and were vaccine non-responders. Treg expansion was found in the non responders group and difference was statistically significant. Most vaccinee belonged to moderate titre group with antibody titer 80 to 160.

Conclusion: The study emphasizes the need for high quality of surveillance both in terms of isolation virus and non cultivable virus by third generation of sequencing. SA-14-14-2 is capable of inducing humoral and cellular immune response. The study suggests the role of expansion of Treg activity which inhibits humoral immune response, thus may contribute to persistent infection. There is need for extensive research in areas related to surveillance, vaccines and virus persistence to provide better understanding of vector borne diseases.

http://dx.doi.org/10.1016/j.ijid.2016.02.405

Type: Poster Presentation

An outbreak of diphtheria in K'Bang District, Gia Lai, Vietnam, October 2013 – July 2014

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Background: Diphtheria has not been recorded in Gia Lai province since 2004. Beginning in October 2013 a large number of suspected cases were reported from K'Bang District hospital, including two deaths. This study describes the epidemiological characteristics of these cases.

Methods & Materials: Retrospective review of patient medical records, and face-to-face interviews of health care providers and patient care-givers.

Results: 108 suspected cases of diphtheria, including two deaths, were reported from K'Bang district from October 2013 through July 2014. Specimens from 7 of 16 cases tested were culture positive for *Corynebacterium diphtheria*. Among the 108 cases, 73% were 1-15 years-old, none were <1 year-old; 84% belonged to the Bana ethnic minority group; 93% were from farming families and 71% were poor; 69% of care givers were illiterate. District wide, only 39% of all families are Bana, 85% are farming families, 30% are poor, and literacy is 95%. Most cases (87%) had not received or had an unknown history of DPT vaccination. Cases came from 13 of the 14 communes in the district, but the largest number (39%) was from Daksmar where the index case lived. Recent coverage with DPT-3 in Daksmar has been the lowest reported for any commune in the district, <50% (2006-2007) and <76% (2010-2014).

Conclusion: The diphtheria outbreak in K'Bang from 2013 through 2014 disproportionately affected children <15 years old, an ethnic minority group, and children of the poor, and illiterate. Rates of immunization in this community have been very low in recent years. Future strategies to improve vaccination coverage in the area should include targeting of poor minority communities and include materials for the illiterate.

http://dx.doi.org/10.1016/j.ijid.2016.02.406

Type: Poster Presentation

Ebola virus diseases signs, symptom and predicting death: A literature review

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Background: The aim of this study is to determine the accuracy of signs and symptoms among patients with Ebola at the time of presentation in predicting deaths.

Methods & Materials: We did a literature review in PubMed using the search terms or combinations of the search terms "ebola", "death" "signs and symptoms". Articles published between January 1976 and March 2015, have been include in this analysis. Further papers were found by screening the reference lists of these articles or as relevant articles suggested by Pubmed. Data are presented using likelihood ratio (LRs) because they function as "diagnostic weights" that are easily translated to posttest probability of death.

Results: Three studies were identified (Democratic Republic of Congo (DRC) =2[1 from Kikwit and 1 from Mosango during the 1995 Outbreak Ebola Hemorrhagic Fever (EHF)], Sierra Leone=1 during the 2014 outbreak Ebola Virus Disease (EVD). A total of 103cases have been analyzed in the study from Kikwit with 84patients who died and 19patients who survived, 23cases were identified in Mosango; 18 of them died. In Sierra Leone, 44cases among them 36died. Several findings significantly decrease the probability of dying of Ebola: In kikwit, DRC; the presence of Cough (likelihood ratio [LR]:0.27; 95% confidence interval [CI], 0.09 - 0.80), hemoptysis (LR:0.08; 95% CI: 0.01-0.74) and the absence of Tachypnea (LR:0.72; 95% CI: 0.61-0.86). In Mosango, DRC; the absence of: Conjunctival injection (LR:0.19; 95% CI: 0.04-0.82), Melena (LR:0.53; 95% CI: 0.30-0.93) and the presence of Rash (LR:0.12; 95% CI:0.03-0.45) significantly decrease the probability of dying of Ebola. In Sierra Leone, the absence of: asthenia (LR:0.44; 95% CI:0.27-0.72), diarrhea (LR:0.60; 95% CI: 0.40-0.90), dizziness (LR:0.51; 95%CI:0.32-0.80) and the presence of Hearing loss (LR:0.06; 95%CI:0.01-0.23) significantly decrease the probability of dying of Ebola.

Conclusion: The probability of the signs and symptoms of Ebola Virus Disease in predicting death varies from one center to another during the same epidemic and an epidemic to another. Further studies need to be conducted in this direction.

http://dx.doi.org/10.1016/j.ijid.2016.02.407