travel for visiting friends and relatives), and the drug recommended (69% with atovaquone-proguanil vs 28%
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with chloroquine). The factors associated with correct use of bed-nets and repellents were: the travel length (70% of adherence if shorter than 15 days vs 0% if longer than 85 days) and the travel purpose (69, 1% in leisure travels vs 17, 4% in those visiting friends and relatives). The mainly reason for not taking the chemoprophylaxis was an inaccurate risk perception (15%), followed by fear to adverse effects (4, 8%).

**Conclusions:** Very high response rate. Low incidence of adverse effects reported with the chemoprophylaxis. An inaccurate risk perception was the mainly reason for not taking the chemoprophylaxis.

PO11.05

**Retrospective analysis of risks for travellers with underlying medical conditions**

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**Introduction:** Recent statistics of increasing numbers of travellers from western to developing countries also apply to travellers with possibly immune compromising medical conditions. As the risk of obtaining travel related health problems is high in this group, specific pre-travel advice, suitable for each individual traveller is indispensable. Consequently, an evaluation of health risks for various groups of immunocompromised travellers, as well as of travel advice and its effectiveness given in current practice is of value.

**Objectives:** To identify characteristics of various groups of travellers with pre-existing medical conditions visiting the AMC travel clinic for travel advice, as well as to evaluate the effectiveness of preventive measures and travel advice that is given. Also, to assess rates and types of health problems related to travel in order to optimally address care needs that are identified.

**Methods and Results:** Retrospectively, demographical and medical details of 420 patients attending the vaccination department in the AMC from January to October 2010 were collected by patient file research. Additionally, after oral consent, information about patients health during and related to their travel was collected by a telephone questionnaire. The largest groups consisted of patients with auto-immune disorders (22,0%), cardiovascular disease (16,7%), diabetes mellitus (15,8%) and HIV positivity (12,1%). A prominent number of the travellers was aged over 60 (23,3%). Generally, patients were of opinion that travel advice given was sufficient. The overall reported percentage of health problems was 38%. Symptoms reported most frequently were gastro-intestinal. There was no report of a diagnosis of a vaccine preventable disease (VPD).

**Conclusions:** Even though there have been no reports of VPD’s, the rate of reported health problems, especially gastro-intestinal problems, is high. Therefore, it is necessary to standardise pre-travel information for various categories of travellers, so that each traveller gets optimal advice. This should at least be possible for the frequently occurring pre-existing immunocompromising conditions such as diabetes mellitus, HIV and auto immune disorders. A prospective study will be launched soon to optimize pre- and post travel care.

PO11.06

**Applying Audience Feedback on Web-Based Travel Health Emergency Communications during the 2009 Influenza A (H1N1) Pandemic**

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**Objectives:** In September 2009, CDC Travelers' Health (TH) evaluated its web-based H1N1 influenza (H1N1) emergency communication materials to ensure that recommendations were effectively communicated to the public as the outbreak evolved. TH focused on messages for four target audiences: travelers, health care professionals (HCP), travel health advisors (THA), and travel and tourism industry professionals (travel professionals).

**Methods:** CDC, in collaboration with Oak Ridge Associated Universities and User Insight, Inc., conducted 36 in-depth interviews with travelers (12), HCP (12), THA (6), and travel professionals (6), recruited through a nationwide survey participant registry. Qualitative data were collected and analyzed. Participants were asked about their awareness of H1N1 and their concerns about H1N1 related to travel. Further, participants interacted with H1N1 content on the TH website to
demonstrate their comprehension of and needs for accessing, finding, and using health content for international travel. 

**Results:** Travelers and travel professionals learned about H1N1 primarily through popular media sources and did not proactively seek travel-related H1N1 information. Travelers’ perceptions of H1N1 were varied, but most had questions only about how H1N1 would affect their travel. THA proactively sought information from trusted websites (CDC, WHO) about current H1N1 outbreaks affecting travel and recommendations for patients’ trips, whereas HCP sought H1N1 disease information unrelated to travel from trusted websites (CDC, WHO). Most participants had trouble finding travel-related H1N1 content on the website. Participants felt the H1N1 Outbreak Notice addressed all their questions, but they preferred a question/answer format and desired a map showing outbreak locations. Participants wanted an explanation for recommendations and expressed a preference for recommendations that were specific, relevant, short, and memorable. 

**Conclusions:** Results of the interviews were used to direct future H1N1 communication efforts to the four audiences. Considering travelers and THA the primary audiences of travel-related H1N1 information, TH reorganized the location of and pathways to travel-related H1N1 content. Popular media and social media sources were used to raise travelers’ awareness of the content. Principles from the audience feedback for H1N1 content were used during TH’s emergency communication efforts after the Haiti earthquake and cholera outbreak in 2010.

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**PO11.07**

**Imported Infectious Disease by Travellers in Spain: Results from the Spanish Network on Imported Infectious Diseases by travellers and Immigrants (+Redivi).**

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**Objectives:** In the last years, the number of Spanish travellers to tropical regions has been on the rise. Local series about imported infections, even in specialized centres, often disclosed a partial view while countrywide networks provide a more representative picture. Our objective was to describe imported infections by travellers based on ad-hoc national network.

**Methods:** +Redivi is composed by 9 medical centres (primary and hospital care, specialized and non-specialized in tropical medicine) who attend travellers and immigrants throughout different representative regions in Spain. This network shares a common database for data registry and analysis on imported infections. We report on data collected from January 2009- December 2010.

**Summary of results:** Data were available from 1340 travellers. Main characteristics are described in the table.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Travellers(N=837)</th>
<th>VFR-Immigrants (n=434)</th>
<th>VFR-Travelers (N=69)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (median years)</td>
<td>35.9</td>
<td>36.6</td>
<td>23.3</td>
</tr>
<tr>
<td>Sex (males %)</td>
<td>46.4</td>
<td>49.8</td>
<td>56.5</td>
</tr>
<tr>
<td>Destination (%)</td>
<td>India: 11.5; Senegal:4.8; Thailandia: 3.8</td>
<td>Bolivia:37.1; Equator:9.7; Equatorial Guinea:9.7</td>
<td>Equatorial Guinea:8.7; India: 8.7; Brasil:5.8</td>
</tr>
<tr>
<td>Duration of trip (Median in days)</td>
<td>178</td>
<td>75</td>
<td>237</td>
</tr>
<tr>
<td>Time to consultation (Median in weeks)</td>
<td>2</td>
<td>36.5</td>
<td>3</td>
</tr>
<tr>
<td>Immunosupression (%)</td>
<td>1.4</td>
<td>1.6</td>
<td>0</td>
</tr>
<tr>
<td>Reason for consultation (%)</td>
<td>Health exam:32.6; Gastrointestinal S.:29.9; Febrile S.:16</td>
<td>Health exam: 54.4; Laboratory Alterations: 19.4; Gastrointestinal S.:8.5</td>
<td>Health exam:40.6; Gastrointestinal S.: 26.1; Febrile S.: 15.9</td>
</tr>
<tr>
<td>Final diagnosis (%)</td>
<td>Healthy:24.1; Travellers diarrhoea:7.4; Giardiasis: 5.7</td>
<td>Eosinophilia:20; Healthy:16.1; Chagas</td>
<td>Healthy:21.7; Eosinophilia:14.5; Travellers</td>
</tr>
</tbody>
</table>
The 79.9% of all type of travelers were considered of high risk (humanity workers, missionaries, backpackers and all VFR). The traveler has received pre-trip travel medical advice in 41.9% of cases. Only in 48.6% of patients who had indication of malaria prophylaxis, it was done adequately. More than one diagnosis was made in 21.2% cases. In 57.3% of asymptomatic patients, an imported disease was detected.

**Conclusions:** Imported infections are common among travellers in Spain. In our series, VFR represent the 40% of total travellers attended after a trip to a tropical region. This impacts in the spectrum of the type of travel, destination and its consequences. Despite the high proportion of high-risk travellers, there is a low proportion of pre-trip advice. In those that have indication to take prophylaxis against malaria, less than half is carried out properly in terms of duration and dosage. In this kind of population, the health exam could be useful. It is advisable to implement standardized protocols for the screening of imported infections in travellers.

**PO11.08**

**Yellow fever queries from United Kingdom Yellow Fever Centres to a national travel health advice line**

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**Objectives:**

- To describe queries relating to yellow fever (YF) asked by health professionals working in United Kingdom Yellow Fever Vaccination Centres (YFVCs).
- To identify aspects of knowledge about YF that is challenging to health professionals.
- To highlight training needs in order to adapt the national training program for YFVCs.

