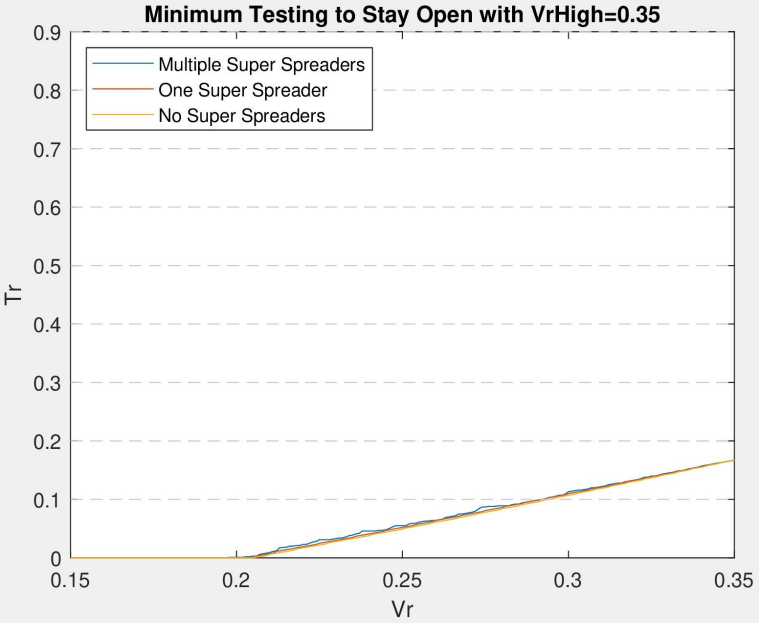
# Brief Summary

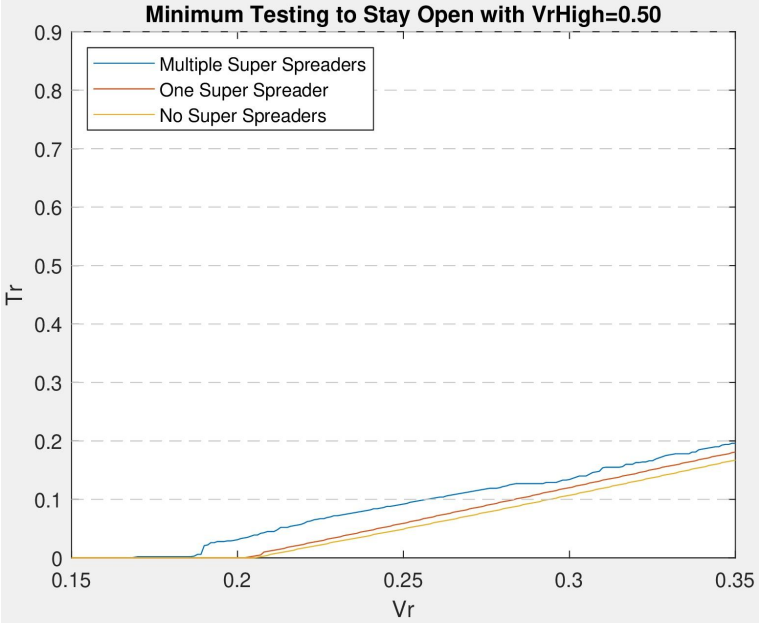
We see a weird bifurcation that occurs looking at the Variable Testing: Min-Testing to Stay Open. It appears there is also a slight one even with constant testing, although, much less pronounced. The bifurcation is most prominent in the multiple super spreader simulations, however, there is also one in the variable testing single superspreader simulations.

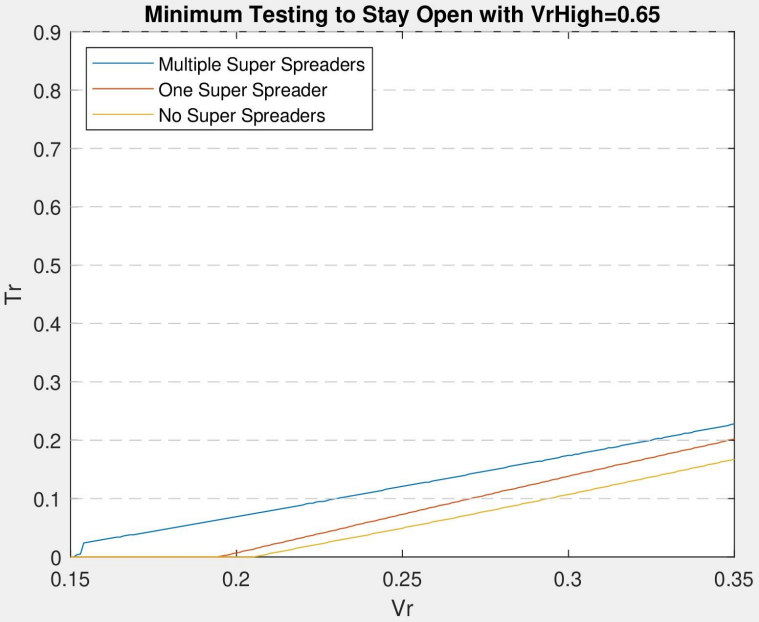
These plots seem to suggest that there is a specific low Vr value that when surpassed, the testing required to keep the school open has to be ramped up. This jump in testing is made larger when testing is only occurring once a week and additionally larger when the Vr rate of a party or weekly parties is higher. The low Vr value this jump in testing occurs at is inversely related to the high Vr value of the party/parties.

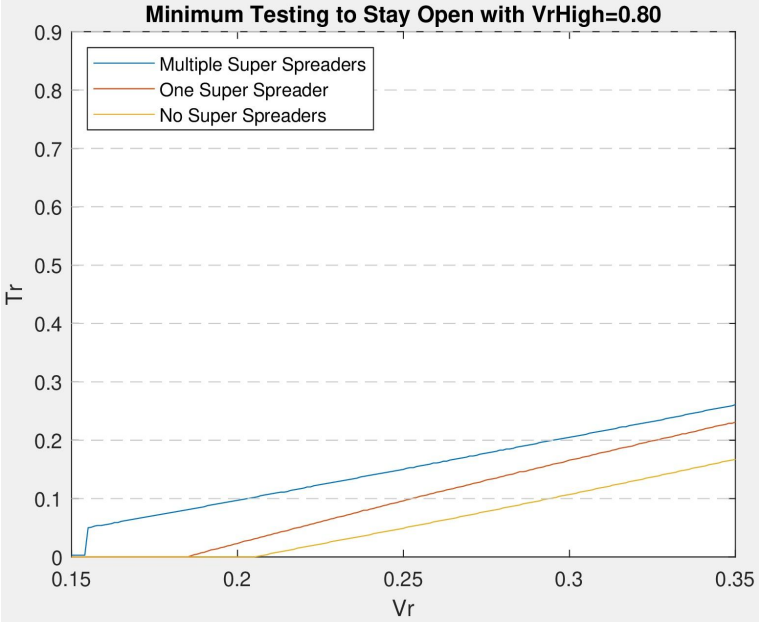
The zoomed in plots in the Variable Testing Section were run at 100 days as opposed to the non-zoomed in ones in that section being run at 116 which explains the slight differences. I will update these plots soon, but it should still give a better view of the approximate bifurcation.

# Constant Testing: Min-Testing to Stay Open

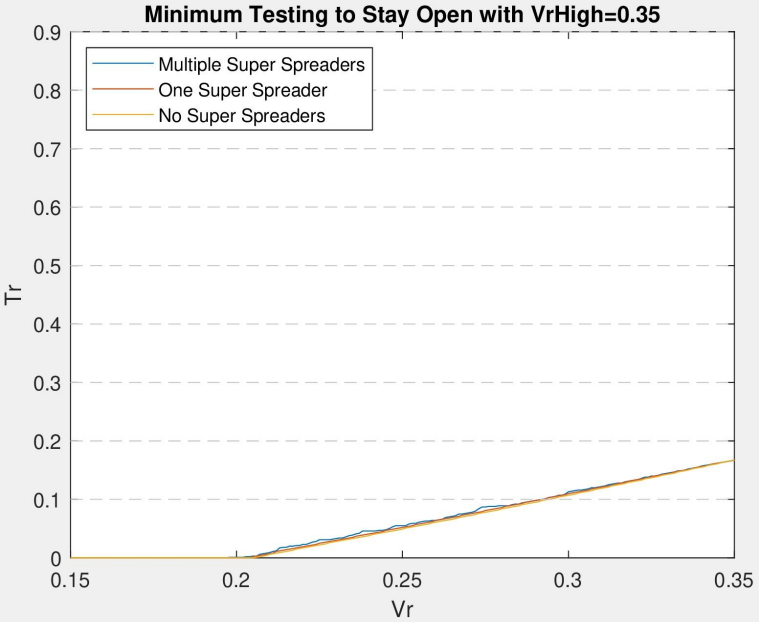



Minimum Testing to Stay Open with VrHigh=0.65
Multiple Super Spreaders
One Super Spreader
No Super Spreaders
Tr
Vr
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.15
0.2
0.25
0.3
0.35


Minimum Testing to Stay Open with VrHigh=0.80
Multiple Super Spreaders
One Super Spreader
No Super Spreaders
Tr
Vr
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.15
0.2
0.25
0.3
0.35

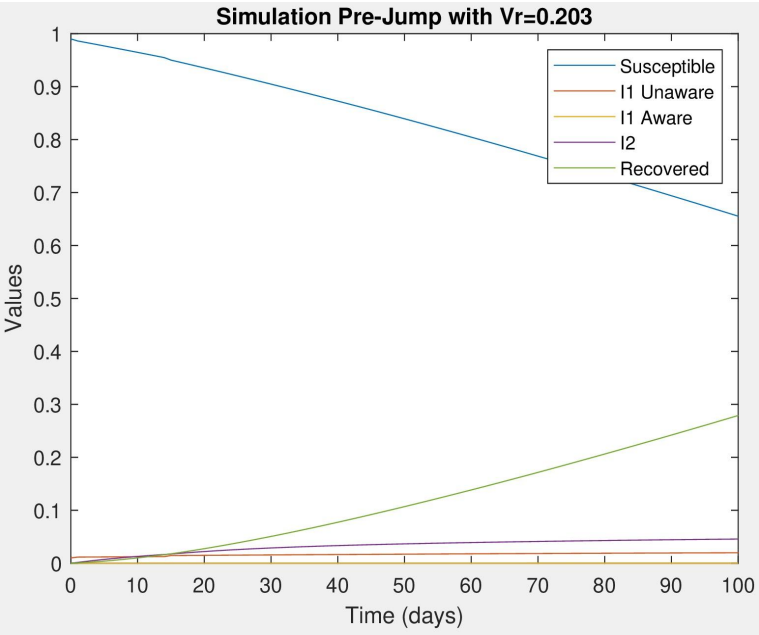
# VR High = 0.35

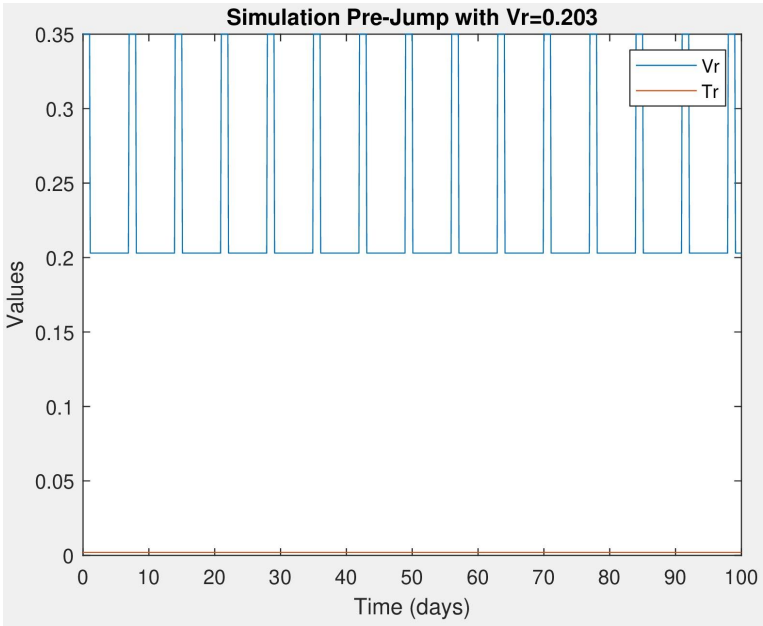



## Multiple Super Spreaders Plots (Vr values come from Jump in Variable Testing)

Pre-Variable Testing Jump

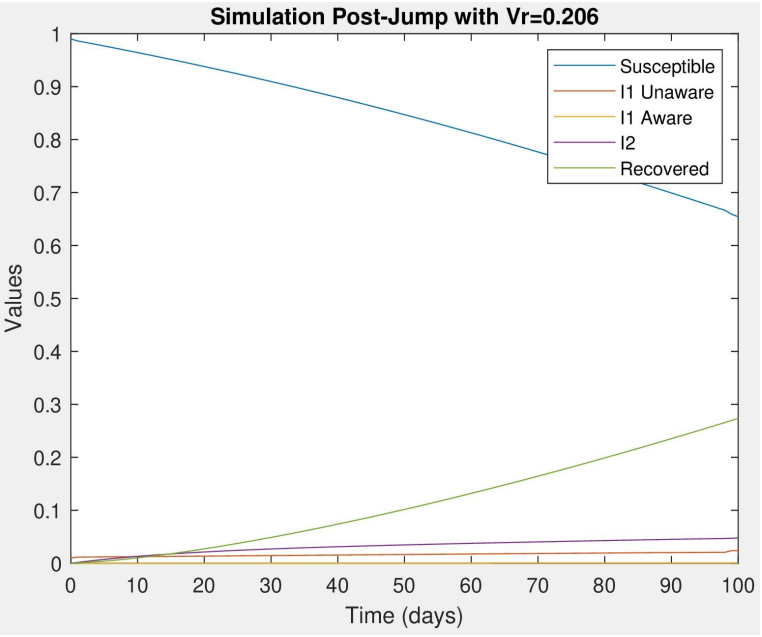
Min Tr=0.001 required to keep the known infection peak below 0.05 when low Vr=0.203 and high Vr=0.35.

