Argentina Covid Report

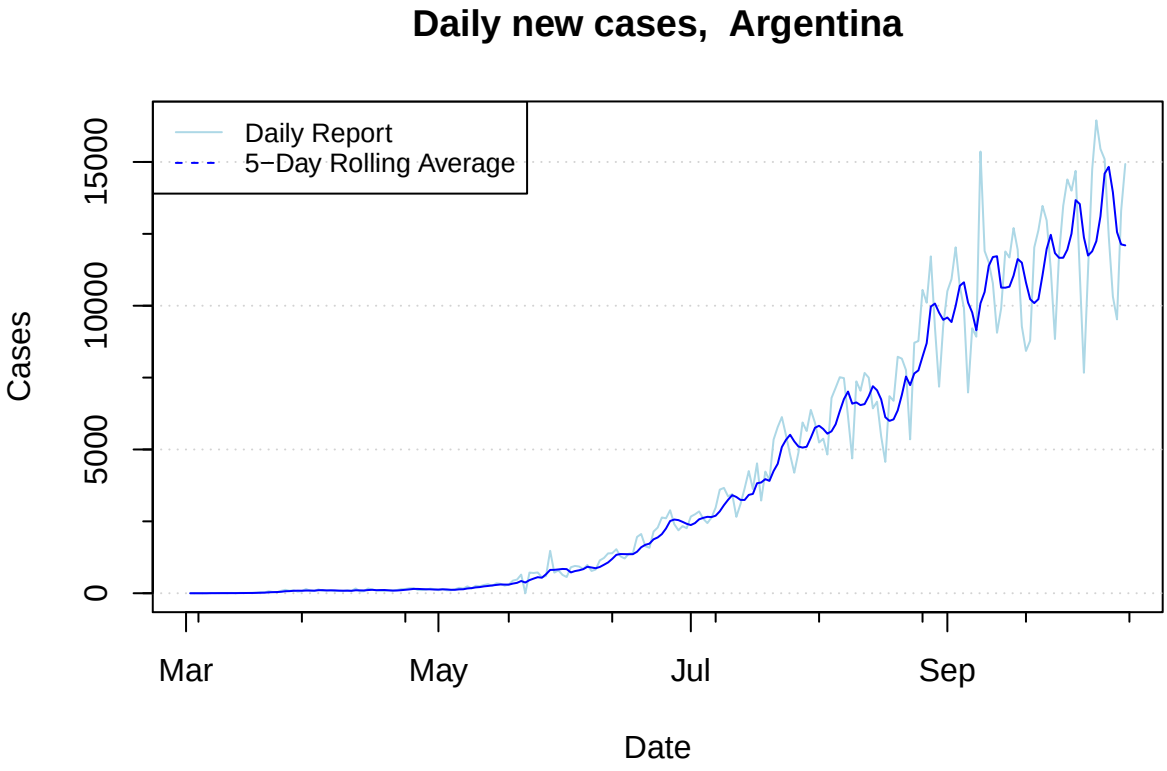
Chris Andino

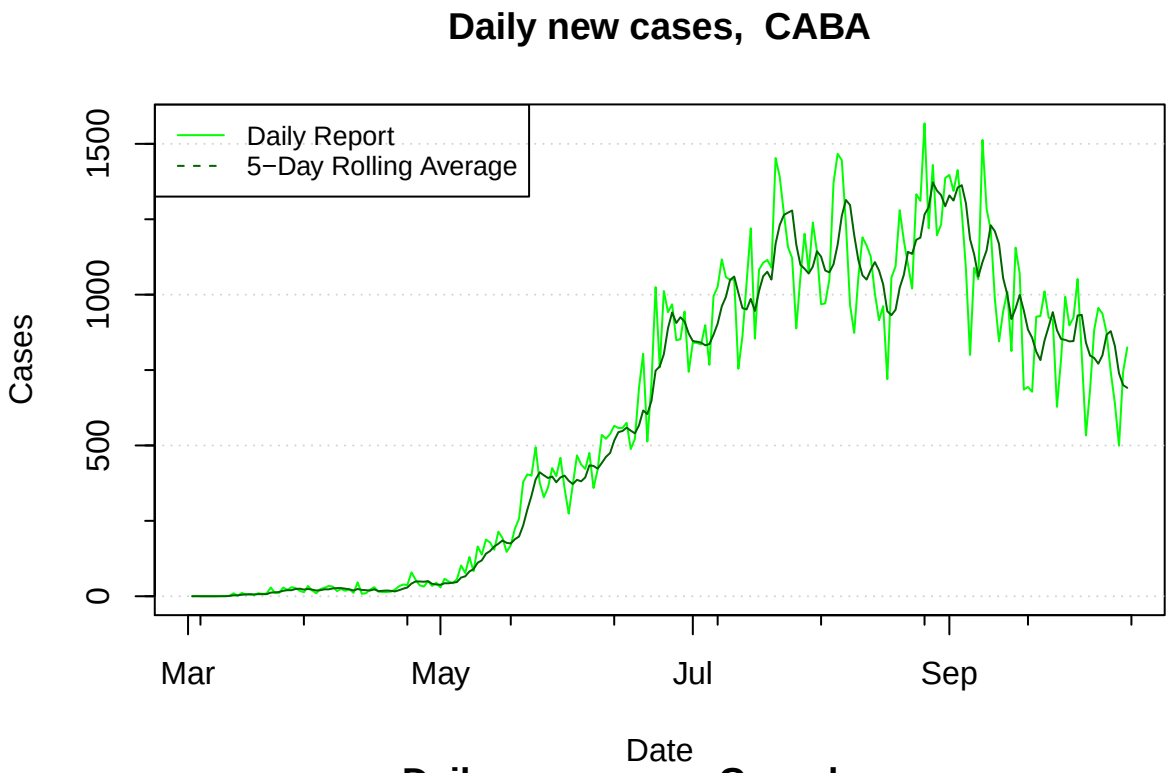
October 14 2020

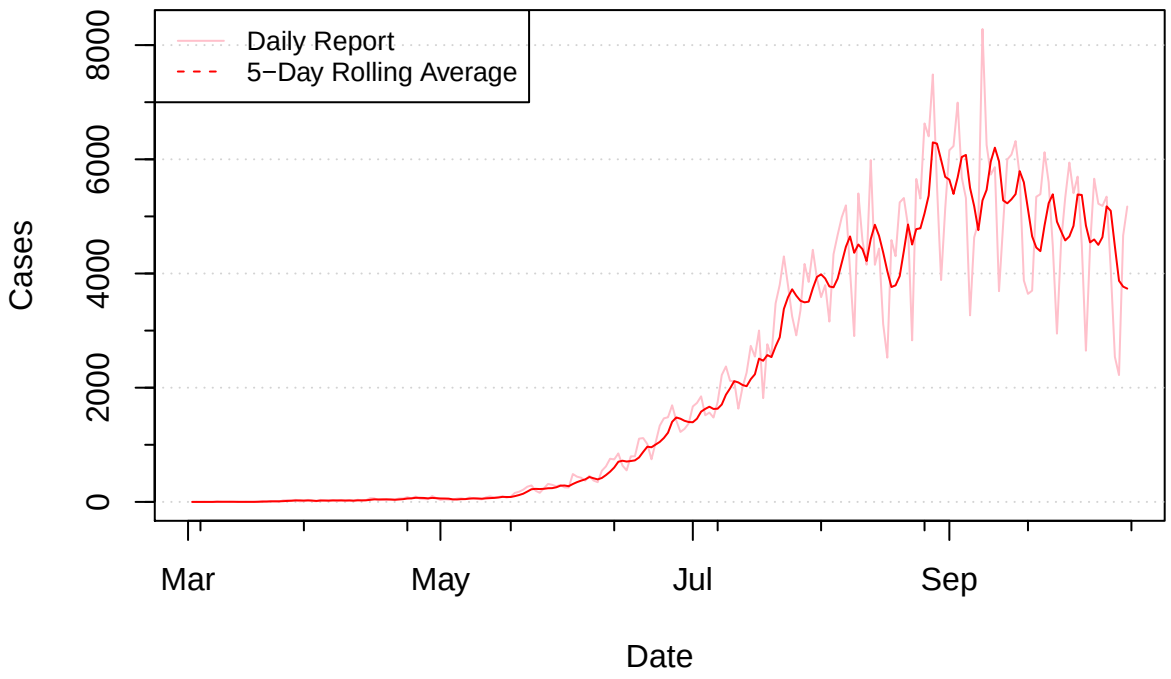
Data as of 10 am 14-OCT-2020

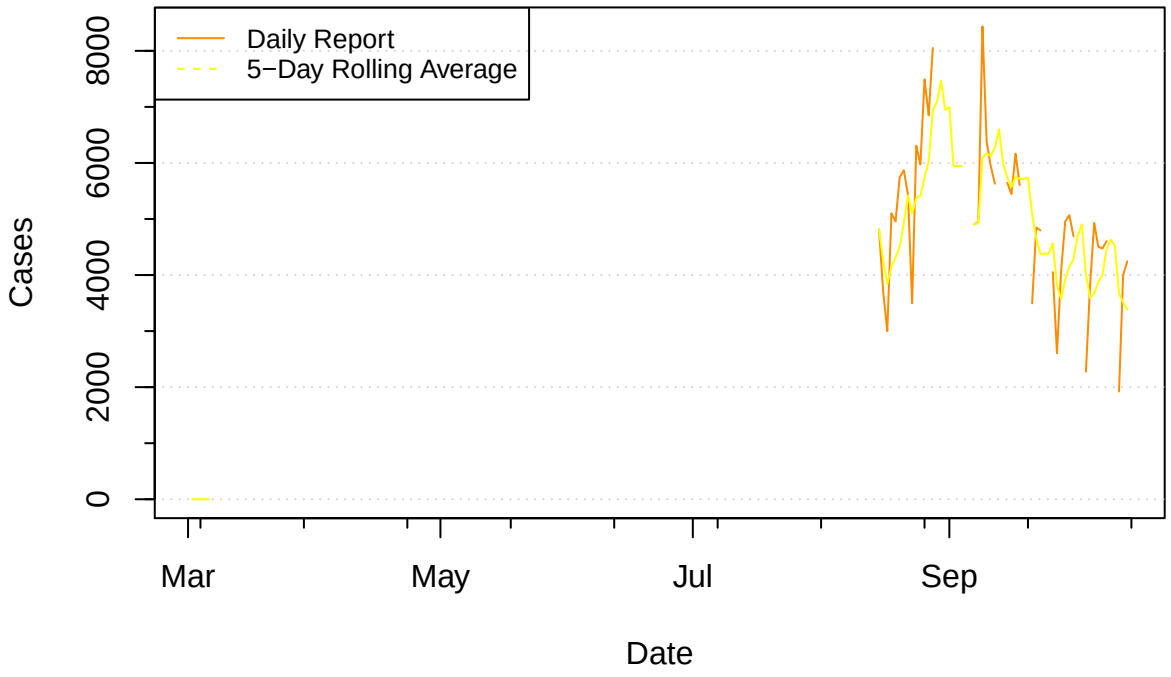
New Cases

The following graphs show the overall epidemiological curves in the localities based on simple "new cases per day" as reported. Note that date of case report DOES NOT equal date of first symptoms or diagnosis, necessarily. Rather, this data is the change in cases from the previous day's report:




Daily new cases, CABA
Daily Report
5−Day Rolling Average
Cases
0
500
1000
1500
Mar
May
Jul
Sep
Date


Daily new cases, Conurbano
Daily Report
5−Day Rolling Average
Cases
0
2000
4000
6000
8000
Mar
May
Jul
Sep
Date

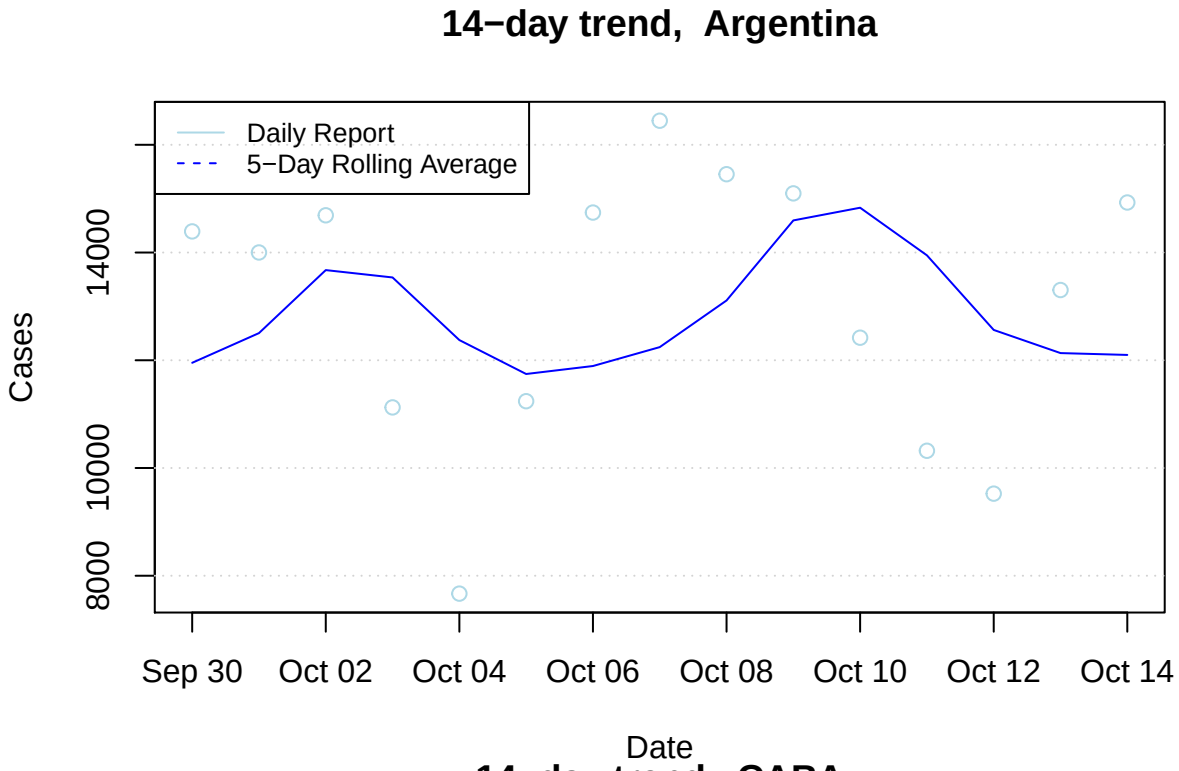


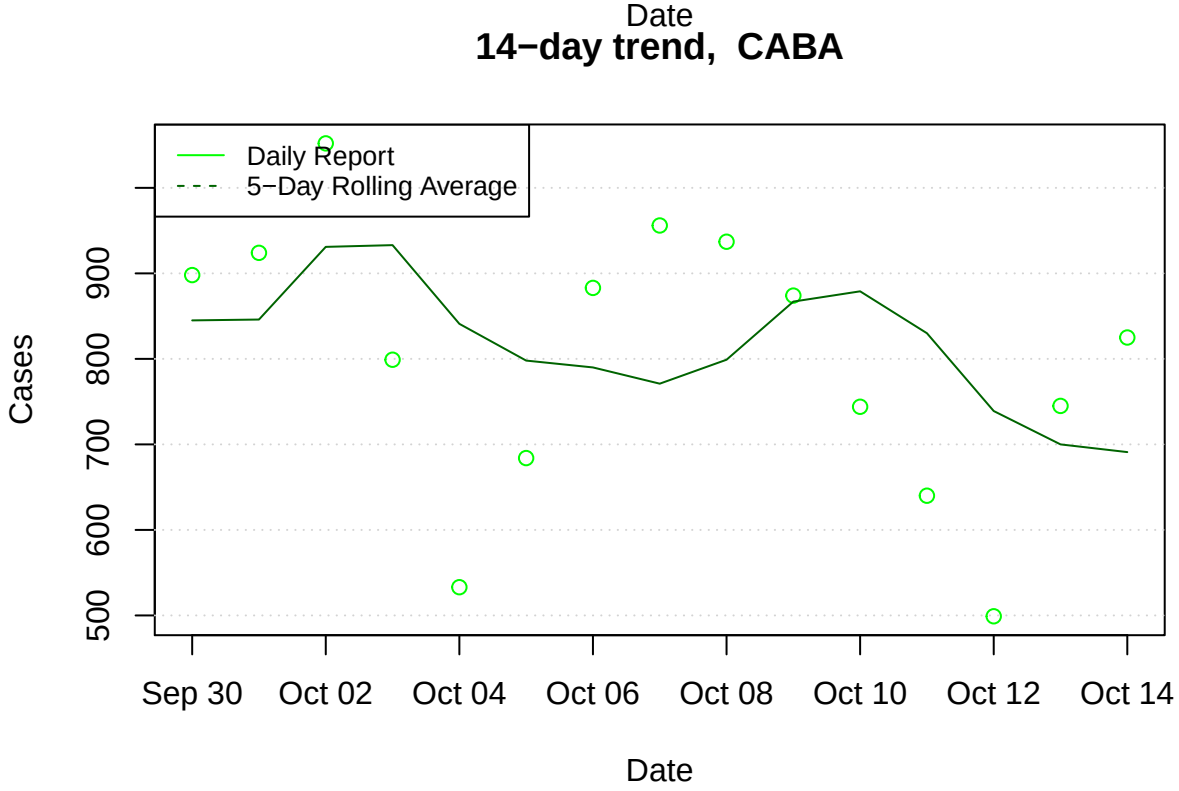

```
##           Date TotalCasesNational NewCasesNational AvgCasesNational
## 213 2020-09-30             750997            14392            11953
## 214 2020-10-01             764998            14001            12504
## 215 2020-10-02             779689            14691            13674
## 216 2020-10-03             790814            11125            13537
## 217 2020-10-04             798482             7668            12375
## 218 2020-10-05             809722            11240            11745
## 219 2020-10-06             824464            14742            11893
## 220 2020-10-07             840911            16447            12244
## 221 2020-10-08             856365            15454            13110
## 222 2020-10-09             871463            15098            14596
## 223 2020-10-10             883882            12419            14832
## 224 2020-10-11             894202            10320            13948
## 225 2020-10-12             903726             9524            12563
## 226 2020-10-13             917030            13304            12133
## 227 2020-10-14             931959            14929            12099
##     TotalCasesCABA NewCasesCABA AvgCasesCABA TotalCasesPBA NewCasesPBA
## 213         125964          898          845        417675        5943
## 214         126888          924          846        423082        5407
## 215         127940         1052          931        428779        5697
## 216         128739          799          933        433284        4505
## 217         129272          533          841        435932        2648
## 218         129956          684          798        440402        4470
## 219         130839          883          790        446062        5660
## 220         131795          956          771        451284        5222
## 221         132732          937          799        456468        5184
## 222         133606          874          867        461814        5346
## 223         134350          744          879        465890        4076
## 224         134990          640          830        468430        2540
## 225         135489          499          739        470651        2221
```