**Methods:** Data were collected from all calls to the National Travel Health Network and Centre (NaTHNaC) telephone advice line for health professionals during a six month period (1 January - 30 June 2009). Key information from each call, including centre demographics and category of query, was entered on a standardised form. Data was collated and analysed using Microsoft Access and Excel®. NaTHNaC has a programme of registration, required training, adherence to standards, and audit for YFVCs in England, Wales and Northern Ireland.

**Results:** A total of 4,000 calls were received during the study period, of which 2,377 (59.4%) were from YFVCs. 93.5% of calls from YFVCs were made by Practice Nurses. Callers asked 1,902 vaccine related queries. Where a specific vaccine was mentioned (n=1,753) 52.3% related to YF vaccine. The most frequent queries related to YF vaccine were; country recommendations for vaccination (23.2%), YF certificate requirements (17.5%) and vaccine appropriate to special health needs (47.7%). Of the special health needs queries, 45.2% were about travellers aged 60 years or older. NaTHNaC nurse advisors were able to answer 94.3% of queries without referral to the on-call physician.

**Conclusion:** Country recommendations for YF vaccine, YF vaccination requirements, and YF vaccination in those aged 60 years or older remain challenging areas for health professionals working in YFVCs. These important aspects of risk assessment should be emphasised in YF vaccination training programmes.
Assessing the Communication of Key Travel Health Messages: Media Coverage of CDC’s “Making the Case for Healthy Travel” Campaign

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**Background:** During the 2009 outbreak of H1N1 influenza, the spread of illness related to travel was apparent. A need was identified for a concerted effort to communicate prevention messages to travelers. CDC Travelers’ Health responded by launching a campaign to encourage travelers to take appropriate precautions. One key campaign strategy involved efforts to generate media coverage.

**Objectives:** To assess news coverage of the campaign in terms of audience reach and accuracy with respect to key campaign health messages.

**Methods:** We identified media stories about the campaign appearing in print and television news using various search engines and databases such as Lexis-Nexis, VOCUS, and Radian-6. The reach of these stories was measured using metrics such as circulation numbers for print media and Nielsen audience data for broadcast television. Transcripts were examined to assess the frequency with which core messages were conveyed, as well as the manner in which these
messages were communicated.

**Results:** Audience Reach: Over 140 stories appeared in print and television news during the campaign. Coverage was concentrated near the Thanksgiving holiday and appeared most frequently in the South, Midwest, and Southwest regions of the United States. An estimated 17 million people were exposed to campaign messages via these stories.

**Health Messages:** Stories generally carried several core messages, with differences across media. For example, tag lines (e.g., “Stop, Wash & Go”) were more likely to be carried in television stories, while print stories were more variable but conveyed recommended messages to a greater extent. Although variations in the phrasing of recommendations were observed, the essence of campaign messages was typically communicated as intended. Notably absent was the recommended source for further information (i.e., www.cdc.gov/travel).

**Conclusions:** Overall, simple recommendations for preventing flu while traveling were communicated to a substantial audience via media coverage of this campaign. Print stories were more variable in their level of coverage yet more informative overall in terms of communicating campaign messages. Finally, since recommendations were typically communicated as intended (despite occasional alternate phrasings), outreach to the traveling public through news coverage may help to raise awareness concerning key travel health issues.

**PO11.11**

Providing simple, credible health advice to travelers during the 2009 H1N1 pandemic: An evaluation of the “Making the Case for Healthy Travel” campaign

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**Background:** The urgency of the H1N1 pandemic prompted CDC to launch a nationwide campaign aimed at US domestic and international travelers. The campaign provided on-the-spot prevention advice with attention-grabbing messages and graphics through communication channels likely to reach travelers. We conducted audience research to guide selection of the messages, graphics, and channels. CDC was able to post travel health advice in airport screening areas. CDC also purchased airport display, billboard, newspaper, XM radio, and travel website advertisements. Additional advice was provided through the CDC website, other health-related websites, e-cards, and social media sites.

**Objectives:** Estimate the campaign’s potential audience size. Determine the number of people who interacted with the campaign online. Assess how the target audience was affected by the advertisements.

**Methods:** To estimate potential audience size, researchers analyzed data from advertisement, web analytics, and media monitoring services. Researchers used web analytics to determine campaign exposure and an online survey to assess advertisement affect on the audience.

**Results:** The potential audience size for the campaign was estimated at just over 83 million people. The largest share was reached by outdoor advertising. Broadcast and internet were the next most successful media, followed by print and social media channels. Although many outreach methods were used, specific data for audience interaction with the campaign were available only for some internet channels. Through these measurable channels, an estimated 103,000 people were exposed to campaign messages. The highest exposure came from health-related websites, with 88,381 views. Online advertising was the next most successful channel, accounting for 11,226 clicks, followed by social media tools at 3,570 views, clicks, and downloads. During concept testing, most travelers rated “Prevention Can Be Travel-Sized,” and “Stop, Wash & Go” highly for measures related to design appeal, understandable and clear instructions, and motivation to action.

**Conclusions:** Adopting a commercial style for public health materials can produce a positive result regarding potential audience impact. In terms of getting attention, public health advertisements may be able to compete successfully with similar commercial online advertising. Careful message segmentation is critical for maximizing the reach of a multichannel campaign.
**PO11.12**

**A preventable death?**

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**Objectives:** The death of a 43 year old woman on holiday in Egypt shocked travel clinic staff. Initial reports suggested that this healthy woman had diarrhoea and vomiting and died because of the effects of low potassium on the heart. A Significant Event Analysis (SEA) was conducted to determine whether anything could have been done to prevent this death, and was repeated when the full post-mortem results were known. It is presented here with the permission of her family.

**Methods:** Significant Event Analysis involves facilitated discussion on key facts and questions about a critical incident. Questions and conclusions are based on a literature review of available evidence. The aim is to learn lessons about the overall quality of care and what changes might lead to future improvement.

**Summary of results:**

<table>
<thead>
<tr>
<th>Factual evidence</th>
<th>Questions raised</th>
</tr>
</thead>
<tbody>
<tr>
<td>The woman had not attended travel clinic for advice or vaccinations.</td>
<td>Could more be done to raise awareness and encourage attendance at the travel clinic?</td>
</tr>
<tr>
<td>The pathogenic cause of the diarrhoea and vomiting was not established but was not thought to be vaccine-preventable.</td>
<td>If food and water hygiene advice had been given, would it have prevented gastroenteritis? Should more emphasis be placed on advising travellers how to manage such episodes and when to seek early medical help?</td>
</tr>
<tr>
<td>The UK post-mortem report, obtained two months following the death, indicated that death was due to an extensive myocardial infarction. Coronary and cerebral arteries showed mild to moderate atheromatous disease.</td>
<td>To what extent could a pre-travel consultation have identified pre-existing risk factors?</td>
</tr>
</tbody>
</table>

**Conclusions:** The conclusions were that this was a rare, tragic but unpreventable death, of a type recognised in the literature on travel-related morbidity and mortality. Nevertheless, valuable lessons on optimum care were learned and will be shared with the ISTM audience.

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**PO11.13**

**Online Survey on Knowledge about Risks, Prevention and Consequences of Infections with Hepatitis B Virus among Travellers from Four European Countries**

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**Objective:** To evaluate knowledge about risks, prevention and consequences of infection with hepatitis B virus (HBV) among travellers from four low HBV risk, European countries.

**Methods:** Individuals from an internet panel and based in the Czech Republic, the Netherlands, Spain and Sweden were invited to take part in an online survey. A total of 4,203 respondents met the inclusion criteria and completed the survey.

**Results:** The majority (62.3%) of respondents did not know the main travel destinations with moderate or high prevalence for HBV. Also, 20.1% were somewhat or very unaware of the ways in which HBV can be caught and travellers aged 18-35 years were significantly more likely \((p < 0.01)\) to have participated in at least one risky activity abroad. Three quarters (74.9%) thought they were somewhat or very aware of the health implications of contracting HBV, but only 11.8% of participants selected more than three out of the six correct answers relating to conditions caused by HBV. Only 39.3% of those who knew their vaccination status had received vaccination against HBV within the previous five years, although some patients may have been vaccinated prior to this period.

**Conclusions:** As country specific variables were not analyzed in this study, the results do not allow interpretation by
country. A high proportion of the respondents were at an elevated risk of HBV infection while visiting moderate or high prevalence countries. They were unlikely to be immunised or take appropriate precautions; participation in risk activities abroad was high, and knowledge of HBV was limited. These findings indicate there is a need for healthcare professionals and the travel industry to educate travellers on the risks of HBV infections while abroad and the importance of preventing infection through vaccination.

PO11.14

Trends in the knowledge, attitudes and practices of travelers towards prevention of hepatitis A: results from the Dutch Schiphol Airport Survey 2002-2009 with focus on risk groups

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Background: Previous studies investigating the travelers' knowledge, attitudes and practices (KAP) indicated an important educational need among those travelling to risk destinations. Initiatives to improve such education should target all groups of travelers, including business travelers, those visiting friends and relatives, and elderly travelers.