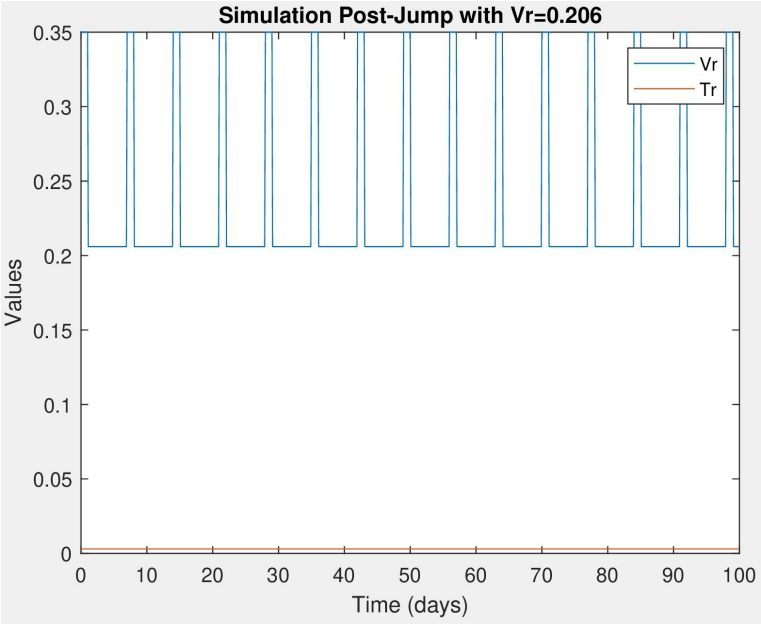


Post Variable Testing Jump

Min Tr=0.003 required to keep the known infection peak below 0.05 when low Vr=0.206 and high Vr=0.35

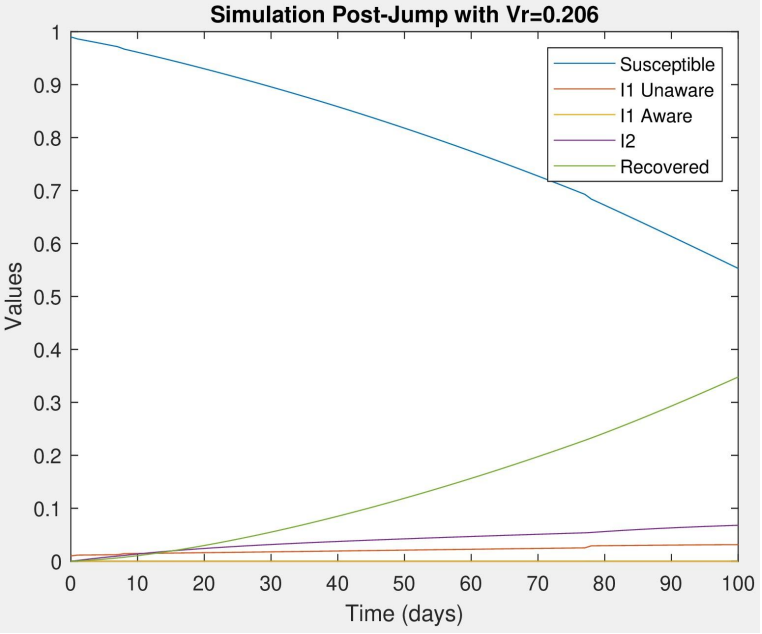


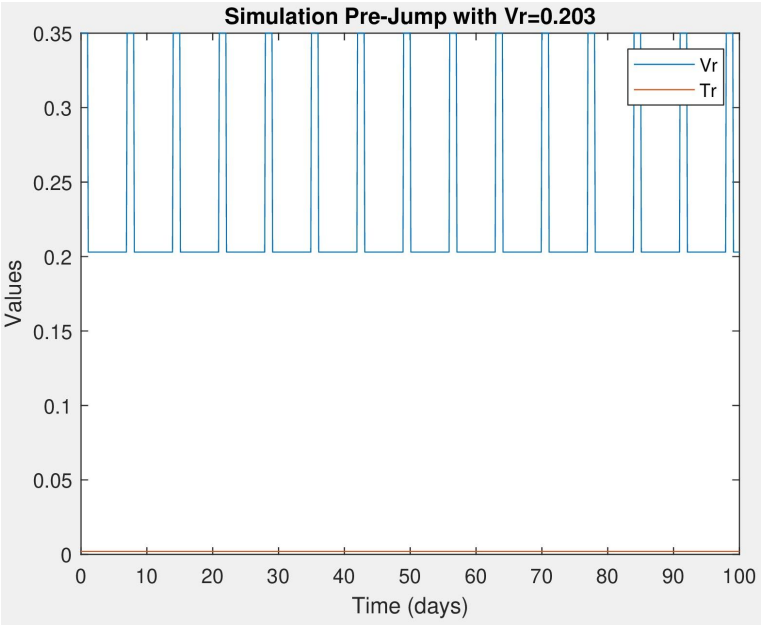




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ie testing too low)

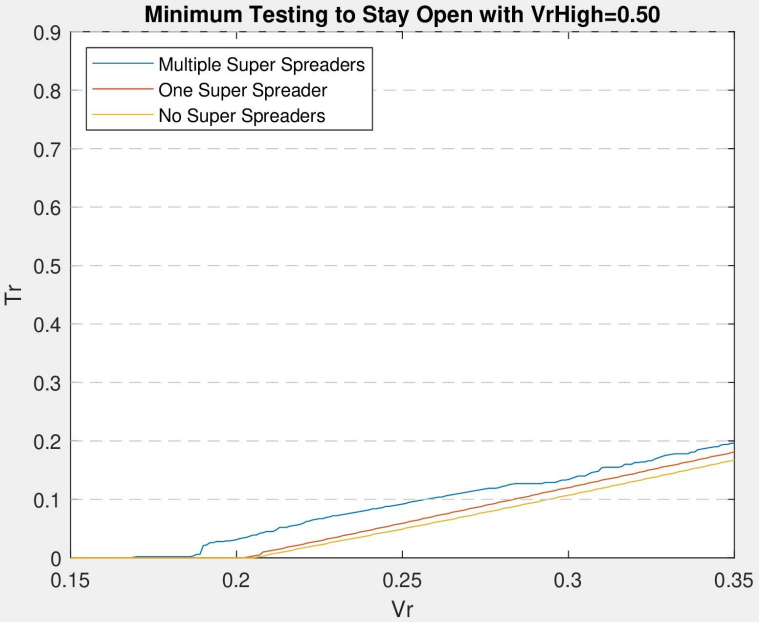
Tr=0.001

Vr low value is actually 0.206 (too lazy to make another Graph so I copy and pasted the one two up from here).



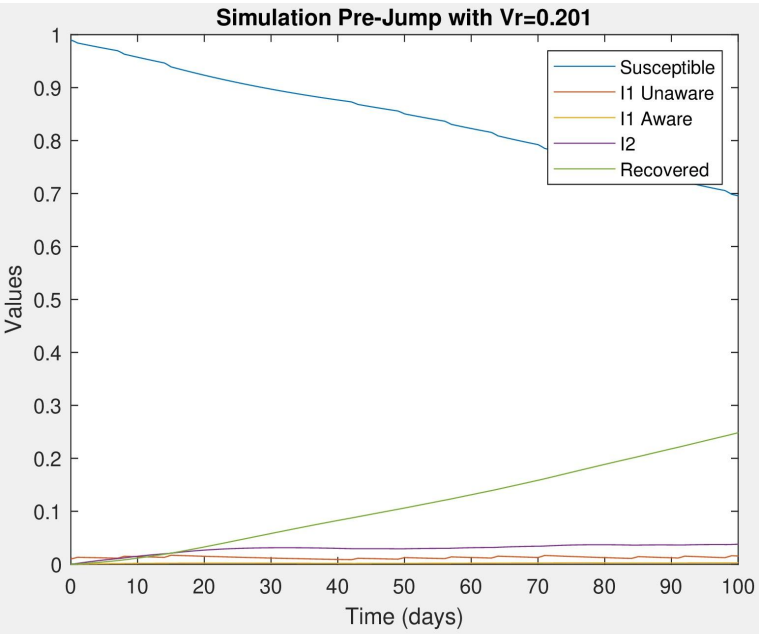
# VR High = 0.50

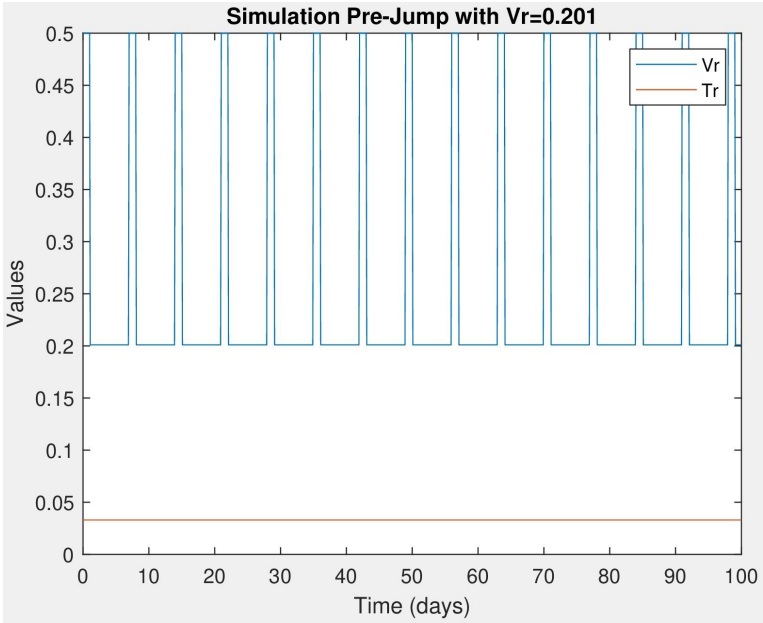



## Multiple Super Spreaders Plots (Vr values come from Jump in Variable Testing)

Pre Variable Testing Jump

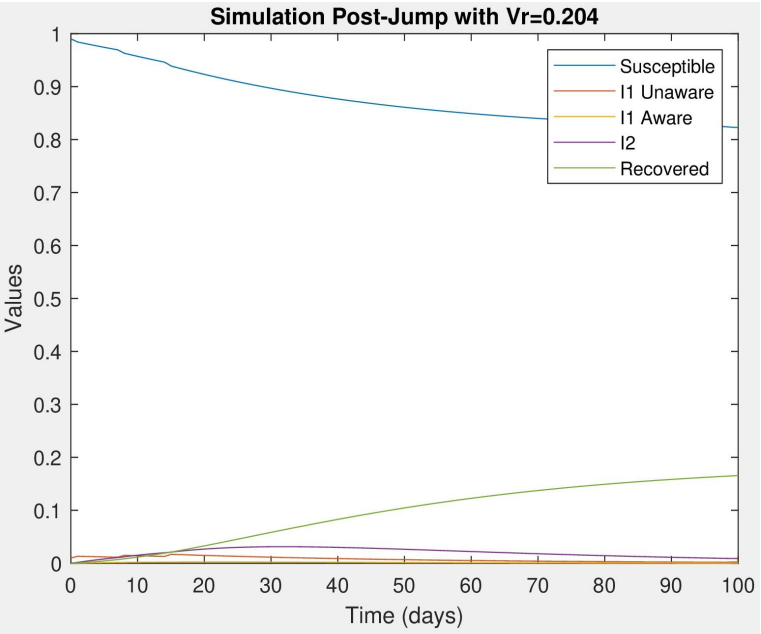
Min Tr=0.033 required to keep the known infection peak below 0.05 when low Vr=0.201 and high Vr=0.50.

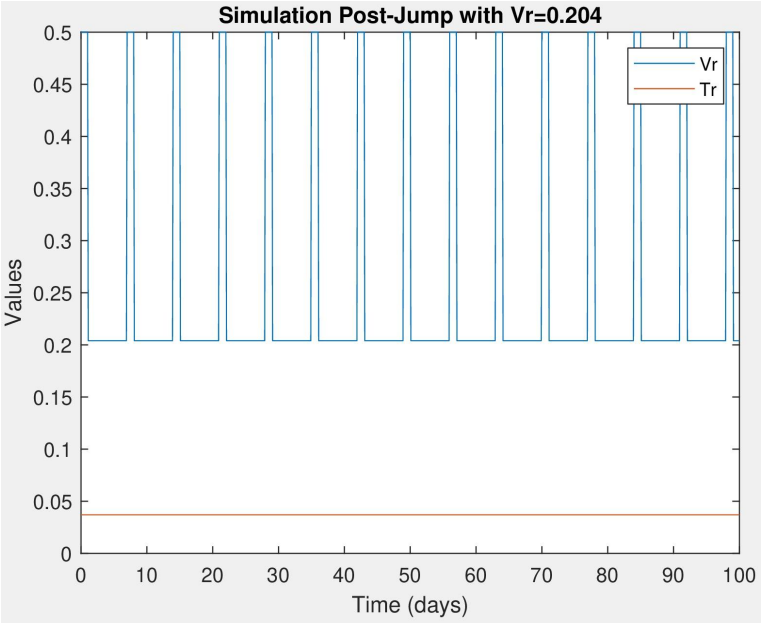


Post Variable Testing JUmp

Min Tr=0.037 required to keep the known infection peak below 0.05 when low Vr=0.204 and high Vr=0.50.

