Request for comments

RFC20070910NH: Conflict resolution rewording

1st draft: N. Harvey, September 10, 2007

Applies to: Model description v1.1.0

Type of change: Clarification

Summary: This RFC proposes a rewrite of the section about how potential conflicts and ambiguities in the model are resolved.

Justification: The existing text does not cover many issues that have come up in testing and discussions.

Change: This change applies to Section A9 (Priorities of action). This text replaces the entire section.

> The many events and processes in the model create possibilities for conflict and ambiguity. This section describes how these problems are resolved.
>
> A unit can be infected by two or more mechanisms on the same day, for example, by both direct and indirect contact. In this situation, two exposures will be reported in the simulation output, but only one new infection. One of the exposures will be chosen randomly to report as the cause of the infection. Similarly, if there are two or more reasons for vaccinating or destroying a unit, one reason is chosen randomly to report as the cause.
>
> A unit can also be infected by the same mechanism multiple times on the same day, for example, by direct contacts from two different sources. In this case, the model will count two exposures by direct contact, but only one new infection.
>
> A simulation proceeds by daily time steps (Section A2) so the state of each unit must be consistent throughout a day. A unit cannot change state part way through a day, nor can it become quarantined or change from being in one zone to another part way through a day. Changes to the units' states and to the zones' shapes can be considered to happen in an instant *between* simulation days.
>
> One consequence of this is that if a unit is detected as diseased on day *d*, it will not become quarantined until day *d*+1. Similarly, if there is a rule to establish zones around detected units, the zones will not be updated until day *d*+1. The detected unit and its neighbors can still be the source and recipient of contacts on day *d*. This can be thought of as contacts happening "before" detection (really, it is simply a consequence of the rule against state changes mid-day). The model user should be aware that this behavior can result in larger outbreaks than if the opposite assumption were applied, that is, if detection happened "before" contacts.

Tracing (Section A6) also happens “after” contacts, so that it will not miss contacts that occur on the same day as the trace.

There can be a conflict between infection and vaccination. If the delay to immunity (see Section A8) is set to zero days, and a unit is both infected and vaccinated on day *d*, does the unit change to Latent or to Vaccine Immune on day *d*+1? In this situation, there is a 50-50 chance of either outcome happening. A vaccination is recorded in the simulation output either way. A new infection is recorded only if the infection happens.

There can be a conflict between vaccination and destruction. Because of the resource limits and priority system (Section A7.2) it may be impossible to tell exactly when a unit will be destroyed. Therefore the model will accept requests to vaccinate a unit (as part of ring vaccination) *even if* that unit is slated to be eventually destroyed. However, if the unit gets to the head of both the vaccination and destruction queues on the same day, the vaccination will be canceled and will not count toward use of vaccination resources.

End of changes.