Model calibration

Initial conditions:

Population size = 100 000

We initiated infection with 32 infected at J=0 (Feb 7th 2020)

Model parameters:

Contact rate (social distancing) (same for each scenario)

- J0-J40 : c=11
- J40-J54 : from c=11 to c=5 (linear progressive decrease)
- J54- end of epidemic : c = 5

Contact tracing rate = 50% (from J0 – J74)

Case detection and isolation rate = 30% (from J0 to J74)

Simulations:

- Starting at day 74 (i.e. April 20th) we made varying the contact tracing rate and the case detection rate between 50 and 80%, and between 30 and 80% respectively.
- We considered the social distancing rate was kept at 5 until the end of the epidemic.

Scenario	case detection/isolation	contact tracing
S1	0.3	0.5

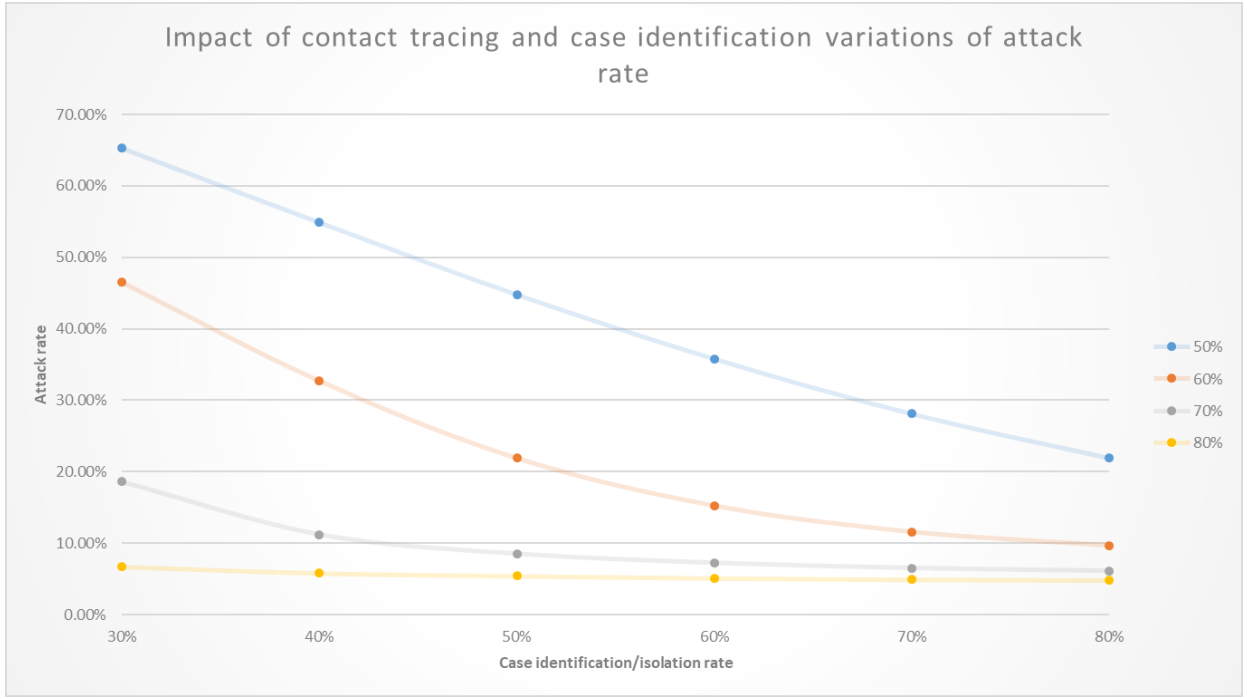
S2	0.3	0.6
S3	0.3	0.7
S4	0.3	0.8
S5	0.4	0.5
S6	0.4	0.6
S7	0.4	0.7
S8	0.4	0.8
S9	0.5	0.5
S10	0.5	0.6
S11	0.5	0.7
S12	0.5	0.8
S13	0.6	0.5
S14	0.6	0.6
S15	0.6	0.7
S16	0.6	0.8
S17	0.7	0.5
S18	0.7	0.6
S19	0.7	0.7
S20	0.7	0.8
S21	0.8	0.5