Methods: In the years 2002 to 2009 a longitudinal questionnaire-based survey was conducted at the Dutch Schiphol Airport with the aim to study trends in travelers' KAP towards hepatitis A with a special focus on the risk groups; last-minute travelers, solo-travelers, business travelers, travelers visiting friends and relatives (VFR) and elderly travelers.

Results: A total of 3045 respondents were included in the survey. Travelers to destinations with a high risk for hepatitis A had significantly less accurate risk perceptions (knowledge) than travelers to low-to-intermediate risk destinations. The risk of acquiring hepatitis A in travelers to high risk destinations was probably mitigated by less risk seeking behaviour and by higher protection rates against hepatitis A as compared with travelers to low-to-intermediate risk destinations. Logistic regression analyses showed that an age>60 years was the only significant determinant for improvement of their knowledge. Trend analyses showed a significant trend over time towards more risk avoiding behaviour and to higher protection rates against hepatitis A in travelers to high-risk destinations in the period 2002 to 2009. Travelers visiting friends and relatives (irrespective of hepatitis A risk of their destination) and solo travelers to high risk destinations were identified as those with the highest risk profile for hepatitis A.

Conclusions: The results of this longitudinal survey in Dutch travelers suggest an annual 5% increase in protection rates (practice) against hepatitis A coinciding with an annual 1% decrease in risk seeking behaviour with regard to hepatitis A. This improvement may reflect the continuous efforts of travel health advice providers to create awareness and to propagate safe and healthy travel. Travelers visiting friends and relatives and solo travelers to high risk destinations were identified as travelers with the highest risk profile for hepatitis A and should be candidates for targeted interventions.

PO11.15

Health risks encountered by Dutch medical students during an elective in the tropics and the quality and comprehensiveness of pre- and post-travel care

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Background: Clinical and research electives abroad offer medical students many unique experiences. However, participating in an unfamiliar health-care setting combined with limited medical experience may place students at risk of illness. To improve pre-and post-travel care, we assessed the health risks and the quality and comprehensiveness of pre- and post-travel care in a cohort of Dutch medical students returning form an elective abroad.

Methods: All medical students who had performed an elective in the tropics between July 2006 and December 2008 were sent an informative email asking them to complete a web-based questionnaire.

Results: 180 of 242 (74%) students completed the questionnaire. Regarding the risk of bloodborne viral infection: 67% of all students and 32% of junior students engaged in procedures that constitute a risk of exposure to bloodborne viral infection, often in countries with high HIV prevalence rates. None of nine students who experienced possible or certain
mucosal or percutaneous exposure to potentially infectious body fluids reported the exposure at the time it occurred and none used PEP. Regarding other health risks: 8 of 40 (20%) students stopped using mefloquine due to adverse effects. This left a sizeable proportion unprotected in countries that are hyperendemic for malaria. Post-travel screening for schistosomiasis, tuberculosis (tuberculin skin test) and carriage of methicillin-resistant Staphylococcus aureus (MRSA) encompassed approximately half of all students who should have been screened.

**Conclusion:** Based on the results of this study we have adopted an integral set of measures to reduce the health risks associated with an elective abroad. The pre and post-travel consult has been centralized and standardized as well as the distribution of PEP. In addition we have developed a mandatory module on Global Health for all medical students planning an elective abroad. (Published: Sharafeldin et al., *BMC Medical Education* 2010, **10**:89.)

**PO11.16**

**Health Protection for travellers: Epidemiological analysis of frequent diseases and proposal of Training project for Tour Operator.**

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**Objectives:** Travellers often are not informed regarding infectious diseases and prevention before their departure. Often Travel agencies does not receive a specific training course regarding travellers health and don’t address their clients to traveller’s clinic in the Italian Department of Prevention that are presented in all the country.

**Materials and methods:** Scope of this study is awakening travel agencies in travel medicine, especially for prevention of infectious disease through sending clients in the traveller's clinic.

In 2009 we did a study of awakening in a school of Tour Operator in Conegliano and Pordenone, and through a questionnaire we did an investigation regarding travellers in the travel clinic and the attitude of client in the travel agency to be submitted to a preventive program before departure.

**Results:** The data show 75% of travellers is disposed to be submitted to a prevention program before departure.

In Treviso Region travel agencies addressed clients to Traveller's clinic in a low percentage (9-19%) but where training program was already done (Pordenone Region) the percentage is higher (43%).

The data in the school of Tour Operator show that before the training program the percentage of correct answer was 39%, after the training program 78%.

**Conclusions:** Invest in prevention of travellers diseases is strategic, but is very important to start a cooperation program between Traveller's clinics, School of Tour Operator and travel agencies.

**PO11.17**

**Use of the National Travel Health Network and Centre website during a natural disaster: flooding in Pakistan 2010.**


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**Objective:** In July 2010, Pakistan experienced widespread flooding leading to a humanitarian disaster. As the national body charged with advising British travellers and health professionals, the National Travel Health Network and Centre (NaTHNaC) wrote and posted on its website, evidence-based health information and guidance about the disaster. The objectives of the study were to:

- Identify access of NaTHNaC website resources about the Pakistan natural disaster.
- Compare trends over time in access of website natural disaster resources.
**Methods:** Verified information from international and national public health bodies were sourced, and beginning 3 August 2010, ’Clinical Updates’ (CUs) were written that summarised key events and provided health guidance about Pakistan. Natural disaster information was posted on a revised Natural Disasters webpage, that was linked from the home page. This page included an updated information sheet giving general advice for travel to natural disaster areas, and links to information for countries experiencing a disaster. NaTHNaC Country Information Pages also linked to information about any natural disasters that were occurring in the country. Website statistics for the period 1 July 2010 to 12 January 2011 were obtained from Google Analytics and analysed.

**Results:** During the study period, NaTHNaC published 5 CUs relating to the Pakistan flooding. The Pakistan CUs were the most frequently viewed CU topic during August 2010, and the 8th most viewed CU topic during the review period. Pakistan country page views from 1July 2010 - 12 January 2011 were 3,692 vs. 1,409 for the same period in 2009 - 2010, a 162% increase.

The revised Natural Disasters resource page was heavily accessed during the study period; there was an increase of 1,029% when compared to the same period 2009 - 2010 (587 vs. 52 views). Access to the information sheet on advice for travel to natural disaster-affected areas increased by 53% (439 vs. 287 page views) compared to the previous year.

**Conclusions:** NaTHNaC provided timely, evidence-based, accessible information and guidance on the flooding in Pakistan. Expanded resources on other natural disasters were frequently accessed, which should lead to more informed health professional and travellers.

**PO11.18**

If we know compliance is our Achille`s heel, why do we keep measuring it rather than trying to change it?

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**Background:** It is not a failure of preventive interventions but rather a failure to use them...this would seem a fundamental explanatory mantra for many travel-related diseases. For example, “we” conclude that malaria in travellers likely reflects poor adherence to chemoprophylaxis and/or a failure to use appropriate bite precautions, or perhaps “we” identify a failed vaccination opportunity when explaining a faecal-oral disease. “We” often then go on to identify risk factors for a particular outcome, perhaps age, duration of travel, perception of risk, etc. What “we” have not done especially well is to objectively evaluate interventions that have, as their goal, increased compliance. Instead, “we” have tended towards tautological thinking with conclusions that are untested or untestable, e.g., “better risk communication will enhance compliance”. To evaluate our above hierarchal hypothesis, we have extracted and evaluated “compliance” studies from the Journal of Travel Medicine (JTM).

**Methods:** We carried out searches with PubMed using the terms “compliance” (or “adherence”) + “JTM”. Recovered abstracts were screened for relevance, and, if retained, were characterized by design (compliance only, compliance and risk factor(s), intervention-based) and subject area (malaria, vaccine, faecal-oral and/or STI prevention).

**Results and Conclusions:** Searches returned 75 articles of which, after removing duplicate records, 48 met our inclusion criteria. “Compliance” has been a common topic in JTM with retained abstracts comprising 4% of all articles published in the journal, and with the majority of these focusing on malaria interventions. Consistent with our hypothesis, the bulk of the extracted JTM articles were not intervention based (approx. 95%), and, of the handful that were, the intervention tended to not be associated with increased compliance. We conclude that, in the context of JTM, our hypothesis is correct, i.e. compliance is an oft cited and well characterized problem that is not well investigated from an experimental intervention perspective. We therefore suggest that efforts should be refocused on intervention evaluation. In other words, there is not a pressing need for more data that shows people don’t take their pills...but understanding how (or if) “we” can get more people to take them is critical.
PO11.19
Human immunodeficiency virus post-exposure prophylaxis for medical trainees on international rotations
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Introduction: The number of US medical students, residents, and fellows participating in overseas clinical and research activities has been steadily increasing. Trainees participating in international electives are at risk for exposure to blood and body fluids.

