

Request for comments

RFC20091016ARa: Vaccination queues

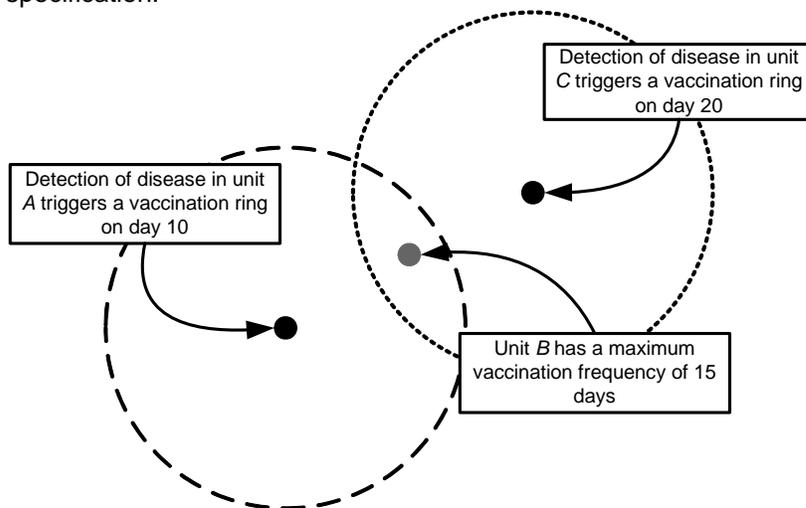
1st draft: A. Reeves, October 16, 2009

Applies to: Model description v1.2.0 (June 11, 2009)

Type of change: Conceptual change, for the next major release of the model

Summary: This RFC describes a change in the behavior of the model to prevent units that require vaccination from being listed in the vaccination queue multiple times.

Justification: According to the current specification, a unit may be queued for vaccination multiple times. Consider the situation described below and shown in the following figure from the specification:



Unit A triggers a vaccination ring on day 10. Unit B is placed in the queue for vaccination. If there are sufficient resources (*i.e.*, if vaccination capacity is sufficiently high), unit B is vaccinated and removed from the queue. When unit C triggers a vaccination ring again on day 20, unit B is again queued for vaccination. If there are sufficient resources, unit B probably will not be vaccinated again, because the 15-day period between vaccinations has not elapsed.

Consider the same situation, if there are severe resource restrictions. When unit A triggers a vaccination ring, unit B is placed in the vaccination queue but may not be vaccinated for some time. When unit C triggers a vaccination ring, unit B is placed in the queue a second time, even if it is still in the queue from the first event.

When unit B comes to the head of the queue, it is vaccinated, but it also remains in the queue due to the second event. When unit B comes to the head of the queue for the second time, it will be vaccinated again if the 15-day period between vaccinations has elapsed.

This behavior causes some difficulties in tracking the amount of time that unit B spends in the queue for vaccination. It may also be unrealistic: if unit B is already in queue to be vaccinated when another trigger event occurs, it may not make sense to queue it again for a subsequent vaccination when the first vaccination hasn't yet taken place.

Change: These changes apply to the first paragraph of Section A7.3.3, Vaccination priorities. New text is highlighted:

If a unit is marked for vaccination but cannot be vaccinated immediately, it goes onto a prioritized waiting list, or queue. When vaccination is carried out for a unit, it is removed from the queue. Although multiple events may trigger several vaccinations of the same unit at different times, a unit can be present on the waiting list only once. If an event occurs that would normally cause a unit to be placed in the vaccination queue while that unit is already in the queue, the event has no effect.

Change: These changes apply to Section A7.3.4, Minimum time between vaccinations. Current text to be deleted is struck out, proposed replacement text is highlighted:

A7.3.4. Minimum time between vaccinations

The minimum time between vaccinations is the number of days which must pass before a unit may be revaccinated between the time that a unit is vaccinated and the time that it can be placed in the queue for another vaccination. Once the specified number of days has passed, a unit may be revaccinated placed again in the vaccination queue if vaccination of that unit is triggered again.

Consider the simple situation involving units *A*, *B*, and *C* as shown Figure A7-1. Disease is detected in unit *A* ten days before disease is detected in unit *C*. Both detections trigger vaccination circles that include unit *B* as shown.

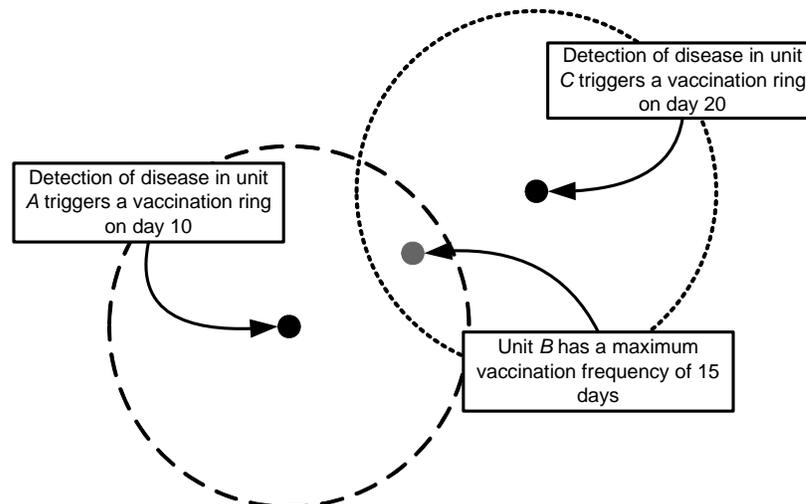


Figure A7-1. Overlapping vaccination rings. See text for description of timing of vaccinations.

~~Unit B is within vaccination circles triggered by detection of units A and C, and will be added twice to the queue of units to be vaccinated. If there is no waiting period for vaccination (i.e. vaccination capacity is not reached), unit B will~~

receive only one vaccination: its minimum time between vaccinations will not have been reached before it comes to the head of the queue the second time it is placed in the vaccination queue as a result of detection of unit *C*.

~~If vaccination capacity has been reached, unit *B* will receive two vaccinations only if the elapsed time between the first and second scheduled vaccinations exceeds the unit's minimum time between vaccinations. This subsequent vaccination resets the vaccine immune period for unit *B*. If the elapsed time is less than the unit's maximum vaccination frequency, unit *B* will not be revaccinated.~~

If vaccination capacity has been reached and unit *B* is still in the vaccination queue when unit *C* is detected, unit *B* will be vaccinated only once. Unit *B* cannot be placed in the vaccination queue a second time if it is still in the queue as a result of an earlier event.

Unit *B* can be vaccinated twice only if the vaccination as a result of the circle triggered by unit *A* occurs at least 15 days before the detection of unit *C* triggers another vaccination circle.

End of changes