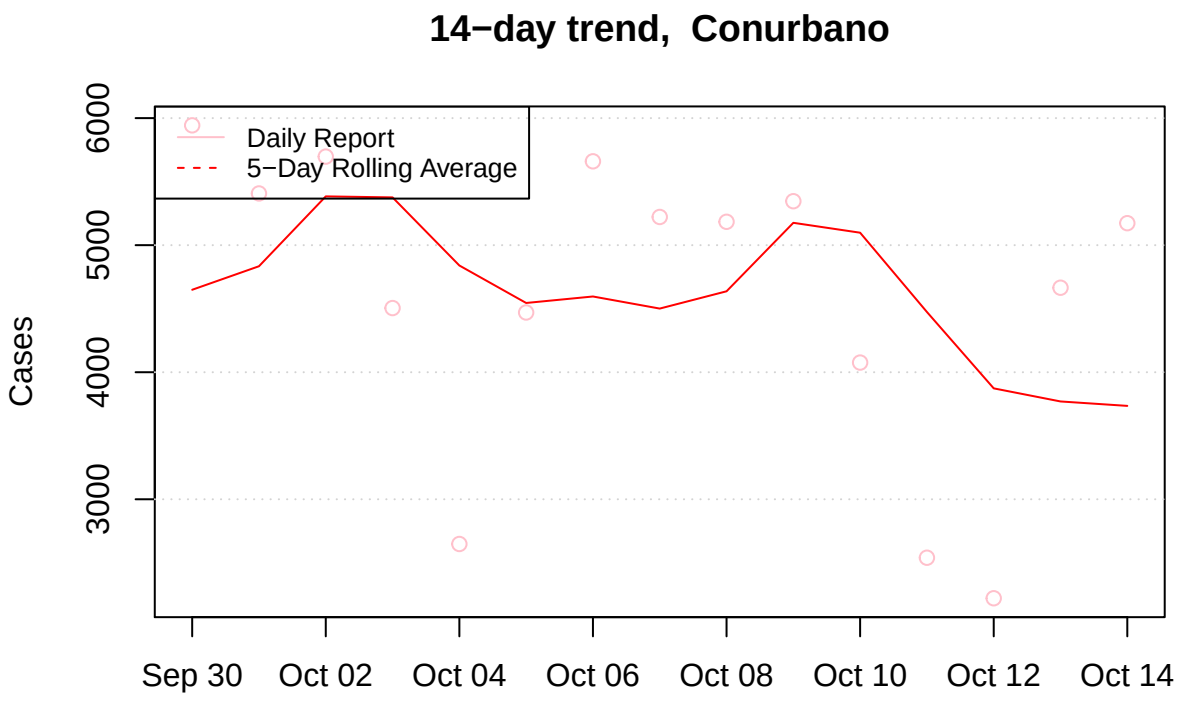
```
## 226         136234          745          700        475316        4665
## 227         137059          825          691        480489        5173
##     AvgCasesPBA TotalCasesAMBA NewCasesAMBA AvgCasesAMBA
## 213        4649         483054         5068         4150
## 214        4834         487746         4692         4278
## 215        5384             NA           NA         4696
## 216        5376         496808           NA         4905
## 217        4840         499086         2278         4013
## 218        4545         502891         3805         3592
## 219        4596         507822         4931         3671
## 220        4501         512325         4503         3879
## 221        4637         516799         4474         3998
## 222        5176         521405         4606         4464
## 223        5098             NA           NA         4628
## 224        4474         526890           NA         4528
## 225        3873         528813         1923         3668
## 226        3770         532811         3998         3509
## 227        3735         537055         4244         3388
```

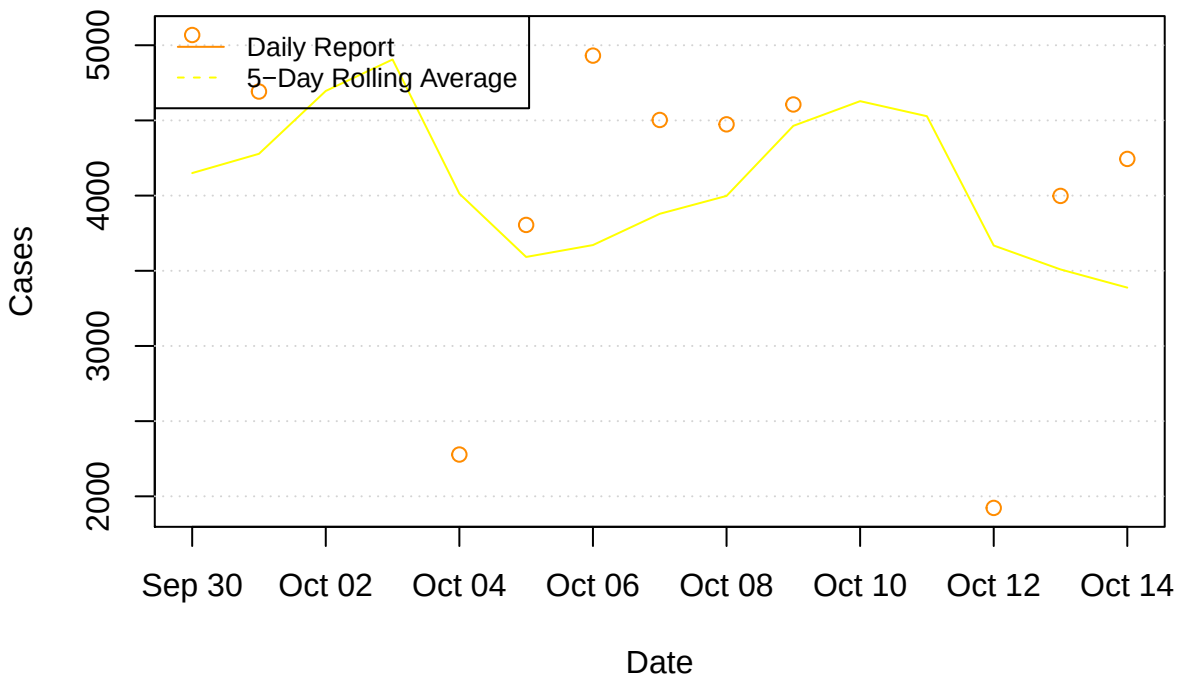
14-day trend

Phase 1: 14-day trend lines



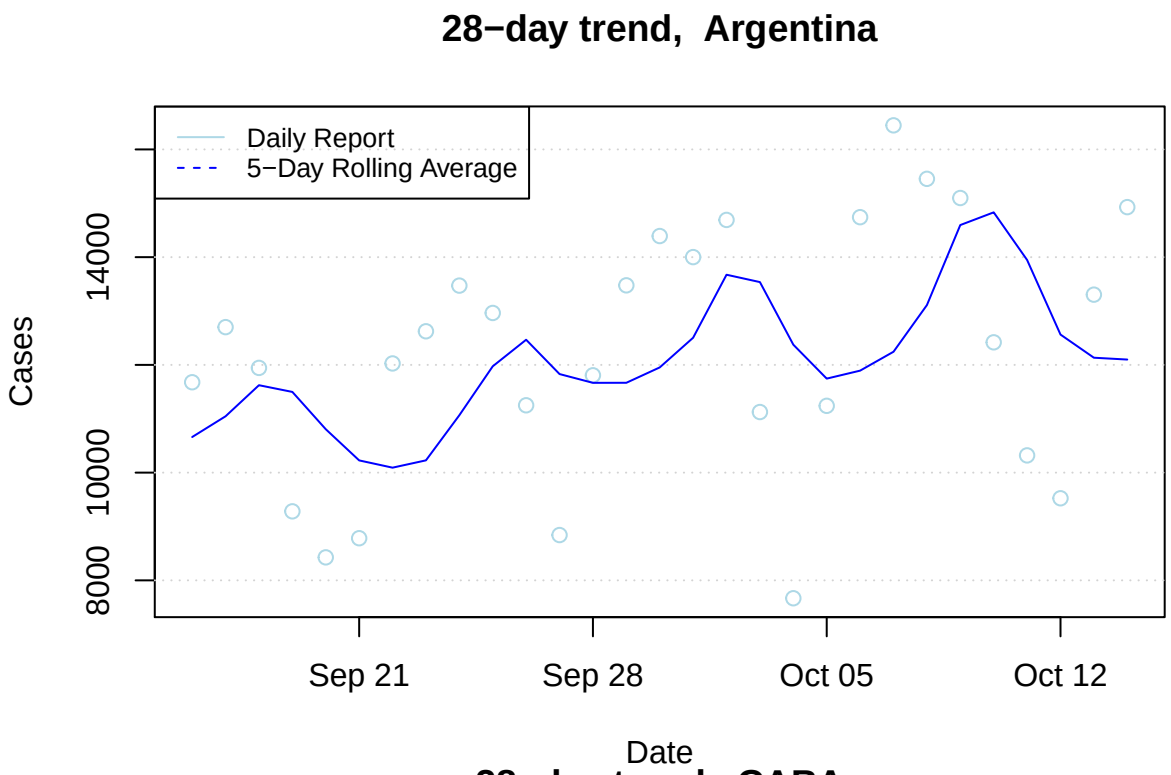


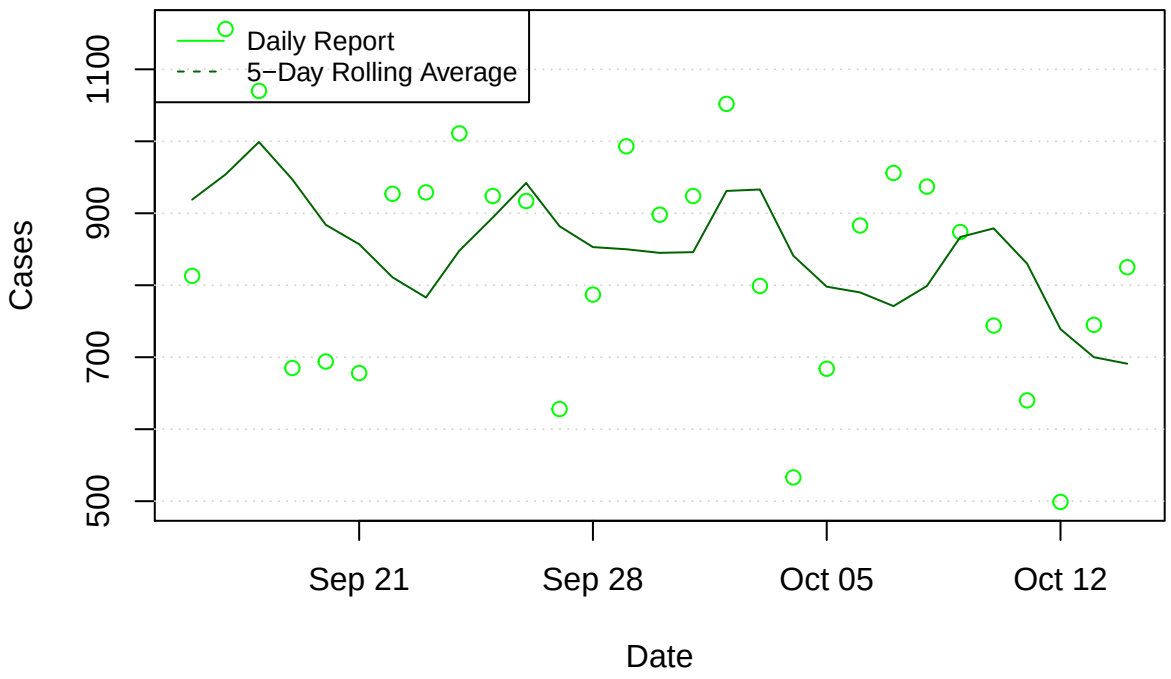


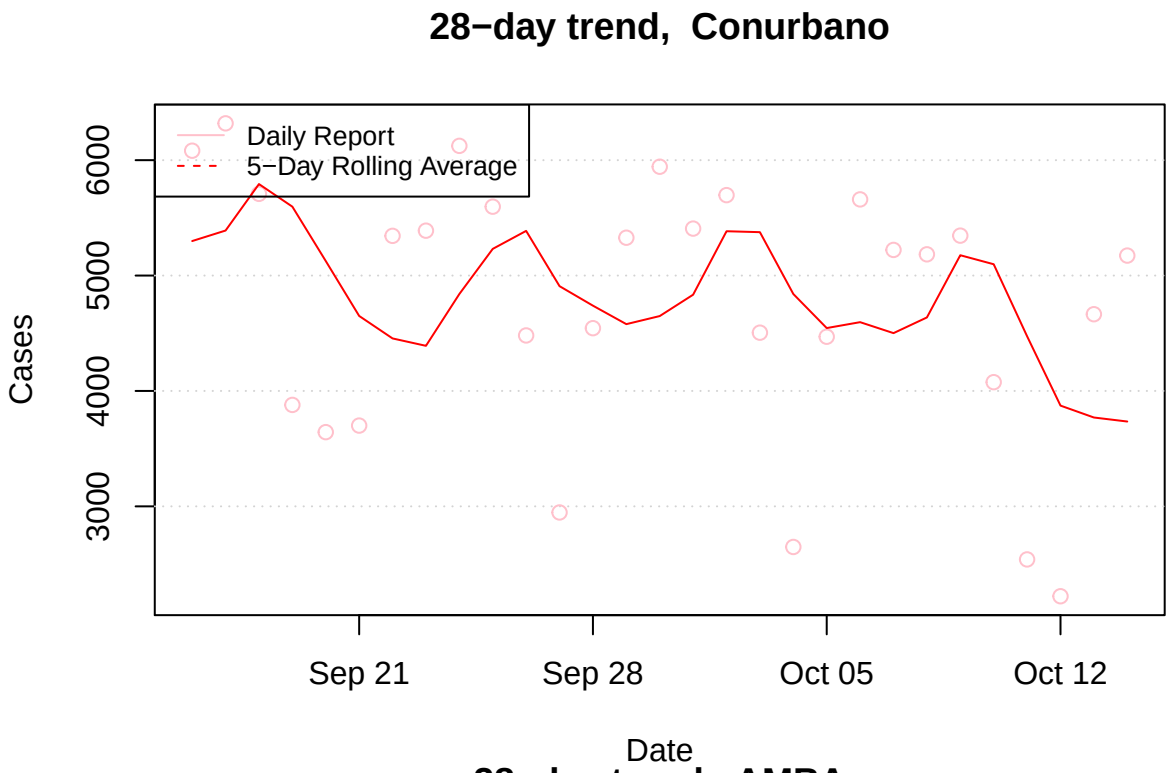


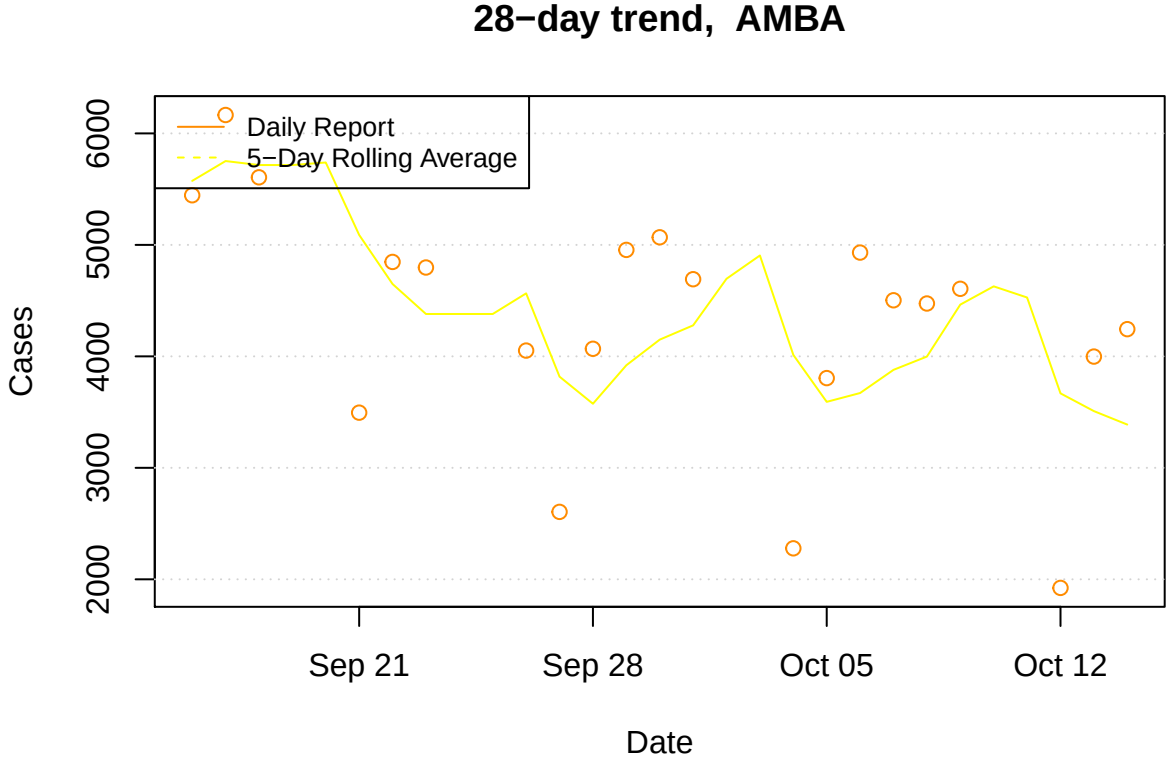
##

Phase 2 decisions


28−day trend, Argentina
Daily Report
5−Day Rolling Average
Cases
8000
10000
14000
Sep 21
Sep 28
Oct 05
Oct 12
Date


