Argentina Covid Report

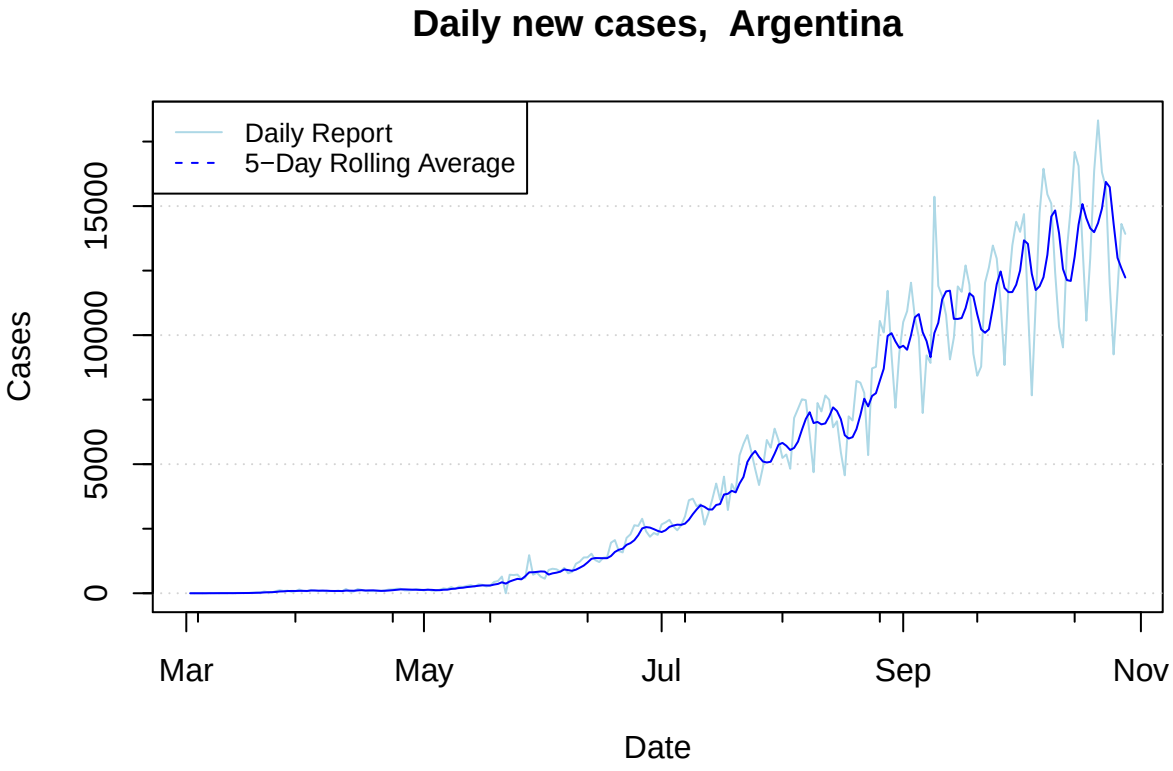
Chris Andino

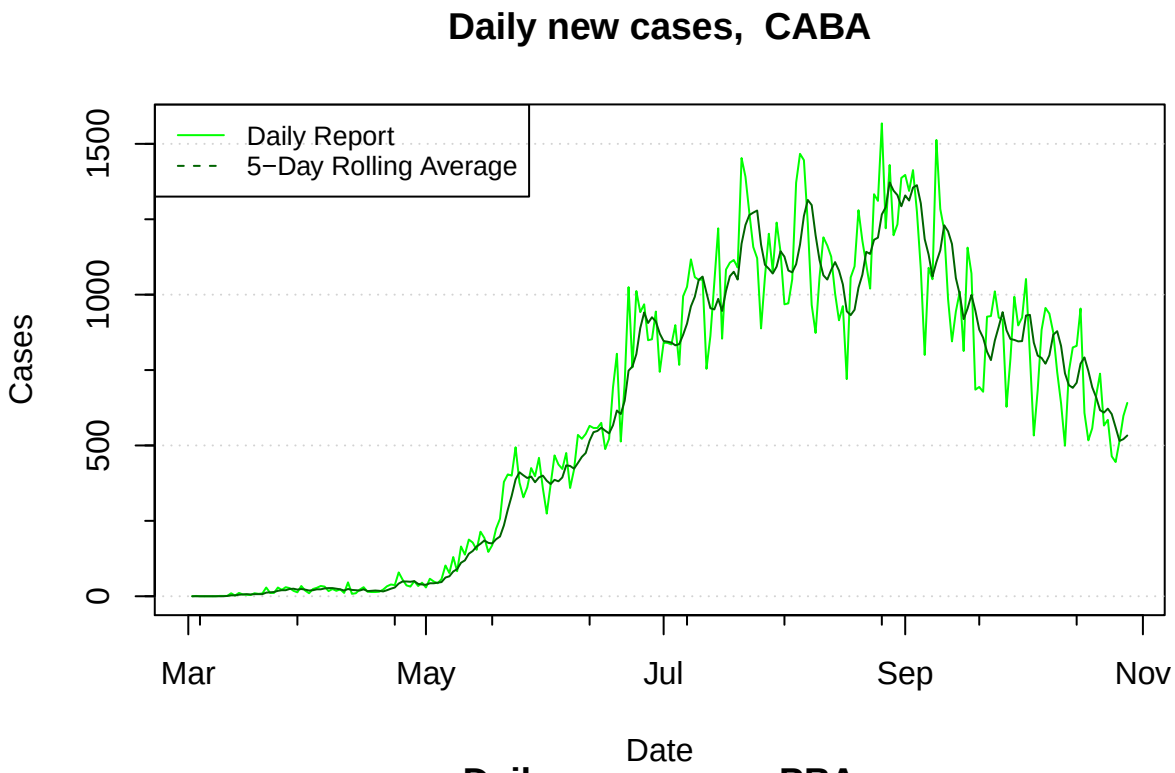
