

# Emory ATLANTA Fall 2021 COVID-19 Model, including vaccination

A model analysis of COVID-19 transmission and control at Emory University

4/16/2021

## Summary

This iteration of the model builds on the Spring and Fall 2020 versions, but now includes vaccination as well as pre-existing immunity from prior natural infections. See [model publication](#) and [online model](#) for more details of the base model.

Vaccination is modeled in a simple way, such that successfully vaccinated individuals are protected from both infection and COVID-19 disease. Vaccine efficacy (or the proportion of vaccines who respond to vaccination) is 90%. In addition, we assume that 20% have been previously infected with previous infection providing 90% protection.

We explore vaccine coverage ranging from 50% to 90%. For now, students and staff are vaccinated at the same level in each simulation, though with the mandate for students, their coverage is likely to be higher.

Baseline scenarios assume non-pharmaceuticals interventions (NPIs) remain in place and that screening of asymptomatic people is performed weekly.

Measure	50% coverage	...without NPIs	...without screening	...without NPIs or screening
Student Cases	55 (23-108)	62 (26-118)	55 (23-108)	62 (26-118)
Student Cases Peak	2 (1-3)	2 (1-3)	2 (1-3)	2 (1-3)
Student Hosps	3 (1-9)	4 (1-10)	3 (1-9)	4 (1-10)
Student Deaths	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
Student Isolate	33 (13-61)	36 (15-68)	33 (13-61)	36 (15-68)
Student Isolate Peak	4 (2-8)	5 (2-9)	4 (2-8)	5 (2-9)
Student Isolate Days	401 (160-754)	448 (181-846)	401 (160-754)	448 (181-846)
Student Quarantined	981 (168-3017)	1148 (196-3492)	981 (168-3017)	1148 (196-3492)
Student Quarantine Peak	19 (3-56)	22 (4-64)	19 (3-56)	22 (4-64)
Student Quarantined Days	1880 (322-5492)	2125 (360-6190)	1880 (322-5492)	2125 (360-6190)
Staff Cases	202 (77-390)	209 (82-400)	202 (77-390)	209 (82-400)
Staff Cases Peak	6 (3-13)	7 (3-13)	6 (3-13)	7 (3-13)
Staff Hosps	20 (6-55)	21 (6-57)	20 (6-55)	21 (6-57)
Staff Deaths	2 (1-5)	2 (1-6)	2 (1-5)	2 (1-6)
Tests	86012 (84821-87206)	86041 (84846-87235)	12083 (10893-13277)	12113 (10918-13306)
Screening Per Capita	3 (3-3)	3 (3-3)	0 (0-0)	0 (0-0)

## Summary results – 50% Vaccine Coverage

Measure	70% coverage	...without NPIs	...without screening	...without NPIs or screening
StudentCases	66 (23-107)	74 (25-117)	66 (23-107)	74 (25-117)
StudentCasesPeak	2 (1-3)	2 (1-3)	2 (1-3)	2 (1-3)
StudentHosps	4 (1-9)	5 (1-10)	4 (1-9)	5 (1-10)
StudentDeaths	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
StudentIsolate	39 (13-61)	44 (15-67)	39 (13-61)	44 (15-67)
StudentIsolatePeak	5 (2-8)	6 (2-9)	5 (2-8)	6 (2-9)
StudentIsolateDays	480 (164-753)	537 (179-831)	480 (164-753)	537 (179-831)
StudentQuarantined	1414 (170-3011)	1669 (195-3523)	1414 (170-3011)	1669 (195-3523)
StudentQuaPeak	28 (3-57)	31 (4-64)	28 (3-57)	31 (4-64)
StudentQuarantinedDays	2697 (329-5560)	2998 (364-6169)	2697 (329-5560)	2998 (364-6169)
StaffCases	166 (56-268)	171 (57-273)	166 (56-268)	171 (57-273)
StaffCasesPeak	5 (2-9)	5 (2-9)	5 (2-9)	5 (2-9)
StaffHosps	18 (4-38)	19 (4-39)	18 (4-38)	19 (4-39)
StaffDeaths	2 (0-4)	2 (0-4)	2 (0-4)	2 (0-4)
Tests	86340 (84746-87059)	86357 (84760-87083)	12411 (10818-13130)	12428 (10832-13154)
TestsPerCapita	3 (3-3)	3 (3-3)	0 (0-0)	0 (0-0)

### Summary results – 70% Vaccine Coverage

Measure	90% coverage	...without NPIs	...without screening	...without NPIs or screening
StudentCases	85 (23-160)	95 (25-175)	85 (23-160)	95 (25-175)
StudentCasesPeak	2 (1-4)	3 (1-5)	2 (1-4)	3 (1-5)
StudentHosps	6 (1-13)	7 (1-14)	6 (1-13)	7 (1-14)
StudentDeaths	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
StudentIsolate	51 (13-84)	56 (15-91)	51 (13-84)	56 (15-91)
StudentIsolatePeak	6 (2-11)	7 (2-12)	6 (2-11)	7 (2-12)
StudentIsolateDays	633 (166-1040)	694 (184-1132)	633 (166-1040)	694 (184-1132)
StudentQuarantined	2205 (171-4378)	2507 (196-4923)	2205 (171-4378)	2507 (196-4923)
StudentQuaPeak	42 (3-87)	46 (4-94)	42 (3-87)	46 (4-94)
StudentQuarantinedDays	4097 (333-8556)	4493 (362-9199)	4097 (333-8556)	4493 (362-9199)
StaffCases	117 (31-179)	120 (31-181)	117 (31-179)	120 (31-181)
StaffCasesPeak	4 (1-6)	4 (1-6)	4 (1-6)	4 (1-6)
StaffHosps	15 (2-28)	15 (2-29)	15 (2-28)	15 (2-29)
StaffDeaths	1 (0-3)	1 (0-3)	1 (0-3)	1 (0-3)
Tests	86698 (84659-87053)	86718 (84674-87074)	12769 (10730-13124)	12790 (10745-13145)
TestsPerCapita	3 (3-3)	3 (3-3)	0 (0-0)	0 (0-0)

## Summary results – 90% Vaccine Coverage