28−day trend, CABA
Daily Report
5−Day Rolling Average
Cases
500
700
900
1100
Sep 21
Sep 28
Oct 05
Oct 12
Date


28−day trend, Conurbano
Daily Report
5−Day Rolling Average
Cases
3000
4000
5000
6000
Sep 21
Sep 28
Oct 05
Oct 12
Date


28−day trend, AMBA
Daily Report
5−Day Rolling Average
Cases
2000
3000
4000
5000
6000
Sep 21
Sep 28
Oct 05
Oct 12
Date

Log graphs

The following graphs are generated by:

$$x = Number\ of\ Days\ since\ March\ 3$$

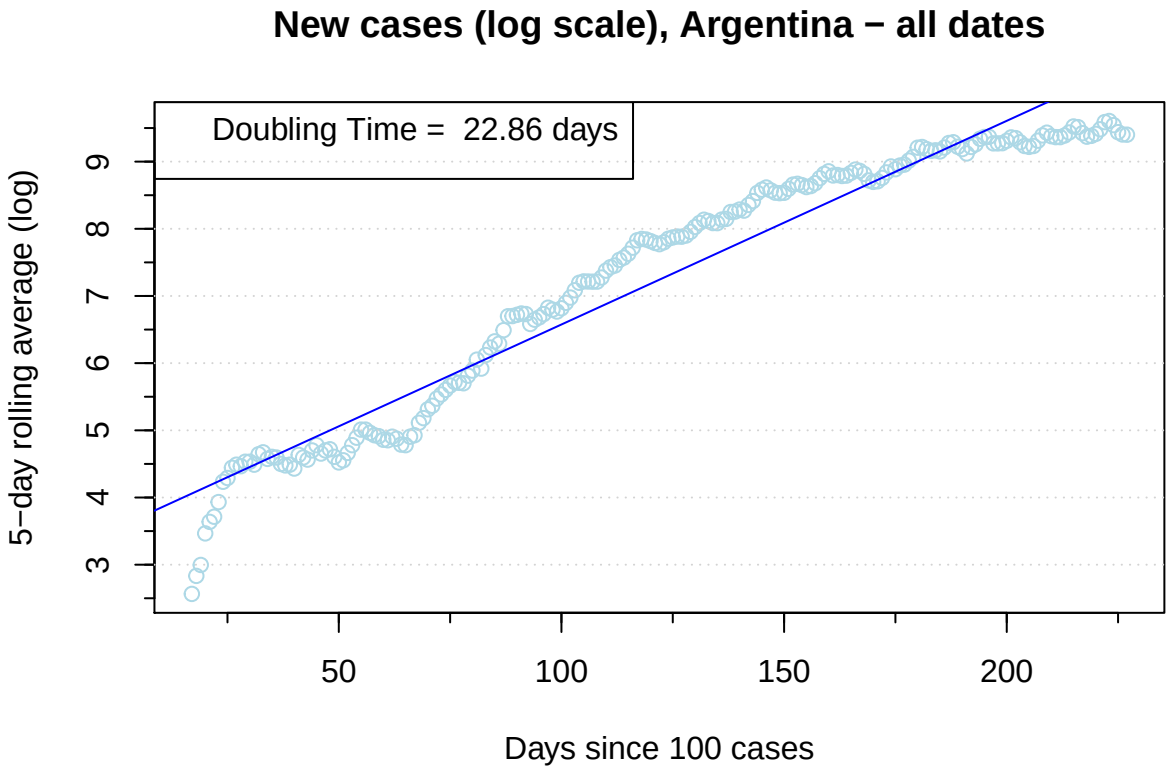
$$y = log(Number\ of\ New\ Cases\ this\ day)$$

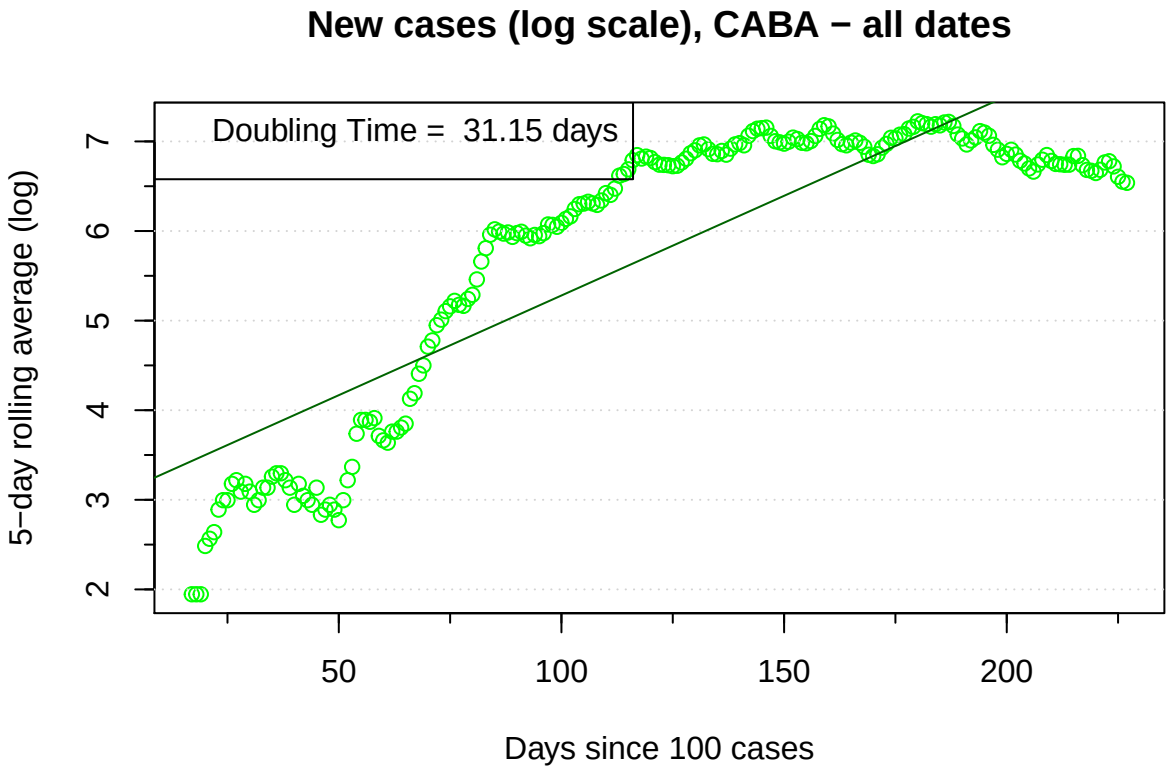
The regression line is drawn using the R "lm()" function over the x values.

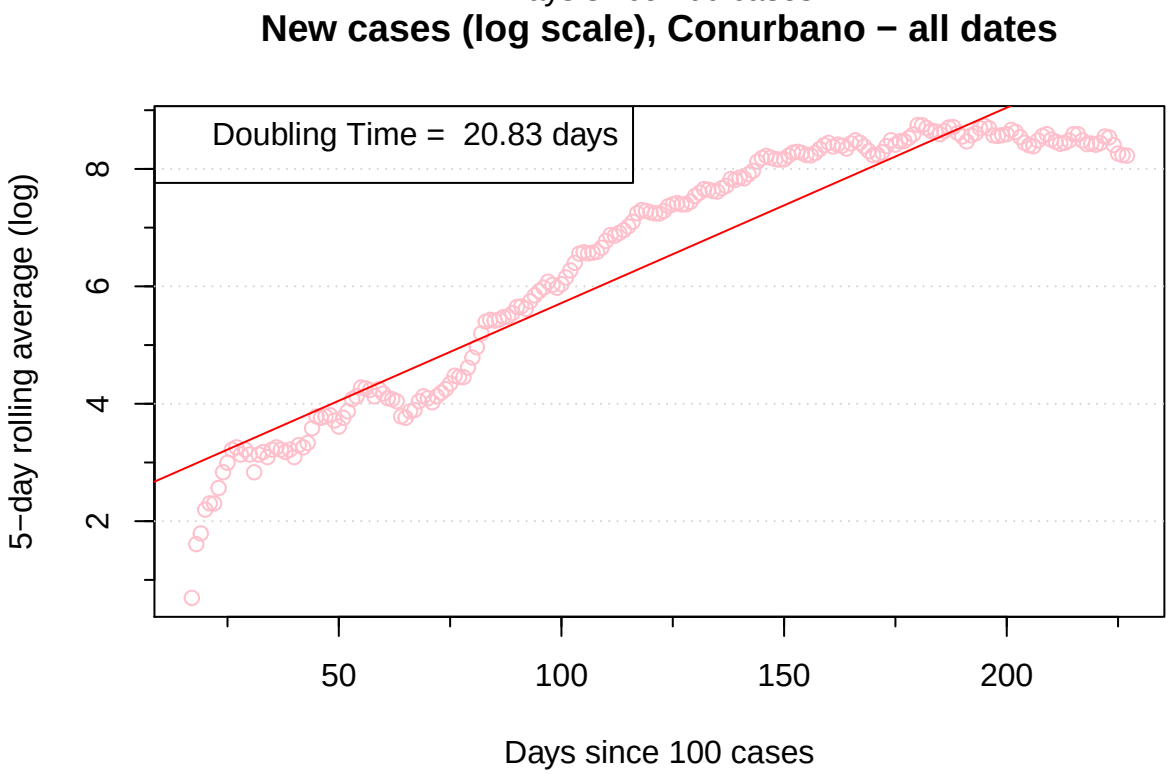
R0 is estimated from the slope of the regression line:

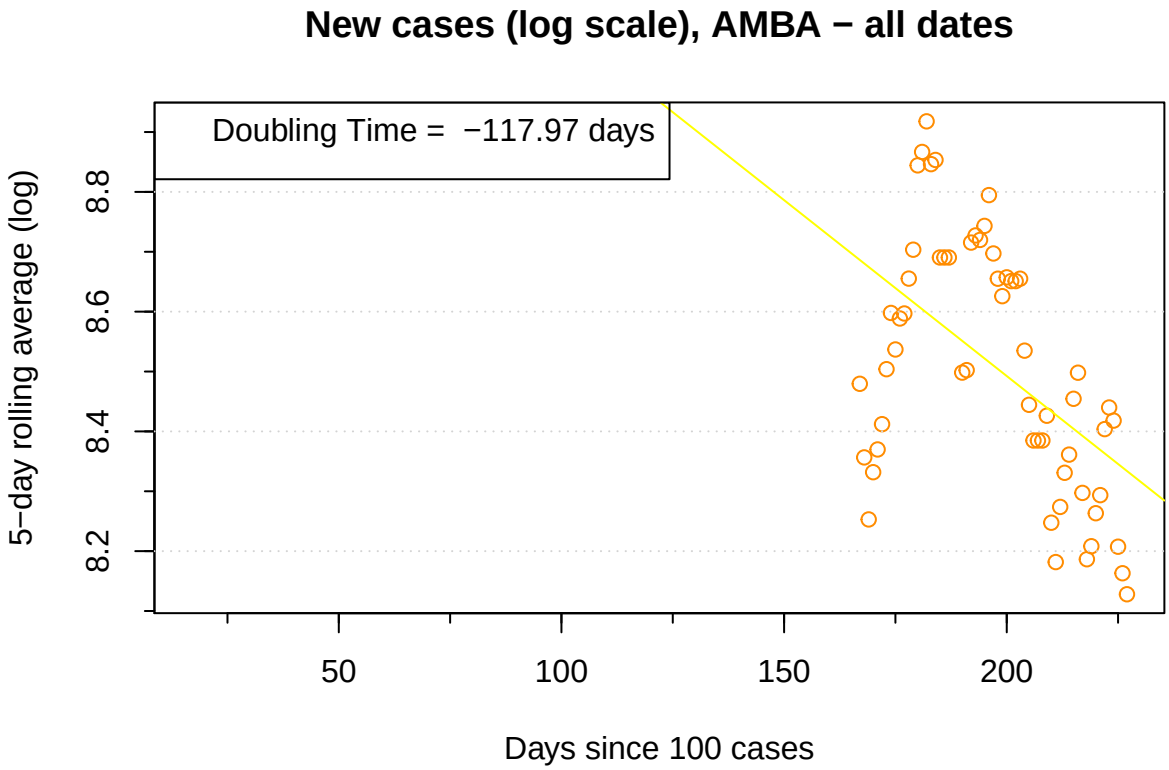
$$y = a + bx$$

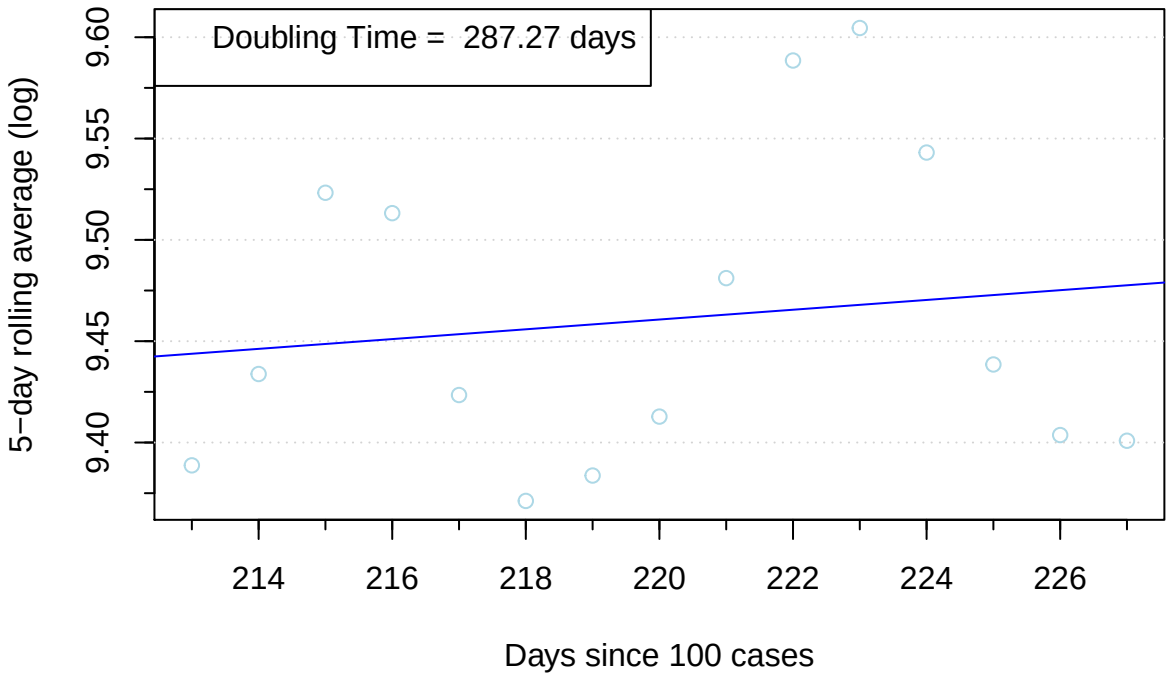
$$dt = log(2)/b$$

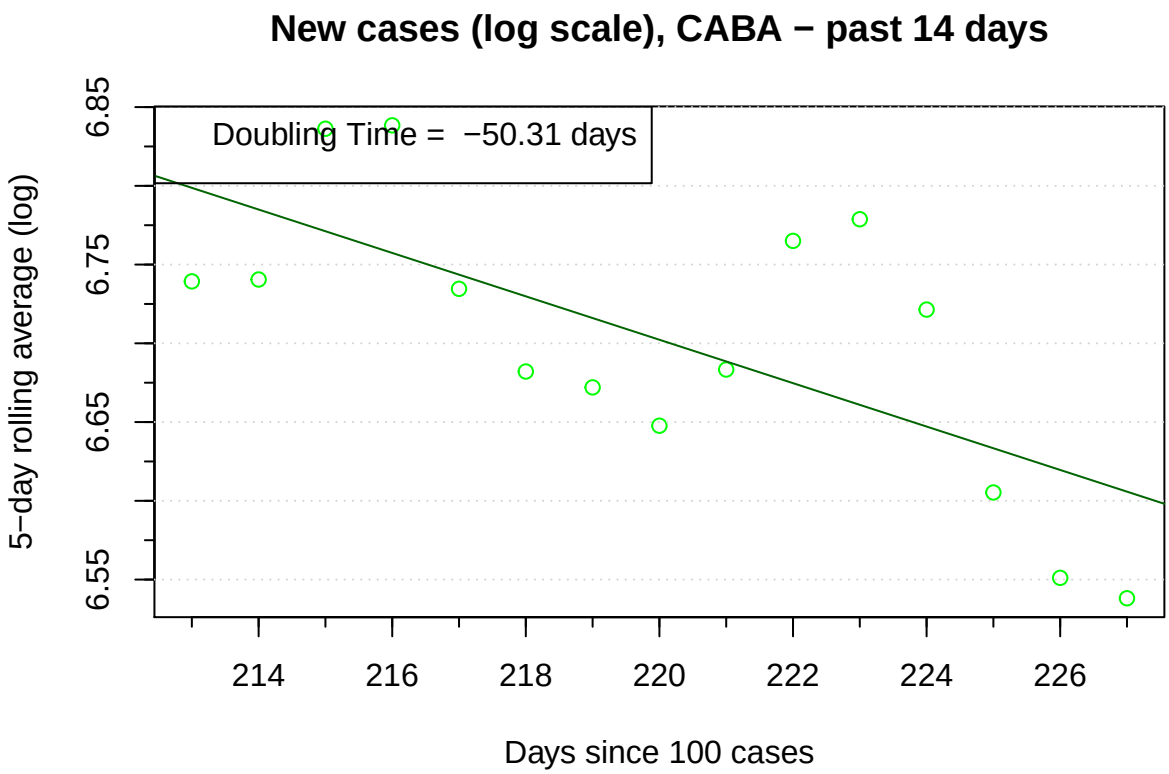


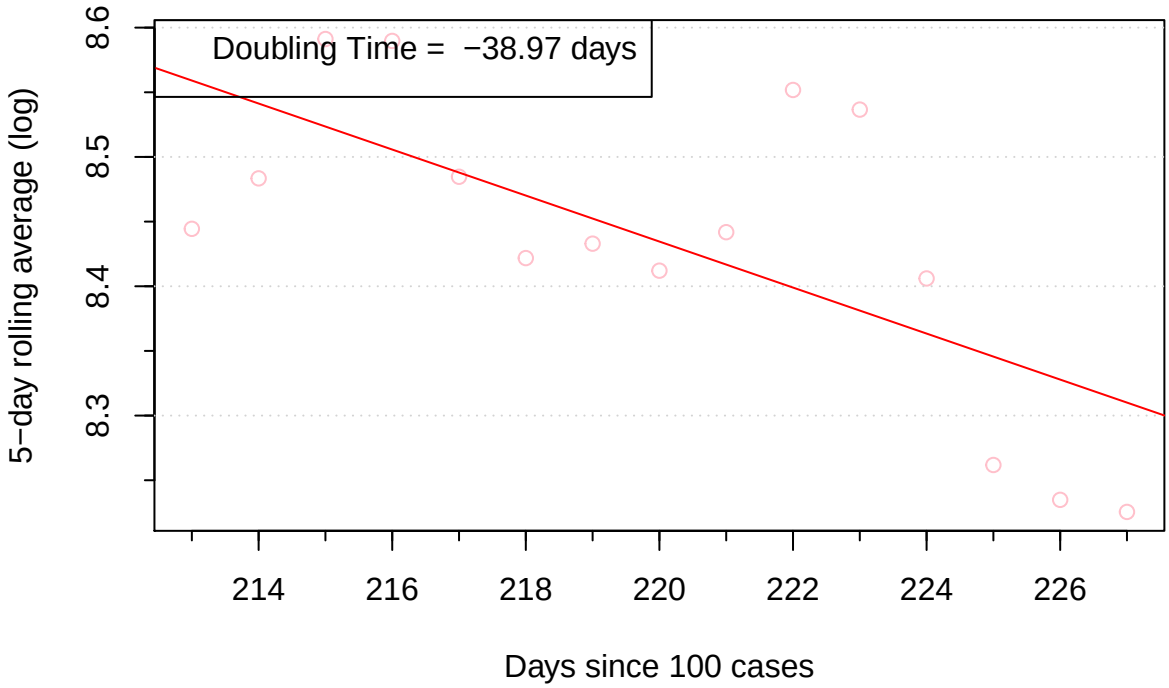

New cases (log scale), CABA − all dates
Doubling Time = 31.15 days
5−day rolling average (log)
2
3
4
5
6
7
50
100
150
200
Days since 100 cases

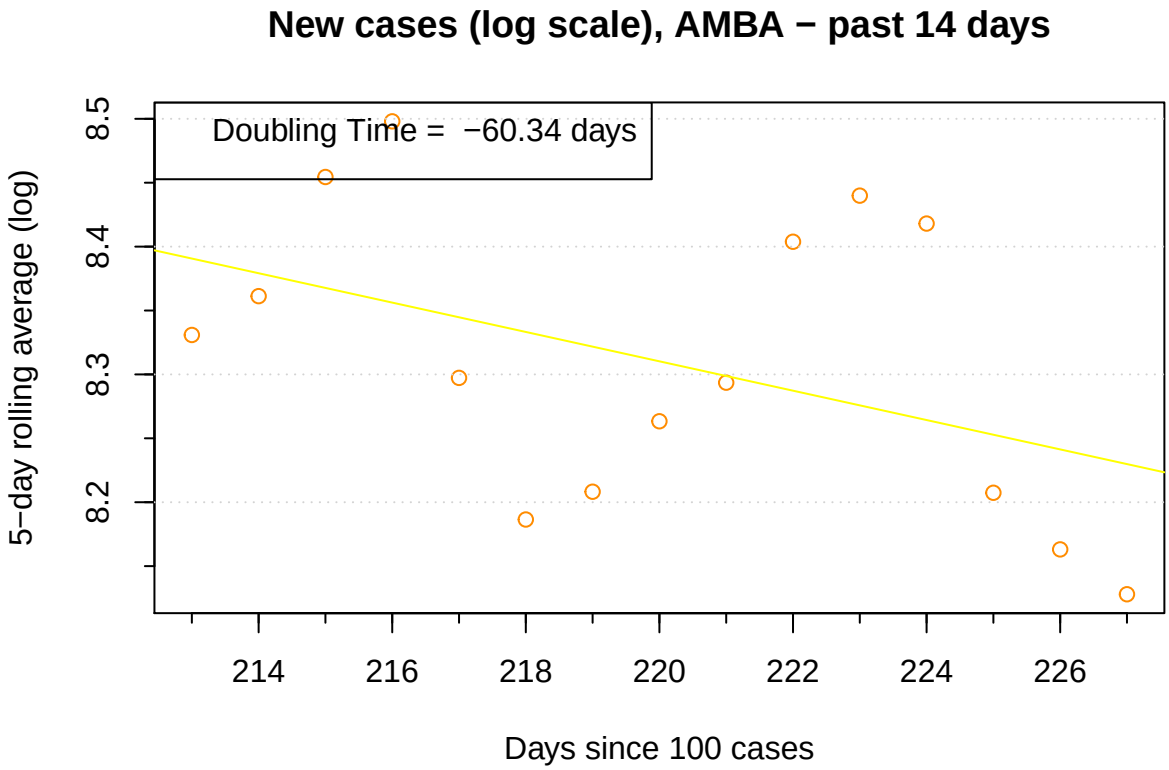

New cases (log scale), Conurbano − all dates
Doubling Time = 20.83 days
5−day rolling average (log)
2
4
6
8
50
100
150
200
Days since 100 cases

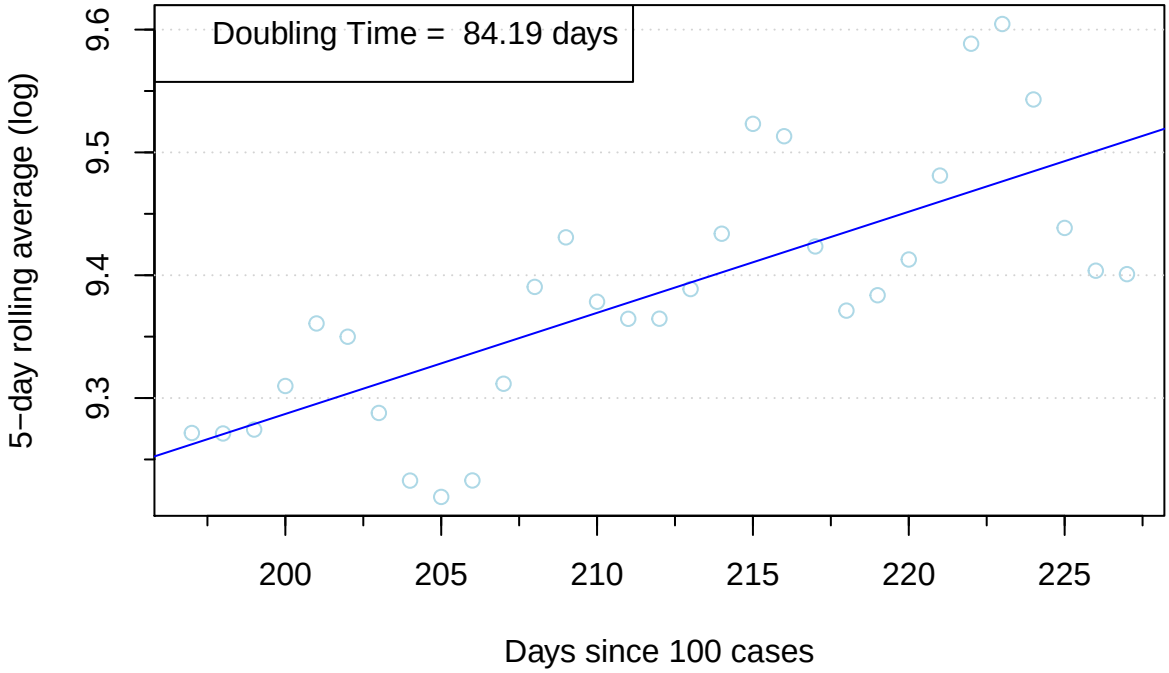

New cases (log scale), AMBA − all dates
Doubling Time = −117.97 days
5−day rolling average (log)
8.2
8.4
8.6
8.8
50
100
150
200
Days since 100 cases

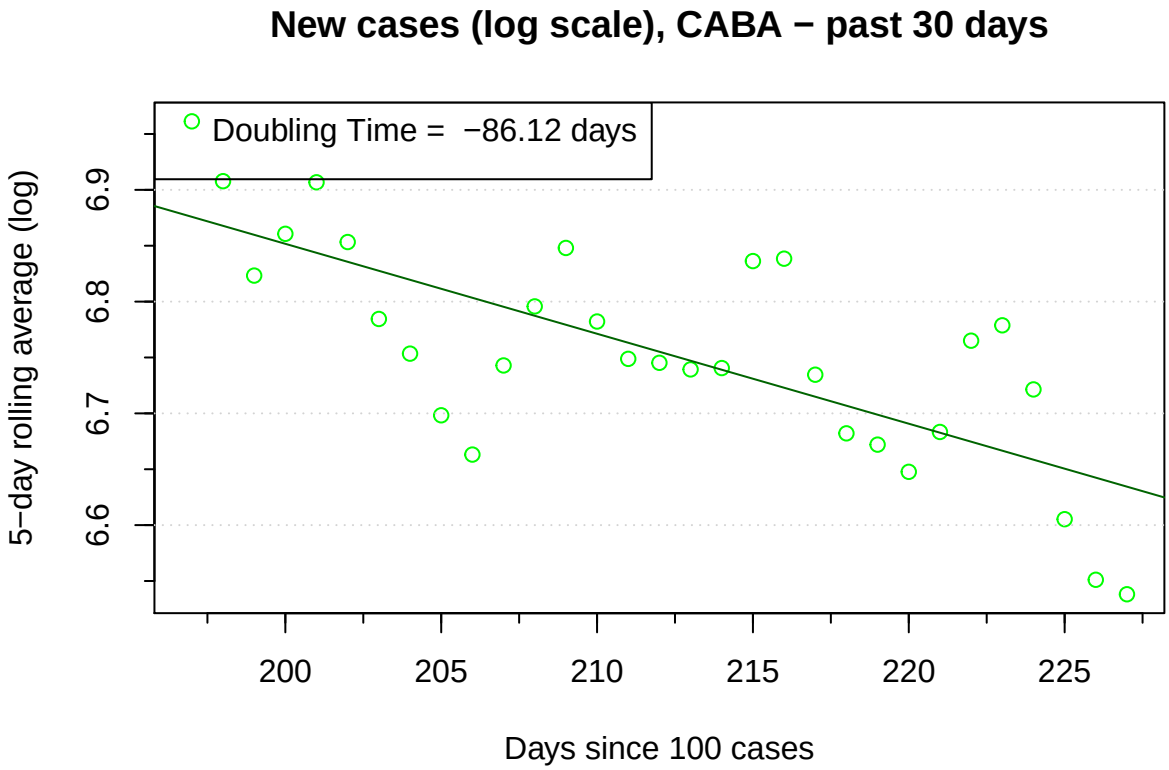

New cases (log scale), Argentina − past 14 days
Doubling Time = 287.27 days
5−day rolling average (log)
9.40
9.45
9.50
9.55
9.60
214
216
218
220
222
224
226
Days since 100 cases

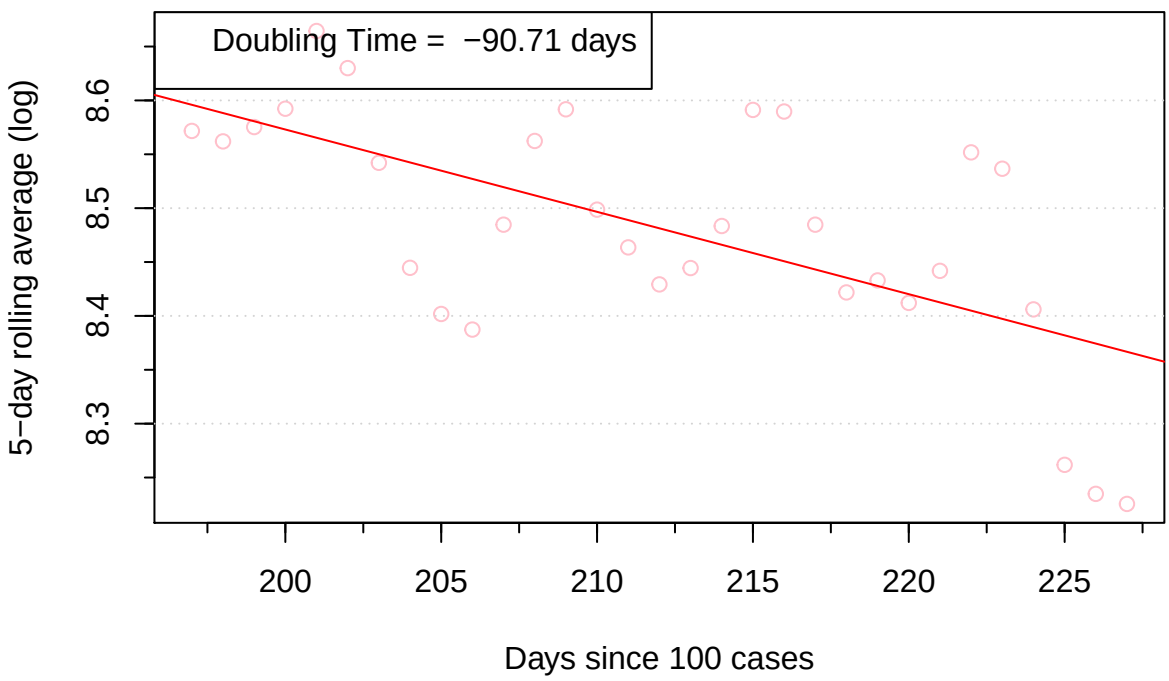

New cases (log scale), CABA − past 14 days
Doubling Time = −50.31 days
5−day rolling average (log)
6.85
6.75
6.65
6.55
214
216
218
220
222
224
226
Days since 100 cases

