Impact of non-pharmaceutical interventions against COVID-19

Iteration 7:   log likelihood = **-9080.8363**
      name: **<unnamed>**
       log: **C:\Users\PaulH\Dropbox\001Covid19 files\Sensitivity analyses with varying time gaps.smcl**
  log type: **smcl**
 opened on: **28 Feb 2021, 18:00:34**

1 . menbreg cases ib0.mass ib0.business ib0.education ib0.non_essential ib0.home ib0.masks dayfromfirst tests1mpop16ap

Fitting fixed-effects model:

Iteration 0:   log likelihood = **-9994.792** (not concave)
Iteration 1:   log likelihood = **-9728.5026**
Iteration 2:   log likelihood = **-9423.4215**
Iteration 3:   log likelihood = **-9289.1035**
Iteration 4:   log likelihood = **-9287.8567**
Iteration 5:   log likelihood = **-9287.854**
Iteration 6:   log likelihood = **-9287.854**

Refining starting values:

Grid node 0:   log likelihood = **-9150.7276**

Fitting full model:

Iteration 0:   log likelihood = **-9150.7276** (not concave)
Iteration 1:   log likelihood = **-9144.1122** (not concave)
Iteration 2:   log likelihood = **-9137.8038**
Iteration 3:   log likelihood = **-9107.7886**
Iteration 4:   log likelihood = **-9081.8283**
Iteration 5:   log likelihood = **-9080.841**
Iteration 6:   log likelihood = **-9080.8363**
Iteration 7:   log likelihood = **-9080.8363**

Mixed-effects nbinomial regression   Number of obs   =   **1,588**
Overdispersion: **mean**
Group variable: **country_code**   Number of groups =   **30**

                                                Obs per group:
                                                              min =   **42**
                                                              avg =   **52.9**
                                                              max =   **63**

Integration method: **mvaghermite**   Integration pts. =   **7**

                                                Wald chi2(**38**)   =   **3579.53**
Log likelihood = **-9080.8363**   Prob > chi2   =   **0.0000**

cases	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass						
1	**1.317029**	**.1196723**	**3.03**	**0.002**	**1.102175**	**1.573765**
2	**1.125023**	**.1379665**	**0.96**	**0.337**	**.8846566**	**1.430698**
3	**.9909768**	**.1532647**	**-0.06**	**0.953**	**.7318406**	**1.34187**
4	**.7990745**	**.1476335**	**-1.21**	**0.225**	**.5563179**	**1.147761**
5	**.7410227**	**.1605023**	**-1.38**	**0.166**	**.484691**	**1.132917**
6	**.6604644**	**.1673839**	**-1.64**	**0.102**	**.4019077**	**1.085357**
business						
1	**1.183943**	**.1265193**	**1.58**	**0.114**	**.9602165**	**1.459797**
2	**.8705053**	**.1228561**	**-0.98**	**0.326**	**.6601456**	**1.147898**
3	**.689605**	**.1169872**	**-2.19**	**0.028**	**.4945376**	**.9616155**
4	**.6074017**	**.1245851**	**-2.43**	**0.015**	**.4063355**	**.907961**
5	**.4714363**	**.1140889**	**-3.11**	**0.002**	**.2933795**	**.7575586**
6	**.3212351**	**.0919537**	**-3.97**	**0.000**	**.1833016**	**.562963**
education						
1	**1.47373**	**.1447278**	**3.95**	**0.000**	**1.215698**	**1.786529**
2	**1.376326**	**.1895708**	**2.32**	**0.020**	**1.050702**	**1.802865**
3	**.9470467**	**.1642194**	**-0.31**	**0.754**	**.6741735**	**1.330366**
4	**.5207754**	**.1083542**	**-3.14**	**0.002**	**.3463752**	**.7829864**
5	**.2582716**	**.062911**	**-5.56**	**0.000**	**.1602275**	**.4163096**
6	**.1433753**	**.0402787**	**-6.91**	**0.000**	**.0826694**	**.2486591**

non_essent~l						
1	1.142639	.1234961	1.23	0.217	.9245092	1.412234
2	1.146635	.1439661	1.09	0.276	.8965042	1.466554
3	1.018911	.1389382	0.14	0.891	.7799502	1.331085
4	.8253778	.1312559	-1.21	0.228	.6043524	1.127237
5	.759917	.1443942	-1.44	0.148	.5236327	1.102822
6	.7628685	.1966775	-1.05	0.294	.4602552	1.264447
home						
1	1.194981	.1243872	1.71	0.087	.9744476	1.465426
2	1.951905	.224044	5.83	0.000	1.558676	2.444339
3	2.275837	.2798113	6.69	0.000	1.788492	2.895979
4	2.550771	.3529303	6.77	0.000	1.944901	3.345381
5	2.489913	.4261743	5.33	0.000	1.780296	3.48238
6	2.393275	.5782635	3.61	0.000	1.490476	3.842908
masks						
1	.6583008	.0615543	-4.47	0.000	.5480662	.7907074
2	.528956	.0566382	-5.95	0.000	.4288218	.6524726
3	.5206164	.0675501	-5.03	0.000	.4037144	.6713693
4	.6819353	.1249588	-2.09	0.037	.4761763	.976604
5	1.146066	.2871408	0.54	0.586	.7013678	1.872724
6	1.059821	.3458243	0.18	0.859	.5590897	2.009016
dayfromfirst	1.138656	.0074957	19.72	0.000	1.124059	1.153442
tests1mpop~r	1.000055	8.54e-06	6.46	0.000	1.000038	1.000072
_cons	2.93e-07	5.09e-08	-86.48	0.000	2.08e-07	4.12e-07
ln(pop~2018)	1	(exposure)				
/lnalpha	-.7180626	.0377877			-.7921251	-.644
country_code						
var(_cons)	.2640212	.0740418			.1523803	.4574554