S22	0.8	0.6
S23	0.8	0.7
S24	0.8	0.8

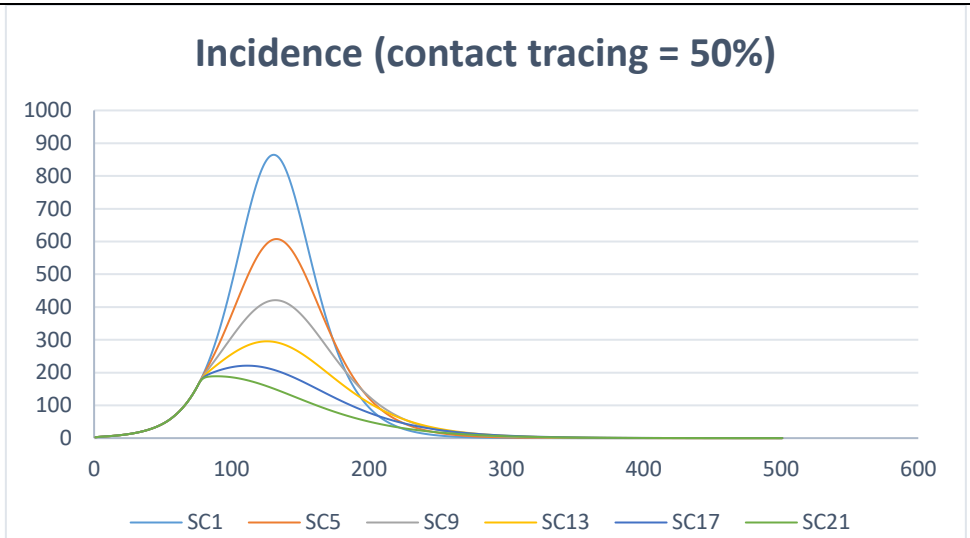
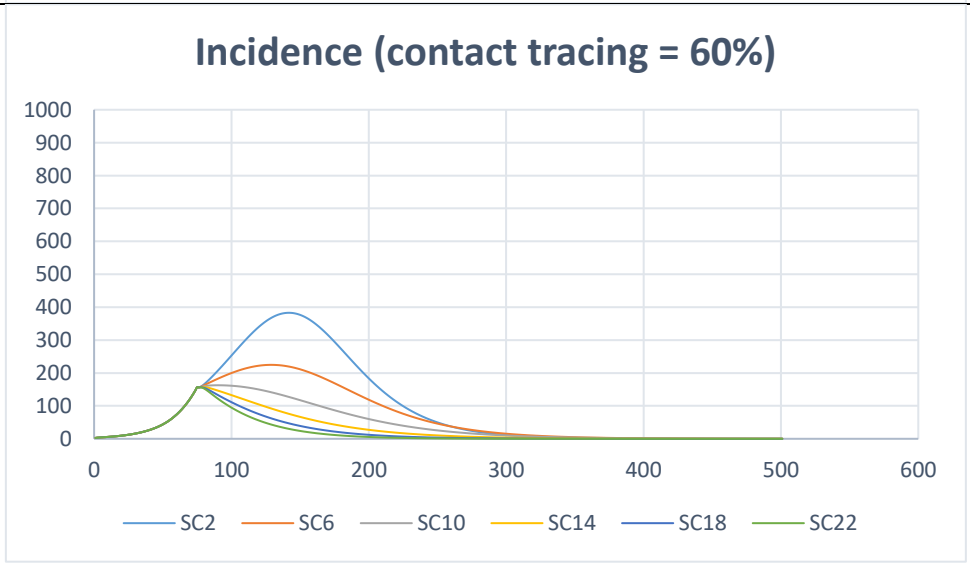
Results