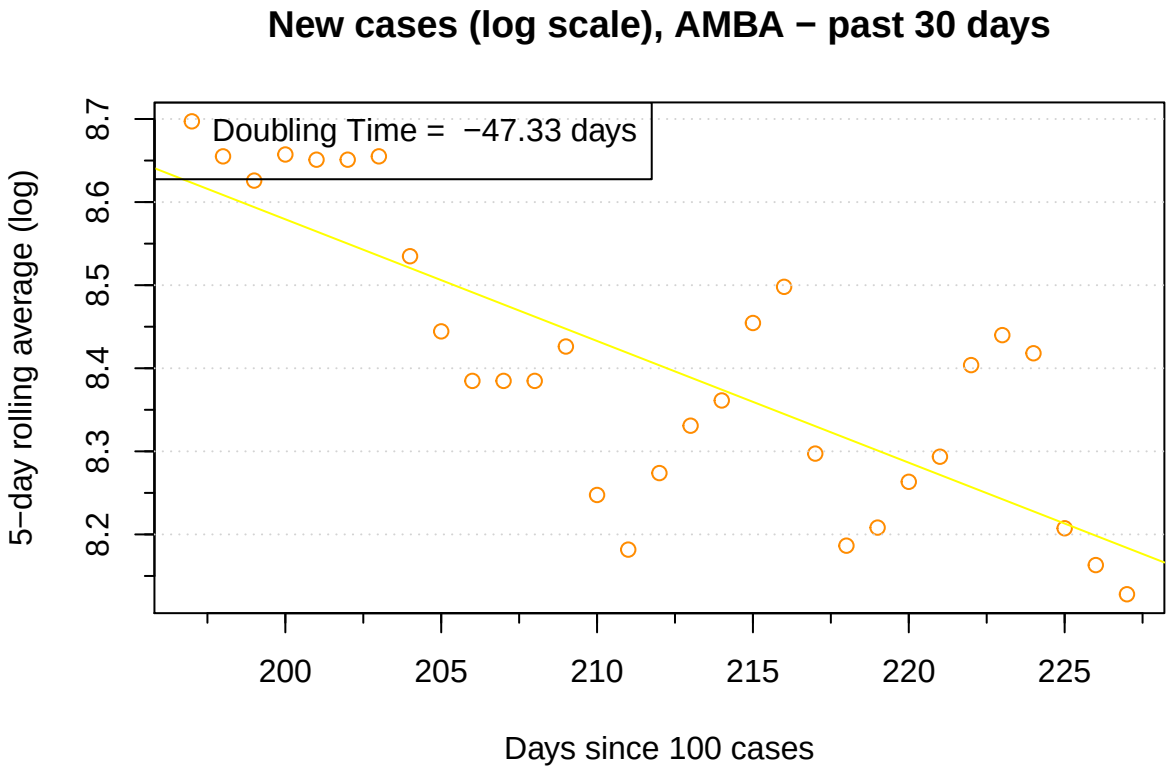

New cases (log scale), Conurbano − past 14 days
Doubling Time = −38.97 days
5−day rolling average (log)
8.6
8.5
8.4
8.3
214
216
218
220
222
224
226
Days since 100 cases

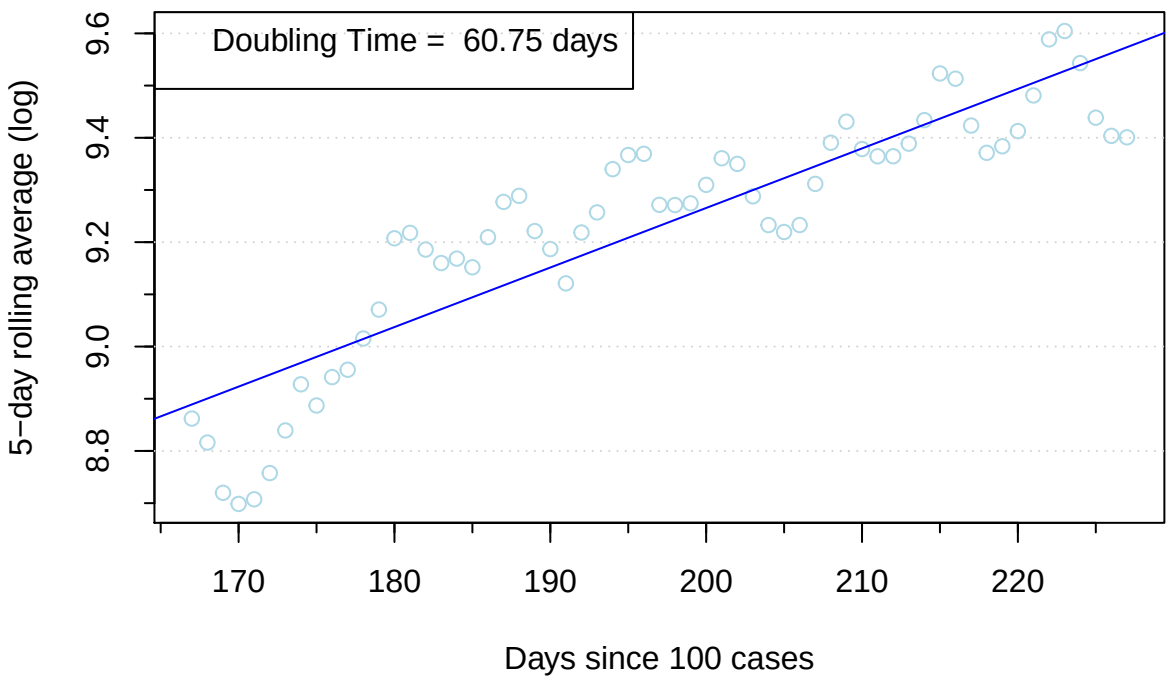

New cases (log scale), AMBA − past 14 days
Doubling Time = −60.34 days
5−day rolling average (log)
8.2
8.3
8.4
8.5
214
216
218
220
222
224
226
Days since 100 cases

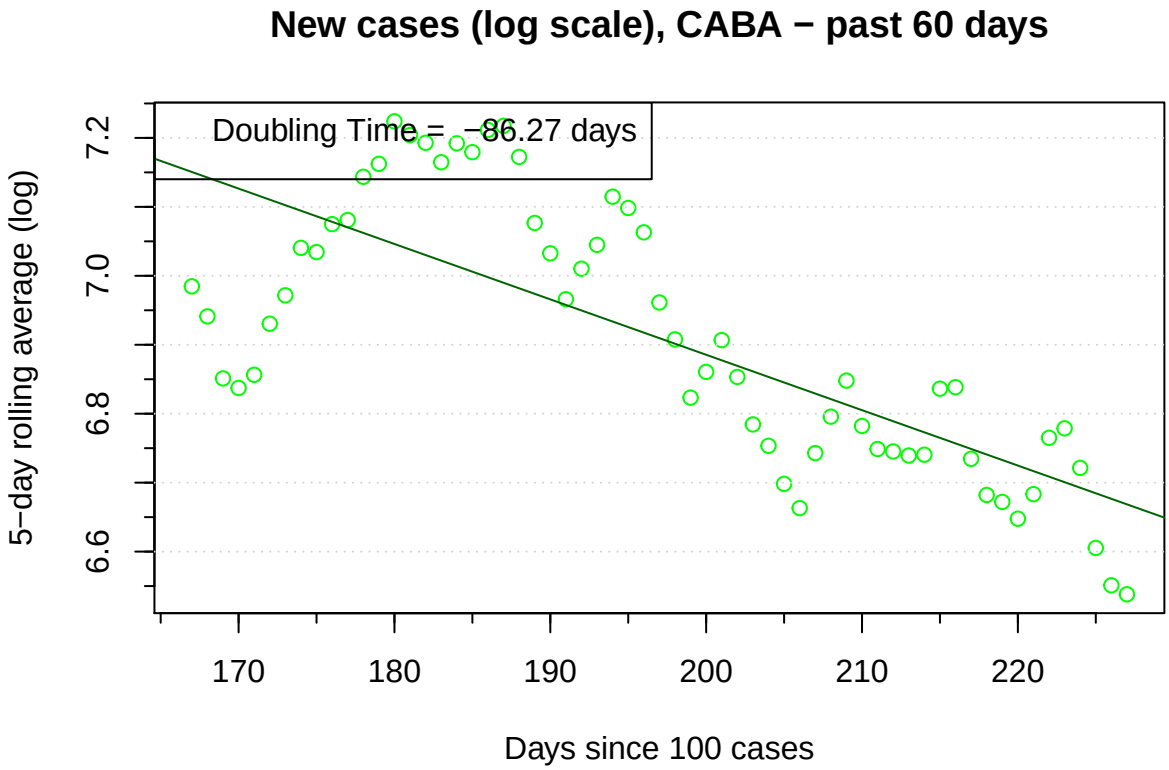

New cases (log scale), Argentina − past 30 days
Doubling Time = 84.19 days
5−day rolling average (log)
9.3
9.4
9.5
9.6
200
205
210
215
220
225
Days since 100 cases

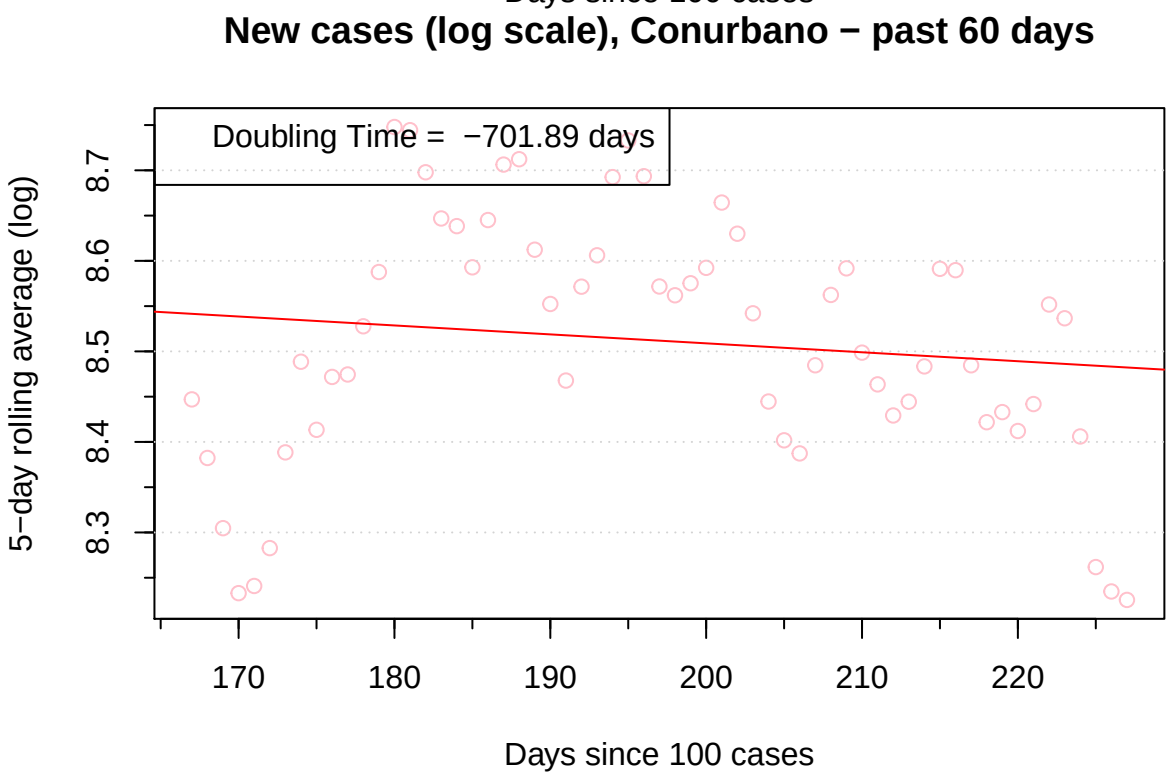

New cases (log scale), CABA − past 30 days
Doubling Time = −86.12 days
5−day rolling average (log)
6.6
6.7
6.8
6.9
200
205
210
215
220
225
Days since 100 cases

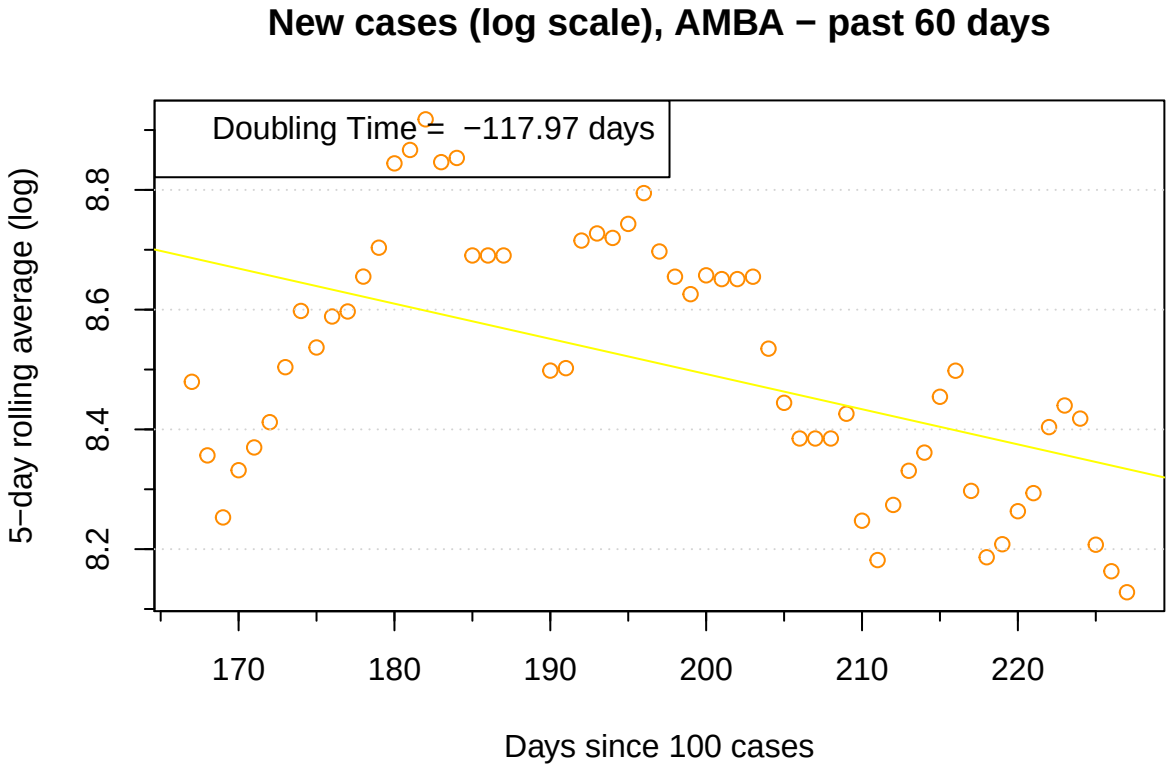

New cases (log scale), Conurbano − past 30 days
Doubling Time = −90.71 days
5−day rolling average (log)
8.3
8.4
8.5
8.6
200
205
210
215
220
225
Days since 100 cases

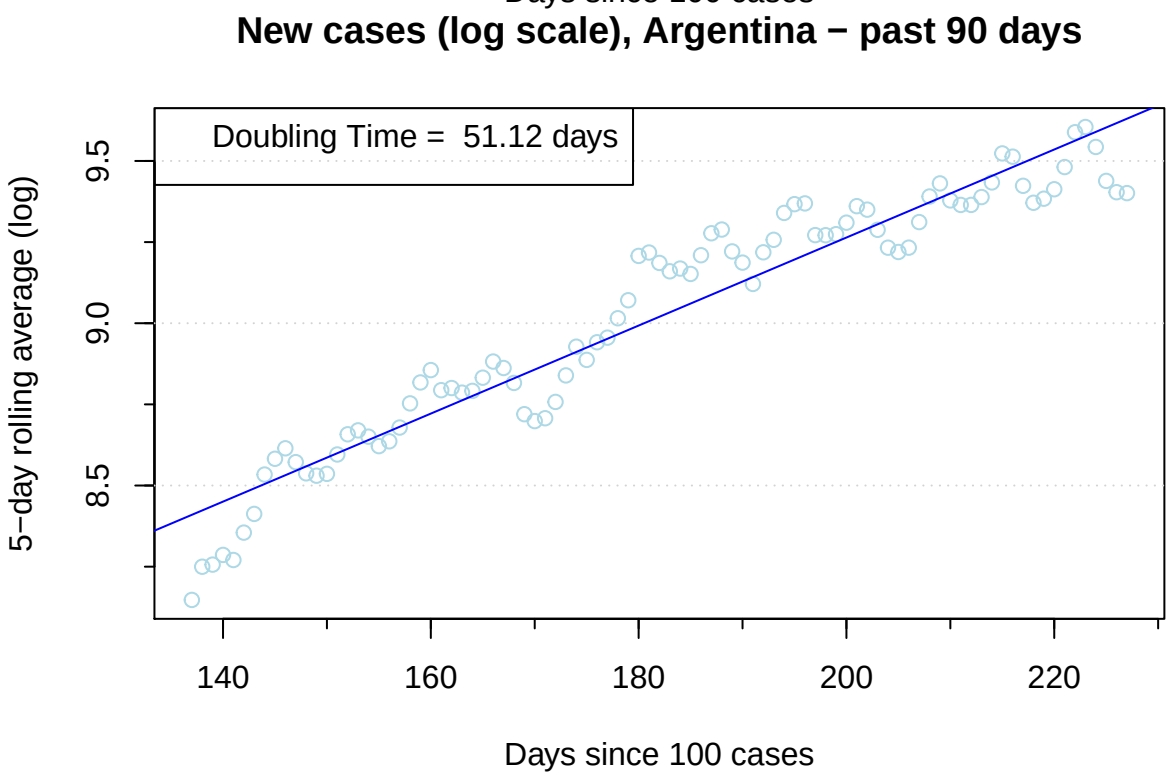

New cases (log scale), AMBA − past 30 days
Doubling Time = −47.33 days
5−day rolling average (log)
8.2
8.3
8.4
8.5
8.6
8.7
200
205
210
215
220
225
Days since 100 cases

