

Population-based Hospitalization Model

Logistic instant growth with population-dependant growth-rate

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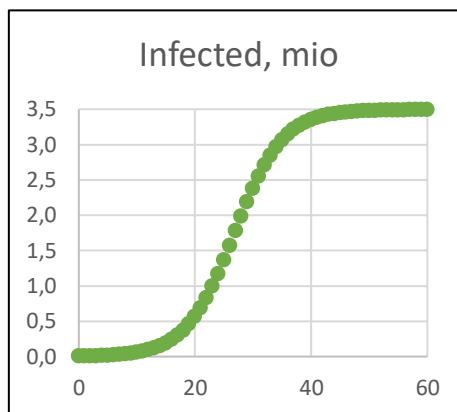
Assumptions

%-rate linearly decreasing to zero at max hospitalized M.
1 respirator per 5 hospitalized (SSI data) and for 7 days.

Data SSI: Statens Serum Institut, Denmark

Logistic formulas

Change in Total Hosp. $H' = ro*(1-H/M)*H$
Level of Total Hosp. $H = M/(1+c*exp(-ro*t))$
Mar 11. $t = 0, Ho = M/(1+c); c = M/Ho-1$



Parameters

DK population Jan 01, 2020 5.822.763
Herd immunity 60% 3.493.658
Infect/hospitalized IH 550

Herning DK March 4-8 estimate 1.650 since
app. 50.000 visitors at a 5 day Horse show
gave 30 Hospitalized
Ratio: 50.000/30 = 1.667

Max H: $M = \text{Herd im.} / \text{IH}$ 6.352
Initial Ho 10
Initial rate ro 24,0% 39,8%

(EU comma used)

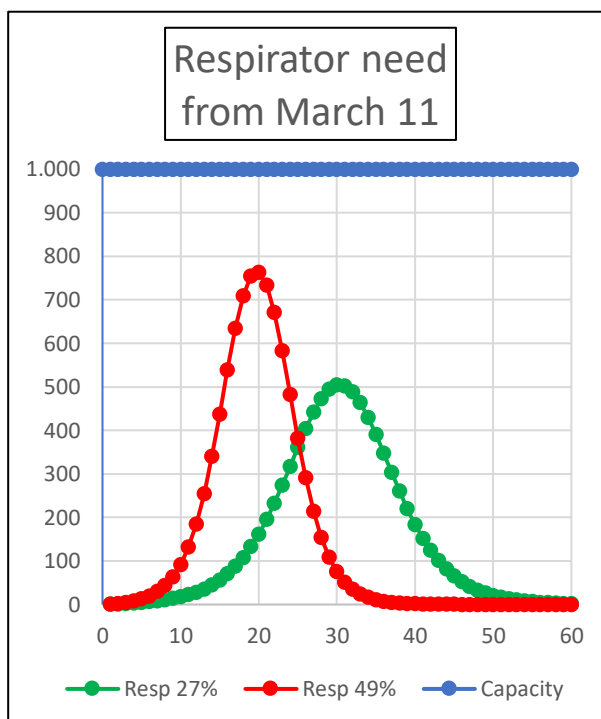
(SSI data)

Enponential tendency March 1-10:

$T = 0,51 * exp(0,3977x)$; so 48,8% growth rate

Enponential tendency March 11-20:

$T = 3,70 * exp(0,2404x)$; so 27,2% growth rate



Predictions

Date	Periods	Total 27%	Total 49%	Hosp 27%	Hosp 49%	Resp 27%	Resp 49%	Capacity	Infect, mio
11-mar	0	10	10					1.000	0,006
12-mar	1	13	15	3	5	1	1	1.000	0,007
13-mar	2	16	22	3	7	1	2	1.000	0,009
14-mar	3	21	33	4	11	2	5	1.000	0,011
15-mar	4	26	49	6	16	3	8	1.000	0,014
16-mar	5	33	72	7	24	5	12	1.000	0,018
17-mar	6	42	107	9	35	6	19	1.000	0,023
18-mar	7	53	158	11	51	9	30	1.000	0,029
19-mar	8	68	232	14	74	11	44	1.000	0,037
20-mar	9	86	340	18	107	14	64	1.000	0,047
21-mar	10	109	493	23	153	18	92	1.000	0,060
22-mar	11	138	707	29	214	22	132	1.000	0,076
23-mar	12	174	998	36	291	28	185	1.000	0,096
24-mar	13	220	1.379	46	382	36	254	1.000	0,121

