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A freely available software tool for assessing aspects of pandemic influenza risk reduction for small islands

The World Health Organization (WHO) advises against travel restrictions for pandemic influenza control.[1] Nevertheless, given historical examples of islands successfully excluding or delaying influenza in past pandemics,[2,3] we have explored this issue further.

After completing the necessary mathematical modelling work, we developed a simple simulation tool and made it freely available ("EscaVal" v1 released on 8 May 2009: http://www.influsim.info/software/escaval). This tool, with adjustable parameters, computes the probability that an isolated population escapes a major outbreak of pandemic influenza if it substantially reduces the number of arriving travellers during the whole course of the pandemic.

Travel volume reductions include the combination of voluntary reductions in travel expected during a pandemic as well as restrictions that might be imposed as a control measure. The output is presented (graphically and in a table) as the probability of escaping a major outbreak (escape probability). This probability is presented for a range of reproduction numbers (R_0) from 1.0 to 3.5, for a full range of travel reductions, and for a range of traveller numbers. A detailed manuscript describing the rationale and mathematics of this modelling work has been submitted to a specialised journal.

This issue is not only of relevance for small island states but also for remote sub-national islands such as those in archipelagos with limited sea or air contact (e.g. see: http://en.wikipedia.org/wiki/List_of_archipelagos). It may also be relevant for New Zealand which has some remote but populated offshore islands (e.g. Stewart Island, Chatham Islands).

Travel volume reductions are most likely to be successful in isolated populations that usually receive less than 10,000 travellers a year. With visitor numbers of that size, this intervention would only have a better than even chance of success if the travel volume reductions were very high (>95% reduction) and for a virus with relatively low infectivity ($R_0 \leq 1.4$, which is at the lower end of the range estimated for the current influenza A(H1N1) epidemic[4]).

Populations with larger traveller numbers would need additional interventions such as screening and quarantining[5] of arriving travellers and the use of antiviral treatment and prophylaxis if they wished to lower the risk of pandemic arrival or substantially delay it. Indeed, most isolated populations would be expected to implement multiple border control interventions. This requirement points to the main limitation of this initial version of EscaVal, which is that it doesn't include the option of investigating the effect of these other interventions.

These additional features will be considered if resources allow development of an expanded version of this tool in the future.

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