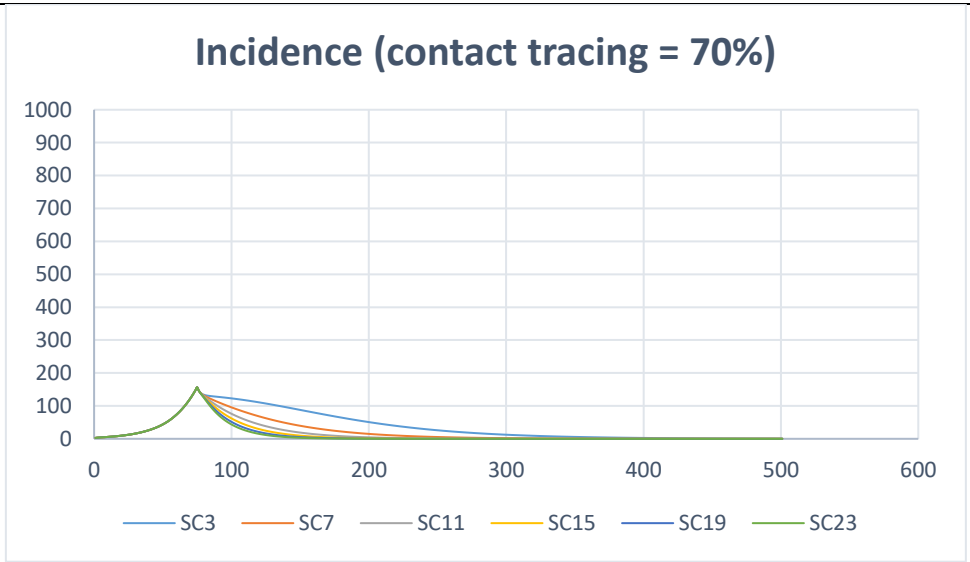
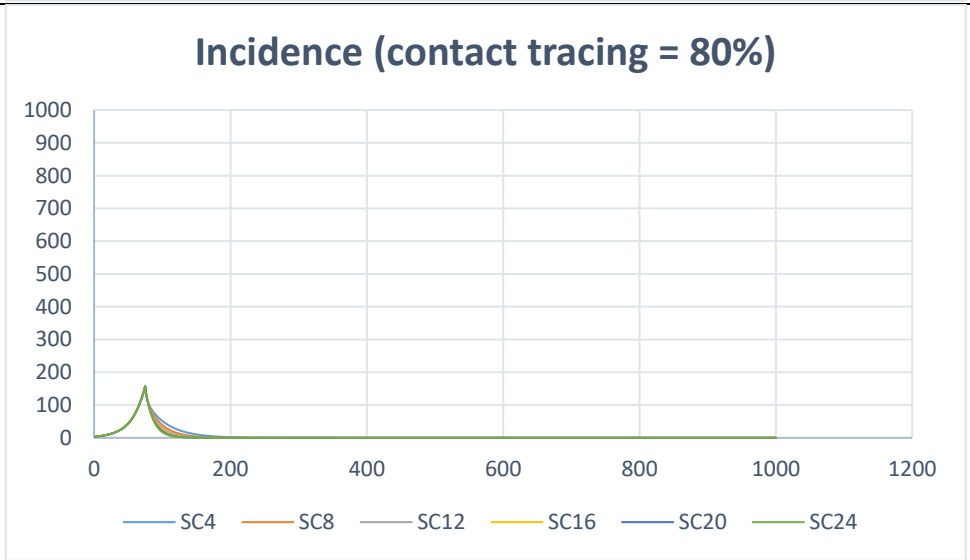
Identifying the ‘epidemic crash ‘ space

		contact tracing rate (lambda)			
case identification/isolation (delta)	ATTACK RATE	**50%**	**60%**	**70%**	**80%**
	30%	65.30%	46.50%	18.60%	6.70%
	40%	54.90%	32.70%	11.20%	5.80%
	50%	44.80%	21.90%	8.50%	5.40%
	60%	35.80%	15.25%	7.23%	5.10%
	70%	28.10%	11.60%	6.50%	4.90%
	80%	21.90%	9.70%	6.10%	4.80%