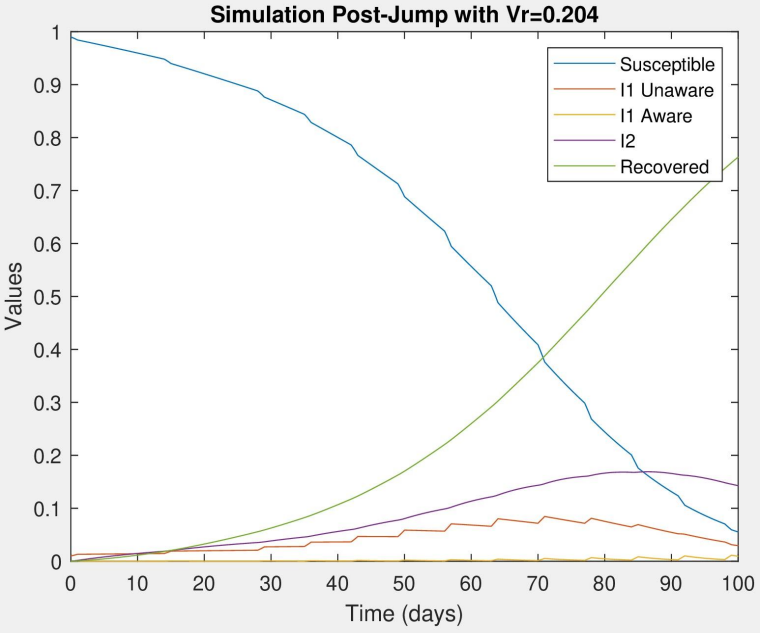


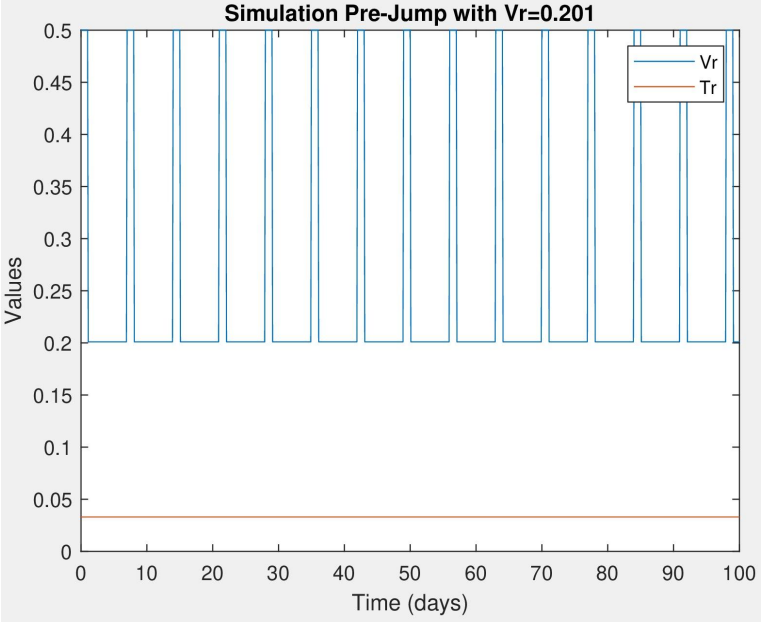




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ie. testing too low).

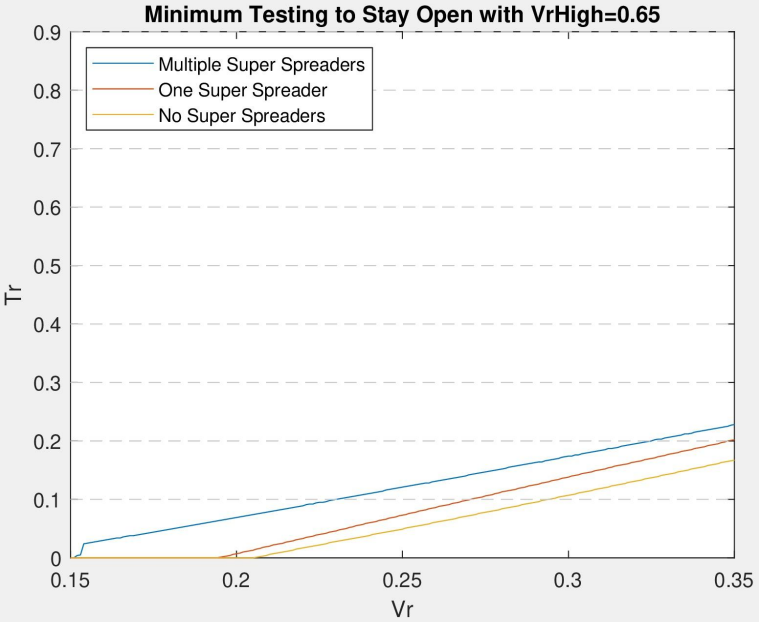
Tr=0.033

Vr low value is actually 0.204 (too lazy to make another Graph so I copy and pasted the one two up from here).



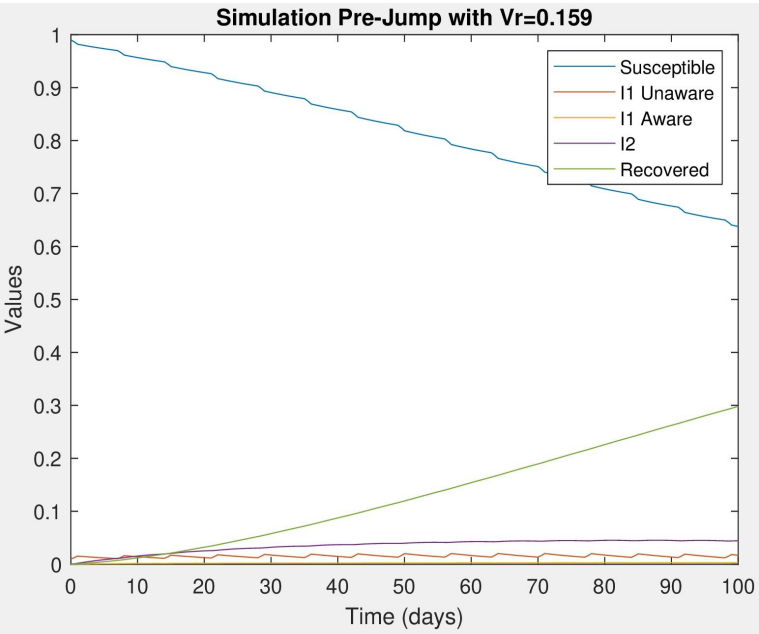
# VR High = 0.65

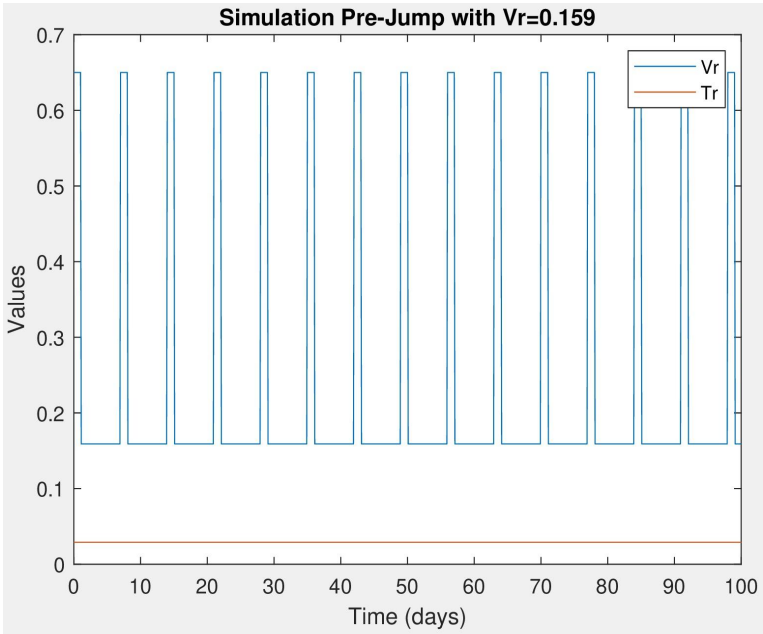



## Multiple Super Spreaders Plots (Vr values come from Jump in Variable Testing)

Pre Variable Testing Jump

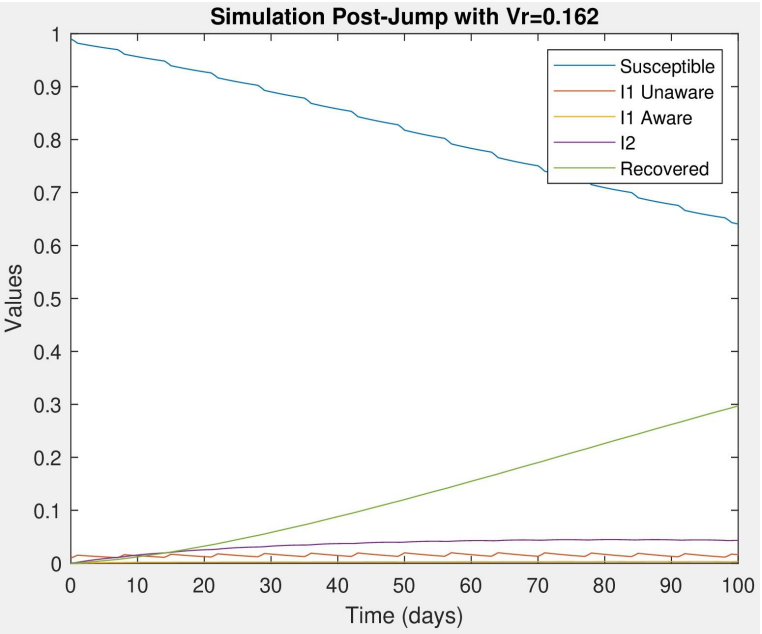
Min Tr=0.029 required to keep the known infection peak below 0.05 when low Vr=0.159 and high Vr=0.65.

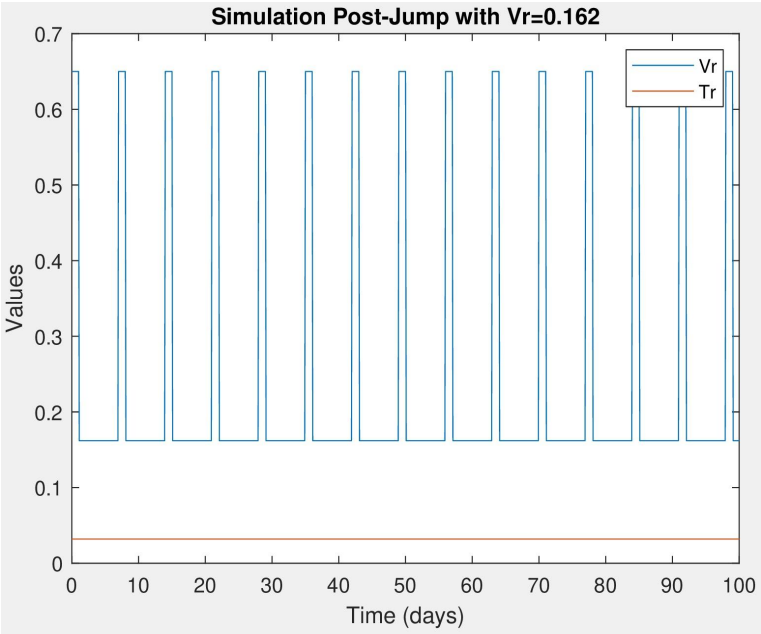


Post Variable Testing Jump

Min Tr=0.032 required to keep the known infection peak below 0.05 when low Vr=0.162 and high Vr=0.65.

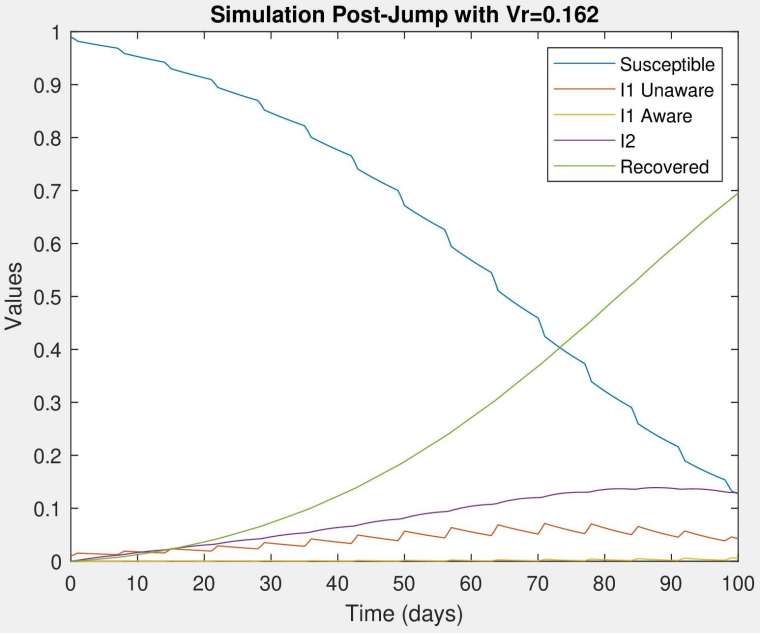


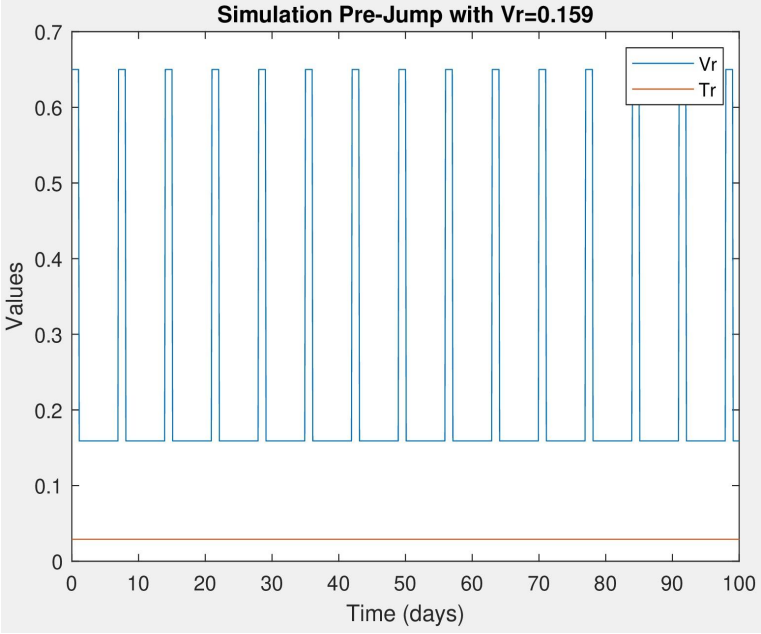




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ie. testing too low).

