

Methods & Materials: We conducted a comparative longitudinal study in 2016, recruiting 274 pulmonary TB patients, 137 from public health facilities and 137 from private health facilities using a multi-stage sampling technique. Data was collected using a questionnaire adapted from a tool developed by USAID and was analysed using SPSS version 23.0 software. CHE was measured using a threshold of out of pocket (OOP) health expenditure > 40% of non-food expenditure. Bi-variate and multi-variate analysis were conducted to identify risk factors by estimating the adjusted odds ratio (AOR) and 95% confidence interval (CI).

Results: The average cost per TB patient successfully treated from the patient's perspective was lower in public health facilities (US\$ 262.9) than in private health facilities (US\$ 485.7) ($t = -2.79$; $p = 0.006$). However, after controlling for the effect of possible confounders, the incidence of CHE due to TB was higher in public health facilities (21.20%) than in private health facilities (13.10%) (AOR = 2.87; 95% CI, 1.22–6.73).

Conclusion: The incidence of CHE due to TB was higher in public health facilities compared to private health facilities. We recommend that efforts to reduce OOP expenditure (e.g. community management of TB) among TB patients in public health facilities should be explored as well as expanding the PPM DOTS services in Kaduna State.

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UMP. 193

ICATE: infection control awareness through education



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Background: Education should be understood and used as a tool for social transformation, and as a resource to achieve social, cultural and economic equality. Therefore, ICATE is a project addressed to lower-income countries and/or rural communities that brings together universities, hospitals, schools and the local communities creating collaborative learning communities (CLC) to improve infection control.

Methods & Materials: Infection Control Awareness Through Education (ICATE) is an educational project for children, teachers and health professionals that directly tackles both: three of the eight Millennium Development Goals: (i) to help achieve universal primary education, (ii) combating HIV/AIDS, malaria, and other diseases, and (iii) to create a global partnership for development; and two of the seventeen Sustainable Development Goals: (i) ensure healthy lives and promote well-being for all at all ages, and (ii) ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. ICATE tackled these issues through a multidisciplinary team of clinicians, biologists, microbiologists and anthropologists that provided the scientific knowledge to elaborate resources, namely books, eBooks, informative flyers, and to organize courses, workshops for children, educators and general population.

Results: ICATE was already implemented in Brazil impacting on teachers and children. After its implementation a partnership for development was created to exponentiate the impact of this project.

Conclusion: Across African and South American countries, three major issues raise the need for awareness: HIV/AIDS, Malaria and Tuberculosis. ICATE takes advantage of the CLC to facilitate the transfer of knowledge and educational expertise from the academic media to schools, hospitals and general community, empowering the population with a set of tools, which will allow them to deal and/or participate in the infection control more pro-actively.

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UMP. 194

Is it time for Universal Varicella Vaccination in Chile? A health economic analysis



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Background: Although the Latin American Society of Pediatric Infectious Diseases (SLIPE) recommended adoption of Universal Varicella Vaccination (UVV) in 2016, UVV is not offered in Chile. In this study, we evaluate the health and economic impact of introducing UVV in Chile.

Methods & Materials: A dynamic transmission model of varicella infection with proportionate mixing in a static population and force of infection varying over age, time, and vaccination status was adapted. Seroprevalence data from Argentina, indicating relatively low varicella virus transmission (with 15% of adults never been exposed to natural varicella), were used for calibration in the absence of available Chilean data. Healthcare resource utilization and costs were estimated from a recent study of the clinical characteristics and economic costs of hospitalized varicella patients in Chile. The Chilean immunization schedule currently has vaccination visits at 12 months, 18 months, and 6 years of age during which varicella vaccination could be offered; the following one- (1D) and two-dose (2D) vaccination strategies were considered (age at vaccination/vaccination coverage %): 1D-Early (12m/90%); 1D-Late (18m/85%); 2D-Early-Short (12m/90%, 18m/85%); 2D-Early-Long (12m/90%, 6y/85%); 2D-Late-Long (18m/85%, 6y/85%). Costs were evaluated in 2017 United States Dollars (USD) (1 USD = 633.527 Chilean Pesos). Costs and benefits were discounted at 3%; a 25-year time horizon was used.

Results: The model estimates 185,419 varicella cases/year (incidence rate 1023/100,000) in Chile in the absence of UVV with 28 deaths per year.

All vaccination strategies were cost saving. The most cost-saving strategy is 1D-Early. 1D-Early UVV will reduce the varicella case load by 87%/99.4%/99.5%/99.7% at 1/5/10/25 years after vaccination, and is estimated to save 3.6M/52M/109M/269M USD (discounted) respectively. Two-dose strategies are more effective, but more costly. Although two-dose strategies are cost effective compared to not vaccinating, the marginal incremental cost effectiveness com-

pared to one-dose strategies is very high. 2D-short is the most effective and cost effective of the two-dose strategies, and can reduce breakthrough varicella by 65–75% compared to one-dose strategies.