Objectives: This abstract describes current published practices of HIV post-exposure prophylaxis (PEP) and addresses issues of reducing risk of nosocomially-acquired HIV infection in medical trainees participating in international electives.

Methods: A review of current HIV needlestick injury risk and PEP practices of 3 academic institutions was conducted. A recent survey of medical schools in the US, conducted by the Global Health Education Consortium (GHEC) was also reviewed.

Results: Among health care workers globally, an estimated 2 million needlestick injuries occur annually; the risk of HIV exposure of international trainees participating in electives overseas has not been systematically evaluated. Regarding pre travel preparation, the GHEC survey (n = 103 respondents) indicated that only 24% of private and 36% of public medical schools offered a general pre-travel preparatory course. A UK survey found that 91% (20 of 22 medical schools) had provided information on occupational exposure to HIV to students, but only 2 (9%) had PEP available for students on overseas electives. A review of three HIV PEP programs for trainees was performed to generate the following recommendations. Pre-departure activities should include education on potential risks and how to minimize occupational blood and body fluid exposures; provision of a supply of antiretroviral drugs; and confirmation of hepatitis B immunity. During the international rotation, the trainee must have access to 24 h/7 d/wk access to support staff to help with psychological support and risk assessment (ideally through their parent institution's needlestick team; counseling and testing for HIV status of the trainee and source patient (when possible); access to an infectious disease specialist for input on complex scenarios; and psychological and medical support during PEP to help with management of side effects. Post-travel follow-up HIV testing should be performed at 4-6 weeks, 3 months, and 6 months.

Conclusions: For sanctioned international health programs, the goal should be to develop a standard protocol for pre-departure education and post-exposure intervention.

PO11.20
Improving Travelers’ knowledge, decision-making, and adherence to malaria chemoprophylaxis: Examining the impact of incorporating the “Ottawa Malaria Decision Aid” into the pre-travel consultation process.
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Objectives: Annually Canada receives 400 imported malaria cases, some of which are fatal. Poor adherence to anti-malarials is common and may result from important gaps in travelers’ knowledge about malaria, options for anti-malaria medications, and decision conflict regarding anti-malaria pills. The Ottawa Malaria Decision Aid (OMDA) was developed as a bilingual resource to help travelers’ make more informed decisions regarding taking antimalaria medications. The objectives of this study are to evaluate whether the OMDA can be integrated into the pre-travel consultation process and can: 1) improve travelers’ knowledge of malaria and malaria prevention options, 2) improve travelers’ preparation and decision-making process 3) reduce traveler's decisional conflict about chemoprophylaxis and 4) improve travelers' adherence to prescribed antimalaria pills.

Methods: Study participants (N=100) will be recruited from The Ottawa Hospital Travel Clinic and the National Capital Region Occupational Health Clinic. Eligibility criteria: being 18 years or older, travelling to a chloroquine-resistant area and traveling for 8 weeks or less. Study participants will be randomized centrally into two groups: 1) standard pre-travel information (control) and 2) the OMDA plus standard pre-travel information (intervention). Both groups will complete questionnaires at 3 time points at (1) study baseline (2) after attending their travel clinic appointment or travel clinic appointment plus decision aid and (3) upon return, in order to assess their adherence to their anti-malaria medications.

Results: Baseline knowledge of malaria and anti-malaria medications will be examined in both groups to identify baseline
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gaps prior to travel medicine consultation or consultation plus OMDA intervention. Pre-post differences in malaria knowledge and decision-making process before and after attending the travel clinics will be compared between groups to assess impact of the OMDA Intervention. Post-travel, participants’ adherence to anti-malaria medications will be compared between groups to examine if travelers randomized to intervention group had better adherence than travelers randomized to the regular clinic control group.

**Conclusions:** Findings will be discussed in terms of implications for assisting travelers in making informed choices regarding anti-malaria medications and mitigating the potential tragic health consequences of non-adherence to anti-malaria treatment recommendations.

PO11.21

**Is risk assessment and teaching effective in reducing illness during the elective periods of medical students from Newcastle Medical School?**

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**Objectives:** Medical Students at the medical school of the University of Newcastle upon Tyne, UK undertake an elective period during their 4th year of medical studies spending 8 weeks at one or more institutions/countries of their choice. We have previously reported on their health and problems (CISTM 10, Vancouver) and have since made changes to the risk assessment and pre-travel preparation as well as the support during their elective. Students are asked to report any illness/problems whilst abroad and in addition fill in a confidential health questionnaire on return.

**Methods:** Analysis of health questionnaire of 4th year students returning from their 8 week elective period in Summer 2010. Questionnaire identifies general questions on elective, pre-travel advise sought, exposure risks to bloodborne viruses/post exposure prophylaxis, malaria prophylaxis and any illness recorded.

**Results:** 340 students undertook 547 elective attachments with the majority of students taking up two 4 week elective attachments. They travelled to 83 different countries. Most popular destinations outside UK were India, Malaysia, Australia, Tanzania and New Zealand which make up 28% of all destinations. Around 50% of all students have a tropical or subtropical destination within South America/Africa or Asia.315/340 students felt they had adequate information/assessment from medical school before their travels. Only 3 students said they did not. Those 3 students spent their elective period in the UK and not abroad. 22 student declined to answer. There were 20 reported exposures to either blood/needle stick, bite or mucosal exposure but only 7 reported to take Post-exposure prophylaxis.108/340 students reported an illness whilst away mostly diarrhoeal sickness. Of the 40 who did not answer that question at least 5 however reported a specific illness. Only 1 student reported to be hospitalised. An incidence log had been set up for students to report any illness/problems requiring our support. Only 13 incidences had been recorded a priori whilst on elective.

**Conclusion:** Medical students travel and report after return in confidence more illness including exposure to higher risk compared to identifying illness whilst abroad. Students appear to be well informed and well prepared but need to ensure they adhere to their pre-travel risk assessment. The importance of reporting of high risk exposure needs to be re-enforced as it has potential implication for their future.
Is international business travel bad for your heart health? A retrospective observational study
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Objective: Examine the effect of International Business Travel (IBT) over one year on cardiovascular risk profile, quantified during the annual Comprehensive Health Assessment (CHA), after adjustment for baseline cardiovascular health and known co-variates (age, family history of heart disease, smoking history). Also research health status pre and post travel to evaluate the relationship between travel and health outcomes.

Method: We will analyze data from 190 patients (95 international business travelers and 95 controls). By standard calculations for normally distributed data, 95 patients per group will provide 80% power to detect a difference between two treatment arms of 5.1% at $p=0.05$, two-sided. This corresponds to a 30% difference in the Framingham 10-year cardiovascular risk (assumed to be have a mean of 10.2%, standard deviation 7.5%) between exposed (IBT) and controls.

To take into account the possibility of a smaller treatment effect, the sample size required to detect differences of 10%, 20% and 30% would be 850, 213 and 95 respectively. In 2010, Medcan Clinic saw a total of 562 travel patients [360 Male, 202 Female; 41% Finance occupation, 25% Legal and 7% Engineering]. For this study, vaccinations were categorized as Routine (Canadian), Required, and Recommended. The clinic administered 41 Routine [Tetanus, Diphtheria and Polio (3), Influenza (27) Herpes Zoster/Shingles (1) Whooping Cough (9), Pneumonoccus (1)], 262 Required [Yellow Fever (167), Meningococcus (94)] and 835 Recommended [Travelers’ Diarrhea (243), Rabies (20), Japanese Encephalitis Virus (17), Hepatitis A and B (235) and Typhoid (320)]. Summary: Medcan Clinic will obtain relevant patient data prior and post IBT. The main service provided at this preventive healthcare clinic is the annual CHA (series of diagnostic and screening tests) designed to identify health risks and prevent disease. The working hypothesis is that international business travel is associated with adverse chronic health outcomes, as reflected by alterations in cardiovascular risk profile. This research will also focus on gaps found in administration of “routine” vaccinations that are outlined in accordance with Canada Health Guidelines.

