"I wrote the Virus on a Network model (based loosely on the Virus model already present in NetLogo). First, I would like to say that the model is not (at least in its present form) intended to be a completely realistic depiction of a real-world phenomenon. It is more of an abstract agent-based model, showing the basic process (which could be taking place on a social network, or a computer network, etc). It also shows a number of different results. There are a number of ways in which the model does not match the real-world (e.g. the network structure is not likely to appear).

However, the equation-based SIR model also does not perfectly match reality, although it may give fairly good aggregate-level predictions in some cases.

I don't really think it makes sense to "validate" the Virus on a Network model against the equation-based SIR model. Perhaps a modified version of the Virus on a Network model, which is trying to model a specific phenomenon (computer viruses? HIV?) could be fruitfully compared to mathematical models of the same phenomenon.

On the other hand, one of the goals of the Virus on a Network model is to show a range of behavior that is possible, depending on the assumptions you make about how the virus might spread, and how nodes in the network might be cured and/or become resistant.

There are parameter settings for which the susceptible population does tend to go to zero. However, there are plenty of parameter choices for which it doesn't. Unlike the SIR model, the virus on a network model allows individuals to become susceptible again, after being infected -- see the GAIN-RESISTANCE-CHANCE slider. Also, sometimes the virus will die out before going throughout the whole population. This is certainly something that happens in the real world, and it makes sense that it would leave some individuals susceptible at the end of the run, since they were never exposed to the virus at all.

In short, I would argue the Virus on a Network model offers much more flexibility (and modifiability) than the equation-based SIR model. However, the Virus on a Network model has not been calibrated to any real data, and the assumptions made for the rules of the model would need to be re-examined carefully before applying it to any specific phenomenon.

Best regards, ~Forrest"