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **414.04**   Prob >= chibar2 = **0.0000**

```
2 . menbreg cases ib0.mass4 ib0.business4 ib0.education4 ib0.non_essential4 ib0.home4 ib0.masks4 dayfromfirst tests1mp

Fitting fixed-effects model:

Iteration 0:   log likelihood = -9986.8369  (not concave)
Iteration 1:   log likelihood =  -9718.087
Iteration 2:   log likelihood = -9455.4816
Iteration 3:   log likelihood = -9260.6121
Iteration 4:   log likelihood =  -9258.192
Iteration 5:   log likelihood =  -9258.184
Iteration 6:   log likelihood =  -9258.184

Refining starting values:

Grid node 0:   log likelihood =  -9117.515

Fitting full model:

Iteration 0:   log likelihood =  -9117.515  (not concave)
Iteration 1:   log likelihood = -9110.9696  (not concave)
Iteration 2:   log likelihood = -9104.6382
Iteration 3:   log likelihood = -9059.2946
Iteration 4:   log likelihood = -9020.1352
Iteration 5:   log likelihood = -9015.6862
Iteration 6:   log likelihood = -9014.9553
Iteration 7:   log likelihood = -9014.9141
Iteration 8:   log likelihood =  -9014.914

Mixed-effects nbinomial regression              Number of obs     =      1,588
Overdispersion:            mean
Group variable:    country_code                 Number of groups  =         30
```

Obs per group:
min = **42**
avg = **52.9**
max = **63**

Integration method: **mvaghermite** Integration pts. = **7**

Wald chi2(**74**) = **4123.30**
Log likelihood = **-9014.914** Prob > chi2 = **0.0000**

cases	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass4						
1	1.185258	.1176035	1.71	0.087	.9757871	1.439696
2	.9096095	.1069167	-0.81	0.420	.7224431	1.145266
3	.7401525	.1030979	-2.16	0.031	.5633198	.9724951
4	.6979264	.112031	-2.24	0.025	.5095362	.9559701
5	.5606689	.1017057	-3.19	0.001	.3929144	.8000461
6	.4650396	.0938509	-3.79	0.000	.313117	.6906741
7	.3496517	.0782323	-4.70	0.000	.2255198	.542109
8	.3327507	.0814023	-4.50	0.000	.2060088	.5374675
9	.3380323	.0910834	-4.03	0.000	.1993428	.5732128
10	.2857476	.0835348	-4.28	0.000	.1611181	.5067817
11	.2210622	.0707774	-4.71	0.000	.1180282	.414041
12	.210928	.0782178	-4.20	0.000	.1019732	.4362974
13	.1535516	.0684175	-4.21	0.000	.0641191	.3677234
14	.0618684	.0348283	-4.94	0.000	.0205255	.1864855
business4						
1	1.196626	.1353321	1.59	0.112	.9587203	1.493567
2	.9023284	.126786	-0.73	0.465	.6851133	1.188411
3	.789744	.1262493	-1.48	0.140	.5773143	1.08034
4	.6610521	.1180563	-2.32	0.020	.465823	.9381029
5	.5675012	.1113741	-2.89	0.004	.3862918	.833716
6	.583267	.1282284	-2.45	0.014	.3790835	.8974285
7	.4548825	.1127513	-3.18	0.001	.279842	.7394106
8	.4323347	.1172199	-3.09	0.002	.2541159	.7355433
9	.2882276	.0863427	-4.15	0.000	.1602308	.5184719
10	.2190637	.073024	-4.56	0.000	.1139792	.4210319
11	.1651703	.0647106	-4.60	0.000	.0766385	.3559727
12	.0091631	.0104551	-4.11	0.000	.0009791	.0857558
education4						
1	1.456755	.1490419	3.68	0.000	1.192064	1.780221
2	1.54878	.2073416	3.27	0.001	1.19134	2.013462
3	1.457869	.2329389	2.36	0.018	1.065892	1.993994
4	1.092813	.2020773	0.48	0.631	.7605824	1.570167
5	.8684146	.1800988	-0.68	0.496	.5783598	1.303936
6	.5471565	.1261643	-2.62	0.009	.348209	.8597716
7	.3983053	.1022937	-3.58	0.000	.2407734	.6589064
8	.2216427	.0626413	-5.33	0.000	.1273751	.385676
9	.1645677	.0512526	-5.79	0.000	.0893816	.3029988
10	.1116608	.0379659	-6.45	0.000	.0573433	.2174296
11	.0856576	.0331237	-6.35	0.000	.0401427	.1827785
12	.0908273	.0582404	-3.74	0.000	.0258469	.3191722
13	.0548464	.0509094	-3.13	0.002	.008893	.338258
non_essential4						
1	1.139119	.1308484	1.13	0.257	.9094802	1.42674
2	1.258193	.1638699	1.76	0.078	.9747309	1.624088
3	1.144833	.1587013	0.98	0.329	.8724596	1.502239
4	1.017415	.1440874	0.12	0.903	.7708147	1.342908
5	1.047637	.1545559	0.32	0.752	.7845749	1.398901
6	.8795601	.1447269	-0.78	0.435	.637096	1.2143
7	.8038324	.1438234	-1.22	0.222	.5660656	1.141469
8	.7328725	.1437931	-1.58	0.113	.4989059	1.07656
9	1.067588	.2528525	0.28	0.782	.6711214	1.698268
10	1.020293	.3168747	0.06	0.948	.5550926	1.875359
11	2.773997	1.677676	1.69	0.092	.8478341	9.07614
home4						
1	1.050294	.1224825	0.42	0.674	.8356919	1.320006