<table>
<thead>
<tr>
<th>Relative Difference*</th>
<th>Absolute difference (10 year risk, %)*</th>
<th>n(patients in each group)**</th>
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<tr>
<td>10%</td>
<td>1.0</td>
<td>850</td>
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<tr>
<td>20%</td>
<td>2.0</td>
<td>213</td>
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<td>30%</td>
<td>3.1</td>
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[Sample size calc. for different treatment sizes]
* Baseline Framingham 10 yr cardiovascular risk assumed to have mean of 10.2%, SD 7.5% [3]
** Number required to detect a difference between groups with 80% power at $p=0.05$, two-sided

Conclusion: This study will reinforce the need for preventative medicine and disease awareness, especially in those who do not follow up prior and post travel. Future research should focus on health outcomes (cardiovascular disease) and its relationship to IBT stressors.
PO12 Altitude, Diving, and Environmental Exposures

PO12.01
Awareness and Risk factors of Acute Mountain Sickness among travellers to Colombia, Equator, Bolivia and Peru: a cross-sectional study
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Objectives of the study: To quantify awareness of acute mountain sickness (AMS) in a sample of travellers to a South American countries and to assess risk factors to present AMS in that population.

Methods: A cross-sectional survey in travellers to Colombia, Equator, Bolivia and Peru who attended the Bellvitge International Health Center between 2007 and 2008 was undertaken. They were surveyed after their ascent to high altitudes and interviewed using a detailed questionnaire regarding knowledge, and personal experience with AMS. Descriptive and bivariate analysis were performed, and logistic regression identified variables which were found to be independently associated with AMS.

Results: One hundred one travellers (88% of all travellers to selected countries) had been surveyed, being 34.6% of them informed about the AMS in the travel clinic. Overall, 53% were found to have some knowledge about symptoms of AMS, and 27.7% carried on acetazolamide and/or analgesics. Travellers who had received information about AMS prior to their trip were significantly more knowledgeable about prophylaxis and treatment options (p < 0.05). Sixty-seven percent suffered from AMS [headache (100%), fatigue (94.1%), dizziness (47.1%), nausea (51.5%), or insomnia (25.0%)] without differences according age, sex, transport arrival and country of destiny. Only 4 of 68 (5.9%) of those who suffered AMS symptoms had acetazolamide with them using it as treatment. Two independent factors were related with AMS: Bolivia as country of destiny (adjusted odds ratio [OR]: 6.8; p=0.031), and prior knowledge of AMS (adjusted OR: 0.28; p = 0.038).

Conclusions: This study suggests that a large population of travellers to South America may be relatively naive to the dangers of AMS, and education could be the main pillar of its prevention in a travel clinic.
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PO13 Occupational, Military and Airline Medicine

PO13.01
Pre Travel " Fitness to Fly " Evaluation in Travelers with Recent or Chronic Medical Problems
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Objectives: Pre travel medical evaluation of travelers should include evaluation of " Fitness to Fly." This is essential to the medical safety of the traveler on commercial aircraft. It also provides an opportunity to assist those with medical issues who are “fit to fly” in planning medically for the flight. It helps prevent medical emergencies that could disrupt the flight, require flight diversions, and create costly problems for other travelers and the airline.

Methods: In evaluating travelers for " Fitness to Fly " the travel medicine physician should be familiar with the total flying environment i.e. cabin altitudes, relative hypoxia, decrease in humidity, seating configurations, onboard medical kits, flying times, jet lag, plus airport physical challenges. Those factors are paramount to evaluating the traveler’s health issues.

Summary: Cardiovascular and pulmonary diseases plus deep vein thrombosis history are areas greatest concern. These need to be evaluated re stability of the disease, medical requirements such as supplemental oxygen, and physical limitations as they relate to the total flying environment. Recent surgeries of many types require trip delay due to possible "trapped gas" expansion in flight. Problems with epilepsy and psychiatric diseases are minimal if well controlled, but can be aggravated with sleep deprivation on long flights. Well controlled high blood pressure, diabetes, asthma,, and mild hematopoetic problems are not contrindications, but severe anemia and sickle anemia are. Non pulmonary infections are not made worse by flying. Contagious infections are a contraindication. A normal singleton pregnancy in not a contrindication to fly except in relationship to gestational age. Multiple gestations and pregnancy complications often are.

Conclusions: Airline travel requires carefull evatuation re " Fitness to Fly " for all travelers. This is for the safety of the traveler, fellow travelers, and the the benefit of the airline. This is more often a concern in the over 50 age group, but the younger traveler must not be forgotten. With a medical clearence to fly most travelers ca enjoy a risk free trip.

PO13.02
Travel Medicine and Occupational Health: important synergy
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Objectives: Saipem is one of the biggest contractor companies in oil and gas industry. Safeguarding its workers’ health is the priority goal of the company’s medical department which to this end has set up a health surveillance service that operates throughout the world. The clinical situation, construed through preventive and periodic assessment of the health of the workers, represents just one aspect of medical surveillance: the identification of the geographic area and the length of the stay abroad are key factors in defining fitness to work with specific duties in a given geographic area. The work conditions can potentially expose workers to hazards for their wellbeing and health.

Materials and methods: To certify fitness to work Saipem has drawn up a series of health protocols based on careful evaluation, by the appointed physician, of the risks involved in the workers’ duties and their workplace. This evaluation is made before departure, during the stay abroad and on return to the country of origin. The Appointed Physician’s activities place him in a unique position, allowing him to periodically assess both individual workers and the epidemiological context in which they work. On the basis of these assumptions it is clear that the opinion on fitness to work must be considered as a function of two fundamental factors: the itinerary/destination of the journey and the traveller’s health. Before travelling abroad for work all of Saipem’s employees receive detailed information about the geographic area to which they are assigned during an individual or group meeting with Travel Medicine specialists and receive a guide to Travel Medicine (Si Viaggiare).

Results: The implementation of pre-travel counselling and the vaccination programme have significantly reduced travellers’ typical pathologies (Travellers’ Diarrhoea, Malaria, Hepatitis A and B, etc.). In the 2008/2009 period alone Saipem organized some 5244 medical check-ups accompanied by the health counselling programme.

Conclusions: Legislative Decree offers companies and appointed physicians the possibility of implementing an even more efficient prevention programme for workers travelling abroad, thanks above all to the involvement of Travel Medicine
specialists. This proves that the synergy between Travel Medicine and Occupational Health has greatly improved and represents an ideal binomial for a correct primary and secondary prevention programme in an operating company like Saipem.

PO13.03

Modalities of Overseas Repatriations of Patients: Reliability of Agreement between Coordinating Physicians

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Objective of the study: To evaluate the reproducibility and homogeneity of medical decisions in the area of repatriations/aeromedical evacuations, as a part of a medical practice evaluation.

Methods: This study was performed in a company providing worldwide medical assistance and overseas repatriations. A team of 22 physicians is in charge of the coordination of repatriations, prescribing if, when and how the patients are being transported. Transfers can be performed aboard air-ambulances, commercial aircrafts (seated or lying on a stretcher), with or without oxygen supply, escorted by a physician and/or a nurse. A panel of 20 short scenarios has been designed and submitted to the entire team. Cases were inspired by frequent and/or challenging situations (coronary syndrome, spontaneous pneumothorax, spine trauma…). Roughly, each scenario stated about age, current conditions, treatment, time interval from the onset of the disease and evolution. Physicians determined what would be their prescription (modalities of repatriations as described above) on a formalized form. Because in most cases there are no evidence-based guidelines, the median decision was considered as the reference for each scenario and the homogeneity/deviation from this reference quantitatively estimated and expressed as percentage. Reliability of agreement was assessed by a Free-Marginal Multirater Kappa.

Results: All physicians participated in the study. On the whole, agreement was 57% on the type of escort (Kappa = 0.46) and 64% on the logistic of transfer (Kappa = 0.55). For 5 scenarios, the prescription was uniform for > 80% of the physicians. On the contrary, for 4 scenario, agreement was < 50%. In case of poor agreement, encountered conditions were threatening premature delivery, severe trauma with liver contusion and gastro-intestinal bleeding.

Conclusions: Reliability of agreement was observed to be moderate. Further thought should be conducted in order to improve reproducibility and homogeneity of our decisions. The first action will be the implementation of staff-meetings focussing on the different topics we identified as related with poor agreement. This methodology for medical practice evaluation has been fully accepted by the team and will be repeated iteratively.

PO13.04

Prospective study of the epidemiology of infectious diseases and their predictors in Netherlands Armed Forces during deployment as part of EUFOR Chad/CAR

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Objectives: To identify infectious disease risks and their predictors in Netherlands Armed Forces deployed to southeast Chad.

Methods: Two cohorts of Netherlands Armed Forces were deployed as part of operation EUFOR Chad/CAR from May 2008 till March 2009. Clinical presentations were recorded in the medical information system by a military physician. After deployment, participants filled out a questionnaire regarding health problems and adherence to personal preventive measures (PPM) during deployment and provided a serum and stool sample for parasitological screening.