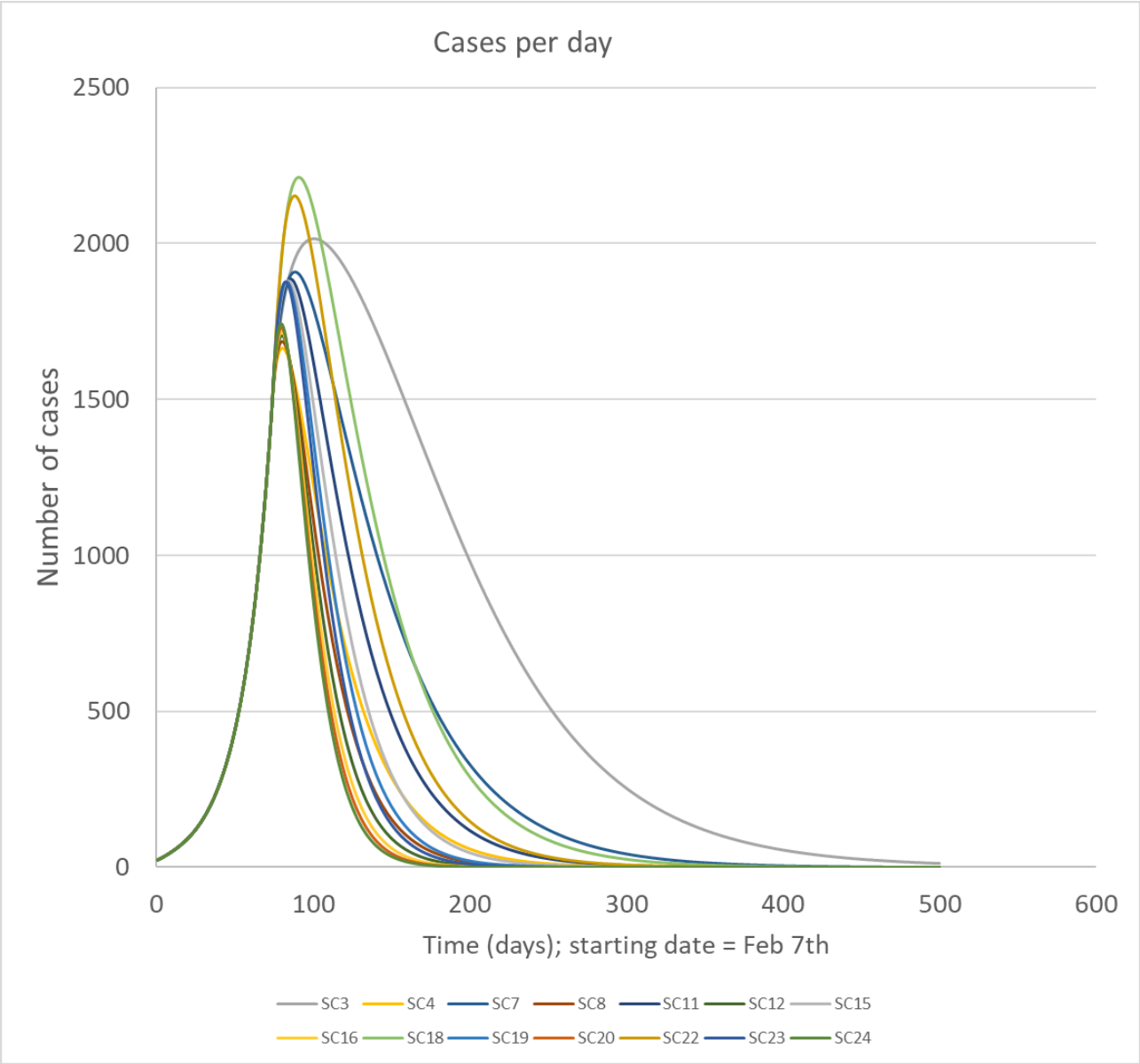

Impact of contact tracing and case identification variations of attack rate
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Attack rate
30%
40%
50%
60%
70%
80%
Case identification/isolation rate
50%
60%
70%
80%

Incidence curves

Impact of changing case identification/isolation at contact tracing rate at 50%	
Impact of changing case identification/isolation at contact tracing rate at 60%	

Impact of changing case identification/isolation at contact tracing rate at 70%	
Impact of changing case identification/isolation at contact tracing rate at 80%	