2	1.442408	.1781364	2.97	0.003	1.13231	1.837431
3	2.18335	.2813717	6.06	0.000	1.696007	2.810729
4	2.491129	.3259727	6.98	0.000	1.927585	3.219428
5	2.716038	.3724418	7.29	0.000	2.075932	3.553517
6	2.71914	.4031361	6.75	0.000	2.03345	3.636048
7	3.307177	.5339675	7.41	0.000	2.410043	4.538267
8	2.940677	.5413366	5.86	0.000	2.049997	4.218338
9	2.660378	.6168096	4.22	0.000	1.688853	4.190779
10	2.581587	.8114433	3.02	0.003	1.39424	4.78009
11	.8914859	.7986507	-0.13	0.898	.1540115	5.16031
masks4						
1	.655428	.0705672	-3.92	0.000	.5307375	.8094132
2	.5767203	.0670066	-4.74	0.000	.4592697	.7242068
3	.5849548	.0734933	-4.27	0.000	.4572755	.7482843
4	.4436336	.0613972	-5.87	0.000	.3382371	.581872
5	.6561941	.1000257	-2.76	0.006	.4867221	.8846746
6	.6569734	.1262464	-2.19	0.029	.4507937	.9574536
7	.7840156	.2008676	-0.95	0.342	.4745083	1.295405
8	.8409724	.2470652	-0.59	0.556	.472837	1.495726
9	1.362676	.4150369	1.02	0.310	.7501322	2.47541
10	1.381992	.6027965	0.74	0.458	.5877992	3.249243
11	2.888456	2.179965	1.41	0.160	.6580364	12.6789
dayfromfirst	1.172339	.0085949	21.69	0.000	1.155614	1.189306
tests1mpop16apr	1.000052	.0000104	5.06	0.000	1.000032	1.000073
_cons	2.54e-07	5.24e-08	-73.46	0.000	1.69e-07	3.80e-07
ln(popdata2018)	1	(exposure)				
/lnalpha	-.816131	.0384955			-.8915807	-.7406813
country_code						
var(_cons)	.3986612	.1128118			.2289464	.6941832

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **486.54**   Prob >= chibar2 = **0.0000**

3 . menbreg cases ib0.mass10 ib0.business10 ib0.education10 ib0.non_essential10 ib0.home10 ib0.masks10 dayfromfirst te

Fitting fixed-effects model:

Iteration 0:   log likelihood = **-9994.7123** (not concave)
Iteration 1:   log likelihood = **-9729.7216**
Iteration 2:   log likelihood = **-9400.1142**
Iteration 3:   log likelihood = **-9314.0225**
Iteration 4:   log likelihood = **-9310.3497**
Iteration 5:   log likelihood = **-9310.341**
Iteration 6:   log likelihood = **-9310.341**

Refining starting values:

Grid node 0:   log likelihood = **-9172.6869**

Fitting full model:

Iteration 0:   log likelihood = **-9172.6869** (not concave)
Iteration 1:   log likelihood = **-9166.0565** (not concave)
Iteration 2:   log likelihood = **-9159.8536**
Iteration 3:   log likelihood = **-9116.4445**
Iteration 4:   log likelihood = **-9108.8947**
Iteration 5:   log likelihood = **-9108.8151**
Iteration 6:   log likelihood = **-9108.8147**

Mixed-effects nbinomial regression   Number of obs   =   **1,588**
Overdispersion: **mean**
Group variable: **country_code**   Number of groups =   **30**

Obs per group:
min = **42**
avg = **52.9**
max = **63**

Integration method: **mvaghermite** Integration pts. = **7**

Wald chi2(**33**) = **3378.08**
Log likelihood = **-9108.8147** Prob > chi2 = **0.0000**

cases	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass10						
1	**1.344834**	**.1218836**	**3.27**	**0.001**	**1.125962**	**1.606253**
2	**1.142497**	**.1495364**	**1.02**	**0.309**	**.8839848**	**1.476607**
3	**.8847125**	**.1507808**	**-0.72**	**0.472**	**.6334797**	**1.235582**
4	**.6812934**	**.1465837**	**-1.78**	**0.074**	**.4468831**	**1.038662**
5	**.4624673**	**.1235176**	**-2.89**	**0.004**	**.2739926**	**.7805906**
6	**.1330454**	**.0568681**	**-4.72**	**0.000**	**.0575662**	**.307491**
business10						
1	**1.242759**	**.1301701**	**2.07**	**0.038**	**1.012115**	**1.525964**
2	**.9461983**	**.1383282**	**-0.38**	**0.705**	**.7104637**	**1.26015**
3	**.788907**	**.148699**	**-1.26**	**0.208**	**.5452367**	**1.141475**
4	**.5075358**	**.1206429**	**-2.85**	**0.004**	**.3185174**	**.8087236**
5	**.3524099**	**.1169214**	**-3.14**	**0.002**	**.1839244**	**.675238**
education10						
1	**1.480886**	**.1430543**	**4.06**	**0.000**	**1.225448**	**1.789567**
2	**1.165597**	**.1648493**	**1.08**	**0.279**	**.8834126**	**1.537917**
3	**.5976606**	**.1088434**	**-2.83**	**0.005**	**.4182514**	**.8540274**
4	**.3167193**	**.0719422**	**-5.06**	**0.000**	**.2029204**	**.4943373**
5	**.211947**	**.0606602**	**-5.42**	**0.000**	**.120951**	**.3714027**
non_essential10						
1	**1.121458**	**.1166766**	**1.10**	**0.271**	**.9145844**	**1.375124**
2	**1.05786**	**.1320182**	**0.45**	**0.652**	**.8283241**	**1.351001**
3	**.9092745**	**.1379363**	**-0.63**	**0.531**	**.6754113**	**1.224113**
4	**1.167886**	**.2336179**	**0.78**	**0.438**	**.7890969**	**1.728504**
5	**3.964275**	**1.980284**	**2.76**	**0.006**	**1.489227**	**10.55277**
home10						
1	**1.273257**	**.1249543**	**2.46**	**0.014**	**1.050464**	**1.543302**
2	**1.982338**	**.2200223**	**6.17**	**0.000**	**1.594783**	**2.464073**
3	**1.872801**	**.2487633**	**4.72**	**0.000**	**1.443534**	**2.429721**
4	**1.56168**	**.285629**	**2.44**	**0.015**	**1.09121**	**2.23499**
5	**.4451837**	**.2615056**	**-1.38**	**0.168**	**.1407779**	**1.40781**
masks10						
1	**.5949662**	**.0519296**	**-5.95**	**0.000**	**.5014158**	**.7059705**
2	**.4794569**	**.052917**	**-6.66**	**0.000**	**.3861924**	**.5952446**
3	**.4821065**	**.0823776**	**-4.27**	**0.000**	**.3449039**	**.6738882**
4	**.7418492**	**.1820478**	**-1.22**	**0.224**	**.458599**	**1.200047**
5	**1.567337**	**1.186874**	**0.59**	**0.553**	**.3552924**	**6.914153**
dayfromfirst	**1.123644**	**.0068083**	**19.24**	**0.000**	**1.110379**	**1.137067**
tests1mpop16apr	**1.000054**	**8.33e-06**	**6.43**	**0.000**	**1.000037**	**1.00007**
_cons	**3.34e-07**	**5.66e-08**	**-87.86**	**0.000**	**2.39e-07**	**4.65e-07**
ln(popdata2018)	**1**	(exposure)				
/lnalpha	**-.6825385**	**.0376508**			**-.7563328**	**-.6087442**
country_code						
var(_cons)	**.2505226**	**.0693896**			**.1455732**	**.4311339**

