

Communicable Diseases

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Lessons from the field – Experience from the Ebola outbreak in Guinea, November–December 2014

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Objective: To describe the experience and lessons learned during a recent field epidemiology deployment to the Ebola outbreak (Siguiro, NE Guinea).

Design and Methods: Current standard practice for field investigation of Ebola virus disease (EVD) includes four “pillars”: active case finding and contact tracing, prompt isolation and treatment of cases in treatment centres, provision of secure burial, and, most importantly, social mobilization (engagement of local communities affected by EVD).

Results: The first case in Siguiro was identified mid-July 2014; three months later, there had been seven separate introductions of EVD into this prefecture (covering an area of about 6000 square miles; population 244 000), for a total of 16 cases, with 12 deaths (case fatality rate [CFR]: 75%). However, just two cases notified toward the end of October led to 18 further cases over the next six weeks, with 12 deaths (CFR: 67%). The main challenges during November–December were high resistance of affected families to being contact traced (fear that we would “give” them EVD), to admitting their ill family members to treatment centres (fear that they would be killed there) and to allowing secure burials for family members who were suspected cases (disbelief that they had EBV).

Conclusion: Three of the four field investigation pillars were difficult to complete due to community resistance caused by high levels of mistrust and little knowledge of EBV. Prior to November, there was little social mobilization in the area. This has since been improved, but until communities are fully engaged in combatting EVD, this epidemic will continue.

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Chikungunya in the Western Hemisphere: A review of the 2014 epidemic, the potential long-term impact and research opportunities

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Objective: The objectives of this paper are to present a comprehensive review of the impact of the recent chikungunya virus (CHIKV) outbreaks in island nations, including the Caribbean, and explore the potential for further study of the epidemiology and pathogen-host interactions of this emerging virus.

Design and Methods: We conducted a review of the current literature and data on multiple facets of CHIKV including acute disease outbreaks, epidemiological and clinical data, comparisons of diagnostic techniques and virologic strains.

Results: Outbreaks of CHIKV on island nations have seen high attack rates with corresponding increased morbidity and mortality. Severe, persistent and relapsing arthritis and tenosynovitis are common among CHIKV patients.

Conclusion: Comprehensive surveillance of CHIKV is required by the linking of epidemiologic, molecular and immunologic data with information on ecological patterns and vector prevalence if the incidence of CHIKV is to be reduced and prevented. More data on the disease spectrum and persistence in the Caribbean nations, the viral strain and the incidence rates are sorely needed. Because CHIKV can only be prevented by preventing mosquito bites, more research needs to be done locally in Caribbean nations to determine the optimal strategies of *Aedes* vector control and public health education with subsequent behaviour change.

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Clinical, molecular and serological outcomes of the chikungunya outbreak in Grenada

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Objective: This study evaluated the clinical utility of chikungunya virus (CHIKV) test results and clinical symptoms in patients with suspected CHIKV infection.

Design and Methods: Patients with CHIKV symptoms who presented at a health facility in Grenada during the recent outbreak had a CHIKV diagnostic test form completed by a health professional and a blood sample was drawn. The serum sample was stored at -80 °C, shipped to the Naval Infectious Diseases Diagnostic Laboratory (NIDDL) on dry ice and tested for CHIKV and dengue using polymerase chain reaction (PCR) real-time assay for viral RNA and immunoglobulin M (IgM) detection by enzyme-linked immunosorbent assay (ELISA).

Results: Sera from more than 600 patients collected from mid-September till mid-October 2014 were drawn and had a CHIKV diagnostic form completed. At the time of writing, 112 patients' sera have been tested at the NIDDL. Ninety per cent of patients had a positive test. Polymerase chain reaction only was positive in 8% of patients; IgM only was positive in 83%, and both PCR and IgM were positive in 9% of patients. The major symptoms presented by patients were joint pain (84%), fever (81%), body pain (74%), headache (62%), chills (54%) and rash (49%).