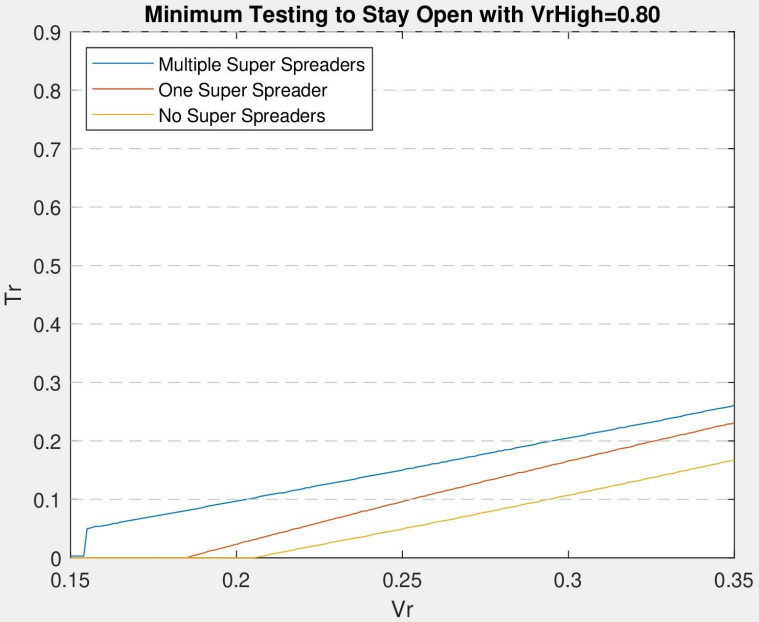
Tr=0.029

Vr low value is actually 0.162 (too lazy to make another Graph so I copy and pasted the one two up from here).



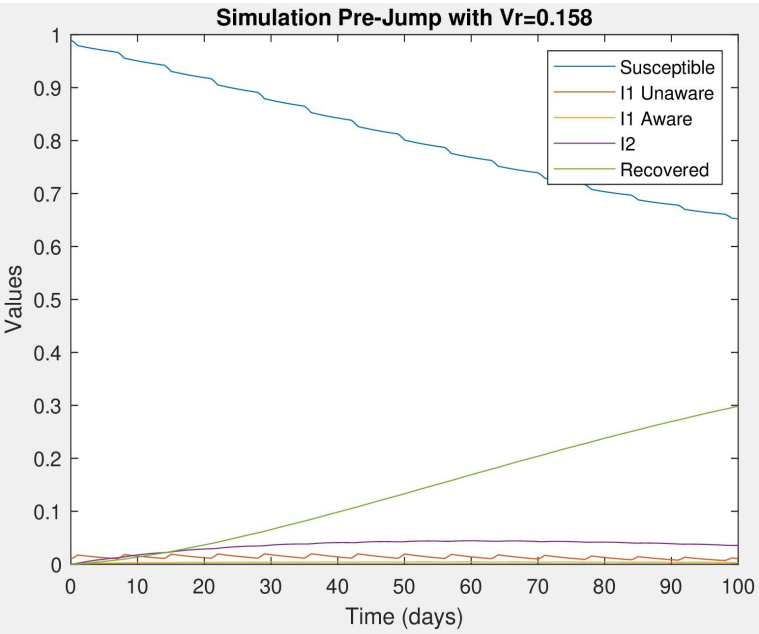
# VR High = 0.80

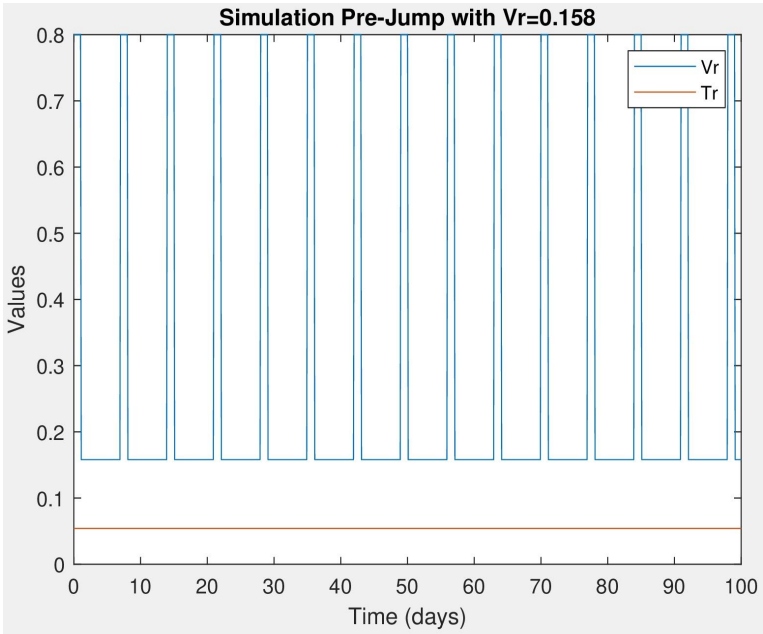



## Multiple Super Spreaders Plots (Vr values come from Jump in Variable Testing)

Pre Variable Testing Jump

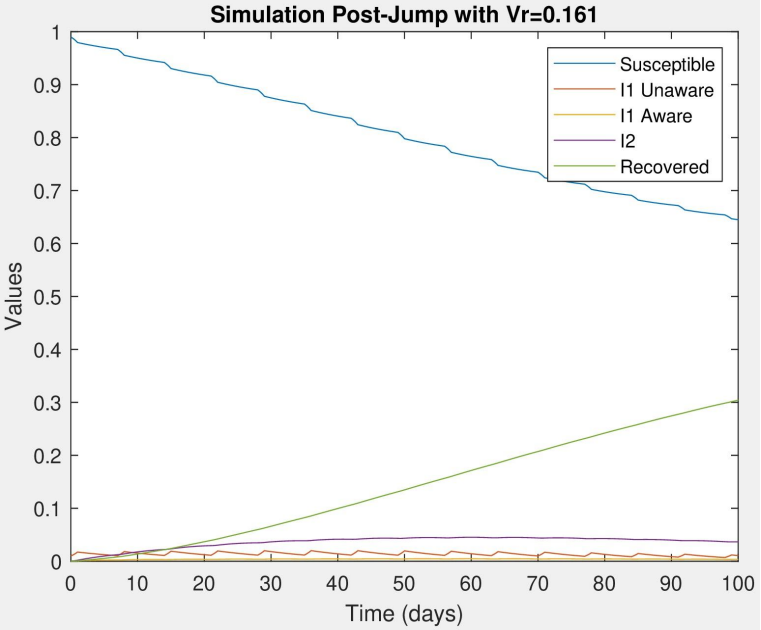
Min Tr=0.054 required to keep the known infection peak below 0.05 when low Vr=0.158 and high Vr=0.80.

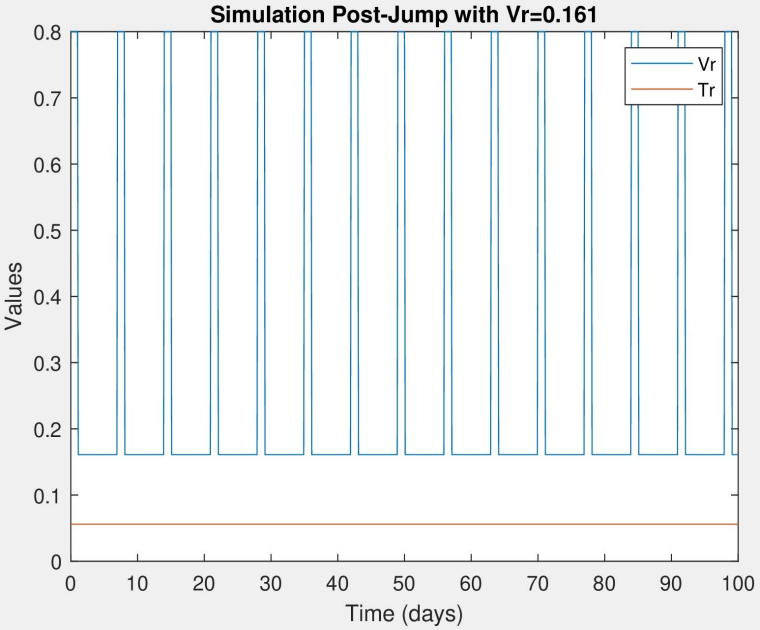


Post Variable Testing Jump

Min Tr=0.056 required to keep the known infection peak below 0.05 when low Vr=0.161 and high Vr=0.80.

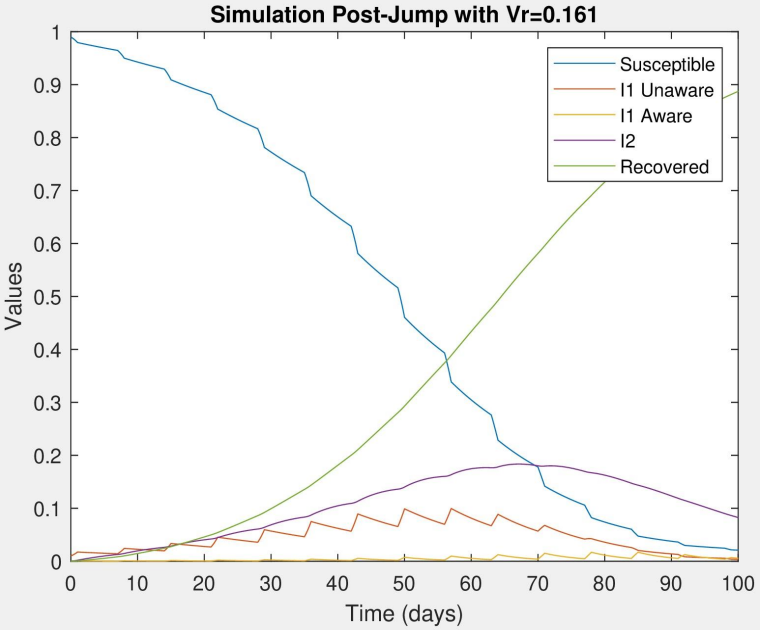


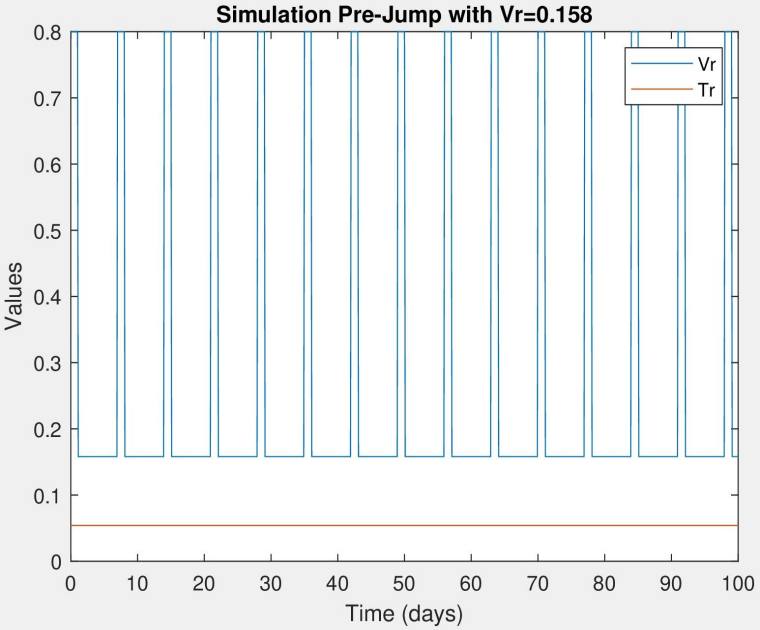




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ir. Testing too low).