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **403.05** Prob >= chibar2 = **0.0000**

```
4 . testparm ib0.mass10

 ( 1)  [cases]1.mass10 = 0
 ( 2)  [cases]2.mass10 = 0
 ( 3)  [cases]3.mass10 = 0
 ( 4)  [cases]4.mass10 = 0
 ( 5)  [cases]5.mass10 = 0
 ( 6)  [cases]6.mass10 = 0

           chi2(  6) =   64.89
         Prob > chi2 =    0.0000

5 . menbreg cases ib0.mass14 ib0.business14 ib0.education14 ib0.non_essential14 ib0.home14 ib0.masks14 dayfromfirst te
note: 4.home14 omitted because of collinearity

Fitting fixed-effects model:

Iteration 0:   log likelihood = -10004.262  (not concave)
Iteration 1:   log likelihood = -9743.3976
Iteration 2:   log likelihood =  -9461.711
Iteration 3:   log likelihood = -9345.9307
Iteration 4:   log likelihood = -9345.2049
Iteration 5:   log likelihood = -9345.2044

Refining starting values:

Grid node 0:   log likelihood = -9214.5766

Fitting full model:

Iteration 0:   log likelihood = -9214.5766  (not concave)
Iteration 1:   log likelihood = -9207.8849  (not concave)
Iteration 2:   log likelihood = -9201.7211
Iteration 3:   log likelihood = -9168.2085
Iteration 4:   log likelihood = -9162.6838
Iteration 5:   log likelihood = -9161.9602
Iteration 6:   log likelihood = -9161.9209
Iteration 7:   log likelihood = -9161.9208

Mixed-effects nbinomial regression              Number of obs     =      1,588
Overdispersion:            mean
Group variable:    country_code                 Number of groups  =         30

                                                Obs per group:
                                                              min =         42
                                                              avg =       52.9
                                                              max =         63

Integration method: mvaghermite                 Integration pts.  =          7

                                                Wald chi2(24)     =    3035.84
Log likelihood = -9161.9208                     Prob > chi2       =     0.0000
```

cases	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass14						
1	1.546279	.1388527	4.85	0.000	1.296736	1.843843
2	1.44411	.194042	2.73	0.006	1.109752	1.879206
3	1.202014	.2197375	1.01	0.314	.8400459	1.719949
4	.8038274	.1994619	-0.88	0.379	.4942486	1.307315
business14						
1	1.204076	.12594	1.78	0.076	.9808952	1.478036
2	.9057518	.1367136	-0.66	0.512	.6737975	1.217556
3	.6316922	.1282855	-2.26	0.024	.4242692	.9405231
4	.3694655	.15298	-2.40	0.016	.1641071	.8318027
education14						
1	1.565542	.1509728	4.65	0.000	1.295923	1.891255
2	1.037304	.15069	0.25	0.801	.7802814	1.378989
3	.4584379	.0886586	-4.03	0.000	.3138082	.6697253
4	.3896325	.1151281	-3.19	0.001	.218345	.6952919

non_essential14						
1	**1.090845**	**.1123048**	**0.84**	**0.398**	**.8915174**	**1.334738**
2	**.9366864**	**.1212635**	**-0.51**	**0.613**	**.7267709**	**1.207232**
3	**.811321**	**.1463667**	**-1.16**	**0.246**	**.5696806**	**1.155458**
4	**1.809959**	**1.183796**	**0.91**	**0.364**	**.5022778**	**6.52219**
home14						
1	**1.478777**	**.1440292**	**4.02**	**0.000**	**1.221793**	**1.789812**
2	**1.825602**	**.2120113**	**5.18**	**0.000**	**1.453965**	**2.292229**
3	**1.762915**	**.287684**	**3.47**	**0.001**	**1.280344**	**2.42737**
4	**1**	(omitted)				
masks14						
1	**.5638435**	**.0473464**	**-6.82**	**0.000**	**.4782803**	**.6647138**
2	**.4510717**	**.0561698**	**-6.39**	**0.000**	**.3533861**	**.5757601**
3	**.7172957**	**.1678056**	**-1.42**	**0.156**	**.4534887**	**1.134567**
dayfromfirst	**1.098089**	**.0058299**	**17.62**	**0.000**	**1.086722**	**1.109576**
tests1mpop16apr	**1.000056**	**7.86e-06**	**7.09**	**0.000**	**1.00004**	**1.000071**
_cons	**3.78e-07**	**6.11e-08**	**-91.54**	**0.000**	**2.75e-07**	**5.19e-07**
ln(popdata2018)	**1**	(exposure)				
/lnalpha	**-.6096359**	**.0371429**			**-.6824347**	**-.5368371**
country_code						
var(_cons)	**.2206711**	**.0606155**			**.1288046**	**.3780588**

