and the recently described resistance island. One of the most worrying antibiotic resistance problems in A. baumannii is the increasing trend of carbapenem resistance since carbapenems are often used as antibiotics of the last resort. Carbapenem resistance results from metallo-β-lactamases, carbapenem-hydrolyzing oxacilllinases and often combined mechanisms of resistance.

Emerging infectious diseases

**O246** Risk assessment and management of possible transmission of Lassa virus during two flights
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**Objectives:** Since the emergence of Lassa fever, reports of about 25 patients who imported Lassa virus to Europe, USA or Canada have been published. More than 1,200 contacts were ascertained in these events and all remained pathogen free except one who showed a seroconversion. On July 10th a person (patient) who flew from Freetown (Sierra Leone) to Frankfurt (Germany) via Brussels (Belgium) tested Lassa positive nine days after arrival in Germany. A risk assessment was conducted to guide the decision on a co-passenger trace back.

**Methods:** During the two flights the patient had no cough but a urinary tract catheter which was disconnected from the reservoir and released relevant amounts of urine on the passenger’s seat. The patient’s urine was tested positive for Lassa virus, which was taken into account for the risk assessment and contributed to the decision to trace back co-passengers potentially exposed.

The passengers at risk were defined as those sitting in maximum three rows distance from the patient. 57 additional persons from the airline and the airport were exposed.

With the help of the airline the passenger’s lists of both flights were available within two days. 92 passengers from nine countries were identified. Every country received a list with names and contact telephone numbers of all passengers at risk who were allocated to the country as well as a questionnaire about symptoms to be filled for traced passengers. The trace back of the concerned staff was done by the airline and the Belgian public health authorities.

**Results:** In EU countries 29 (66%) of 44 contact passengers, in European non-EU countries 7 (68%) of 9 passengers were traceable and from non-European countries 0 of 27 passengers were traceable. 100% of the staff were traceable. Overall 62.4% of the contacts were traceable. Only one of the traced contacts developed symptoms but revealed to be Lassa negative.

**Conclusion:** In this investigation, the leakage from the urinary catheter reservoir influenced the risk assessment and the decision for a passenger trace back as Lassa fever is primarily transmitted by urine of rats. Nevertheless, no contact passenger revealed Lassa virus. Our investigation confirms that the human to human transmission of Lassa virus during flights is unlikely if no haemorrhagic symptoms appear at this time. Tracing back co-passengers remains a challenge internationally and stresses the need for an early voluntary implementation of the revised international health regulation.

**O247** Comparison of oral ribavirin treatment in Crimean–Congo haemorrhagic fever: a historical cohort study in Turkey

**Objectives:** To analyse the efficacy of oral ribavirin treatment in Crimean–Congo haemorrhagic fever (CCHF) patients and to compare with a historical cohort.

**Methods:** In Turkey, patients admitted to four tertiary care hospitals with a disease resembling CCHF were treated with oral ribavirin as recommended by the World Health Organisation (WHO) between April and September, 2004. Treated patients were compared with an untreated historical cohort who admitted to the same hospitals in 2003. Sera from suspected CCHF patients were obtained immediately following hospitalisation. Whenever possible, a second sample was obtained at least one week later. Serologic and virologic analyses were performed in the CCHF reference laboratory of the RSH Institute of the Turkish Ministry of Health. Only the patients that obtained a definitive diagnosis of CCHF by means of clinical presentation and the presence of specific IgM antibody against CCHF virus and/or viral RNA were included in the study. Demographics of all patients, clinical and laboratory findings, given blood and blood products, length of hospitalisation stay and outcome were recorded.

**Results:** The treatment group and the historical cohort consisted of 126 and 92 confirmed CCHF cases respectively. The mean age of the treatment group was 44 and 41 years in the historical cohort (>0.05). Among the given mean units of blood products, only the amount of consumed fresh frozen plasma was significantly lower than the treatment group (median 4 vs 6.5 units; p < 0.05). Median length of hospitalisation days was 8 in the treatment group and 9 days in the historical cohort (>0.05). The case fatality rate in the treatment group was not significantly different than in the historical cohort (7.1% vs 11.9%; p > 0.05). A logistic regression analyse showed altered sensorium and/or prolonged international normalised ratio (>1.4) were independent predictors of mortality. These predictors discriminated fatal cases with a sensitivity of 0.73 (14 of 19 fatal patients) and a specificity of 0.83 (156 of 186 non-fatal patients).