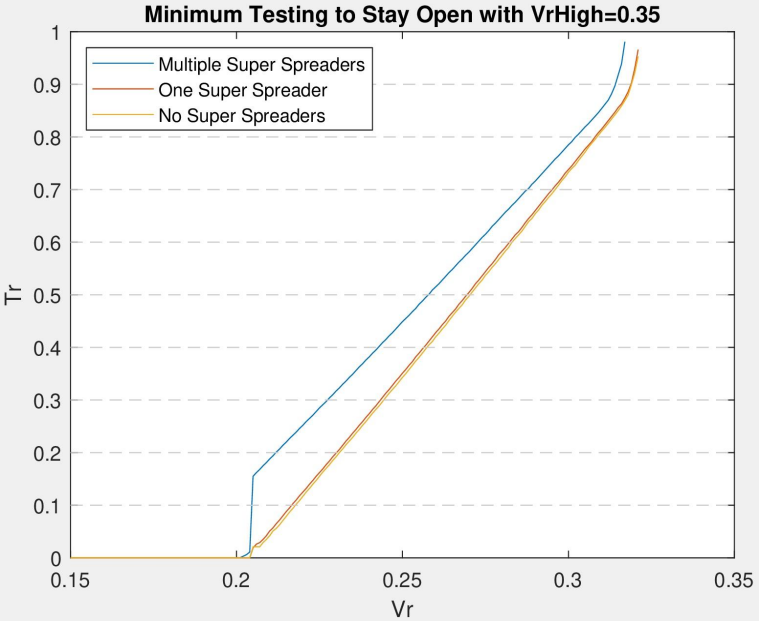
Tr=0.054

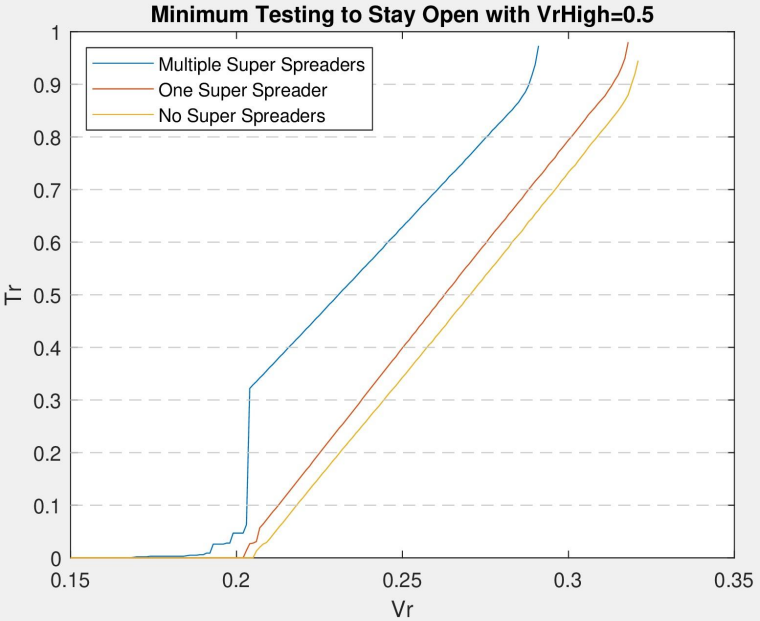
Vr low value is actually 0.161 (too lazy to make another Graph so I copy and pasted the one two up from here).

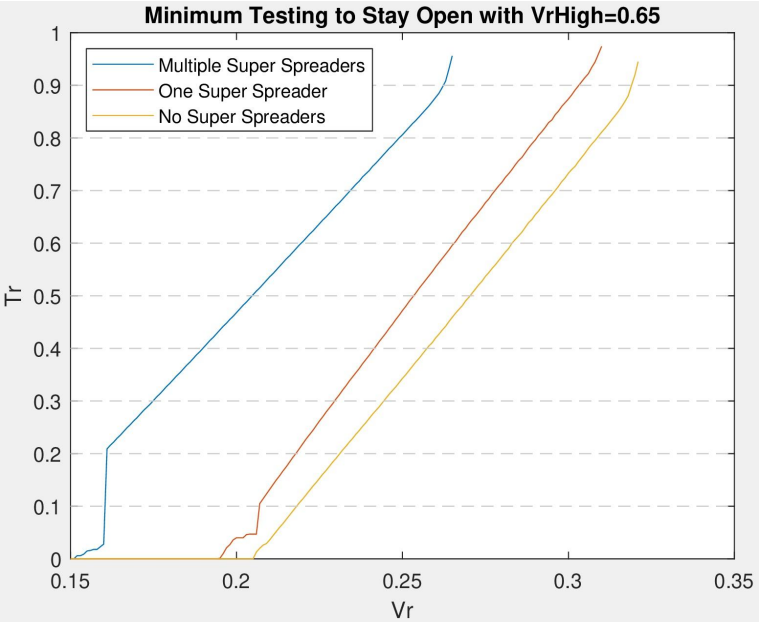


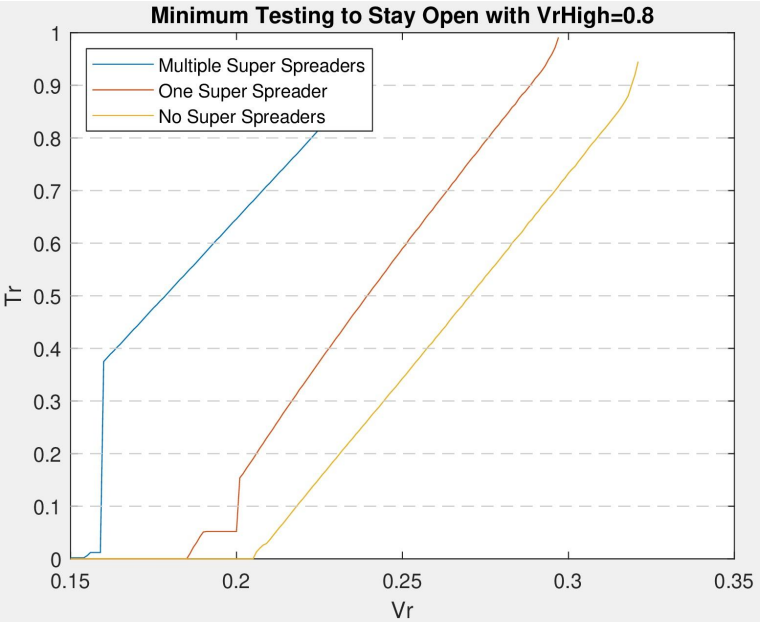



# Variable Testing: Min-Testing to Stay Open



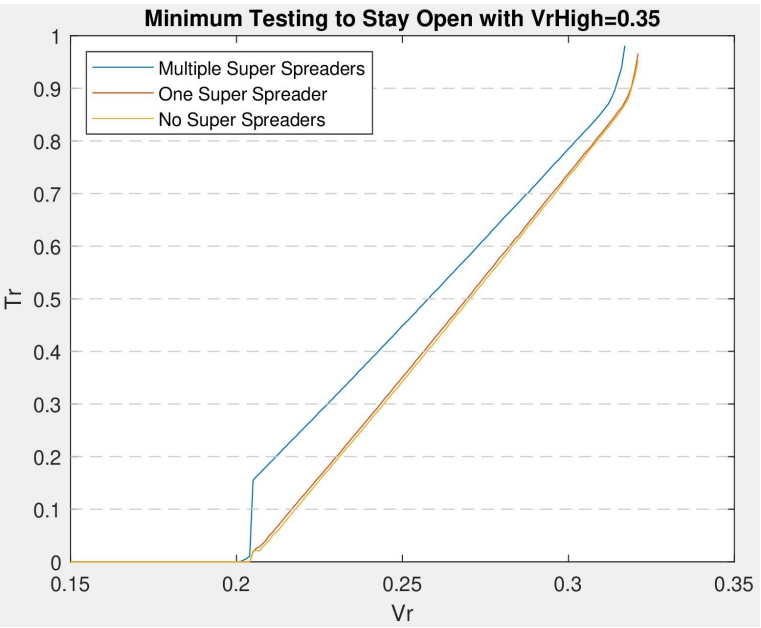




Seems to suggest that there is a point where increasing the resting Vr leads to increased cases and without a certain amount of testing the number does not go back down to normal before the next party which leads to another increase in cases. This repeats and the scale increases each time.

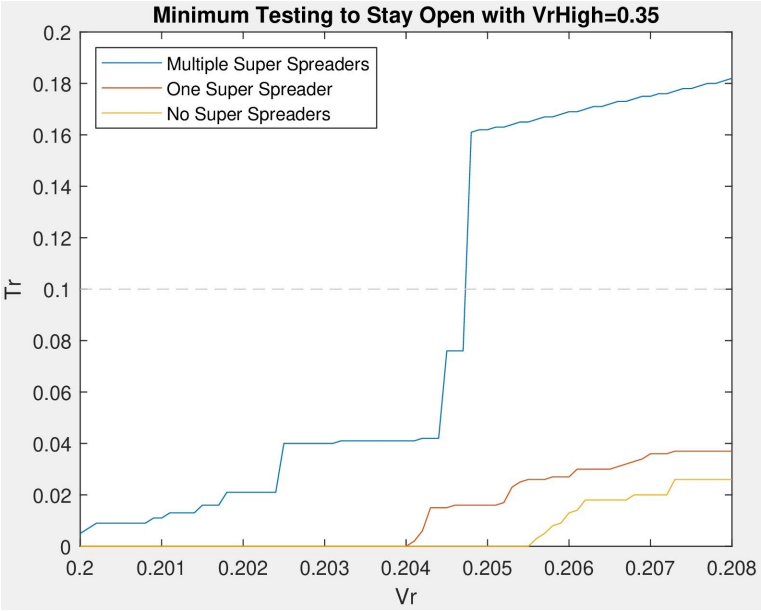
Here are plots next to zoomed in counterparts.

# VR High = 0.35

Bifurcation occurs between low Vr values of 0.204 and 0.205.



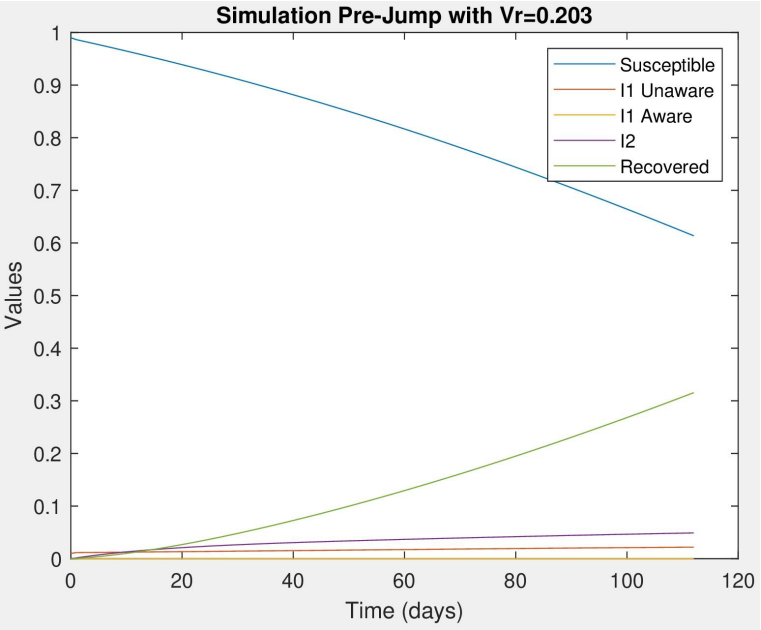

Zoomed Plot (for some reason these are slightly different)

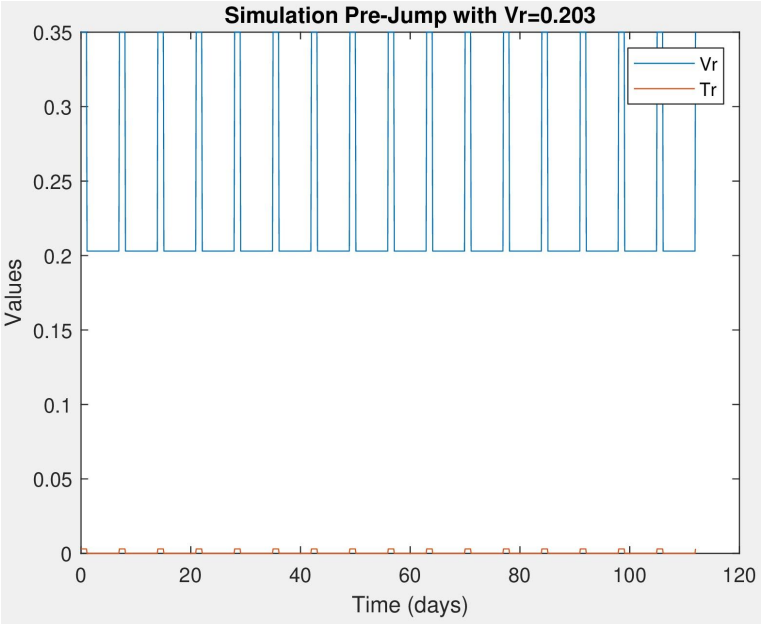



## Multiple Super Spreaders Plots (Pre and Post the Jump we see above)

Pre Variable Testing Jump

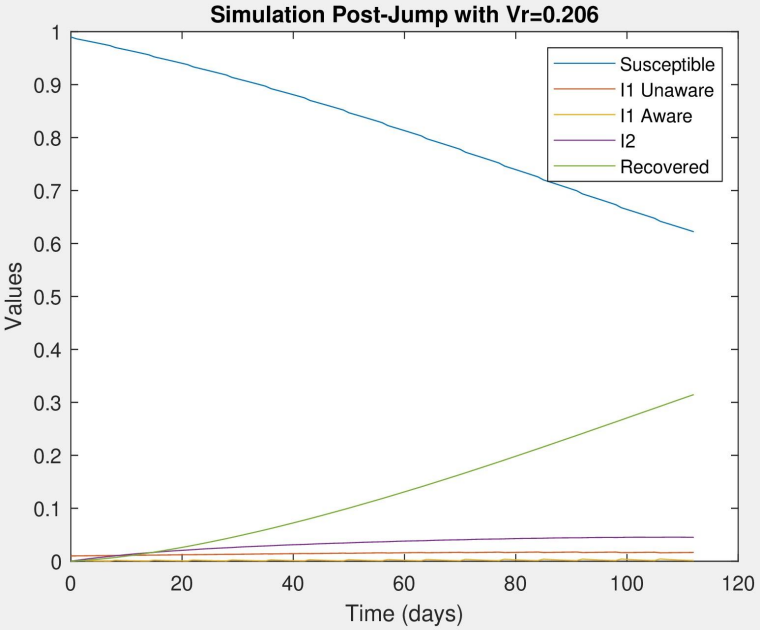
Min Tr=0.021 required to keep the known infection peak below 0.05 when low Vr=0.203 and high Vr=0.35.