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **366.57**   Prob >= chibar2 = **0.0000**

```
6 . menbreg deaths ib0.mass ib0.business ib0.education ib0.non_essential ib0.home ib0.masks dayfromfirst tests1mpop16a

Fitting fixed-effects model:

Iteration 0:   log likelihood = -6092.0787  (not concave)
Iteration 1:   log likelihood =  -5450.907  (not concave)
Iteration 2:   log likelihood = -5093.0957  (not concave)
Iteration 3:   log likelihood = -5002.9839
Iteration 4:   log likelihood =  -4827.041  (backed up)
Iteration 5:   log likelihood = -4626.4817
Iteration 6:   log likelihood = -4620.6277
Iteration 7:   log likelihood =  -4620.566
Iteration 8:   log likelihood =  -4620.566

Refining starting values:

Grid node 0:   log likelihood = -4349.6314

Fitting full model:

Iteration 0:   log likelihood = -4349.6314
Iteration 1:   log likelihood = -4132.8538
Iteration 2:   log likelihood = -4098.1002
Iteration 3:   log likelihood = -4096.2717
Iteration 4:   log likelihood = -4096.2635
Iteration 5:   log likelihood = -4096.2635

Mixed-effects nbinomial regression              Number of obs     =      1,588
Overdispersion:                 mean
Group variable:    country_code                 Number of groups  =         30

                                                Obs per group:
                                                              min =         42
                                                              avg =       52.9
                                                              max =         63

Integration method: mvaghermite                 Integration pts.  =          7
```

Log likelihood = **-4096.2635** Wald chi2(**38**) = **4664.97**
Prob > chi2 = **0.0000**

deaths	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass						
1	.7563676	.120079	-1.76	0.079	.5541129	1.032446
2	.5832463	.1076164	-2.92	0.003	.406251	.8373551
3	.5948864	.132347	-2.33	0.020	.384648	.9200357
4	.5578361	.1458002	-2.23	0.026	.3342183	.9310714
5	.5042393	.1518256	-2.27	0.023	.2794739	.9097709
6	.4930222	.1732332	-2.01	0.044	.2476167	.9816419
business						
1	1.066555	.1597097	0.43	0.667	.7952827	1.43036
2	1.073205	.19744	0.38	0.701	.7483161	1.539147
3	.7191153	.1582015	-1.50	0.134	.4672387	1.106772
4	.4951598	.130937	-2.66	0.008	.2948892	.8314419
5	.415128	.1298009	-2.81	0.005	.2249216	.7661838
6	.3742309	.1370291	-2.68	0.007	.1825836	.7670388
education						
1	2.509827	.3650106	6.33	0.000	1.887345	3.337615
2	3.140665	.6171348	5.82	0.000	2.136791	4.616163
3	2.756948	.6459132	4.33	0.000	1.741824	4.363679
4	2.019311	.5457603	2.60	0.009	1.188909	3.429714
5	1.096814	.3385769	0.30	0.765	.5989282	2.008591
6	.5517744	.1932168	-1.70	0.089	.277775	1.096049
non_essential						
1	1.396027	.2180175	2.14	0.033	1.027926	1.895946
2	1.405768	.2414743	1.98	0.047	1.003921	1.968466
3	1.418574	.2602883	1.91	0.057	.9900763	2.032523
4	1.440418	.3027939	1.74	0.083	.9540155	2.174812
5	1.044527	.2531821	0.18	0.857	.649528	1.679739
6	.7685437	.2336021	-0.87	0.386	.4235866	1.394424
home						
1	1.304813	.2010532	1.73	0.084	.964695	1.764844
2	2.007811	.3310027	4.23	0.000	1.453436	2.773638
3	2.2306	.3901335	4.59	0.000	1.583237	3.14266
4	1.985532	.3800538	3.58	0.000	1.364417	2.889393
5	1.835626	.4052875	2.75	0.006	1.190824	2.829573
6	1.213501	.3408576	0.69	0.491	.6997581	2.104419
masks						
1	.9091138	.0910322	-0.95	0.341	.7471108	1.106246
2	.8940483	.103534	-0.97	0.333	.7125065	1.121846
3	.9701593	.1395542	-0.21	0.833	.7318137	1.286132
4	1.399045	.3072944	1.53	0.126	.9096386	2.151764
5	1.357023	.4367027	0.95	0.343	.7222082	2.549833
6	1.453493	.6602568	0.82	0.410	.5966917	3.540591
dayfromfirst	1.167611	.0100284	18.04	0.000	1.14812	1.187433
tests1mpop16apr	1.000021	.0000182	1.17	0.243	.9999855	1.000057
_cons	2.98e-09	1.07e-09	-54.76	0.000	1.47e-09	6.01e-09
ln(popdata2018)	1	(exposure)				
/lnalpha	-1.205326	.0668716			-1.336392	-1.07426
country_code						
var(_cons)	1.190973	.3250558			.6975593	2.033401