Results: 120 out of 128 eligible military participated. Although doses were forgotten now and then, adherence to malaria chemoprophylaxis was good overall. Use of permethrin-impregnated battledress during working hours was limited due to supply problems. After working hours they regularly wore non-impregnated sports or leisure clothing; in the evening with long sleeves and trousers. DEET repellents were applied erratically or never. Main reason for not applying DEET was not being bothered by mosquitoes. Self-reported use of insecticide-treated bed nets was very good. Health problems were reported by 39.3%; most frequently diarrhoea (24.1%), followed by heat shock (5.2%) and skin problems (5.2%). Two
serious medical events occurred; one case of suspected septic shock due to severe gastro-enteritis and one case of hypotension and arrhythmia following a scorpion bite. Malaria or fever of unknown origin were not seen. Serology indicated 4 *Schistosoma* and 5 *Strongyloides* infections; in all baseline tests were positive. Triple-faeces-test yielded one hookworm infection; no baseline sample was available.

**Conclusions:** Despite the presence of unprotected military personnel, few infectious diseases occurred likely due to local climatic and ecologic factors and relatively low population density in the deployment area. PPM was not fully adhered to and is a cause for continuing concern. Adherence was characterized by a high level of self-determination, based on not feeling at-risk and not experiencing insect bites. Studies like this, when structurally implemented, standardized and published, will in time provide a full scope of the epidemiology of health problems during military deployments and provide valuable feedback towards Force Health Protection policy.

**PO13.05**

**Prevention and Management of Alcohol and Drugs use and abuse in an oil and gas company**

**Nicosia V.**, **Consentino M.**, **Gialdi C.**, **Murer S.**, **Rizzato D.**, **Zamparo E.**

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**Objectives:** Saipem, an Eni Group company whose main mission is to carry out oil & gas activities in remote areas and deep water, is a leader in the supply of engineering, procurement, project management and construction services with unique offshore and onshore engineering and contract execution skills, also with high technological content such as the valorisation of natural gas and heavy oils. For their commitment to be proven useful, and considering the particular conditions in which the employees may work, it is necessary to define initiatives to be taken for prevention and management of use and abuse of alcohol and drugs.

**Materials and methods:** Saipem Occupational Health Dept. started a specific training and health surveillance program. Special attention is paid to information regarding:· Management of health checks related to the use of narcotic or psychotropic drugs by personnel whose duties entail a high risk of accidents at work or for the safety, wellbeing and health of third parties in accordance with European Guidelines, Italian Legislative Decree 81/08 and subsequent amendments and supplements and the Measure of 30.10.07;· Management of health checks to rule out alcohol addiction of personnel whose duties entail a high risk of accidents at work or for the safety, wellbeing and health of third parties in accordance with Legislative Decree 81/08 and subsequent amendments and supplements and the Measure of 16/03/2006.

**Results:** The implementation of training and health surveillance program is strategic for the prevention of alcohol and drugs use and abuse. In the 2010 period Saipem organized more than 1000 medical check-ups accompanied by the training programme.

**Conclusions:** Legislative Decree 81/08 offers companies and Saipem Occupational Health Department the possibility of implementing an even more efficient prevention programme for workers travelling in off shore. This proves that the synergy between Oil and Gas Industry and Occupational Health has greatly improved and represents an ideal binomial for a correct primary and secondary prevention programme in an operating company like Saipem.
PO14 Trauma, Injury, Security

PO14.01

Envenoming By Sting-Ray Bites in French Guiana: Report of 8 Cases
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¹Paris XI University and Bicetre Hospital APHP, Tropical Diseases Dept, Kremlin-Bicetre, France, ²Health Center, Maripasoula, French Guiana, ³Health Center, Direction, Cayenne, French Guiana

Objectives: Marine animals may cause severe morbidity by the introduction of a venom into the tissues. The freshwater sting-rays are regarded by native people in the Amazonia as dangerous fishes, responsible of frequent stings. We report 8 cases of such envenoming

Methods: In the health center of Maripasoula, (French Guiana), near the Maroni River, where a lot of people take a medical advice for different problems, 8 patients were admitted for a severe pain after a bite of a sting-ray during a bath in the Maroni River: 2 children (8 and 12 y old), 1 girl (17 y old), and 4 men (respectively 18, 27, 45 and 52 y old). The clinical symptoms and the treatment were the same: very severe local pain of the foot, and the patient were distraught, mostly the children. The wound was little (1 to 5 mm) with haemorrhages. The general examination and the blood check-up were not disturbed. The treatment was symptomatic: local injection of lidocaine, cleaning of the area with iodine solution, and the tetanus immunization. After 4 to 8 hours, the 8 patients recovered fully after local symptomatic treatment.

Results and discussion: The freshwater sting-rays (Potamotrygon motoro) have a tail that contains 1 to 6 barbs, in a sheath bathed in venom, which provoke severe local pain, but without systemic symptoms. The muscle pain causes a reluctance to move the wounded limb and may be confused with paralysis. As there is no antivenom available, the local pain is reduced by local anaesthetic injected around the wound. X-ray of the wound area can be useful to find remaining foreign material and to remove any piece of barb. Cleaning the area with iodine is necessary. Antibiotics are sometimes necessary, as tetanus immunization. Injuries can be fatal when the stings penetrate the thorax or abdomen, rupturing tissue and vessels with secondary infection. So, the people must be aware of the sting-rays when they swim in the Maroni river.
PO15 Non-Infections Disease Travel Risks (e.g., pulmonary emboli, jet lag)

PO15.01
Cardiovascular risk among international travelers
Chanudet X.1
1CMETE, Paris, France

Objectives of the study: Coronary heart diseases are a leading cause of disability among international travelers. The objective of this study is to assess the cardiovascular risk among different categories of professional travelers (expatriates, on mission, rotational workers) and to evaluate the respective contribution of traditional risk factors and BMI to the risk.

Methods: Retrospective study of 4660 international travelers (mainly French) aged more than 30 y, assessed in a French travel clinic, between 2009 and 2010. Health measures are: gender, age, BMI, blood pressure, total cholesterol, smoking, diabetic status (not reported). Cardiovascular risk is evaluated according to the Framingham risk equation. Statistical analysis: descriptive analysis, logistic regression (SAS 9.2).

Summary of results: Population characteristics (mean ± sd): Age 45 ± 9.6 y, sex ratio (M/F) 0.75, weight 77 ± 15.8 kg, height 1.74 m ± 0.08 kg, BMI 25.4 ± 4.2 kg/m2 (< 25: 51%, 25-30: 36.3%, > 30: 12.3%), blood pressure (mm Hg): SBP 125 ± 16 (< 140: 82%, 140-160: 14%, > 160: 4%), DBP 76 ± 11 ( < 90: 87%, > 90: 13%), smokers: 27%, total cholesterol 205 ± 39 mg, hdl cholesterol 56 ± 17 mg/l, reference risk: 4 ± 2.4, absolute risk: 6.9 ± 6.9%, relative risk: 1.7 ± 1.2. There is no difference on the absolute risk according to traveler status after adjustment on the sex. In the logistic regression the BMI does not contribute to the risk, to the opposite of classical risk factors.

Conclusions: In this cohort: 12% of the population is obese, the cardiovascular risk is higher than the reference risk but it is not different from the absolute risk of the French population of the same age. The risk level is not determined by the status of the traveler (expatriation, missions, rotations).
PO16 Professional Education and Training

PO16.01

E-learning in travel medicine - The Portuguese case study
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¹Faculdade de Ciências Médicas, Public Health, Lisbon, Portugal

Objectives: To describe a case-study of a postgraduate specialization course in travel medicine for medical doctors using an e-learning platform (Blackboard Academic Suite).

Methods: The course lasts for 2 months and is taught in blended e-learning. The program consists in 16 learning units, concerning topics on: pre-travel consultation, immunization, malaria, traveler's diarrhea, travelers with special needs, environmental aspects and vector transmitted diseases and post-travel care. These learning units are taught and discussed twice a week in private chat rooms among the teacher and the students with the support of slides. One week before each chat room session, the students have access to the learning contents (slides and e-book). The students can practice what they have learnt with self-assessment exercises with automatic correction. The evaluation is also made face-to-face and it includes a written exam and a paper with oral presentation. At the end, the students complete an anonymous survey about their opinion and evaluation of the course. This postgraduate specialization course intends to enable the medical doctor to advice and prepare the international traveler.

Results: Three courses edition have already taken place, with an average of 18 students per course, coming from all over Portugal including the Islands (Azores and Madeira). There were 4 teachers involved, one of them lecturing from Angola. In average 15 students participated in the weekly chat sessions and were very motivated, cooperating to the dynamics and the success of the sessions. Students considered the platform very user friendly. Two students out of 55 chose not to do the evaluation, the others were successful. In the students opinion the e-learning model has important advantages when compared to the classical model, although they miss the interaction face-to-face. In their words the e-learning model allows sharing of experiences between medical professional all over the world Portuguese speaking community and juggling work with classes.