**Conclusions:** The results of this study showed that oral ribavirin treatment failed to improve the survival rate in our confirmed CCHF cases. However, more controlled studies with oral ribavirin are needed before more definite conclusion. We suggest the use of only the parenteral form of ribavirin according to a risk assessment by the predictors of mortality.

**O248** Crimean–Congo haemorrhagic fever among children in Southeast Iran (clinico-epidemiological feature and outcome analysis)
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**Background:** Crimean–Congo haemorrhagic fever (CCHF) is a viral haemorrhagic illness of the nairovirus group. Although primarily it is a zoonosis, sporadic cases and outbreaks of CCHF affecting humans do occur. The disease is endemic in many countries in Africa, Eastern Europe and Asia. During recent years, outbreaks have been reported in South Africa, the Middle East and Iran. Despite the endemicity of the disease especially in the Southeast of Iran, data on CCHF in children from Iran are limited. This study was conducted to detect the risk factor and clinico-epidemiological feature and outcome analysis regarding efficacy of ribavirin in children with CCHF in Iran.

**Patients and Method:** Between 1999 and 2006, the study included 34 cases under the age of 18 years who were admitted to BooAli hospital in Systan province of Iran. The diagnosis was confirmed through detection of IgM ELISA and/or genomic segment of PCR CCHF Virus.

**Results:** Out of 34 children with Crimean–Congo haemorrhagic fever (23 male, 11 female) with age range of 5 to 18 years, 29 patients (85%) were from rural areas and tick bite was determined as a risk factor for 23.5% of affected children. The most observed symptoms were fever (85.2%), myalgia (67.6%) and bleeding (61.7%). The most common sites of bleeding were nasal and oropharyngeal mucosa, with gastrointestinal tract ranking second. High fever (>38.5°C) during hospitalisation; confusion, bleeding from multiple sites and presence of petechia/echymosis occurred more often in those patients who died than in surviving ones. (The presence of high fever during admission, confusion, bleeding from multiple sites, and petechia/echymosis were associated with higher mortality rate in admitted patients.) Additionally, the mean values of ALT, AST, PTT, INR and urea were also higher, and mean platelet count was lower in the patients who died. Nearly all of the patients (except two) were treated with ribavirin. The recovery rate was
higher in children whose treatment started during the initial 3 days of illness in comparison to children whose treatment started after the first 3 days (85.2% versus 24.8%).

**Conclusion:** In children who suffered from CCHF in southeast of Iran, clinical features, factors influencing outcome of disease and risk factors were similar to other outbreaks of this disease in adult patients in Iran. Treatment with oral ribavirin can increase recovery rate in children as well as adult patients.

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**O249 Clinical features of dengue infections, and predictors of dengue haemorrhagic fever in Singapore**

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**Objectives:** In 2004, Singapore experienced its worst dengue outbreak in 30 years with 9,459 notified cases, of which 80% were hospitalised. The study objective was to explore the demographic, clinical and laboratory features of dengue fever (DF) and dengue haemorrhagic fever (DHF) upon presentation to the hospital, and to determine predictors of DHF as a marker of severity.

**Methods:** A retrospective study was conducted on all laboratory-diagnosed dengue cases admitted from 1 Jan to 31 Dec 2004 to Tan Tock Seng Hospital (TTSH), the main dengue treatment hospital in Singapore. Demographic, clinical, and laboratory data were collected from the hospital's emergency department and standardised dengue clinical pathway during admission. Using data throughout the admission, cases were classified as DF or DHF according to the World Health Organisation classification. Data on presentation was then used to determine the predictors of subsequent development of DHF.

**Results:** The study included 2,144 laboratory-diagnosed dengue cases. Of these, 140 (6.5%) were classified as DHF, with one death. On presentation, the mean age among DF and DHF patients were not significantly different (35.1 years compared to 32.3 years respectively). However, there were more male DHF patients (74.3%) compared to DF patients (63.2%, p < 0.01). DHF patients had more frequent dehydration on admission (20.7%), compared to DF patients (2.9%, p < 0.001). DHF patients also had more co-morbid medical conditions (27.9%) compared to DF patients (10.4%, p < 0.001). For the laboratory results, DHF patients had lower mean white cell count (2.99×10³/μL) compared to DF patients (3.65×10³/μL, p < 0.01), and lower total protein levels (2.95g/dL) compared to DF patients (6.32g/dL, p < 0.01). Mean prothrombin and partial thromboplastin times, and atypical lymphocytes counts were also significantly lower in DHF compared to DF patients. From the multivariate analysis, males [odds ratio (OR) = 1.61], dehydration (OR = 6.06), white cell count (OR = 0.86), total protein levels (OR = 0.96), and atypical lymphocyte counts (OR = 0.95) were independently and significantly associated with DHF.