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **1048.60** Prob >= chibar2 = **0.0000**

```
7 . menbreg deaths ib0.mass4 ib0.business4 ib0.education4 ib0.non_essential4 ib0.home4 ib0.masks4 dayfromfirst tests1m

Fitting fixed-effects model:

Iteration 0:   log likelihood = -6085.9998  (not concave)
Iteration 1:   log likelihood = -5456.6922  (not concave)
Iteration 2:   log likelihood = -5087.2181  (not concave)
Iteration 3:   log likelihood = -4993.0782  (not concave)
Iteration 4:   log likelihood = -4947.6529
Iteration 5:   log likelihood =   -4649.61
Iteration 6:   log likelihood = -4596.5313
Iteration 7:   log likelihood = -4595.8369
Iteration 8:   log likelihood = -4595.8358
Iteration 9:   log likelihood = -4595.8358

Refining starting values:

Grid node 0:   log likelihood = -4329.3104

Fitting full model:

Iteration 0:   log likelihood = -4329.3104
Iteration 1:   log likelihood = -4114.8771
Iteration 2:   log likelihood = -4062.0213
Iteration 3:   log likelihood = -4048.4743
Iteration 4:   log likelihood = -4048.4537
Iteration 5:   log likelihood = -4048.4537

Mixed-effects nbinomial regression              Number of obs     =      1,588
Overdispersion:            mean
Group variable:    country_code                 Number of groups  =         30

                                                Obs per group:
                                                              min =         42
                                                              avg =       52.9
                                                              max =         63

Integration method: mvaghermite                 Integration pts.  =          7

                                                Wald chi2(74)     =    4914.42
Log likelihood = -4048.4537                     Prob > chi2       =     0.0000
```

deaths	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass4						
1	.5847977	.1084222	-2.89	0.004	.4066229	.8410455
2	.5879855	.1128876	-2.77	0.006	.4035934	.8566218
3	.3668961	.0810156	-4.54	0.000	.2380051	.5655876
4	.3894459	.0994524	-3.69	0.000	.2360895	.642418
5	.3189652	.0926378	-3.93	0.000	.1805206	.5635855
6	.2822302	.0922415	-3.87	0.000	.1487321	.5355529
7	.2450735	.0896624	-3.84	0.000	.1196401	.5020144
8	.2146618	.0865236	-3.82	0.000	.097423	.4729859
9	.1879309	.0837082	-3.75	0.000	.0784974	.4499255
10	.1686319	.0816859	-3.67	0.000	.0652551	.4357775
11	.1707839	.0900275	-3.35	0.001	.0607774	.4799008
12	.1472727	.0855079	-3.30	0.001	.0471962	.4595552
13	.1240041	.0795963	-3.25	0.001	.0352422	.4363239
14	.0943584	.071085	-3.13	0.002	.021554	.4130801
business4						
1	1.097531	.1790413	0.57	0.568	.7971858	1.511034
2	.9655254	.1806591	-0.19	0.851	.6691071	1.393259
3	1.130661	.2418595	0.57	0.566	.7434505	1.719542
4	.8317088	.2021432	-0.76	0.448	.516524	1.339221
5	.6129191	.1689121	-1.78	0.076	.3571278	1.05192
6	.5121274	.1606383	-2.13	0.033	.2769382	.9470506
7	.4135227	.1467851	-2.49	0.013	.2062313	.8291708
8	.3753815	.1481539	-2.48	0.013	.1731907	.8136194
9	.3705288	.1619581	-2.27	0.023	.157312	.8727343
10	.3681416	.1775462	-2.07	0.038	.143054	.9473923
11	.3111824	.1710421	-2.12	0.034	.105962	.9138603

12	.1111157	.1535649	-1.59	0.112	.0074027	1.667859
education4						
1	2.056265	.3068929	4.83	0.000	1.534756	2.754984
2	2.623156	.4945699	5.11	0.000	1.812753	3.795856
3	2.668537	.6027761	4.35	0.000	1.713964	4.15475
4	2.425121	.6178535	3.48	0.001	1.471875	3.995728
5	2.349112	.6718227	2.99	0.003	1.341123	4.114707
6	1.985382	.6332169	2.15	0.032	1.062582	3.70959
7	1.367885	.4844265	0.88	0.376	.6832864	2.738397
8	.8678009	.3380697	-0.36	0.716	.4044054	1.862186
9	.609483	.2606812	-1.16	0.247	.2635696	1.409379
10	.3384913	.15844	-2.31	0.021	.1352445	.8471793
11	.2831938	.1458306	-2.45	0.014	.1032185	.7769802
12	.1266484	.0854567	-3.06	0.002	.0337479	.475283
13	.0735043	.062757	-3.06	0.002	.0137901	.3917934
non_essential4						
1	1.378051	.229698	1.92	0.054	.9939952	1.910497
2	1.334065	.2391555	1.61	0.108	.9388226	1.895704
3	1.300853	.2380027	1.44	0.151	.9088523	1.861929
4	1.325037	.2503383	1.49	0.136	.914979	1.918867
5	1.326435	.2586255	1.45	0.147	.9051498	1.943799
6	1.41912	.3067426	1.62	0.105	.9290346	2.167735
7	1.314033	.3094178	1.16	0.246	.8282709	2.084684
8	1.058531	.2738149	0.22	0.826	.6375577	1.757469
9	.9468984	.2855925	-0.18	0.856	.5242927	1.710145
10	.681326	.2583866	-1.01	0.312	.3239997	1.432733
11	1.030781	.6757346	0.05	0.963	.2852047	3.725431
home4						
1	1.301498	.2272646	1.51	0.131	.9242905	1.832645
2	1.547739	.2765779	2.44	0.015	1.090409	2.196877
3	2.382469	.4240976	4.88	0.000	1.680765	3.377129
4	2.368919	.4322144	4.73	0.000	1.65671	3.3873
5	2.575174	.4875535	5.00	0.000	1.776847	3.732185
6	2.409067	.4857608	4.36	0.000	1.622609	3.576712
7	2.317956	.5088787	3.83	0.000	1.50742	3.564314
8	2.19568	.5343065	3.23	0.001	1.362806	3.537563
9	1.783916	.5160842	2.00	0.045	1.011866	3.145037
10	1.516464	.5632429	1.12	0.262	.7322846	3.140394
11	.8600512	.7007593	-0.19	0.853	.1741709	4.24691
masks4						
1	.9292004	.1070975	-0.64	0.524	.7413135	1.164708
2	.9410561	.1158773	-0.49	0.622	.739269	1.197922
3	.9575459	.1279443	-0.32	0.745	.7369274	1.244212
4	1.024722	.1585697	0.16	0.875	.7566373	1.387793
5	1.11171	.1904436	0.62	0.536	.7946477	1.555278
6	1.590809	.3522862	2.10	0.036	1.030667	2.455372
7	1.490327	.4674364	1.27	0.203	.8059439	2.755867
8	1.038825	.4130926	0.10	0.924	.4764953	2.264779
9	3.151694	1.254835	2.88	0.004	1.444247	6.877754
10	2.579486	1.956182	1.25	0.211	.583465	11.40385
11	2.780446	3.416485	0.83	0.405	.2501477	30.90524
dayfromfirst	1.206331	.01368	16.54	0.000	1.179815	1.233444
tests1mpop16apr	1.000018	.0000192	0.92	0.357	.99998	1.000055
_cons	2.61e-09	9.77e-10	-52.74	0.000	1.25e-09	5.43e-09
ln(popdata2018)	1	(exposure)				
/lnalpha	-1.326459	.0685182			-1.460752	-1.192165
country_code						
var(_cons)	1.306631	.3616677			.7595306	2.247814