Conclusion: Both one- or two-dose UVV is estimated to be cost-saving in Chile. Because of historically low varicella transmission rates, UVV can rapidly and sustainably reduce the burden of varicella in Chile.

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UMP. 195

Spatiotemporal dynamics between dengue and climatic variables on capitals of the Brazilian Northeast region by wavelets

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Background: Recent analysis indicates that the number of cases of Dengue Fever may be as high as 400 million/year in the world. In 2015, according to the Brazilian Ministry of Health, there were 1,621,797 probable cases of Dengue in the country, including all classifications except discarded notifications, and this is the highest number recorded on the historical series since 1990. Many studies have found associations between climatic factors and dengue transmission, specifically to understand the frequency and periodicity of epidemiological cycles dependent on those factors, main purpose of this study.

Methods & Materials: In this work, Wavelet Transform based in Morlet function was applied to observed data to characterize the space-time frequency distributions of Dengue Fever incidence, following the gradual change of the atmospheric forcing, for all the Brazilian Northeast capitals, from Jan 2001 to Dec 2012. This allows a spectral description those distributions of dengue epidemics in this area.

Results: The Wavelet Transform analysis shows the persistence of Dengue Fever incidence on annual cycle (12-month periods) in all capitals studied. Concomitantly, there is significant periodicity observed between 3.6 and 4.6 years, characterizing the higher Dengue Fever incidence occurrences. Recife, Aracaju and Salvador cities show similar pattern of epidemiological distribution. Indeed, the application of biwavelet permitted the investigation of the relationship between Dengue incidence and climatic variables observed at surface, considering periodicity, frequency and phase-coherence between times series. Significant periodicities of meteorological variables are reflected on incidences, with well-defined nuclei, characterizing periods of higher infection. For instance, in Aracaju, the cross-wavelet power spectrum has shown simultaneous annual phase of the occurrences of dengue and rainfall with subscale of 3 to 4 months, particularly between 2007–2010, showing the sensibility power of the biwavelet technique to covariance and correlation analysis.

Conclusion: Based on the review, it is proposed the use of wavelets to relate dengue incidence to climatic variables, considering the space-time frequencies. The model can serve for the

understanding of the periodicity of dengue epidemiological peaks, specifically in the capitals of the Northeast of Brazil, with occurrence of 3.6 to 4 years, analysis unprecedented in the literature for this region.

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UMP. 196

Optic Neuritis and Acute Transverse Myelitis after Chikungunya virus infection

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Background: Since 2015, an outbreak of the Chikungunya virus (CHIKV), was identified in north and northeastern Brazil and Caribbean. The infection has demonstrated itself to be benign and self-limited in the vast majority of cases; however, complications, including injuries to the central and peripheral nervous systems, have been reported. Complete Acute Transverse Myelitis (ATM) associated with Optic Neuritis (ON) after this virus infection has never been reported in the literature.

Methods & Materials: Medical record and clinical interview.

Results: Case report: 63-year-old white woman, presented after acute fever, headache, and arthralgia, urinary retention associated with progressive paraparesis, evolving with paraplegia in a few days. Simultaneously presented reduction of visual acuity, sudden installation, associated with bilateral diplopia. The beginning of neurological symptoms surfaced about of 30 days after the beginning of fever. Confirmed the serological diagnosis of CHIKV (IgM/ELISA). Spinal cord MRI showed multiple lesions in cervical and thoracic areas, with gadolinium uptake. Assessment of visual acuity was reduced in both eyes, with bilateral scotomas. Cerebrospinal fluid analysis revealed normal patterns of protein and glucose, but lymphocytic pleocytosis. Bacterial (Gram and Ziehl Neelsen methods), fungal (Cryptococcus) and viral (herpes simplex, cytomegalovirus, varicella-zoster, HTLV, dengue, zika and chikungunya) analyses were negative; intrathecal synthesis of IgG, IgM and oligoclonal bands presented with normal values. Blood test results were normal throughout the clinical course. She began treatment with methylprednisolone (1 g/daily) for 3 days. There was visual deficit improvement and total disappearance of spinal cord lesions, but with persistence of motor neurological deficits.

Conclusion: This is an unprecedented case report of association between the CHIKV infection and neurologic manifestations: optic neuritis and acute transverse myelitis. Although the association between the arbovirus and demyelinating syndromes is rare it is possible the involvement of the nervous system secondary to the infectious process. If a patient who lives in or who has traveled to an area with endemic CHIKV presents with signs of ATM or ON, the existence of this agent must be investigated. If its presence is confirmed in the blood and/or CSF, in the absence of other causes, its relationship with nervous injury is confirmed.

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