Conclusion: Immunoglobulin M testing detected 92% of test positive patients while PCR detected 17%. The IgM assay was clinically most useful. In an outbreak where dengue is ruled out and CHIKV is the cause, patients with the constellation of symptoms above could be considered positive for CHIKV infection with a 98% accuracy without confirmatory testing.

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Dengue deaths – Length of hospital stay, haematological parameters and presence of co-morbidities

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Objective: To review the characteristics of the patients who died from dengue in Trinidad to determine if there was any association between length of hospital stay, haematological parameters and ethnicity and any association with gender and the presence of co-morbidities.

Design and Methods: A descriptive study was undertaken via a review of case notes. Four major public hospitals were included in the study to locate patients who died from dengue between 2001 and 2010.

Results: The duration of hospital stay until death was characterized by a mode of three days and a median of four days. Eleven patients (47.8%) had a history of diabetes and seven (30.4%) had a history of hypertension recorded in the notes. A falling platelet count was observed in 69.5% of patients. A low normal haematocrit was observed in 78.2% of cases. Analyses did not reveal a significant association between length of hospital stay and platelet levels, nor with ethnicity; neither was a significant association found between gender and the presence of co-morbidities.

Conclusion: Morbidity and mortality from dengue continue to pose a public health problem globally. Most patients had a history of diabetes with low platelets on admission, but low to normal haematocrit throughout their stay in hospital (mode three days). A prospective comparison study would better explore the significance of co-morbidities and the meaning of low to normal haematocrit levels.

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Exploratory space-time analysis of dengue incidence in Trinidad: A retrospective study, 1998–2004

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Objective: To obtain an understanding of the space and time dynamics of dengue and provide health agencies with important clues for reducing its impact.

Design and Methods: Dengue haemorrhagic fever (DHF) cases observed for the period 1998–2004 were geo-referenced using Geographic Information System software. Spatial clustering was calculated for individual years and for the entire study period using the Nearest Neighbor Index. Space and time interaction between DHF cases was determined using the Knox Test while the Nearest Neighbor Hierarchical method was used to extract DHF hot spots. All space and time distances calculated were validated using the Pearson r significance test.

Results: Results show that 1) a decrease in mean distance between DHF cases correlates with activity leading up to an outbreak, 2) a decrease in temporal distance between DHF cases leads to increased geographic spread of the disease, with an outbreak occurrence about every two years and 3) a general pattern in the movement of dengue incidents from more rural to urban settings leading up to an outbreak with hotspot areas associated with transportation hubs.

Conclusion: The results of this study can be used by public health officers to help visualize and understand the spatial and temporal patterns of dengue and to prepare warnings for the public. Dengue space-time patterns and hotspot detection will provide useful information to support public health officers in their efforts to control and predict dengue spread over critical hotspots, allowing better allocation of resources.

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The current prevalence and potential elimination of the soil transmitted helminths from Grenada

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Objective: This study formed part of a soil transmitted helminth elimination programme in Grenada. The study assessed the prevalence of soil transmitted helminths (STHs) in Grenadian primary school children.

Design and Methods: A longitudinal study was carried out on students attending 39 (72.2%) out of all 54 primary schools in Grenada, Carriacou and Petite Martinique between March 2013 and December 2014. The schools were randomly selected for inclusion in the study. Zinc sulphate floatation with centrifugation and microscopy was used to assess the prevalence of STHs in stool samples from Grenadian primary school children.

Results: The overall prevalence of STHs was 1.3% (95% CI: 0.54, 2.72). In four of the eight parishes, the prevalence was 0%. The highest prevalence was 3.9% (0.48, 13.46) in St Patrick. The STH identified were *Ancylostoma duodenale*, *Ascaris lumbricoides* and *Trichuris trichuria*.

Conclusion: The prevalence of STHs in the initial survey was 1.3%. This low prevalence indicates that the elimination programme, which utilizes a multipronged approach including targeted chemotherapy and education, may be feasible.