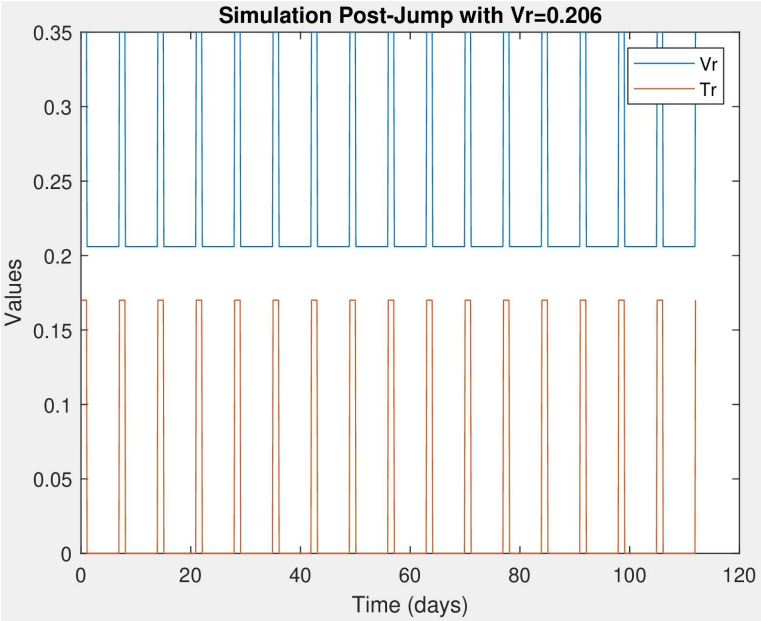


Post Variable Testing Jump

Min Tr=0.169 required to keep the known infection peak below 0.05 when low Vr=0.206 and high Vr=0.35.

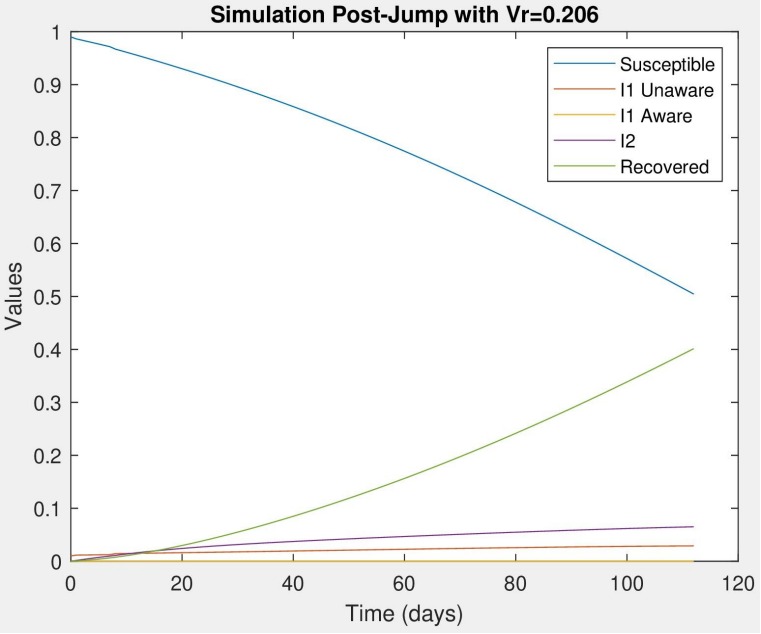


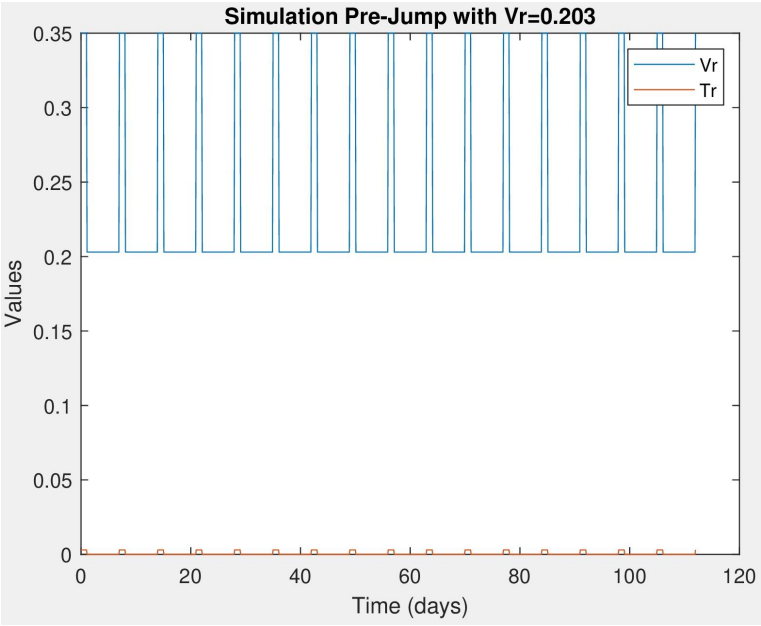




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ie, testing too low).

Tr=0.021

Vr low value is actually 0.206 (too lazy to make another Graph so I copy and pasted the one two up from here).

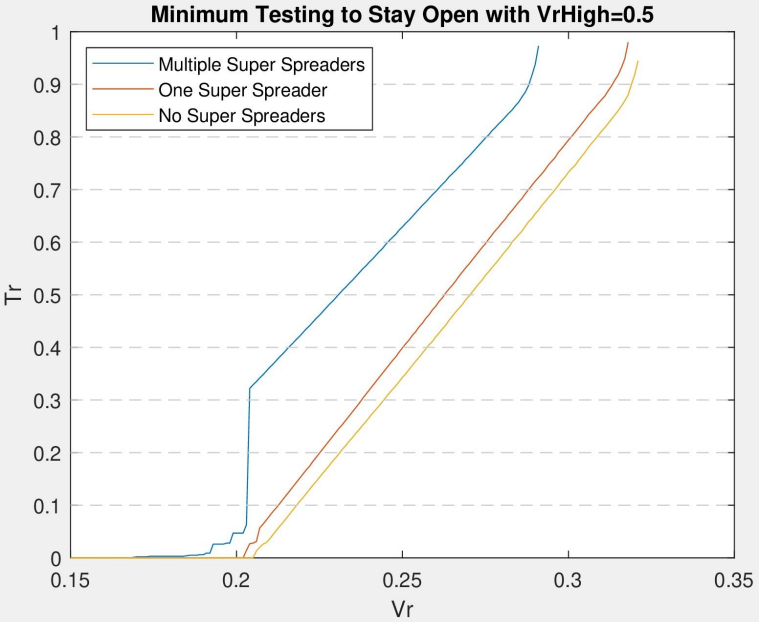


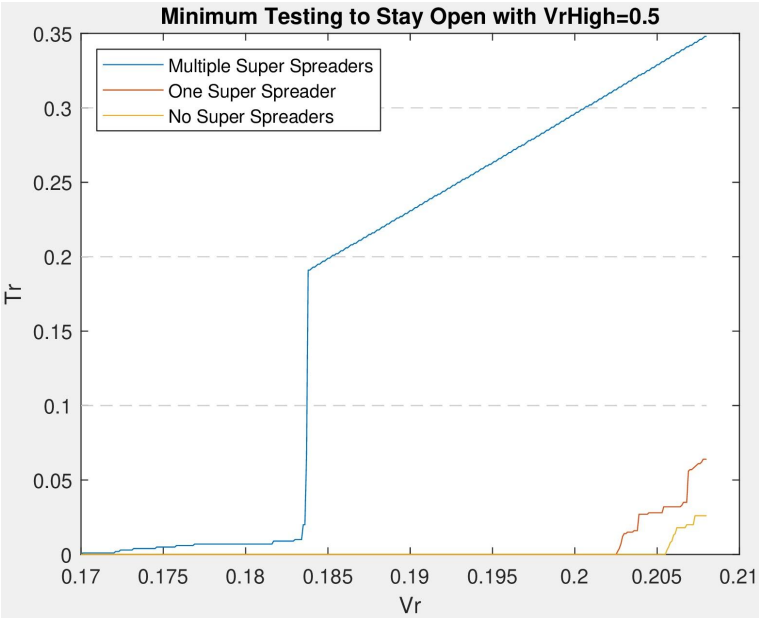



# VR High = 0.50

Bifurcation occurs between low Vr values of 0.202 and 0.203.

Zoomed Plot (for some reason these are slightly different)

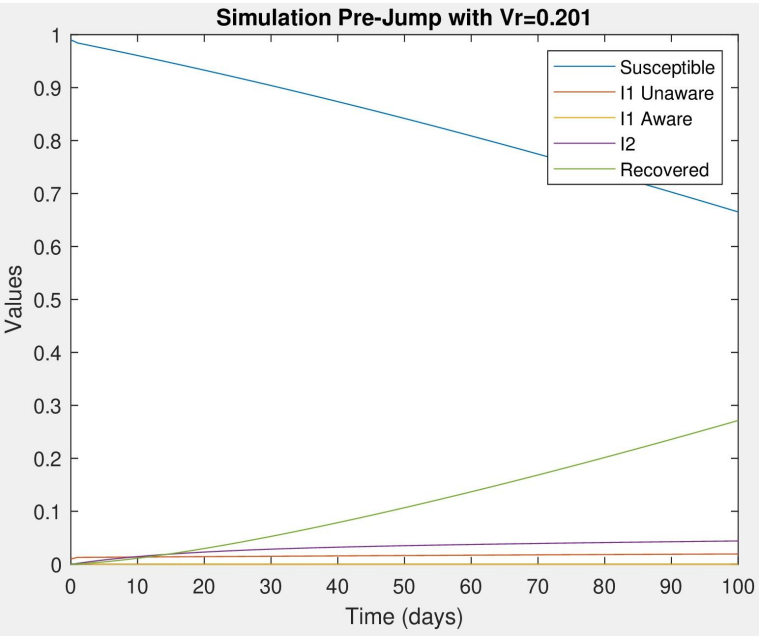


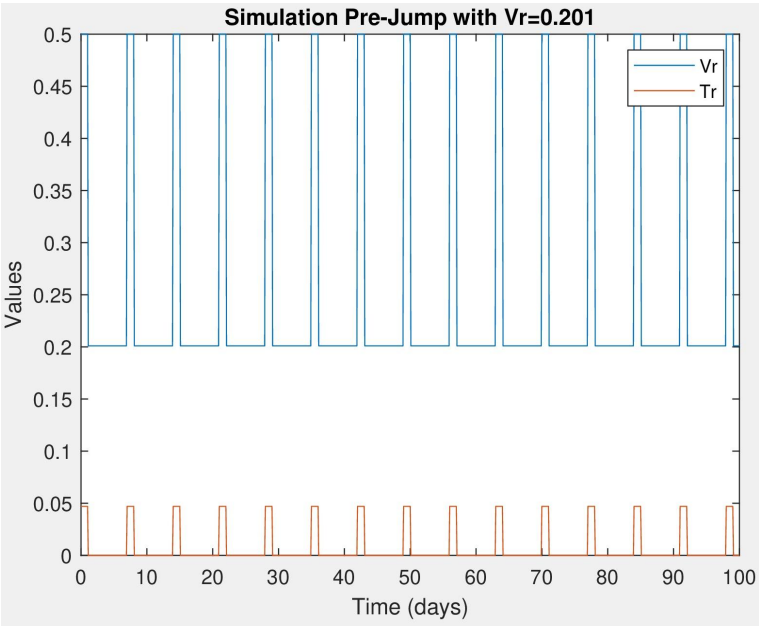




## Multiple Super Spreaders Plots (Pre and Post the Jump we see above)

Pre Variable Testing Jump

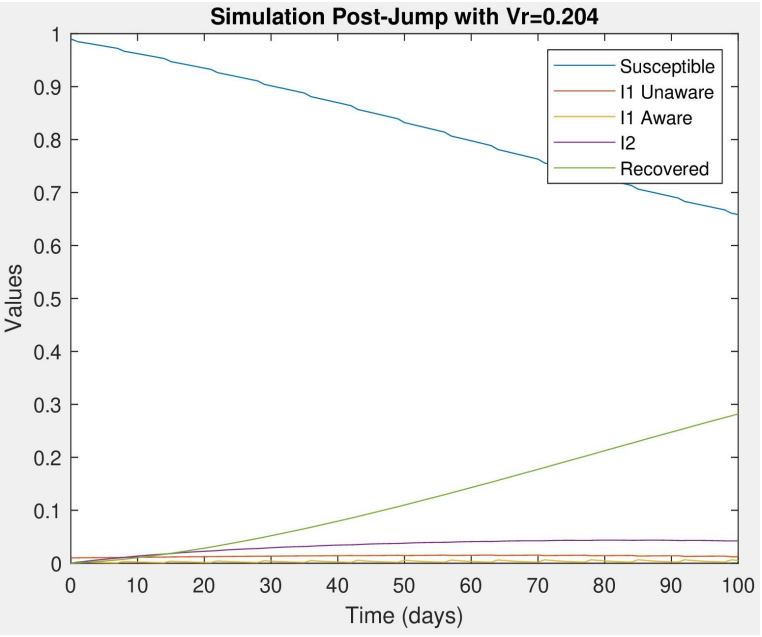
Min Tr=0.047 required to keep the known infection peak below 0.05 when low Vr=0.201 and high Vr=0.50.

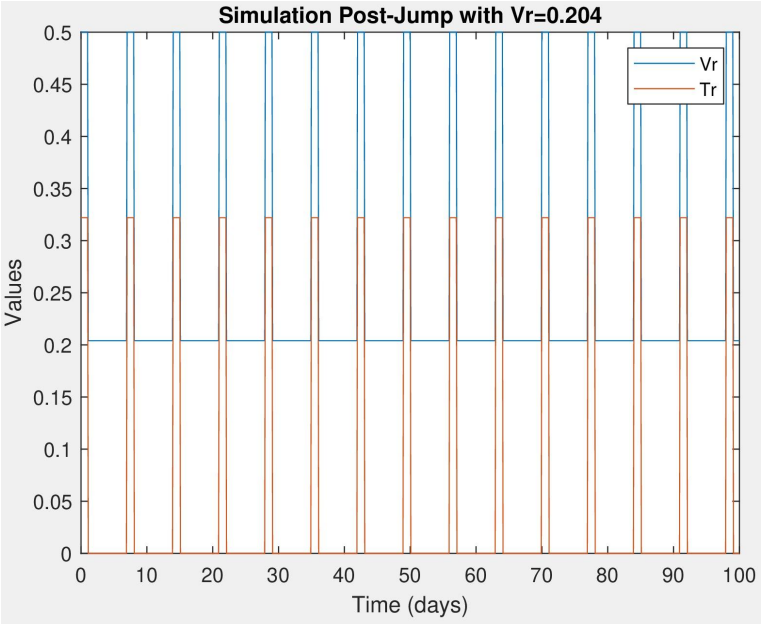


Post Variable Testing Jump

Min Tr=0.322 required to keep the known infection peak below 0.05 when low Vr=0.204 and high Vr=0.50.