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **1094.76** Prob >= chibar2 = **0.0000**

```
8 . menbreg deaths ib0.mass10 ib0.business10 ib0.education10 ib0.non_essential10 ib0.home10 ib0.masks10 dayfromfirst t

Fitting fixed-effects model:

Iteration 0:   log likelihood = -6096.7024  (not concave)
Iteration 1:   log likelihood = -5442.2489  (not concave)
Iteration 2:   log likelihood = -5099.6838  (not concave)
Iteration 3:   log likelihood = -5013.7263
Iteration 4:   log likelihood = -4717.0454  (backed up)
Iteration 5:   log likelihood = -4649.6372
Iteration 6:   log likelihood = -4648.6644
Iteration 7:   log likelihood =   -4648.66
Iteration 8:   log likelihood =   -4648.66

Refining starting values:

Grid node 0:   log likelihood = -4387.6526

Fitting full model:

Iteration 0:   log likelihood = -4387.6526
Iteration 1:   log likelihood =  -4188.023
Iteration 2:   log likelihood = -4148.1391
Iteration 3:   log likelihood = -4146.1946
Iteration 4:   log likelihood = -4146.1839
Iteration 5:   log likelihood = -4146.1839

Mixed-effects nbinomial regression              Number of obs     =      1,588
Overdispersion:            mean
Group variable:    country_code                 Number of groups  =         30

                                                Obs per group:
                                                              min =         42
                                                              avg =       52.9
                                                              max =         63

Integration method: mvaghermite                 Integration pts.  =          7

                                                Wald chi2(33)     =    4358.84
Log likelihood = -4146.1839                     Prob > chi2       =     0.0000
```

deaths	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass10						
1	.7933842	.1263504	-1.45	0.146	.5806648	1.084031
2	.6462756	.1314059	-2.15	0.032	.4338551	.9626996
3	.6323483	.1586684	-1.83	0.068	.3866993	1.034045
4	.4859425	.1477044	-2.37	0.018	.2678295	.8816809
5	.3990637	.1444065	-2.54	0.011	.1963468	.8110744
6	.1616749	.0796189	-3.70	0.000	.0615826	.4244512
business10						
1	1.354599	.202174	2.03	0.042	1.011041	1.8149
2	1.20092	.2335491	0.94	0.346	.8203075	1.758133
3	.8332331	.2080098	-0.73	0.465	.5108237	1.359133
4	.7346226	.2298941	-0.99	0.324	.397821	1.356566
5	.6529924	.2649127	-1.05	0.293	.2948383	1.446213
education10						
1	2.618531	.3908756	6.45	0.000	1.954323	3.508479
2	3.272596	.651684	5.95	0.000	2.21508	4.834986
3	2.401223	.5825608	3.61	0.000	1.492528	3.863158
4	1.280701	.372342	0.85	0.395	.7243953	2.264228
5	.8868284	.3091561	-0.34	0.730	.4478198	1.756207
non_essential10						
1	1.304915	.2045242	1.70	0.090	.9597769	1.774166
2	1.37905	.2423596	1.83	0.067	.9772074	1.946138
3	1.455649	.3032486	1.80	0.072	.9676759	2.189695
4	1.271133	.324759	0.94	0.348	.7704057	2.09731
5	1.779882	.9400789	1.09	0.275	.6321393	5.011522

