Conclusion: Above results suggests that contamination of hospital environment due to breaks in transmission control is actually associated with nosocomial *Clostridium difficile* infections, the chances of these infections being directly related with either the time spent in hospital or with ICU setting.

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Spotted fever group, typhus group rickettsioses and sennetsu neorickettsiosis in rural Thailand

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Background: Rickettsioses are zoonotic diseases of global impact; pathogens include spotted fever (SF), murine typhus (MT) and scrub typhus (ST). Sennetsu neorickettsiosis (SN) was first reported in Japan but limited information is available on its geographic distribution and prevalence. We describe characteristics of serologically-confirmed rickettsioses and SN among febrile illness patients in Thailand.

Methods & Materials: We prospectively enrolled patients aged ≥7 years with undifferentiated febrile illness presenting to the outpatient and inpatient departments in 4 district hospitals in rural Thailand during 2002-2005. Serum was collected at enrollment and from 91% of participants 3-5 weeks later. Antibody titers to SF, MT, ST and SN were measured by immunofluorescent assay (IFA). Seropositivity was defined as immunoglobulin (Ig) G ≥1:128 or IgM ≥1:64. Cases of acute infection were confirmed by a 4-fold increase in IgG or IgM titers between acute and convalescent sera.

Results: Of 1,292 patients, 13 (1.0%), 66 (5.1%), 65 (5.1%) and 4 (0.3%) had at least one serum specimen positive for SF, MT, ST and SN respectively. Acute infection with SF was confirmed in 8 (0.6%), MT in 24 (1.9%), ST in 23 (1.8%) and SN in 2 (0.2%), respectively. SF patients (n=8) were less likely than other febrile patients to report having toilet in their home (63% vs. 99%, P<0.01) or trash removal in their village (38% vs. 73%, p=0.04). MT patients (n=24) were more likely than other febrile patients to present with myalgia (96% vs. 76%, p=0.02) and report seeing rodents around their houses (63% vs. 23%, p<0.01). Compared to other febrile patients, ST patients (n=23) were more likely to present with rash (30% vs. 11%, p=0.01), elevated aspartate transaminase (91% vs. 51%, p<0.01), and elevated alanine transaminase (70% vs. 29%, p<0.01). ST patients were more likely to report insect bites (52% vs. 22%, p<0.01) and cutting down trees (35% vs. 16%, P=0.04). SN was confirmed in 2 patients, who both presented with myalgia, fatigue, cough and chest pain.

Conclusion: Spotted fever rickettsioses and sennetsu neorickettsiosis may be under-diagnosed as causes of febrile illness in Thailand. Further investigation of zoonotic reservoirs is required to determine risks for infection.

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Sero-epidemiological findings of zoonotic infections in Maputo suburban residents

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Background: In several low-income countries in Africa, e.g. Mozambique, especially viral zoonotic disease patterns are not yet well surveyed. Sero-epidemiological studies of relevant human illnesses will give background data on the spread of diseases in the population and an indication on prevention and intervention needed.

Methods & Materials: Thirty febrile patients enrolled in a study at the Polana Caniço Health Center in the suburban areas of Maputo city, Mozambique, July-September 2012 were investigated. Serum/plasma was analyzed for IgG response to chikungunya virus (CHIKV), dengue virus (DENV), hantavirus, Rift Valley fever virus (RVFV), West Nile virus (WNV), and *C. burnetii* and *Brucella sp.* All patients were routinely screened for malaria.

Results: Ten of the 30 patient samples showed positive sero-epidemiological finding for flavivirus. 9 out of 10 IgG positive patients had an unclear diagnosis before the additional study-analysis was done. 8 patients were IgG-positive for CHIKV, 1 for RVFV, 3 were positive for DENV and 3 for WNV, of which 2 for both DENV and WNV. All other zoonotic diseases investigated so far were negative. 27% of the 30 patients had malaria, among those one patient positive for CHIKV. Results for 60 additional patients (paired acute and convalescent samples) are pending, but will be presented at the conference.

Conclusion: Antibodies to CHIKV were found in 27% of the samples. Interestingly, especially in view of previous report from Mozambique from the 1980s*, one patient was positive for IgG antibodies to RVFV. The samples positive for both DENV and WNV could represent previous infections with the viruses or co-reactivity. The overall study results indicate passed exposure to vector borne flaviviruses in Maputo patients seeking medical attention for fever, and points at widened alternative diagnoses when investigating patients with febrile illness in the southern African suburban setting. In particular CHIKV and RVFV could be a pos-

sible cause of fever or seen as a co-infection to malaria. The findings further strengthen the importance of vector control measures.