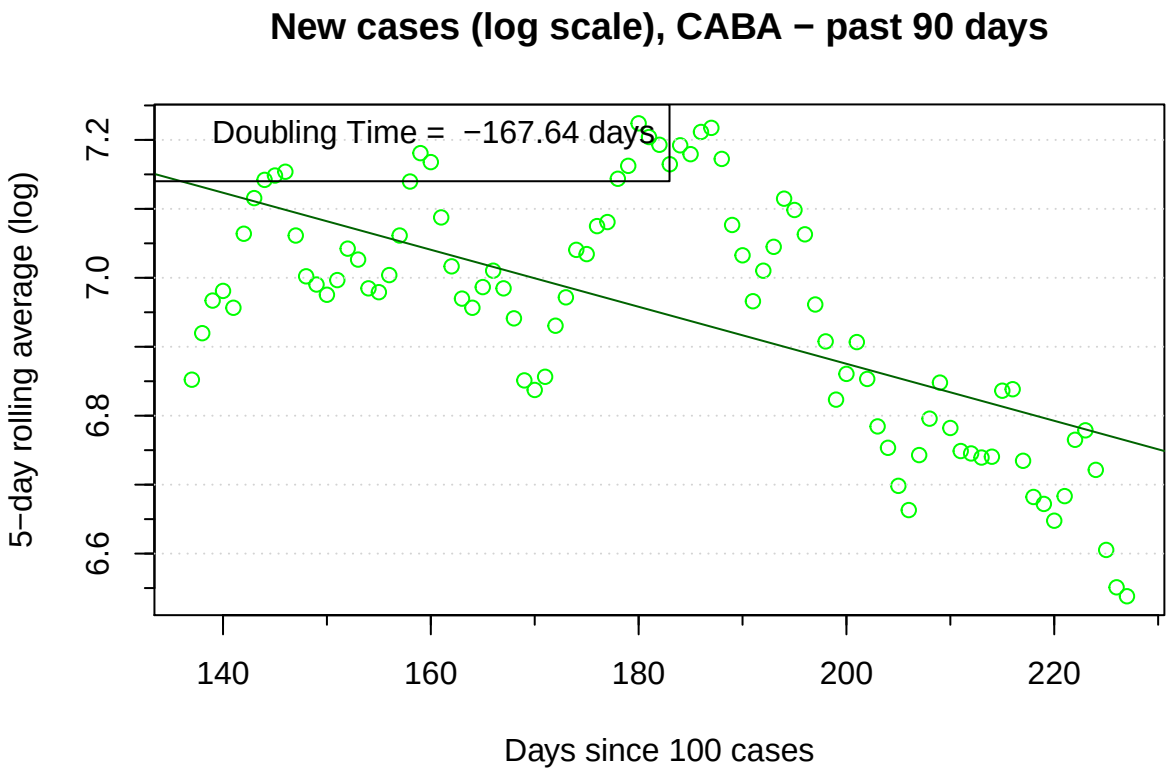

New cases (log scale), Argentina − past 60 days
Doubling Time = 60.75 days
5−day rolling average (log)
8.8
9.0
9.2
9.4
9.6
170
180
190
200
210
220
Days since 100 cases

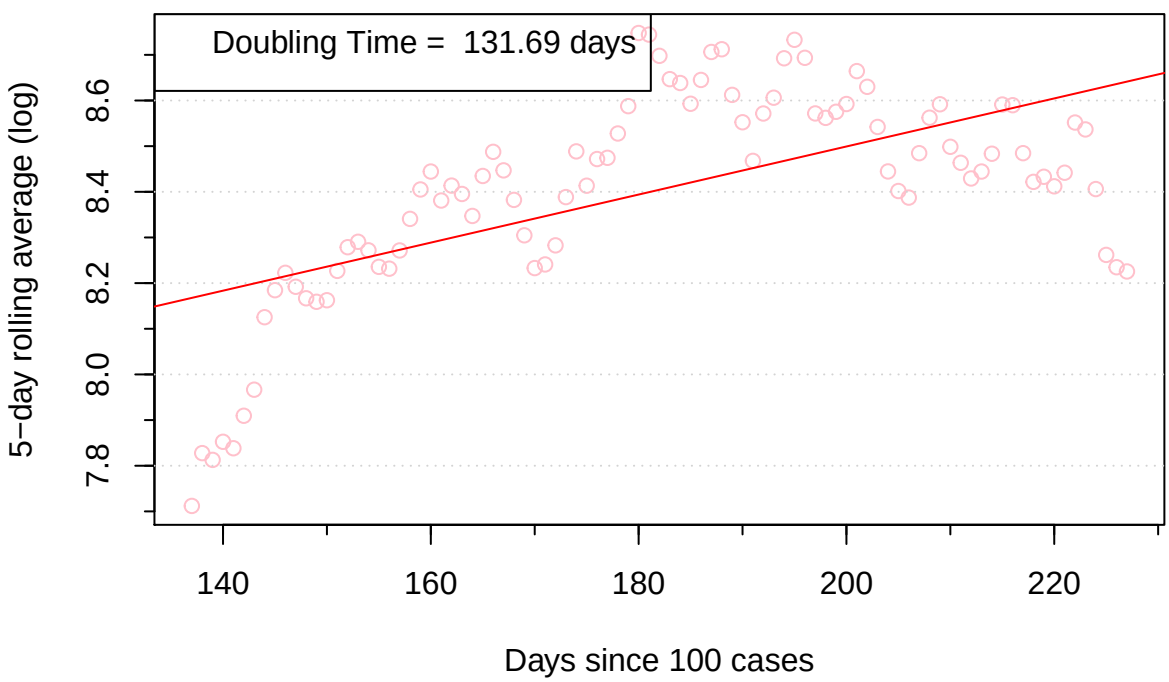

New cases (log scale), CABA − past 60 days
Doubling Time = −86.27 days
5−day rolling average (log)
7.2
7.0
6.8
6.6
170
180
190
200
210
220
Days since 100 cases

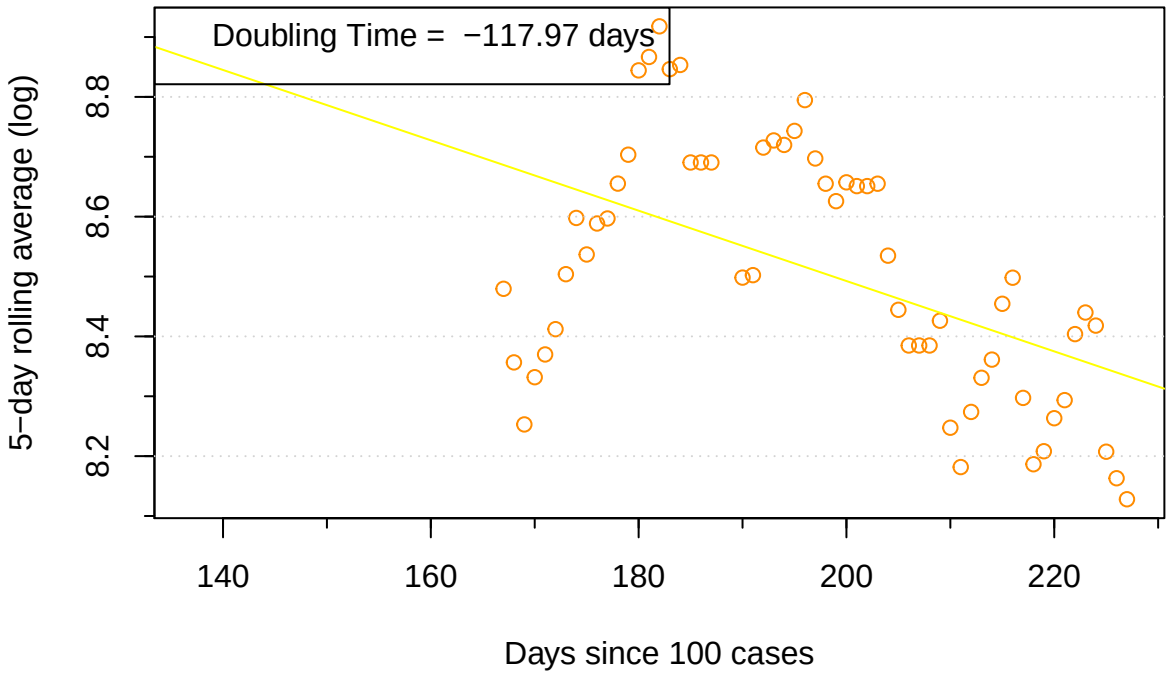

New cases (log scale), Conurbano − past 60 days
Doubling Time = −701.89 days
5−day rolling average (log)
8.7
8.6
8.5
8.4
8.3
170
180
190
200
210
220
Days since 100 cases


New cases (log scale), AMBA − past 60 days
Doubling Time = −117.97 days
5−day rolling average (log)
8.2
8.4
8.6
8.8
170
180
190
200
210
220
Days since 100 cases


New cases (log scale), Argentina − past 90 days
Doubling Time = 51.12 days
5−day rolling average (log)
8.5
9.0
9.5
140
160
180
200
220
Days since 100 cases


New cases (log scale), CABA − past 90 days
Doubling Time = −167.64 days
5−day rolling average (log)
7.2
7.0
6.8
6.6
140
160
180
200
220
Days since 100 cases


New cases (log scale), Conurbano − past 90 days
Doubling Time = 131.69 days
5−day rolling average (log)
8.6
8.4
8.2
8.0
7.8
140
160
180
200
220
Days since 100 cases




```
##              Argentina    CABA Conurbano    AMBA
## all dates        22.86   31.15     20.83 -117.97
## past 14 days    287.27  -50.31    -38.97  -60.34
## past 30 days     84.19  -86.12    -90.71  -47.33
## past 60 days     60.75  -86.27   -701.89 -117.97
## past 90 days     51.12 -167.64    131.69 -117.97
```

R0 over time (daily cases estimate)

These graphs rely heavily on the Epitrix, EpiEstim, and incidence modules in R. These graphs are rough estimates based on the number of new cases reported each day and not/not the actual date of registry/onset of symptoms, which provide a more-accurate picture of the rate of transmission.

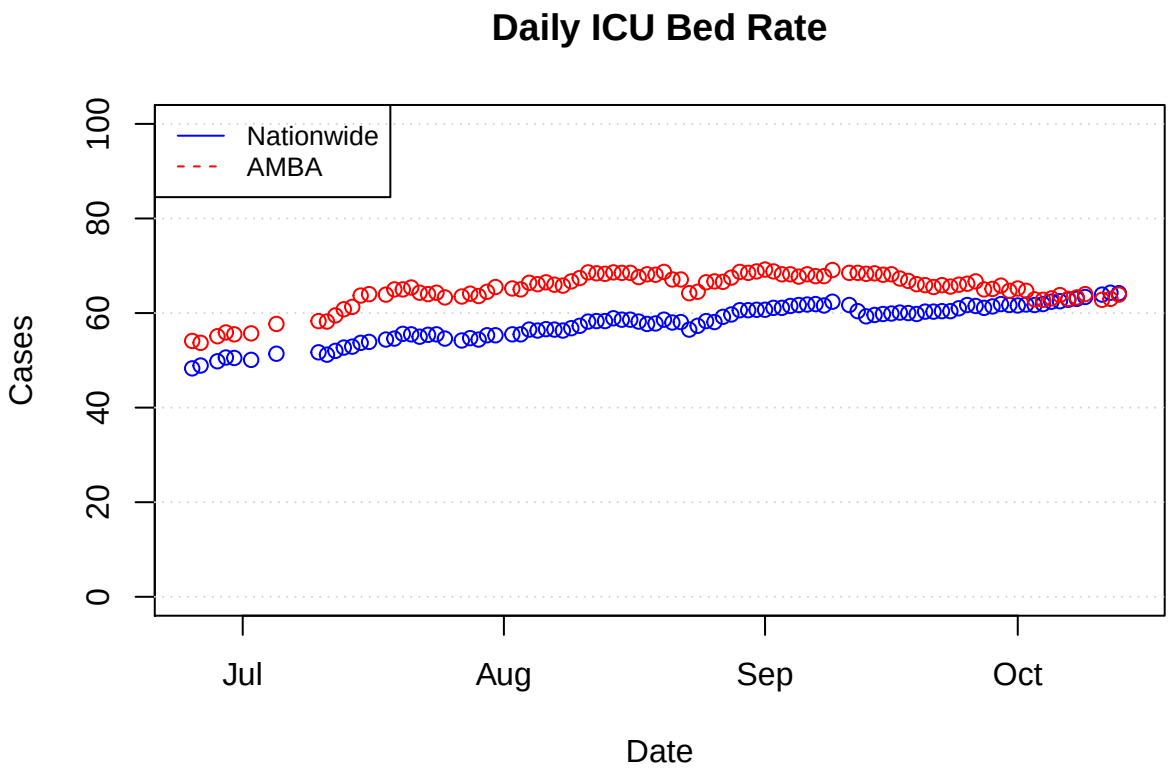
The following data on serial incidence are drawn from a meta analysis of COVID-19: https://doi.org/10.1002/jmv.26041

$$\mu = 5.08\ days$$

$$\sigma = .18$$

A gamma distribution is created programatically, and the estimate_R function is run against incidence objects containing the new cases reported each day.

ICU Capacity



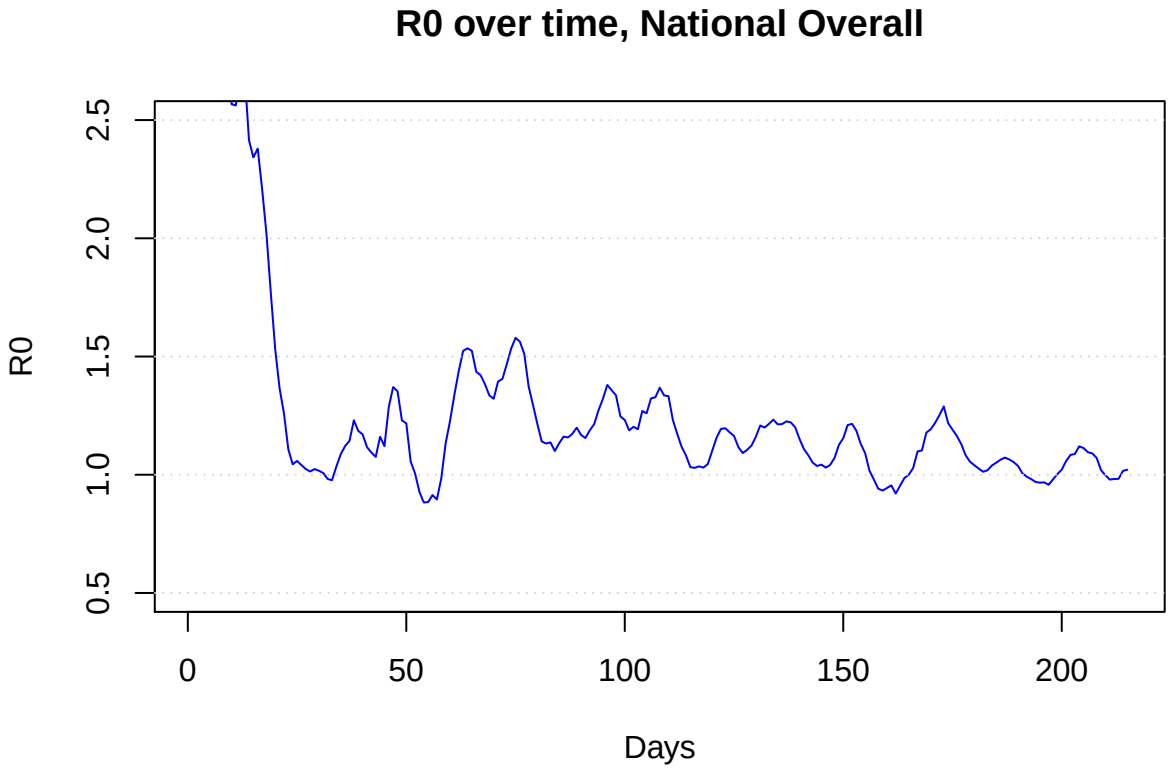

```
##           Date ICUBeds ICUPctNation ICUPctAMBA
## 83  2020-09-15    3049         59.8       68.1
## 84  2020-09-16    3118         59.9       68.2
## 85  2020-09-17    3108         60.1       67.3
## 86  2020-09-18    3225           60       66.8
## 87  2020-09-19    3213         59.8       66.1
## 88  2020-09-20    3261         60.3       65.9
## 89  2020-09-21    3387         60.3       65.5
## 90  2020-09-22    3362         60.4       65.9
## 91  2020-09-23    3511         60.4       65.6
## 92  2020-09-24    3527           61         66
## 93  2020-09-25    3595         61.7       66.2
## 94  2020-09-26    3633         61.5       66.7
## 95  2020-09-27    3604         61.1         65
## 96  2020-09-28    3678         61.4       65.1
## 97  2020-09-29    3768         61.9       65.8
## 98  2020-09-30    3792         61.7       64.7
## 99  2020-10-01    3799         61.6       65.2
## 100 2020-10-02    3828         61.8       64.7
## 101 2020-10-03    3820         61.7       62.9
## 102 2020-10-04    3950         61.9       62.8
## 103 2020-10-05    3978         62.4       63.1
## 104 2020-10-06    4007         62.5       63.8
## 105 2020-10-07    3997         62.8         63
## 106 2020-10-08    4043           63       63.3
## 107 2020-10-09    4092         63.4         64
## 108 2020-10-10      NA         <NA>       <NA>
## 109 2020-10-11    4237         63.9       62.8
```