25-mar	14	277	1.856	57	477	45	340	1.000	0,153
26-mar	15	349	2.418	71	562	56	437	1.000	0,192
27-mar	16	437	3.035	88	617	70	539	1.000	0,240
28-mar	17	545	3.662	108	628	87	634	1.000	0,300
29-mar	18	678	4.253	132	591	108	709	1.000	0,373
30-mar	19	837	4.770	160	517	133	754	1.000	0,461
31-mar	20	1028	5.195	191	424	162	763	1.000	0,566
01-apr	21	1253	5.525	224	330	195	734	1.000	0,689
02-apr	22	1512	5.772	259	247	233	671	1.000	0,832
03-apr	23	1806	5.950	294	178	274	583	1.000	0,993
04-apr	24	2132	6.076	326	126	317	483	1.000	1,173
05-apr	25	2485	6.164	353	88	361	382	1.000	1,367
06-apr	26	2856	6.225	372	60	404	291	1.000	1,571
07-apr	27	3237	6.266	381	41	442	214	1.000	1,780
08-apr	28	3616	6.294	379	28	473	154	1.000	1,989
09-apr	29	3983	6.313	367	19	494	108	1.000	2,190
10-apr	30	4328	6.326	345	13	504	75	1.000	2,380
11-apr	31	4644	6.334	316	9	502	52	1.000	2,554
12-apr	32	4927	6.340	283	6	488	35	1.000	2,710
13-apr	33	5175	6.344	248	4	464	24	1.000	2,846
14-apr	34	5388	6.347	213	3	430	16	1.000	2,964
15-apr	35	5569	6.348	181	2	391	11	1.000	3,063
16-apr	36	5720	6.350	151	1	347	7	1.000	3,146
17-apr	37	5844	6.350	124	1	303	5	1.000	3,214
18-apr	38	5946	6.351	102	1	260	3	1.000	3,270
19-apr	39	6028	6.351	82	0	220	2	1.000	3,315
20-apr	40	6094	6.352	66	0	184	2	1.000	3,352
21-apr	41	6148	6.352	53	0	152	1	1.000	3,381
22-apr	42	6190	6.352	43	0	124	1	1.000	3,405
23-apr	43	6224	6.352	34	0	101	0	1.000	3,423
24-apr	44	6251	6.352	27	0	81	0	1.000	3,438
25-apr	45	6272	6.352	21	0	65	0	1.000	3,450
26-apr	46	6289	6.352	17	0	52	0	1.000	3,459
27-apr	47	6303	6.352	13	0	42	0	1.000	3,466
28-apr	48	6313	6.352	11	0	33	0	1.000	3,472
29-apr	49	6321	6.352	8	0	26	0	1.000	3,477
30-apr	50	6328	6.352	7	0	21	0	1.000	3,480
01-maj	51	6333	6.352	5	0	16	0	1.000	3,483
02-maj	52	6337	6.352	4	0	13	0	1.000	3,485
03-maj	53	6340	6.352	3	0	10	0	1.000	3,487
04-maj	54	6343	6.352	3	0	8	0	1.000	3,489
05-maj	55	6345	6.352	2	0	6	0	1.000	3,490
06-maj	56	6346	6.352	2	0	5	0	1.000	3,491
07-maj	57	6348	6.352	1	0	4	0	1.000	3,491
08-maj	58	6349	6.352	1	0	3	0	1.000	3,492
09-maj	59	6349	6.352	1	0	2	0	1.000	3,492
10-maj	60	6350	6.352	1	0	2	0	1.000	3,492