Mathematical modeling of SARS: errata and updates

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Ying-Hen Hsieh, Education *Department of Applied Mathematics, National Chung Hsing University, Taichung, Taiwan*, Cathy WS Chen, Department of Statistics, Feng Chia University,Taichung, Taiwan

Send letter to journal: Re: Mathematical modeling of SARS: errata and updates

Email Ying-Hen Hsieh, et al.

Dear Editor

We write to follow on from our eLetter published in 2003.[1]

As more information becomes available regarding the diagnosis and laboratory testing of SARS, the official number of laboratory confirmed SARS cases in Taiwan during the 2003 outbreak has been officially determined to be 346.[2]

The duration of the outbreak by onset date is February 25 to June 15. In order to take advantage of the newly-available data for modeling purpose, we use the up-dated cumulative case data of the 346 lab confirmed cases to fit the exponential curve with first-order autocorrelation in the error structure.[3] We divided the time duration of the outbreak into four time periods, the resulting estimated mean effective reproductive number of the observed time period R* of the curve-fitting and a chronology of the significant events related to the outbreak which occurred in Taiwan at the dividing point of each time period is given in the Table. The temporal fluctuation in the value of R* is further exhibited in the Figure with similar trend as that of the mean effective reproduction number for various time intervals obtained in [1] using the probable cases. The drastic decrease in the mean effective reproduction number after April 29 further confirms the fact that the turning point for the outbreak to subside had occurred around April 29 [4]. These result shows that the mathematical modeling methodology used here is inherently consistent, regardless of whether we use the cumulative probable case data as in [1], or the more restrictive but reliable cumulative laboratory confirmed case data.

References

1. Hsieh YH, Chen CWS. (2003) Re: Mathematical modeling of SARS: Cautious in all our movements [electonic response to the JECH Severe Acute Respiratory Syndrome Supplement] **jech.com 2003** http://jech.bmjjournals.com/cgi/eletters/57/6/DC1#66

2. Center for Disease Control (Taiwan). Available at http://www.cdc.gov.tw/sarsen

3. Hsieh YH, Chen CWS. (2003) Severe Acute Respiratory Syndrome: Numbers don't tell the whole story. British Medical J 2003; 326: 1395-1396.

4. Hsieh YH, Lee JY, and Chang HL. (2004) SARS epidemiology modeling. Emerging Infectious Diseases 10(6), to appear June 2004.

Table 1. Mean effective reproductive numbers R* for each of the four time periods with chronological events of relevance for the time periods.

Time Period	Mean	Std. Err.	95 Lower C.I.	95 Upper C.I.
2/25-4/9	2.33401	0.20365	1.93487	2.73316
4/10-4/28	3.22814	0.34836	2.48578	3.97049
4/29-5/16	1.26861	0.03626	1.19029	1.34693
5/17-6/15	0.12190	0.00920	0.10301	0.14078

25/2 - Onset date of first confirmed case.
09/4 - Admission of first SARS patient to Ho Ping Hospital.
28/4 - Implementation of Level B quarantine and other interventions measures.
16/5 - Change of leadership at Department of Health and CDC-Taiwan.
15/6 - Onset date of the last hospital infection.

Figure. Histogram for mean effective basic reproduction number R* during the four time periods of SARS outbreak in Taiwan, 2003.