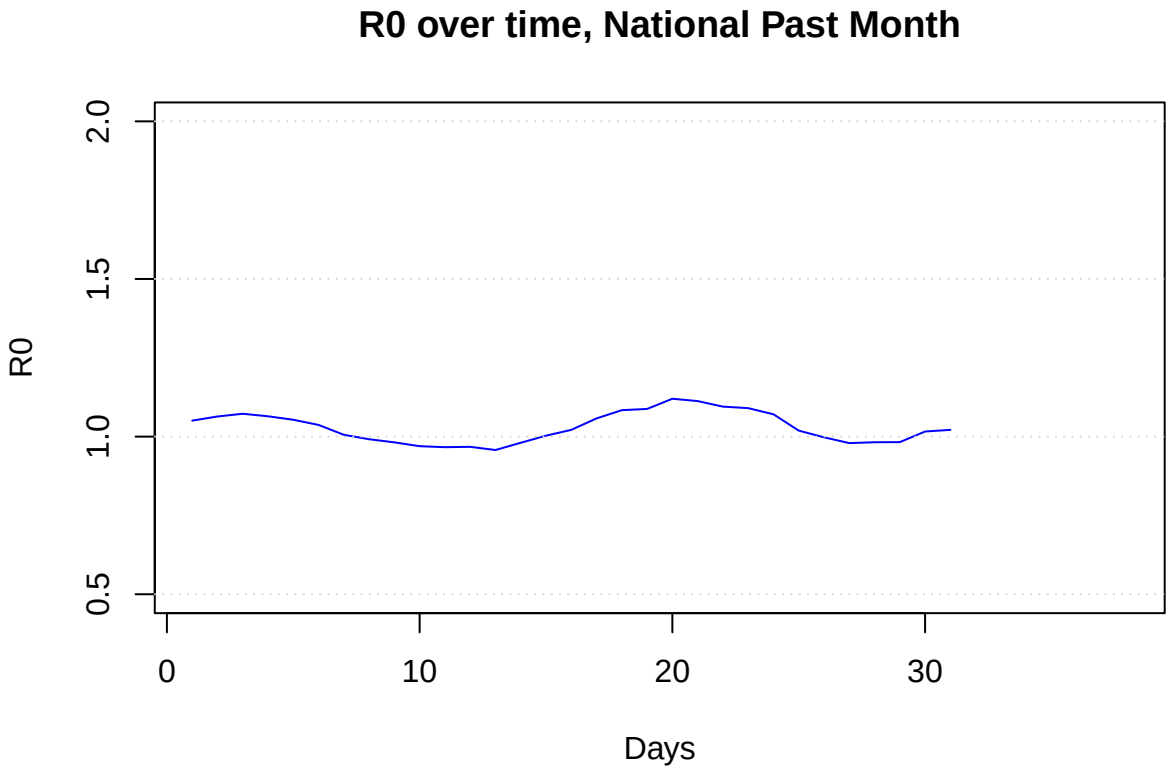
```
## 110 2020-10-12    4287         64.3         63
## 111 2020-10-13    4294         64.2       63.9
## 112 2020-10-14      NA         <NA>       <NA>
```

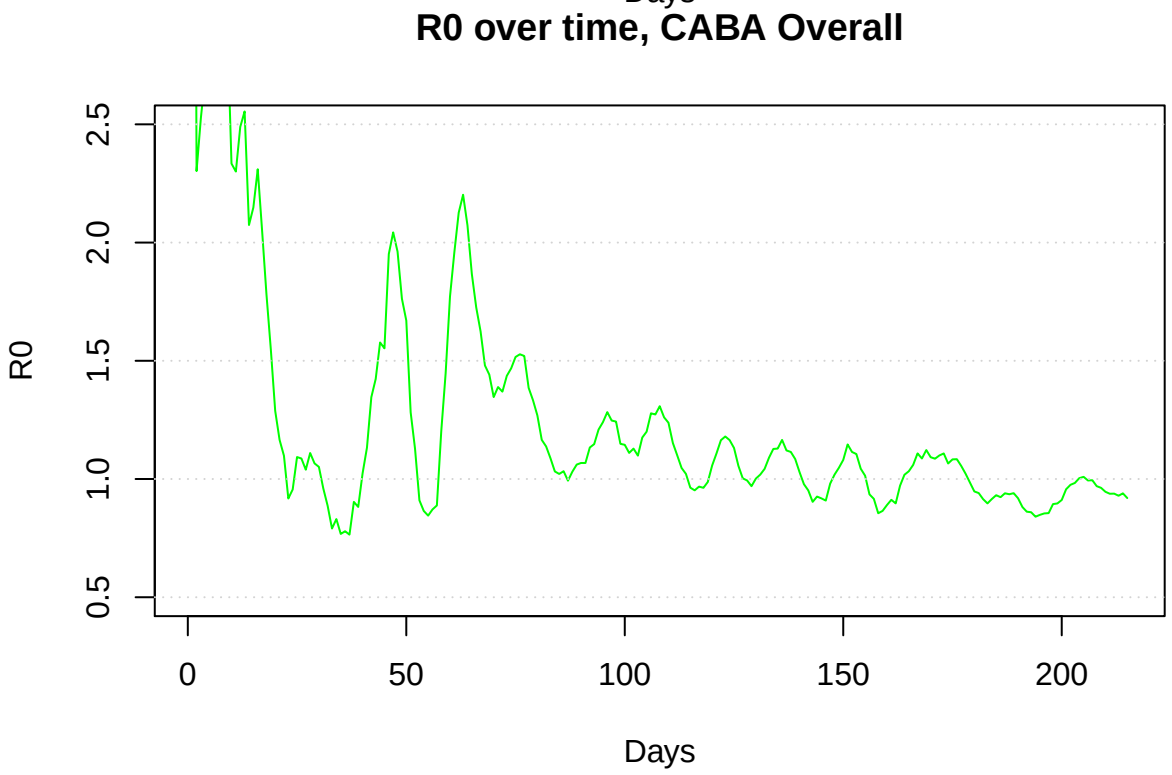
Better R Estimate

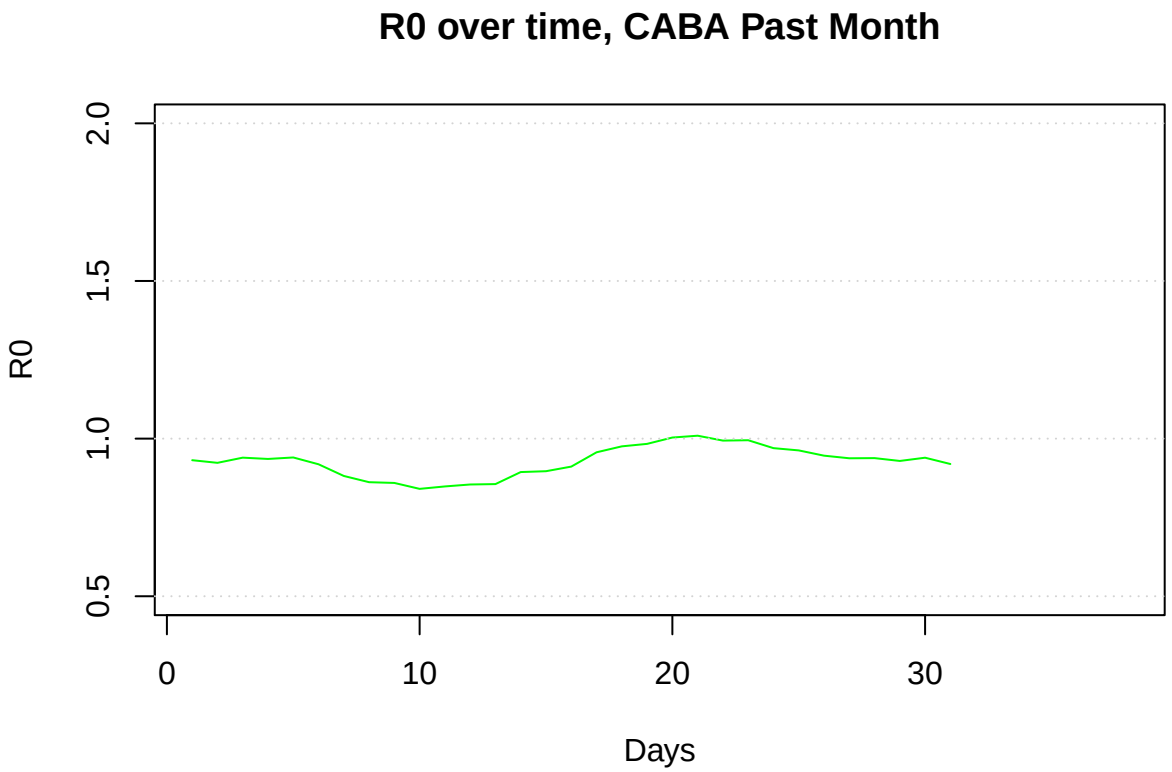
This data is drawn from over 1 million epidemiological records, indexed by the date the case was registered with the Ministry of Health. Cases are often registered prior to a confirmed diagnosis; therefore, this data "lags".

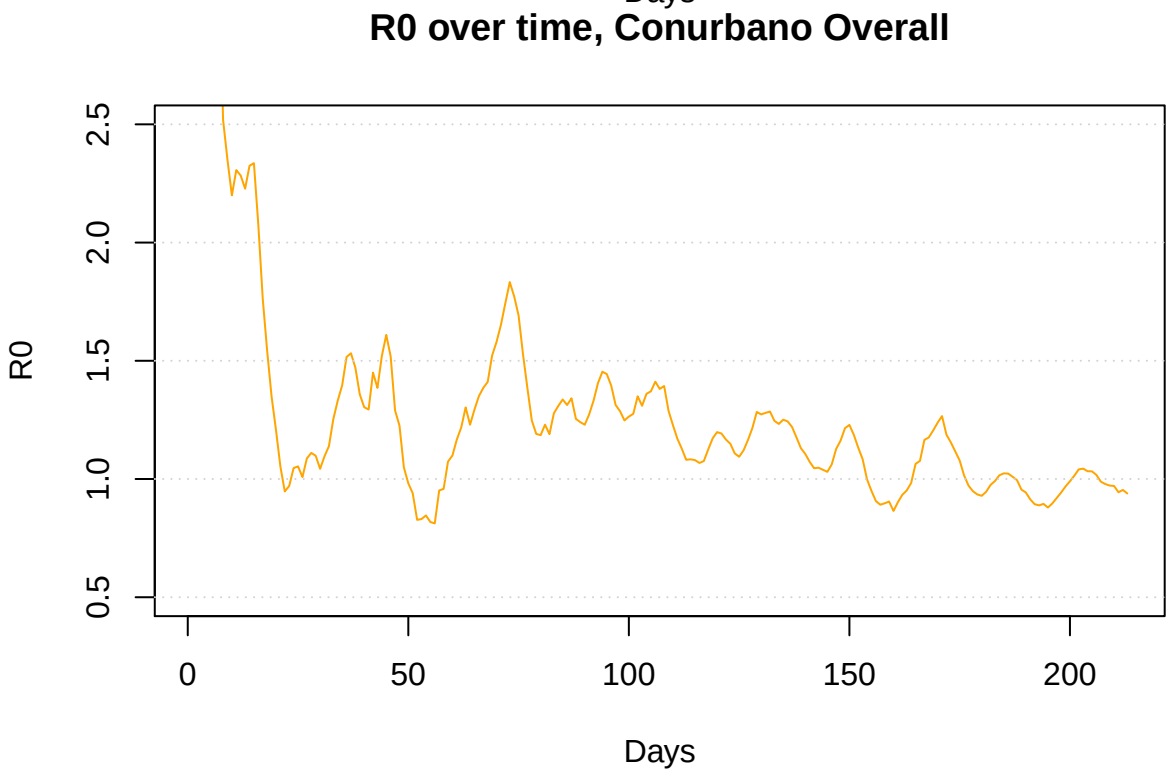
An incidence object is created using all confirmed cases in Argentina. The estimate_R() function from the EpiEstim package is used with the serial interval as described in the R estimate section above. While the estimate_R() function uses a rolling 7-day window, we also force the estimate away from the last five days of data due to the confirmation lag.