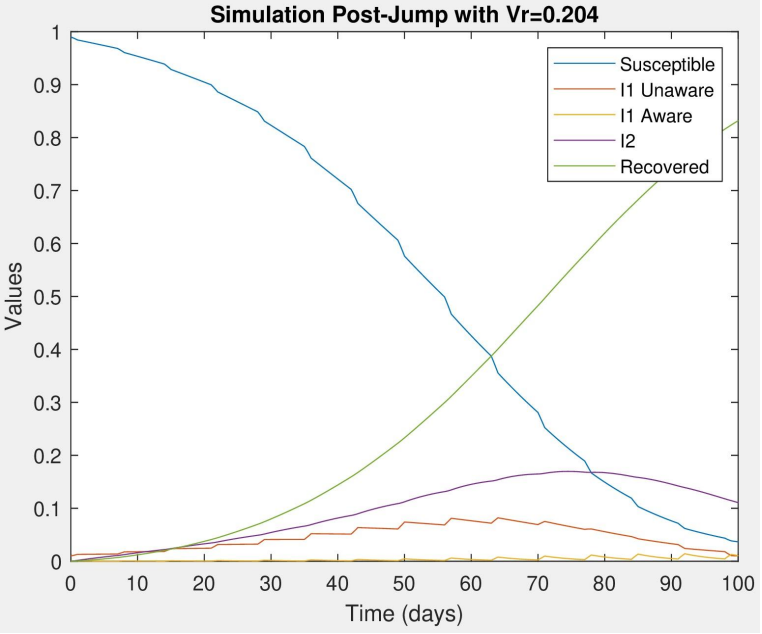


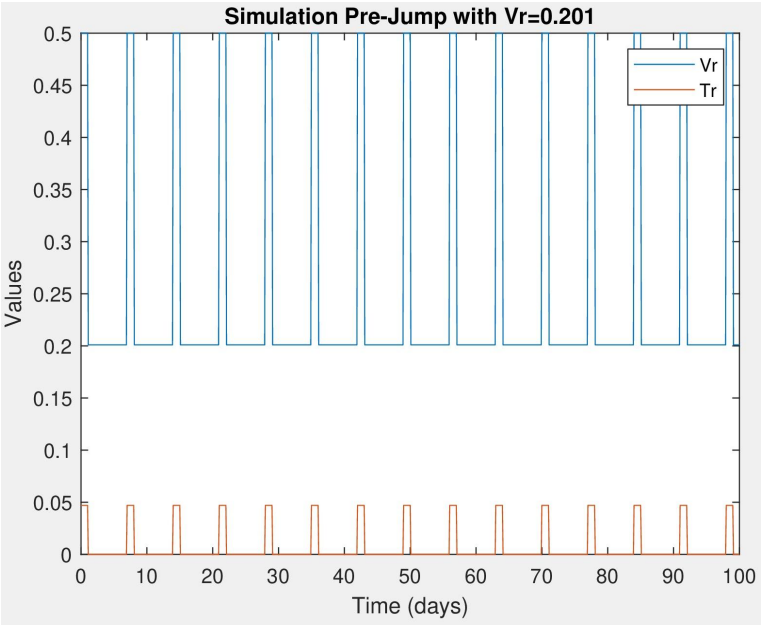




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ie. testing too low).

Tr=0.047

Vr low value is actually 0.204 (too lazy to make another Graph so I copy and pasted the one two up from here).

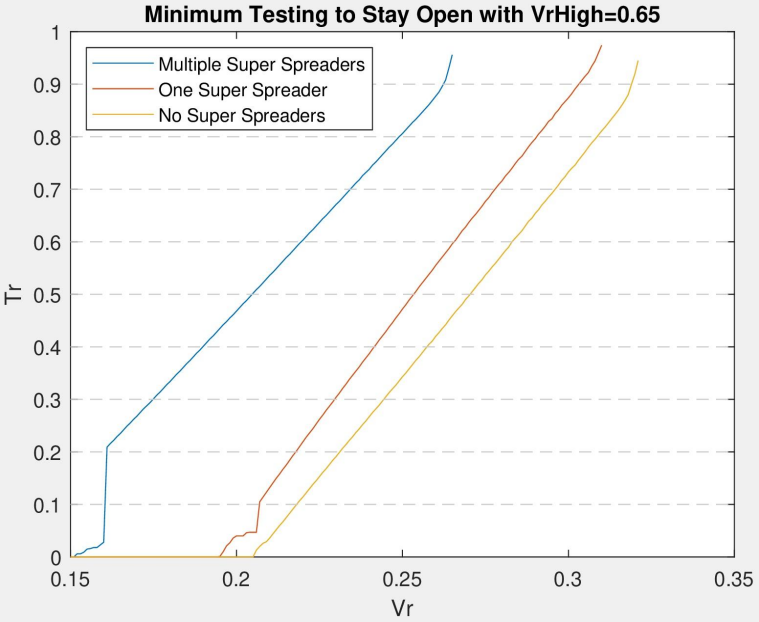


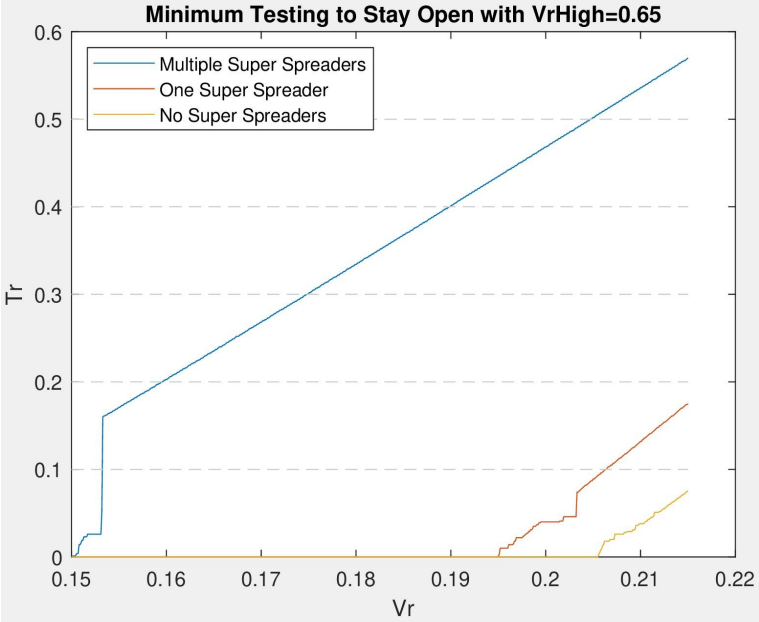



# VR High = 0.65

Bifurcation occurs between low Vr values of 0.160 and 0.161.

Zoomed Plot (for some reason these are slightly different)

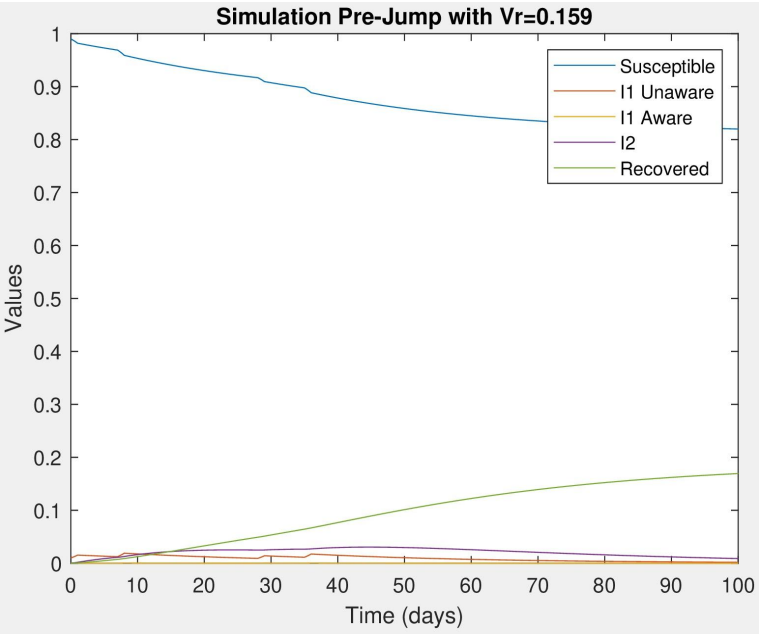


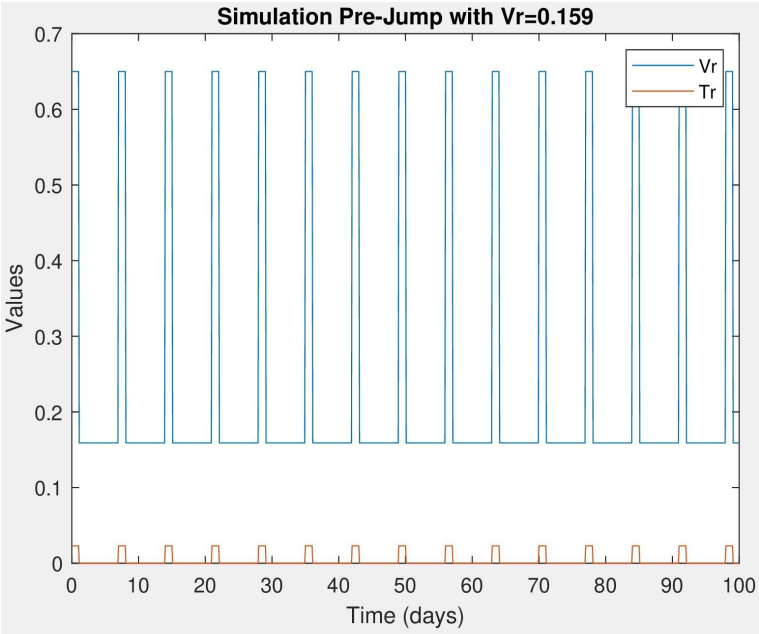




## Multiple Super Spreaders Plots (Pre and Post the Jump we see above)

Pre Variable Testing Jump

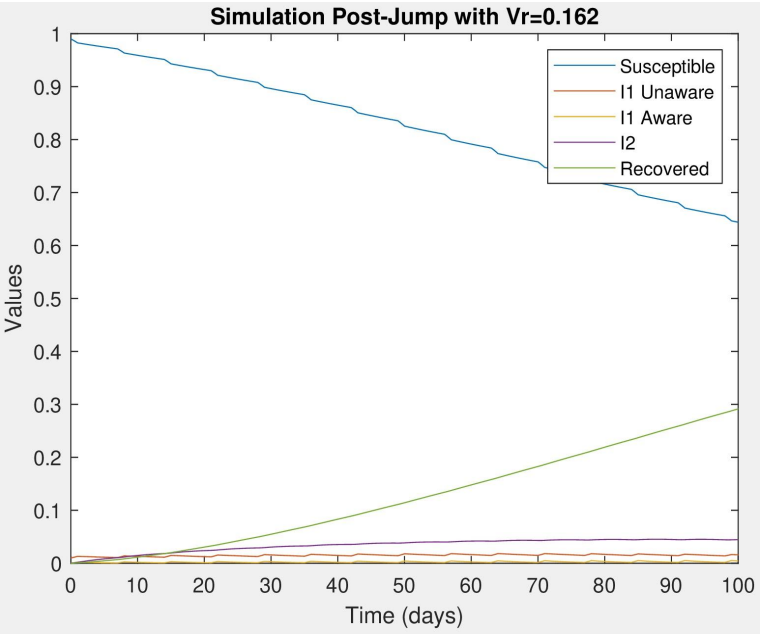
Min Tr=0.023 to keep the known infection peak below 0.05 when low Vr=0.159 and high Vr=0.65.

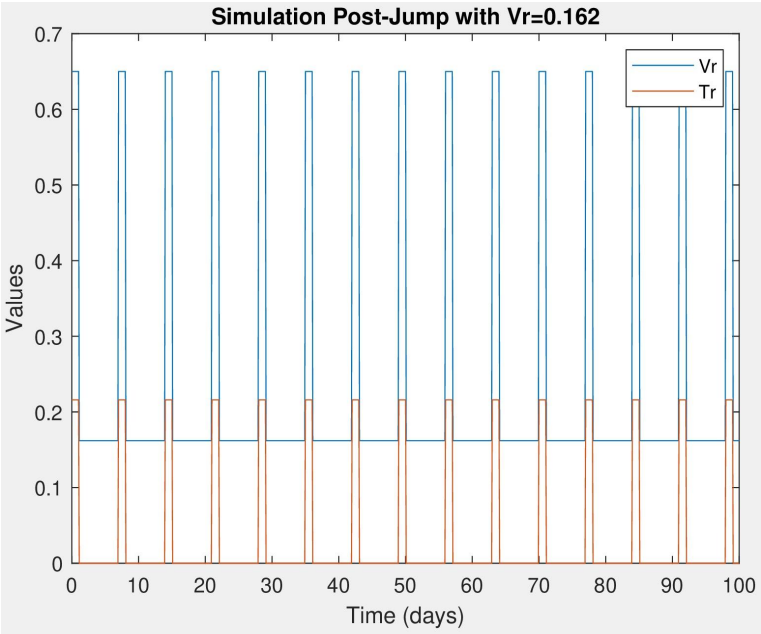


Post Variable Testing Jump

Min Tr=0.216 required to keep the known infection peak below 0.05 when low Vr=0.162 and high Vr=0.65.