The collected material will be further analysed. Neutralization test might be a way forward, as looking at IgM-reactivity and for the microbes by PCR.

*Niklasson; Epidem. Inf. (1987), 99, 517-522

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Investing in emerging infectious diseases: A systematic analysis of UK research

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Background: Emerging and infectious diseases threaten health, security, and the global economy. However, little is known about investments in research to tackle outbreaks and innovate new tools for infectious disease control.

Methods & Materials: We systematically searched databases and websites for information on research investments for the period 1997-2010. We identified 325,922 studies for screening, included 6,165 studies in the initial analysis, and identified 654 studies on emerging infectious diseases in the final analysis.

Results: We identified a total research investment in emerging infectious diseases of £199 million, accounting for 7.7% of a total research investment in infectious diseases of £2.6 billion. In comparison, investment in HIV research amounted to £478 million (18.4% of total investment).

Diagnostic tools for control accounted for £9.8 million (4.9%) across 66 studies. Studies assessing therapeutics accounted for £20.0 million (9.9%) across 35 studies. Vaccine research attracted the least funding for tools to tackle emerging infectious diseases, with £11.5 million (5.8%) across 24 studies.

Hepatitis C received the most investment with £59.7 million (30.0%), followed by prion research with £33.5 million (16.8%), *Campylobacter jejuni* with £24.1 million (12.1%), and *Helicobacter pylori* with £15.1 million (7.6%). Although total influenza investment was £80.1 million, funding specifically for H5N1 influenza virus was £13.7 million (6.9%) and for H1N1 influenza virus was £10.8 million (5.4%).

Public funding accounted for £144.0 million (72.3%) across 361 studies with philanthropic funding awarding £40.6 million (20.4%) across 173. Preclinical research attracted the most investment with £142.4 million (71.5%) followed by epidemiological and operational research with £42.1 million (21.2%) and product development research with £12.2 million (6.1%). Phase 1, 2, 3 clinical trials was the least well-funded type of research with £2.5 million (1.2%).

Conclusion: Emerging infectious diseases receives small amounts of funding compared to other scientific disciplines, with the exception of HIV. It is essential that we map, monitor and evaluate emerging infectious disease research funding given their importance to global health security.

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Neurological aspects of human parvovirus B19 infection: A systematic analysis

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Background: Parvovirus B19 has been linked with various clinical syndromes including neurological manifestations. However, its role in the latter remains not completely understood. Although, the last 10 years witnessed a surge of case reports on B19-associated neurological aspects, the literature data remains scattered and heterogeneous, and epidemiological information on the incidence of B19-associated neurological aspects cannot be accurately extrapolated. Our aim was to systematically identify the characteristics of cases of B19-associated neurological manifestations.

Methods & Materials: A computerized systematic review of existing literature concerning cases of B19-related neurological aspects was conducted using all databases included in Web of Knowledge and PubMed database following PRISMA guidelines. Data were summarized using percentages and cross tabulations. The 95% confidence intervals for percentages were calculated using the Wilson method. All statistical analyses used the conventional two-sided 5% significance level and were carried out using SPSS version 20 and CIA version 2.0.

Results: As shown in Figure 1, 89 articles describing 129 cases of B19-related neurological aspects were considered eligible and further analysed; 79 (61·2%) were associated with central nervous system manifestations, 41 (31·8%) were associated with peripheral nervous system manifestations and nine (7·0%) were linked with myalgic encephalomyelitis. The majority of the cases (50/129) had encephalitis. Clinical characteristic features of the cases were analysed, and possible pathological mechanisms were also described.

Conclusion: B19 should be included in differential diagnosis of encephalitic syndrome of unknown aetiology in all age groups. In addition, B19 should be included in differential diagnosis of some peripheral nervous system manifestations such as neuralgic amyotrophy. Diagnosis should rely on investigation of anti-B19 IgM antibodies and B19 DNA in serum or CSF. Treatment of severe cases could benefit from a combined regime of intravenous immunoglobulins and steroids.

To confirm these outcomes, goal-targeted studies are recommended to exactly identify epidemiological scenarios and explore potential pathogenic mechanisms of these complications. Performing retrospective and prospective, and multicenter studies concerning B19 and neurological aspects are in demand.

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