Conclusions: Distance learning in travel medicine education and training is innovating in an area that is international, interdisciplinary and favored by professional e-networks. The interaction teacher-students in chat rooms is very easy, useful, reachable to all those involved wherever they are. Our course enables post-graduation in travel medicine all over the world Portuguese speaking community.

PO16.02

Travel Health Knowledge among Taiwanese Tourism Industry Members on Travel Health and Infectious Disease
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¹National Cheng-Kung University Hospital, Department of Family Medicine, Tainan city, Taiwan, Republic of China,
²National Cheng-Kung University, Department of Family Medicine College of Medicine, Tainan city, Taiwan, Republic of China

Objective: A recent report by Center for disease control of Taiwan in 2010 found that most of febrile diseases among travelers who returned from Southern Asia and China contributed to food borne/ water borne diseases and vector borne diseases. However, according to the statistics of Tourism Bureau, Taiwan 2010, southern Asia and China are the most popular tropical destinations among Taiwanese travelers (67.8%) and most of travelers arrange the tours by tourism industry members (87.7%). Therefore, it may be an important strategy to reduce the imported disease by enhancing the knowledge of travel health among tourism industry members.

Methods: This was a cross-sectional questionnaire -based study. In 2010, Sep, data were collected from one day seminar on travel health and infection diseases of travel agents, tour guilds and tour group operators in National Chung Kung University, in Tainan city of Taiwan. It was supported by the Center for disease control of Taiwan and the Taiwan Association of international Health. Every subject first read a brief introduction explaining the purpose of the study and agreed to join the study filled out the questionnaire by themselves before and after the seminar. The questionnaire consisted four parts: general travel health information and perception of vector-borne disease, food/water borne disease, disease transmitted from animals and others.

Results: In total, 89 (90.8%) of the 98 questionnaires were returned: 44 (49.5%) of those were tour guilds, 7 (7.5%) were
tour group operators and travel agents, 38 (42.7%) were teachers and students of tourism schools. The other demographic profile of the study participants is shown in Table 1. The proportion of correct answers in most travel health questions was different between pre-seminar and post-seminar test. Higher travel health knowledge level was noted in post-seminar test (Table2).

Conclusions: In our study, We found the tourism industry members’ travel health knowledge regarding management of unstable chronic disease during traveling, prevention of infective diseases was limited, although they desired most of trips for travelers in Taiwan. There is an urgent need for increased awareness about travel-related infectious diseases among tourism industry members by way of holding continuous travel health education programs.

![Table 1](image)

Table 1. Characteristics of the study population and travel demographics (N=89)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age, years (mean±S.D.)</td>
<td>45.89±9.60</td>
</tr>
<tr>
<td>Gender, Male</td>
<td>49(55.1)</td>
</tr>
<tr>
<td>Educational level, Above University</td>
<td>77(86.5)</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Tour guiders</td>
<td>44(49.4)</td>
</tr>
<tr>
<td>Tour group operators and travel agents</td>
<td>7(7.5)</td>
</tr>
<tr>
<td>Teachers and students of tourism schools</td>
<td>38(42.7)</td>
</tr>
<tr>
<td>Years of working experience, ≤5 years</td>
<td>60(67.4)</td>
</tr>
<tr>
<td>Frequency of being tour guide/year, ≤10 times/year</td>
<td>64(71.9)</td>
</tr>
<tr>
<td>Destination of country visited'</td>
<td></td>
</tr>
<tr>
<td>Asia Pacific, America/ European, Taiwan, Africa</td>
<td>72(69.7), 11(11.3), 53(56.2), 5(5.6)</td>
</tr>
<tr>
<td>Continued educational experience for Travel health, yes</td>
<td>17(19.1)</td>
</tr>
<tr>
<td>Travel health information sources, Website</td>
<td>67(75.3)</td>
</tr>
<tr>
<td>Having seen a travel medicine specialist, yes</td>
<td>6(6.7)</td>
</tr>
<tr>
<td>Having suggested travelers to visit a travel clinic, yes</td>
<td>7(7.9)</td>
</tr>
</tbody>
</table>

Data were expressed as N (percentage) unless otherwise indicated

*= Multiple response are allowed

[TABLE 1]
Table2. Knowledge of travel medicine among Taiwanese tourism industry members (N=89)

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre-Seminar</th>
<th>Post-Seminar</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of general travel medicine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting travel clinic timely‡</td>
<td>24(27)</td>
<td>76(85.4)</td>
<td>.000</td>
</tr>
<tr>
<td>Management of unstable chronic diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. How to prevent hypoglycemia during traveling‡</td>
<td>35(39.3)</td>
<td>73(82.0)</td>
<td>.000</td>
</tr>
<tr>
<td>2. Monitor of hypoglycemia symptoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold sweating, Palpitation, Hungry</td>
<td>70(78.7)</td>
<td>77(86.5)</td>
<td>59(66.3)</td>
</tr>
<tr>
<td>3. Treatments of hypoglycemia during traveling‡</td>
<td>70(78.7)</td>
<td>81(91.0)</td>
<td>.009</td>
</tr>
<tr>
<td>Knowledge of vector-borne diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmission mode of malaria‡</td>
<td>73(82.0)</td>
<td>86(96.6)</td>
<td>.002</td>
</tr>
<tr>
<td>Clinical pictures of malaria‡</td>
<td>64(71.9)</td>
<td>71(79.8)</td>
<td>.049</td>
</tr>
<tr>
<td>Prevention methods of malaria‡</td>
<td>15(16.9)</td>
<td>41(46.1)</td>
<td>.000</td>
</tr>
<tr>
<td>Transmission mode of yellow fever‡</td>
<td>48(53.9)</td>
<td>78(87.6)</td>
<td>.000</td>
</tr>
<tr>
<td>Clinical pictures of yellow fever</td>
<td>60(67.4)</td>
<td>68(76.4)</td>
<td>.140</td>
</tr>
<tr>
<td>Prevention methods of yellow fever</td>
<td>55(61.8)</td>
<td>62(69.7)</td>
<td>.106</td>
</tr>
<tr>
<td>Knowledge of diseases transmitted from animals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmission mode of rabies</td>
<td>83(93.3)</td>
<td>86(96.6)</td>
<td>.103</td>
</tr>
<tr>
<td>Rabies endemic countries‡</td>
<td>71(79.8)</td>
<td>81(91.0)</td>
<td>.032</td>
</tr>
<tr>
<td>Possible rabies sources‡</td>
<td>67(75.3)</td>
<td>82(92.1)</td>
<td>.001</td>
</tr>
<tr>
<td>How to avoid rabies‡</td>
<td>39(43.8)</td>
<td>54(60.7)</td>
<td>.017</td>
</tr>
<tr>
<td>Mortality rate of rabies‡</td>
<td>26(29.2)</td>
<td>38(42.7)</td>
<td>.032</td>
</tr>
<tr>
<td>Knowledge of food-borne and waterborne diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmission mode of hepatitis A‡</td>
<td>52(58.4)</td>
<td>76(83.4)</td>
<td>.000</td>
</tr>
<tr>
<td>Clinical pictures of hepatitis A</td>
<td>76(85.4)</td>
<td>76(85.4)</td>
<td>.442</td>
</tr>
<tr>
<td>Prevention methods of hepatitis A‡</td>
<td>80(89.9)</td>
<td>87(97.8)</td>
<td>.004</td>
</tr>
<tr>
<td>Prevention methods of traveler diarrhea‡</td>
<td>59(66.3)</td>
<td>69(77.5)</td>
<td>.042</td>
</tr>
<tr>
<td>Management of traveler diarrhea‡</td>
<td>16(18.0)</td>
<td>83(93.3)</td>
<td>.000</td>
</tr>
</tbody>
</table>

Data were expressed as N (percentage)

The P value was calculated using the pair t test for analysis between pre-seminar and post seminar

‡ P<0.05; † P<0.001
PO16.03

The Challenges to Delivering Effective Travel Medicine Education in a Multi-disciplinary & Multi-state Health Care Corporation

McDevitt, RN, BSN, COHN-S.A.1, Kalish, MD S.1
1Take Care Health Systems, Employers Solutions Group, New York, United States

Walgreen’s and its Take Care Health Systems divisions employs medical professionals in a variety of settings across the United States and Guam. The Employers Solutions Group (ESG) provides on-site episodic and primary care as well as travel medicine services at a wide variety of corporate settings. The Consumers Solutions Group (CSG) provides community-based care at Walgreen’s in-store Take Care Clinic and offers travel medicine services at selected sites.

