PROPOSER: Alex Cook

TITLE: Dengue incidence in Singapore and Malaysia

SUBJECT CLASSIFICATION: Statistics

DESCRIPTION OF THE SCOPE OF THE PROJECT:
Dengue is endemic to Singapore and Malaysia. Following successful control programmes in
the years after Singapore obtained her independence, the last few decades have seen a
resurgence in dengue, both locally (Ooi et al, 2006) and globally (Gubler, 1998), with 2005
having the most dengue cases on record in Singapore. The causes of the resurgence locally
are not clear, but the reduction in herd immunity caused by our previous public health
successes has been implicated (Ooi et al, 2006).

Infectious diseases such as dengue have no respect for man-made borders, and there is
considerable in- and efflux of people between Singapore and her neighbours, especially
Johor, to the north. It has been postulated (by me) that ostensible seasonality of dengue in
non-seasonal Singapore may be the result of dengue spread from other areas, such as
Malaysia, with greater seasonal forcing. Indeed, travelling waves of dengue have been
reported from further up the peninsula (Cummings et al, 2004).

This project will involve developing a model to relate dengue in Singapore and Malaysia to
each other, and potentially to other predictors, such as climate. Weekly case data is available
at the national level for Singapore and the state level for Malaysia. The hope is to determine
whether dengue in Malaysia or specifically Johor leads or lags dengue in Singapore.

EXPECTATIONS:
To get an upper second from this module, the student will be expected to develop a model for
dengue cases in the two countries.

PREREQUISITES:
The student should have good knowledge of R or another programming language.

RELEVANT ST4000 MODULES:
4231 Computationally intensive statistical methods (please take this), 4234 Bayesian
statistics

REFERENCE:
Ooi EE, Goh KT, DJ Gubler (2006). Dengue prevention and 35 years of vector control in
Dis 4:442--50.
DA Cummings et al (2004). Travelling waves in the occurrence of dengue haemorrhagic fever