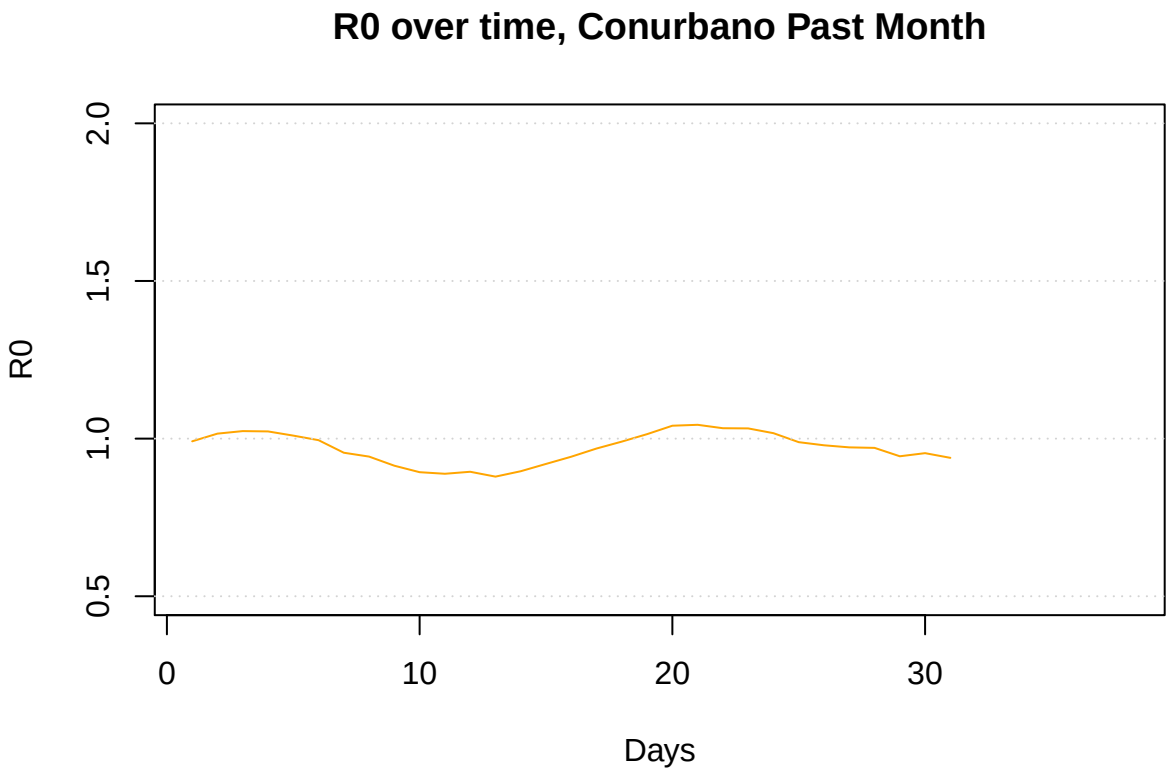


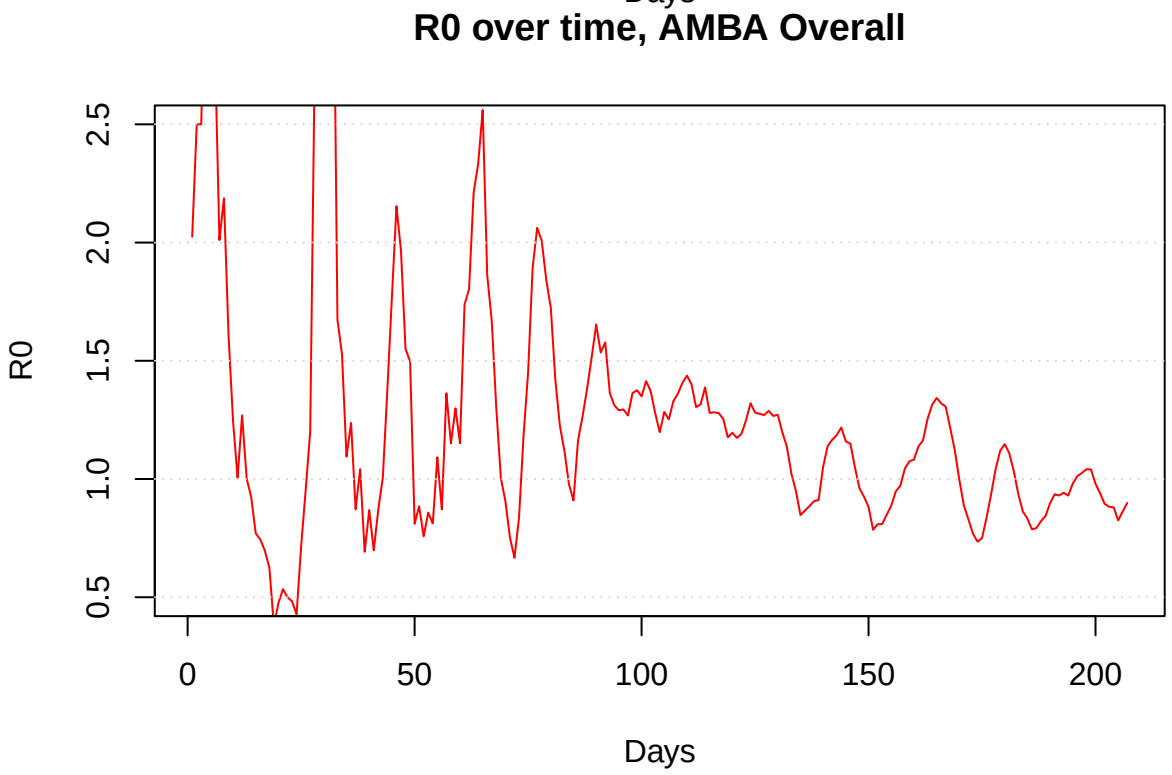

R0 over time, National Past Month
R0
2.0
1.5
1.0
0.5
0
10
20
30
Days

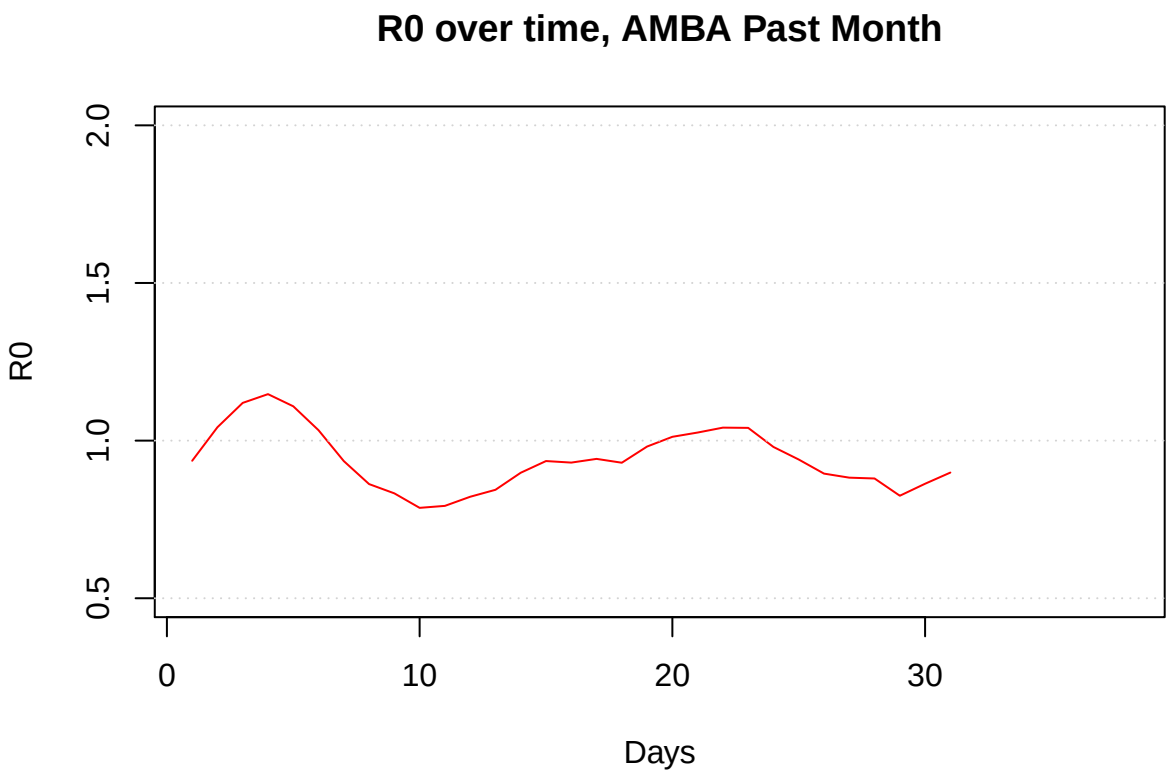

R0 over time, CABA Overall
R0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
Days


R0 over time, CABA Past Month
R0
2.0
1.5
1.0
0.5
0
10
20
30
Days

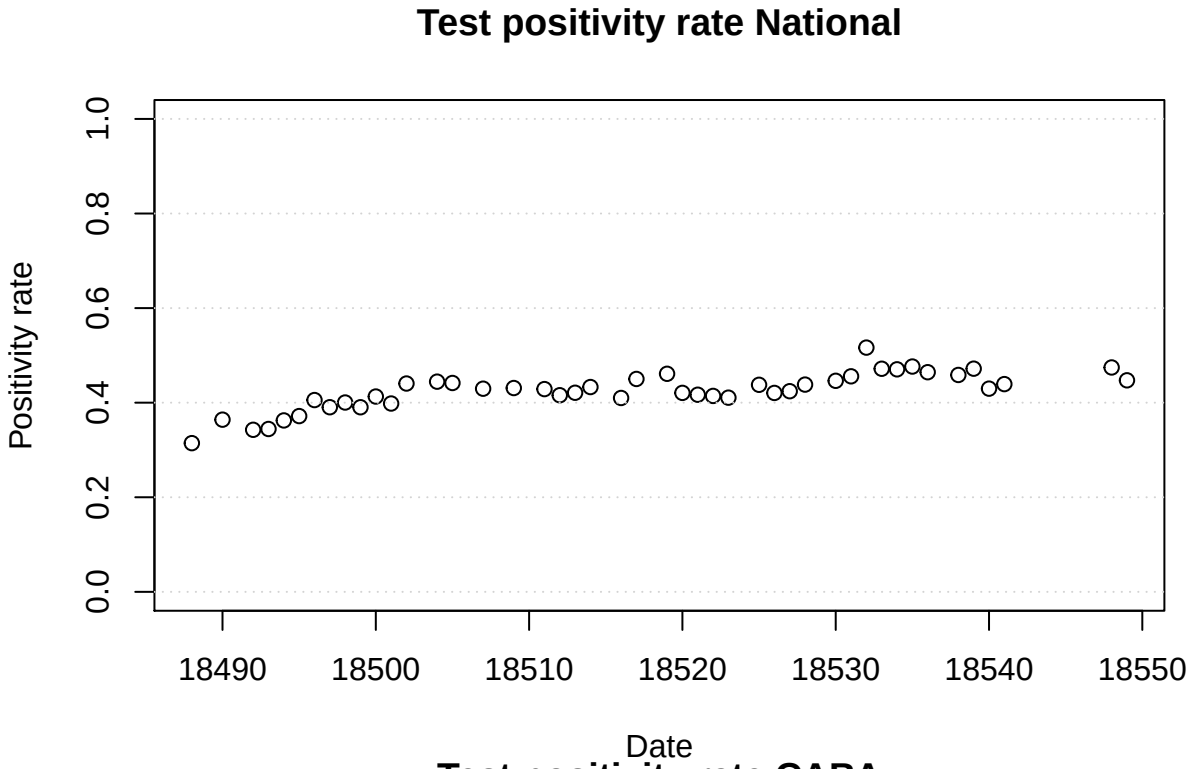

R0 over time, Conurbano Overall
R0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
Days

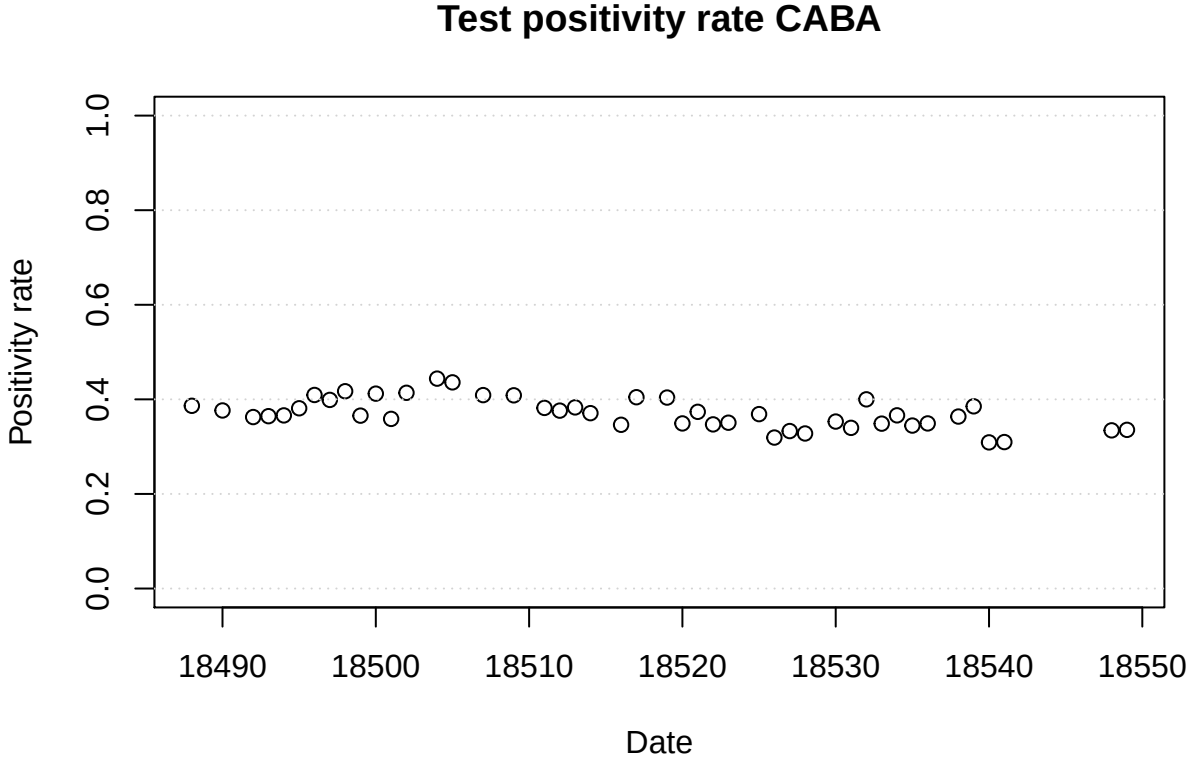

R0 over time, Conurbano Past Month
R0
2.0
1.5
1.0
0.5
0
10
20
30
Days

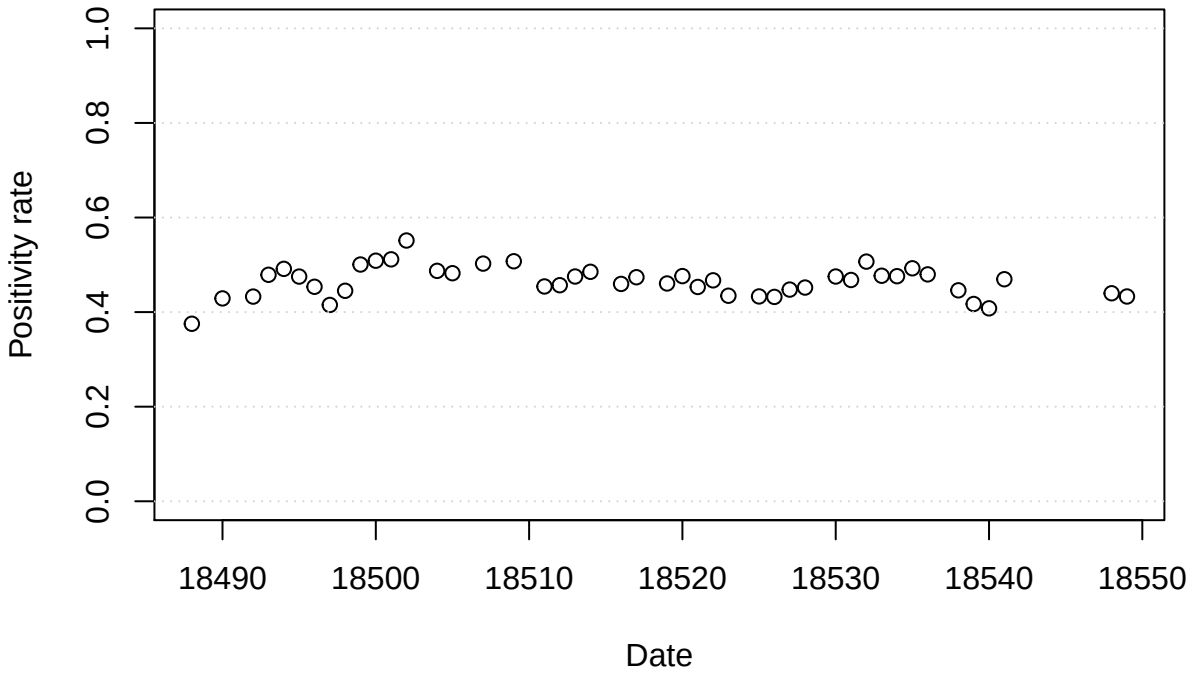

R0 over time, AMBA Overall
R0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
Days


R0 over time, AMBA Past Month
R0
2.0
1.5
1.0
0.5
0
10
20
30
Days

Testing and positivity rates








```
##       V1 NewTestsNational PositiveTestsNational PositivityNational NewTestsCABA
## 1  18488           986389                310156          0.3144358       491484
## 2  18490            32633                 11882          0.3641100        15314
## 3  18492            33544                 11494          0.3426544        14119
## 4  18493            19841                  6832          0.3443375         8375
## 5  18494            22827                  8274          0.3624655        10250
## 6  18495            22084                  8207          0.3716265         9758
## 7  18496            19607                  7951          0.4055184         9324
## 8  18497            13628                  5320          0.3903728         6206
## 9  18498            22040                  8824          0.4003630        12122
## 10 18499            22556                  8804          0.3903174        10206
## 11 18500            25378                 10481          0.4129955        11805
## 12 18501            26391                 10509          0.3982039        12460
## 13 18502            25696                 11320          0.4405355        12690
## 14 18504            36630                 16281          0.4444717        17219
## 15 18505            20953                  9254          0.4416551        10043
## 16 18507            49293                 21174          0.4295539        20869
## 17 18509            53770                 23173          0.4309652        22255
## 18 18511            38362                 16447          0.4287316        15483
## 19 18512            21629                  8992          0.4157381         9132
## 20 18513            27683                 11655          0.4210165        11614
## 21 18514            28452                 12322          0.4330803        11623
## 22 18516            57159                 23432          0.4099442        22744
## 23 18517            22765                 10248          0.4501647         9176
## 24 18519            40853                 18838          0.4611167        14390
## 25 18520            27583                 11605          0.4207302        10379
## 26 18521            26253                 10943          0.4168286         9175
## 27 18522            29602                 12263          0.4142625        11280
## 28 18523            26954                 11068          0.4106255         9183
## 29 18525            38689                 16939          0.4378247        13992
```

```
## 30 18526            20010                8416          0.4205897         6666
## 31 18527            26800               11370          0.4242537         9430
## 32 18528            27001               11833          0.4382430         8687
## 33 18530            54438               24293          0.4462508        18049
## 34 18531            22326               10175          0.4557467         7085
## 35 18532            15442                7975          0.5164486         3980
## 36 18533            23119               10906          0.4717332         6712
## 37 18534            26581               12507          0.4705241         8790
## 38 18535            27442               13074          0.4764230         8184
## 39 18536            26015               12082          0.4644244         8794
## 40 18538            47981               22005          0.4586190        15331
## 41 18539            14929                7045          0.4719003         4052
## 42 18540            22393                9622          0.4296878         7734
## 43 18541            27772               12199          0.4392554         9155
## 44 18548           132609               62916          0.4744474        39945
## 45 18549            22322                9984          0.4472717         7800
##    PositiveTestsCABA PositivityCABA NewTestsPBA PositiveTestsPBA PositivityPBA
## 1             189909      0.3863992      226778            85115     0.3753230
## 2               5766      0.3765182        7985             3425     0.4289292
## 3               5119      0.3625611        8632             3736     0.4328082
## 4               3052      0.3644179        5026             2407     0.4789097
## 5               3752      0.3660488        5655             2779     0.4914235
## 6               3719      0.3811232        5891             2799     0.4751316
## 7               3816      0.4092664        4897             2221     0.4535430
## 8               2475      0.3988076        3151             1308     0.4151063
## 9               5057      0.4171754        4561             2030     0.4450778
## 10              3731      0.3655693        5767             2887     0.5006069
## 11              4865      0.4121135        6430             3271     0.5087092
## 12              4469      0.3586677        6732             3444     0.5115865
## 13              5252      0.4138692        5985             3300     0.5513784
## 14              7642      0.4438121        8331             4059     0.4872164
## 15              4378      0.4359255        4274             2061     0.4822181
## 16              8535      0.4089798       12624             6344     0.5025349
## 17              9092      0.4085374       13026             6611     0.5075234
## 18              5913      0.3819027        9205             4181     0.4542097
## 19              3435      0.3761498        4498             2055     0.4568697
## 20              4448      0.3829861        7407             3520     0.4752261
## 21              4310      0.3708165        6867             3332     0.4852192
## 22              7874      0.3462012       14298             6571     0.4595748
## 23              3712      0.4045336        5617             2661     0.4737404
## 24              5811      0.4038221        9687             4461     0.4605141
## 25              3623      0.3490702        6633             3158     0.4761043
## 26              3428      0.3736240        6543             2965     0.4531560
## 27              3915      0.3470745        7186             3357     0.4671584
## 28              3220      0.3506479        6735             2927     0.4345954
## 29              5160      0.3687822        7931             3435     0.4331106
## 30              2128      0.3192319        4807             2077     0.4320782
## 31              3140      0.3329799        6318             2828     0.4476100
## 32              2848      0.3278462        6298             2846     0.4518895
## 33              6372      0.3530389       12553             5966     0.4752649
## 34              2407      0.3397318        4828             2259     0.4678956
## 35              1592      0.4000000        2818             1428     0.5067424
## 36              2340      0.3486293        5324             2539     0.4768971
## 37              3219      0.3662116        5633             2681     0.4759453
```

```
## 38          2820      0.3445748        6354          3130      0.4926031
## 39          3070      0.3491017        5428          2604      0.4797347
## 40          5575      0.3636423       10946          4882      0.4460077
## 41          1561      0.3852419        3543          1478      0.4171606
## 42          2390      0.3090251        4699          1917      0.4079591
## 43          2835      0.3096668        6053          2842      0.4695192
## 44         13359      0.3344348       27787         12221      0.4398100
## 45          2617      0.3355128        5275          2284      0.4329858
```