Objective(s): This study was initiated to determine the following:

- Determine which client sites and community-based clinics provide Travel Medicine Services
- Level of knowledge & training amongst colleagues
- Barriers to effective Travel Medicine education
- How to effectively deliver educational programs

Method: A 26 question electronic survey was sent to 700 worksites via Zoomerang to be completed by RNs, NPs, PAs, MDs & Pharmacists

Summary:

- The geographic and time zone differences present unique challenges to effective training programs as well as those due to the usual demands of patient care in clinics. This leads to interrupted attendance. Since 2007, educational programs have been available via webinar on a quarterly basis and have been well attended. Attendees have cited the complexity of the subject matter and interruptions during prior sessions as reasons for repeat participation. Programs are revised to maintain currency of information.

Conclusions:

- Travel medicine services are provided at 200+ client sites and select in-store clinics.
- Demand for services continue to rise, leading to increasing need for education.
- Effective education via webinars and learner-paced self education programs are useful tools in delivering consistent learning experiences provided the students are able to devote full attention to a challenging topic.
- Program redesign (ie: pre-recorded sessions) is required to increase access to colleagues working alternate or demanding schedules

PO16.04

A Survey of the ISTM Nurse Professional Group to assess members’ needs and identify areas for improvement

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1Nurse Professional Group of the International Society of Travel Medicine, ., United States, 2International Society of Travel Medicine, Secretariat, ., United States

Objectives: To better understand the professional profile and professional needs of NPG members and identify areas where improvements could be made to membership services.

Methods: An on-line questionnaire was produced to seek information on countries in which members were based; level of
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travel health work experience; type of practice; ways in which training, experience and qualifications were obtained; topics of interest; challenges faced in practice; the role of the ISTM and ways in which it could be improved. Members were contacted by email and reminded once. 365 NPG members were approached and the survey was completed by 185 (50.7% response).

Summary of results: Respondents worked in 14 different countries (US 60%; UK 17%; Canada 13%. 74.3% of members had worked 5 or more years in travel medicine. 39% worked full time in travel medicine. Hours worked by part-time nurses ranged from 1-40. Travel medicine nurses work in a variety of settings, 35% in private travel clinics, 22% in general medical practice. The most common sources of training were on the job (72%), conferences (54%), and schooling/courses (52%). Topics that the majority included in their top three areas of interest were malaria, immunizations and vaccines, patient education and patients with special needs. Many of the respondents faced similar challenges in their practice. The most common challenges surrounded immunizations/vaccines. A large number of respondents reported difficulties with educating patients. The respondents were in agreement that ISTM was a very important resource. Virtually all respondents noted the usefulness of the organization. The most helpful aspects reported by the nurses were: collaboration and networking, the Journal of Travel Medicine, conferences and the ListServe. The Certificate in Travel Health was highly regarded. Suggestions were provided on ways to improve the following areas: advocacy, educational resources, communication, and networking and collaboration.

Conclusions: NPG members represent a significant resource of professional expertise which could be better deployed by the ISTM to the benefit of travellers and the Society itself.

PO16.05

Travel Health Advisory Group: travel health promotion activities of a joint travel industry and travel health special interest group

Leggat P.A.1, Hudson B.2, Zwar N.3, Gherardin T.4, Cheng I.2, Travel Health Advisory Group, Australia
1 James Cook University, Anton Breinl Centre, Townsville, Australia, 2Royal North Shore Hospital, Sydney, Australia, 3University of New South Wales, School of Public Health and Community Medicine, Sydney, Australia, 4Travel Doctor, Melbourne, Australia

Background: 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 poster describes the major activities of THAG 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.

Results: THAG is currently affiliating with the Australasian College of Tropical Medicine (ACTM) as a Special Interest Group and is seeking support from various travel industry and health groups. An updated travel health bookmark is now available for distribution through travel agents and THAG members. The welltogo.com.au website was developed in 2004 and has recently been updated and relaunched. THAG has published several papers in the leading travel medicine journals. An extensive program of health promotion is planned in 2011.

Conclusions: A partnership approach between the travel industry and travel medicine professionals can effectively support a range of activities to promote the health of travelers. The welltogo website is now making an important contribution in providing information to the Australian public on travel health.

Travel Health Advisory Group (THAG): Member organizations are the Anton Breinl Centre, James Cook University (Peter Leggat), Australian Federation of Travel Agents (Jayson Westbury), Faculty of Travel Medicine, ACTM (Tony Gheradin), Jetset Travelworld Group (Karen McGee), MASTA Australia (Bernie Hudson), Qantas Airways (vacant), Royal Australian College of General Practitioners (Nick Zwar) and the Youth Hostels Association (Julie Freeman). Members at large are Ian Cheng; Ms Bronwyn Claxton.
PO16.06
Survey of Immunisation Training Awareness in the United Kingdom
Ford L.1,2, Simons H.J.1,2, Wong C.S.1,2, Hill D.R.1
1National Travel Health Network and Centre, London, United Kingdom, 2Liverpool School of Tropical Medicine, Liverpool, United Kingdom

Objectives:

- To assess whether health professionals (HPs) are aware of the recommended National Minimum Standards for Immunisation Training for England, Wales and Northern Ireland (EWNI).
- To determine whether initial training standards are achieved and updates in immunisation training are accessed.
- To determine whether there is training and assessment of immunisation techniques.

Methods: A survey (Survey Monkey®), open to all HPs, was posted on the National Travel Health Network and Centre (NaTHNaC) website from July to November 2010. The survey was advertised on the NaTHNaC website, in a Department of Health (England) newsletter, and through notifications from the Health Protection Agency and Royal College of Nursing.

Results: 1,520 HPs completed the survey; 82% were practice nurses in National Health Service general practices. 29% were unaware of the National Minimum Standards for immunisation training in EWNI. Of 1,394 respondents who had immunisation training, 51% had less than the recommended minimum of 2 days training and 36% had received no practical training. Only 62% were clinically supervised for at least a week following the initial training. 81% had attended immunisation update training within the last 2 years, but 11% had not received any updates since initial training. 80% had not undergone any assessment of their injection techniques since initial training. Local primary care organisations and vaccine manufacturers provided most of the training updates (55% and 32% respectively). The injection techniques used by respondents were intramuscular (99%), subcutaneous (82%), oral (24%), and intradermal (ID) (10%). The ID technique was used for administration of BCG (31%), Mantoux tuberculosis testing (27%), rabies vaccine (15%), and “other” (27%).

Conclusion: The National Minimum Standards for immunisation training in EWNI should be made compulsory and HPs enforced to achieve these standards. Biennial updates of immunisation practice were achieved by the majority of participants, but efforts need to be made to improve this number, and perform clinical assessment of their techniques. Most practitioners perform intramuscular and subcutaneous injections, but the intradermal technique is not widely used.

PO16.07
Travel Health Nursing in the United States: A descriptive study of employment, education, and perceived professional challenges
Rosselot G.A.1, Rosenblatt E.2, Weinberg S.3, Acosta R.4, American Travel Health Nurses Association, USA
1Travel Well of Westchester, Inc, Briarcliff Manor, United States, 2University Hospital and Clinics, Internal Medicine Clinic, Madison, United States, 3Ridgefield Visiting Nurse Association, Ridgefield, United States, 4Traveler's Medical Service, NY, United States

More than 5000 U.S. nurses provide care to international travelers. However, travel health nurses (THNs) in the United States are a rarely studied group of health professionals. In April 2010, the American Travel Health Nurses Association (ATHNA) accepted members for the first time. After 6 months, we undertook a descriptive study of this initial membership group.

Objectives: The purpose of this study was to explore the employment, educational needs, and professional challenges of U.S. THNs.

Methods: 105 active THNs (RNs, NPs, LPNs) were invited in November 2010 to complete a 36 item questionnaire delivered electronically using SurveyMonkey.

Summary of Results: Overall response rate was 64% (67/105). RNs (81%) (54/67) and women over age 45 (91%) (60/66) comprised a majority of the respondents. More than half, 61% (40/65), have practiced > 5 years in the field. Most, 92% (61/66), hold a Baccalaureate degree or higher. Only 33%, (21/62) of respondents, hold any specialty credential in travel health. Three worksites were equally represented (approx. 22% each): college health (13/60), private travel clinics (12/60), and employee health units (14/60). Most nurses do not work full time in travel health and 75% (46/62) work 3 days or less per week. One quarter, (10/41) of respondents, are challenged by pre-travel visit time constraints. Self-study
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is the #1 reported educational method (47/64). A majority of participants (41/60) requested educational programs specific to nurses and public campaigns to promote U.S. travel health services. Nearly three quarters, 73% (44/60), are interested in U.S. competencies and specialty recognition for U.S. THNs

**Conclusions:** This early study of ATHNA membership suggests that U.S. THNs are a mature, experienced, and well-educated health care group. They are eager for public awareness of their services, professional recognition of their specialty, an established set of national competencies, and more opportunities for travel health education specifically designed for nurses.