home10						
1	**1.487145**	**.2242743**	**2.63**	**0.009**	**1.106585**	**1.998581**
2	**1.876879**	**.313318**	**3.77**	**0.000**	**1.353133**	**2.603348**
3	**1.403147**	**.2671175**	**1.78**	**0.075**	**.9661836**	**2.03773**
4	**.8840621**	**.208023**	**-0.52**	**0.600**	**.5574321**	**1.402083**
5	**.1816888**	**.1060076**	**-2.92**	**0.003**	**.0579013**	**.570122**
masks10						
1	**.8454197**	**.0820308**	**-1.73**	**0.084**	**.6990054**	**1.022502**
2	**.8645704**	**.1104758**	**-1.14**	**0.255**	**.6730275**	**1.110626**
3	**1.043792**	**.2166648**	**0.21**	**0.836**	**.6949062**	**1.56784**
4	**1.230409**	**.4119592**	**0.62**	**0.536**	**.6383439**	**2.371616**
5	**1.272183**	**1.557947**	**0.20**	**0.844**	**.1153845**	**14.02659**
dayfromfirst	**1.147815**	**.0090551**	**17.48**	**0.000**	**1.130204**	**1.165701**
tests1mpop16apr	**1.000016**	**.000019**	**0.82**	**0.410**	**.9999784**	**1.000053**
_cons	**3.40e-09**	**1.26e-09**	**-52.51**	**0.000**	**1.64e-09**	**7.04e-09**
ln(popdata2018)	**1**	(exposure)				
/lnalpha	**-1.085879**	**.065591**			**-1.214435**	**-.957323**
country_code						
var(_cons)	**1.294418**	**.3538466**			**.7575077**	**2.211882**

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **1004.95**   Prob >= chibar2 = **0.0000**

```
9 . menbreg deaths ib0.mass14 ib0.business14 ib0.education14 ib0.non_essential14 ib0.home14 ib0.masks14 dayfromfirst t
note: 4.home14 omitted because of collinearity

Fitting fixed-effects model:

Iteration 0:   log likelihood = -6105.2707  (not concave)
Iteration 1:   log likelihood =  -5341.976  (not concave)
Iteration 2:   log likelihood = -5109.2826  (not concave)
Iteration 3:   log likelihood = -5046.7401  (not concave)
Iteration 4:   log likelihood = -4944.9043
Iteration 5:   log likelihood = -4764.9866
Iteration 6:   log likelihood = -4664.3758
Iteration 7:   log likelihood =  -4663.255
Iteration 8:   log likelihood = -4663.2537
Iteration 9:   log likelihood = -4663.2537

Refining starting values:

Grid node 0:   log likelihood = -4394.9043

Fitting full model:

Iteration 0:   log likelihood = -4394.9043
Iteration 1:   log likelihood = -4204.3637
Iteration 2:   log likelihood = -4169.7704
Iteration 3:   log likelihood = -4169.0356
Iteration 4:   log likelihood = -4169.0308
Iteration 5:   log likelihood = -4169.0308

Mixed-effects nbinomial regression              Number of obs     =      1,588
Overdispersion:            mean
Group variable:    country_code                 Number of groups  =         30

                                                Obs per group:
                                                              min =         42
                                                              avg =       52.9
                                                              max =         63

Integration method: mvaghermite                 Integration pts.  =          7
```

Log likelihood = **-4169.0308** Wald chi2(**24**) = **4122.31**
Prob > chi2 = **0.0000**

deaths	IRR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mass14						
1	.8952258	.1423886	-0.70	0.487	.6554601	1.222697
2	.9902703	.20305	-0.05	0.962	.6625507	1.480091
3	.8994396	.2289916	-0.42	0.677	.5460866	1.481435
4	.7018597	.2232273	-1.11	0.266	.3762917	1.309109
business14						
1	1.323085	.1970869	1.88	0.060	.9880811	1.77167
2	.8965988	.1750896	-0.56	0.576	.6114681	1.314687
3	.6933552	.1757276	-1.44	0.148	.4219128	1.139433
4	1.083379	.4883515	0.18	0.859	.447803	2.621042
education14						
1	2.777188	.4169053	6.80	0.000	2.069307	3.727227
2	2.789269	.5449698	5.25	0.000	1.901874	4.090712
3	1.343229	.324296	1.22	0.222	.8368432	2.156034
4	.5776422	.1929843	-1.64	0.100	.3001105	1.111826
non_essential14						
1	1.375352	.2158628	2.03	0.042	1.011153	1.870729
2	1.356355	.2466374	1.68	0.094	.949713	1.937111
3	.9347891	.2141295	-0.29	0.768	.596666	1.464522
4	.3028598	.1800789	-2.01	0.045	.0944325	.9713188
home14						
1	1.658136	.249702	3.36	0.001	1.234344	2.227431
2	1.784602	.3096292	3.34	0.001	1.270157	2.507409
3	1.438098	.3076567	1.70	0.089	.9455587	2.187201
4	1	(omitted)				
masks14						
1	.7787291	.0730946	-2.66	0.008	.647872	.9360168
2	.7451864	.1077411	-2.03	0.042	.561301	.9893136
3	.6632024	.2066264	-1.32	0.187	.3601197	1.221364
dayfromfirst	1.134572	.0075746	18.91	0.000	1.119823	1.149516
tests1mpop16apr	1.00002	.0000182	1.11	0.265	.9999846	1.000056
_cons	3.38e-09	1.21e-09	-54.49	0.000	1.67e-09	6.81e-09
ln(popdata2018)	1	(exposure)				
/lnalpha	-.9963278	.0634911			-1.120768	-.8718875
country_code						
var(_cons)	1.193087	.324013			.7006589	2.031596

Note: Estimates are transformed only in the first equation.
Note: **_cons** estimates baseline incidence rate (conditional on zero random effects).
LR test vs. nbinomial model: chibar2(01) = **988.45** Prob >= chibar2 = **0.0000**

```
10 . log close
      name:  <unnamed>
       log:  C:\Users\PaulH\Dropbox\001Covid19 files\Sensitivity analyses with varying time gaps.smcl
  log type:  smcl
 closed on:  28 Feb 2021, 18:07:26
```