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Project Title: Seroepidemiologic study of dengue virus infection in southern Taiwan (Tainan City)

Project Number: DOH96-DC-2021

Executing Institute: Centers for Disease Control, Department of Health

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Abstract:

We had previously reported the establishment of NS1 serotype-specific IgG ELISA for dengue diagnosis and seroepidemiology. A retrospective seroepidemiologic studies on serum samples collected from residents of Liuchiu Hsiang, Pingtung County in the southern Taiwan during 1997-1998. The results demonstrated that NS1 serotype-specific IgG ELISA could replace PRNT for seroepidemiologic study to differentiate JE and dengue infections and for the dengue serotyping. In this three year studies, we carry out seroepidemiologic studies to investigate the seroprevalence rates of Kaohsiung City, Pingtung County, and Tainan City for the understanding of population infection rates, individual infection times, and the dengue virus serotypes infected. The results showed an age-dependent increase in seroprevalence rate for all areas studied. Overall age-stratification analyses showed that most of the young individuals less than 19 years old (born after 1988) were antibody negative (0-10%), the positive rates then increase with age, and reached up to 30-90% for the individuals higher than 65 years old with 30-70% secondary infection. The age-dependent seroprevalence rates correlated well with specific time period suggesting that dengue fever is not endemic disease in Taiwan and most infections were due to a few large-scale dengue epidemics from imported dengue viruses in that four larger dengue epidemics occurred in 1942-1943, (possibly DENV-2), 1981 (DENV-2), 1987-1988 (DENV-1), and 2001- 2002 (DENV-2). Our data also revealed that majority of population born after 1943 in Tainan City are naïve to dengue virus infection and are at high risk of infection with all of the four dengue virus serotypes. This is in contrast to Samin and Cianjhen districts of Kaohsiung City, where about 25% of residents are dengue seropositive due to previous DENV-1 (1987-1988) and DENV-2 (2001-2002) large epidemics, and the population is at high risk of DENV-3 and DENV-4 infections. This study demonstrated the non-endemic status of dengue in Taiwan, with low seroprevalence in young age residents.

Keyword: Dengue fever, Japanese encephalitis, ELISA, Nonstructural protein1 (NS1)