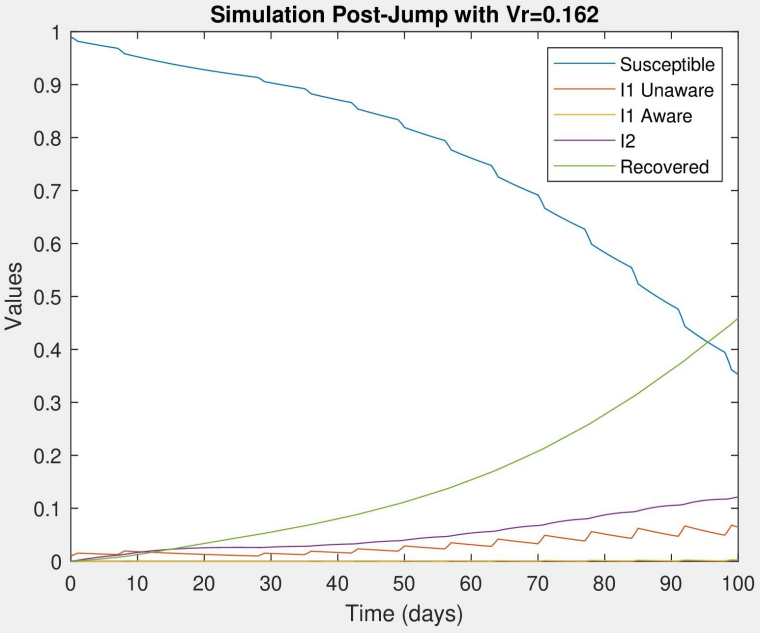


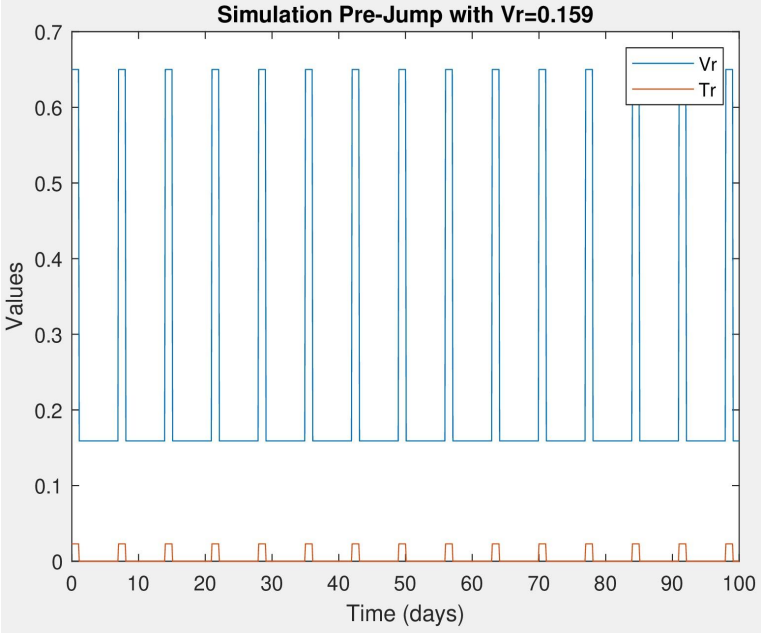




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ie. testing too low).

Tr=0.023

Vr low value is actually 0.162 (too lazy to make another Graph so I copy and pasted the one two up from here).

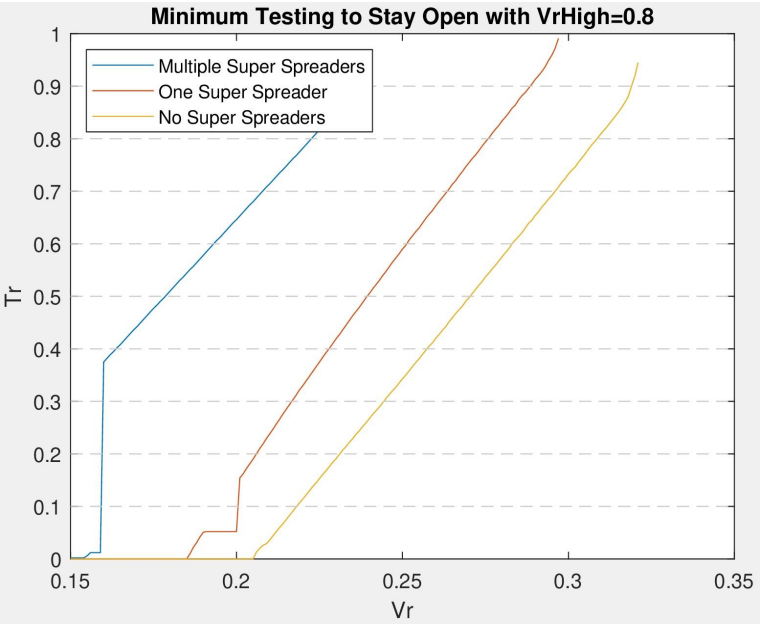


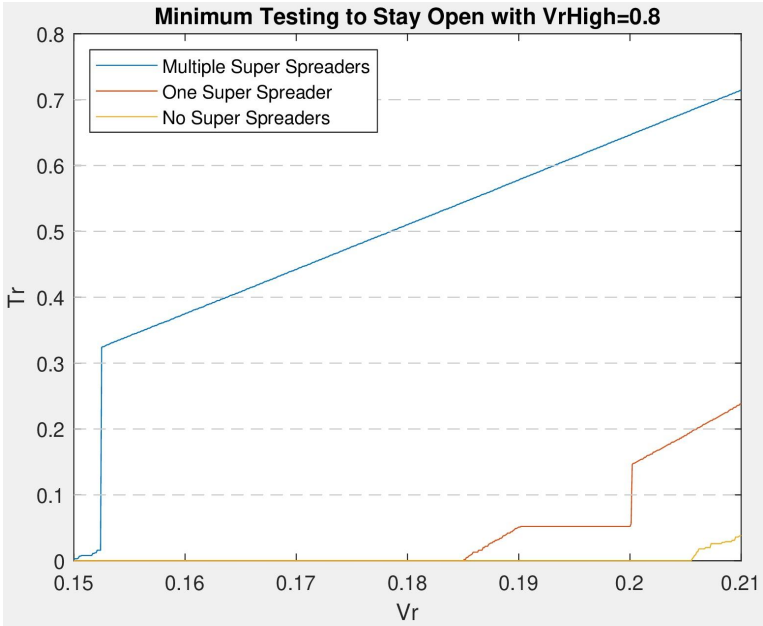



# VR High = 0.80

Bifurcation occurs between low Vr values of 0.159 and 0.160.

Zoomed Plot (for some reason these are slightly different)

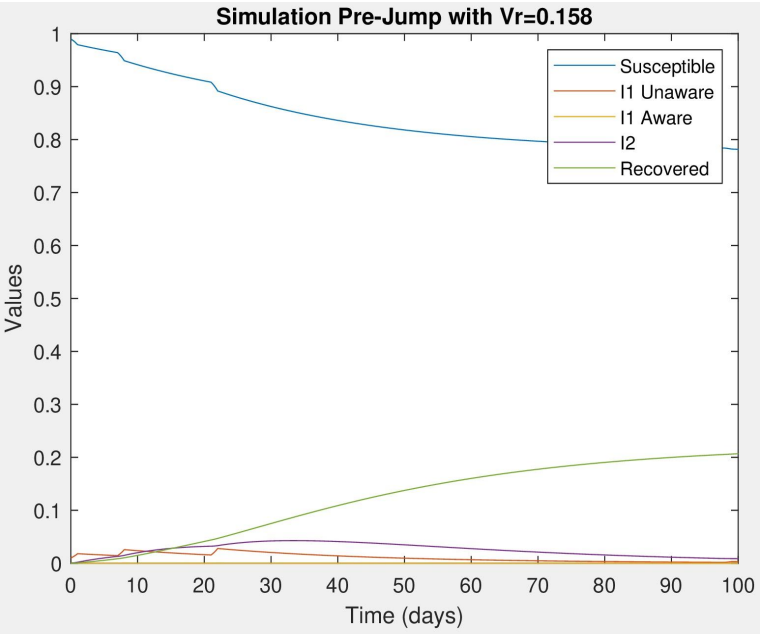


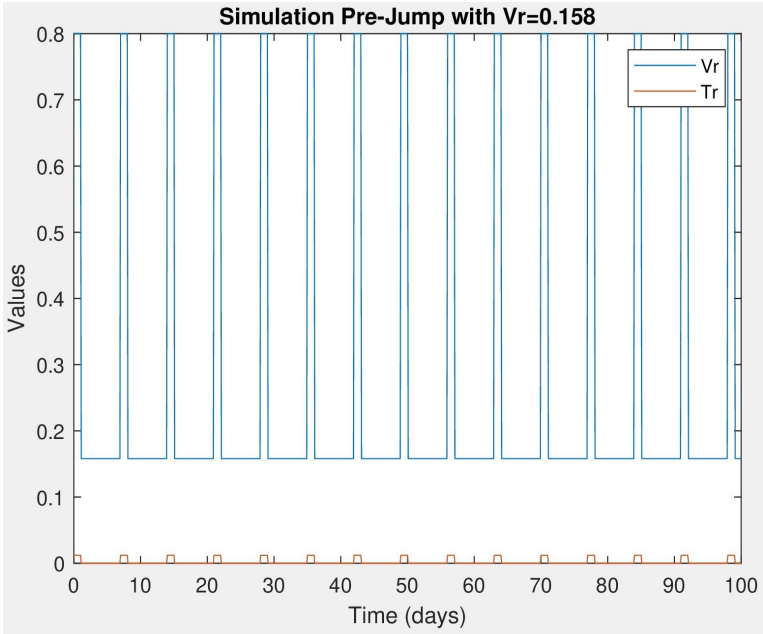




## Multiple Super Spreaders Plots (Pre and Post the Jump we see above)

Pre Variable Testing Jump

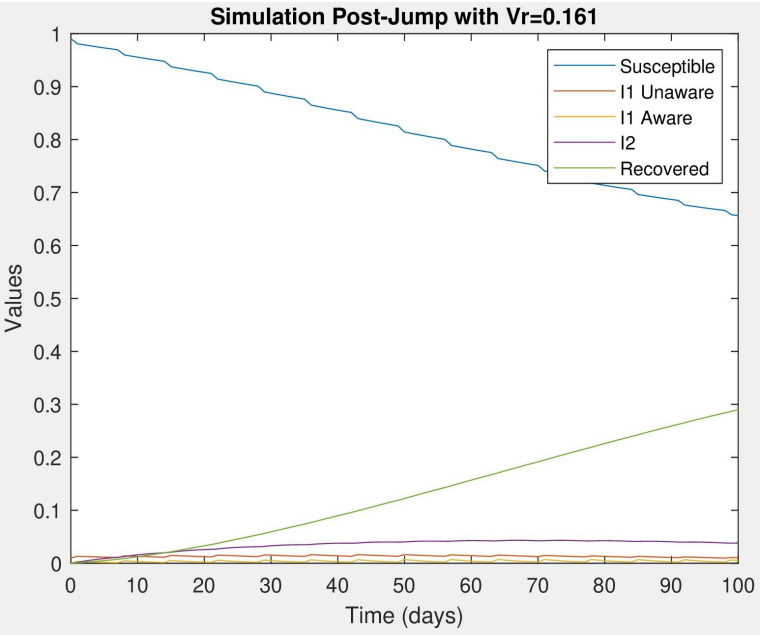
Min Tr=0.012 required to keep the known infection peak below 0.05 when low Vr=0.158 and high Vr=0.80.

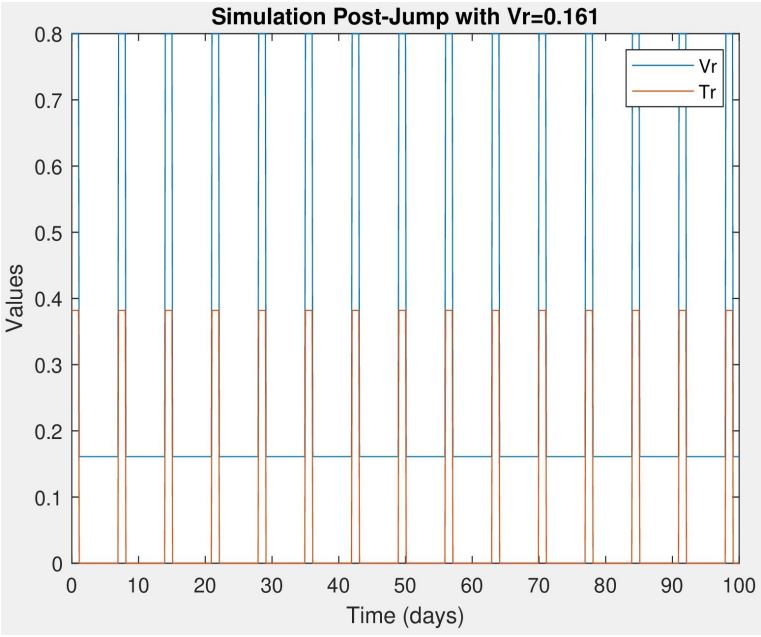


Post Variable Testing Jump

Min Tr=0.382 required to keep the known infection peak below 0.05 when low Vr=0.161 and high Vr=0.80.




This is what the post jump looks like if we use the TR values from the pre-Jump VR value (ie. testing too low).

Tr=0.012

Vr low value is actually 0.161 (too lazy to make another Graph so I copy and pasted the one two up from here).