Evolution of total number of cases by day for the epidemic crash scenarios



Additional descriptive outputs

SC #	case detection/isolation	contact tracing	Total number of infected	Max number of cases	Peak date for infected (days)	Max incidence	Peak date for incidence (days)	Outbreak duration (days)	Attack rate (%)	Max hospitalized	Peak date for hospitalized (days)	Max quarantined	Peak date for quarantined (days)	Max isolated	Peak date for isolated (days)	Number of hospitalized	Number of death
1	0.3	0.5	65653.98	12992	142	864.4667	131	817	65.30%	976.767	148	280.4524	138	6000.14	148	6569.03	788.5699
2	0.3	0.6	46558.14	6056.9	154	382.942	142	more than 1000 days	46.50%	457.3888	160	187.8437	149	2809.674	160	4595.68	557.4788
3	0.3	0.7	18640.13	2014.2	101	156.6723	75	more than 1000 days	18.60%	151.5754	108	90.19974	105	931.1064	108	1761.474	222.3151
4	0.3	0.8	6737.167	1665	81	156.6723	75	more than 1000 days	6.70%	121.5076	88	79.65842	91	746.406	88	668.0877	80.21431
5	0.4	0.5	54941.08	9458.9	144	607.5028	133	952	54.90%	788.688	150	176.7211	139	4844.797	150	6088.346	731.3716
6	0.4	0.6	32741.1	3643.9	142	224.7304	129	more than 1000 days	32.70%	304.4534	147	97.86845	136	1870.214	147	3525.12	433.597
7	0.4	0.7	11207.95	1909.6	89	156.6723	75	more than 1000 days	11.20%	157.6678	95	69.22784	93	968.5319	95	1206.156	146.0362
8	0.4	0.8	5836.587	1685.8	80	156.6723	75	821	5.80%	135.6692	87	67.30861	88	833.3988	87	621.9952	74.46889
9	0.5	0.5	44874.84	6724.3	144	420.9476	132	more than 1000	44.80%	599.1656	149	110.4884	138	3680.589	149	5301.455	638.2853
10	0.5	0.6	21988.76	2607.8	111	162.711	90	more than 1000	21.90%	232.3088	117	62.48667	104	1427.04	117	2511.707	309.5224
11	0.5	0.7	8479.898	1886.3	86	156.6723	75	more than 1000	8.50%	165.5953	91	58.29633	89	1017.23	91	967.5347	115.9067
12	0.5	0.8	5378.267	1703.6	80	156.6723	75	668	5.40%	146.3982	86	58.93407	86	899.3059	86	598.6154	71.4868

13	0.6	0.5	35815.51	4802.3	138	295.4104	126	more than 1000	35.80%	448.1111	143	70.43092	131	2752.683	143	4407.568	532.9352
14	0.6	0.6	15264.56	2320.5	96	157.4758	79	more than 1000	15.25%	215.7521	101	50.49298	92	1325.335	101	1835.104	222.8418
15	0.6	0.7	7233.126	1878.9	84	156.6723	75	966	7.23%	172.3602	89	51.15996	86	1058.786	89	852.4358	101.7877
16	0.6	0.8	5102.054	1718.6	80	156.6723	75	576	5.10%	154.7867	86	52.73299	84	950.8349	86	584.9384	69.67088
17	0.7	0.5	28100.61	3621	125	221.0881	125	more than 1000	28.10%	349.5344	129	48.1911	116	2147.14	129	3553.594	431.3892
18	0.7	0.6	11658.17	2211.5	91	156.6723	75	more than 1000	11.60%	212.1965	96	44.0199	87	1303.494	96	1448.685	173.9461
19	0.7	0.7	6540.602	1876.4	83	156.6723	75	807	6.50%	178.0202	88	45.98191	84	1093.555	88	787.8985	93.85384
20	0.7	0.8	4917.758	1731.2	80	156.6723	75	514	4.90%	161.6687	85	47.99032	83	993.1105	85	576.2317	68.45147
21	0.8	0.5	22002.08	3018.6	110	188.8027	89	more than 1000	21.90%	298.9138	114	37.76666	95	1836.185	114	2842.892	344.9992
22	0.8	0.6	9698.989	2153.8	88	156.6723	75	more than 1000	9.70%	211.8603	93	39.66811	84	1301.429	93	1228.562	146.7441
23	0.8	0.7	6104.247	1876	83	156.6723	75	705	6.10%	182.6945	87	42.05427	83	1122.268	87	747.4366	88.82175
24	0.8	0.8	4786.165	1741.8	80	156.6723	75	470	4.80%	167.1788	85	44.15614	82	1026.958	85	570.3999	67.57698