**Conclusions:** A few key routine demographic, clinical, and laboratory variables collected on admission may be used to predict DHF. These variables can be used by clinicians to determine the likelihood of DHF occurring during the admission, and may also be used as a marker to determine the need for admission or close monitoring.

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**O250 Transmission potential of Chikungunya fever in a two-wave epidemic in Reunion Island**

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**Background:** A Chikungunya fever epidemic, transmitted by *Aedes albopictus* mosquitoes, has swept Reunion Island (Indian Ocean), causing 3000 cases in a first wave (April–May 2005) then 260,000 cases in a second wave (December 2005–May 2006). The reason for this dramatic increase between the two seasons is unknown, but it has been suggested that molecular changes may have increased the transmission potential.

**Methods:** We assessed the transmission potential through determining the reproduction number R (i.e. average number of secondary cases per index case) during the course of the epidemic. R values larger than 1 correspond to an epidemic outbreak. The method uses the epidemic curve and the generation interval distribution (time from symptoms in the index case to symptoms in a secondary case). The generation interval distribution was reconstructed by composing the latent, viremic and incubation period in humans, as well as the bite rate and mortality in mosquitoes.

**Results:** R was larger than 1 during 6 weeks in the 2005 epidemic (average 2.3), and during 20 weeks in the 2005/2006 epidemic (average 1.7). In all cases, the magnitude of the reproduction number was comparable between the two waves. Our best estimate for the initial reproduction number (R₀) was 3.7, although it could range from 2 to 11 depending on assumptions regarding incubation and lifespan in mosquitoes. In the best fitting case, each infected individual may have contaminated 3 mosquitoes at most, and each mosquito contaminated 1.4 persons on average. Using data from the first season alone, model-based extrapolations suggested that epidemic outbreaks were possible as long as more than one third of the population remained susceptible.

**Conclusion:** Despite a thousand-fold change in incidence between the two seasons, the transmission characteristics of Chikungunya were similar; therefore there is no epidemiological evidence for an increase in virulence between seasons. At a time when information systems make it easier to monitor the course of emerging diseases, methods for timely and efficient analysis of the data must also be developed.

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**O251 Seroprevalence and reservoirs of leptospirosis in Conakry (Guinea)**

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**Objectives:** From September to December 2001, an urban outbreak of febrile jaundice revealed 107 cases in Conakry. Among them, 16 were diagnosed with acute leptospirosis. Because this disease is probably underdiagnosed in this country, a pilot study was undertaken in 2004 in Conakry, with an investigation of both humans and small mammals. Sera from 1200 human subjects were screened for leptospirosis antibodies to estimate the incidence of the infection during the past rainy season and identify risk factors for transmission. In parallel, rodents were trapped in households to identify the reservoir animals of the disease.

**Methods:** A cross-sectional serologic survey was carried out in 5 resource-poor urban neighbourhoods in Conakry, Guinea. A detailed standardised questionnaire was completed to document demographic and environmental risk factors of transmission. Leptospirosis specific IgM and IgG levels were detected by ELISA and confirmed with MAT testing. The trapped rodents were taxonomically identified and one kidney was collected for detection of leptospires by culture and PCR testing. A nested PCR with a high sensitivity was performed, non-pathogenic leptospires (e.g. *L. biflexa*) were excluded by primer design. PCR positive samples were confirmed using different typing PCRs.

**Results:** Approximately 7 percent of study subjects were positive for leptospira antibodies. Preliminary epidemiological analysis revealed as risk factors for leptospira IgM antibodies: (i) living in a neighbourhood from which leptospirosis cases were reported in 2001; (ii) use of tap water for washing and bathing; (iii) living close to a waste pipe; (iv) history of hospitalisation during the past rainy season 330 rodents were trapped within the 5 neighbourhoods. *Rattus rattus* and *Mus musculus* were the most frequent species, but in addition some *Crocidura* and *Mastomys* spp. were identified. In five of the kidney samples leptosomal DNA was detected by nested PCR. In three cases specific molecular typing revealed *L. kirschneri*.

**Conclusion:** This survey shows that a significant percentage of the population of Conakry, a city with ~2 Million inhabitants, is exposed to leptospirosis during the rainy season. Transmission probably occurs through leptospirosis infested water on the domestic compounds, with rodents as one possible reservoir. As the outbreak in 2001 shows, there is an urgent need for further identification of the main reservoir(s) of the disease and environmental control measures.