October 14 2020

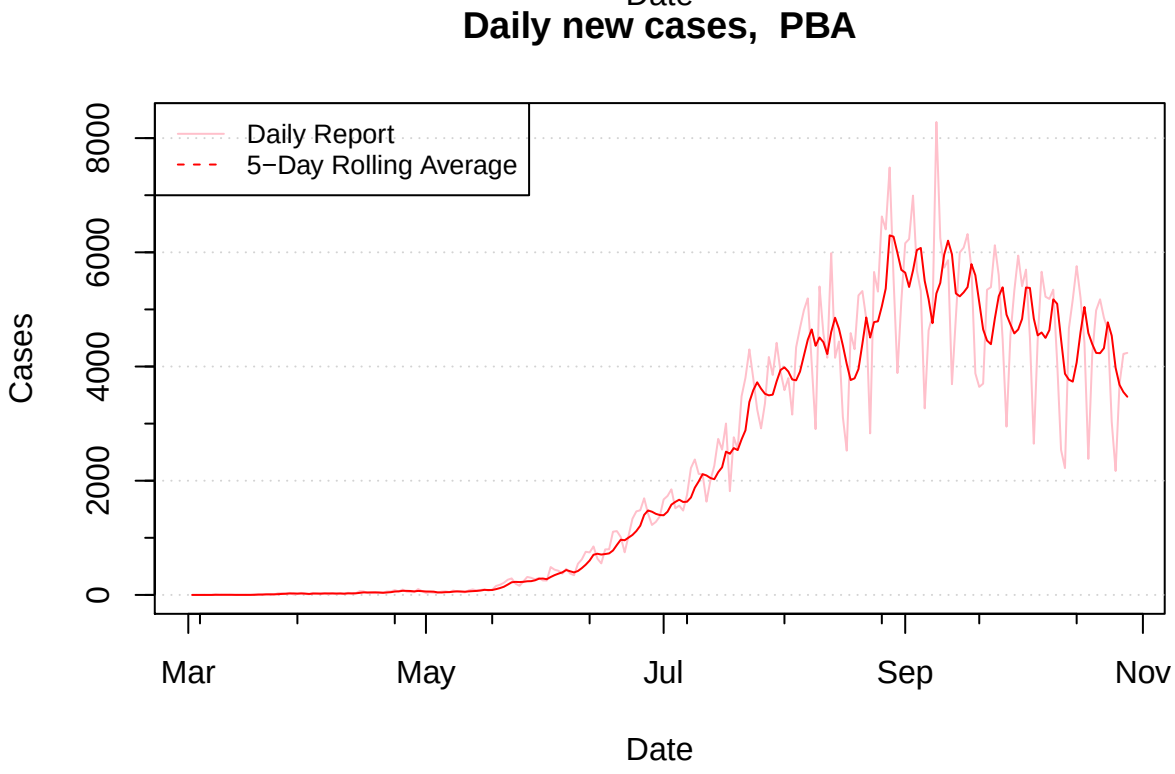
Data as of 10:40 am 26-OCT-2020

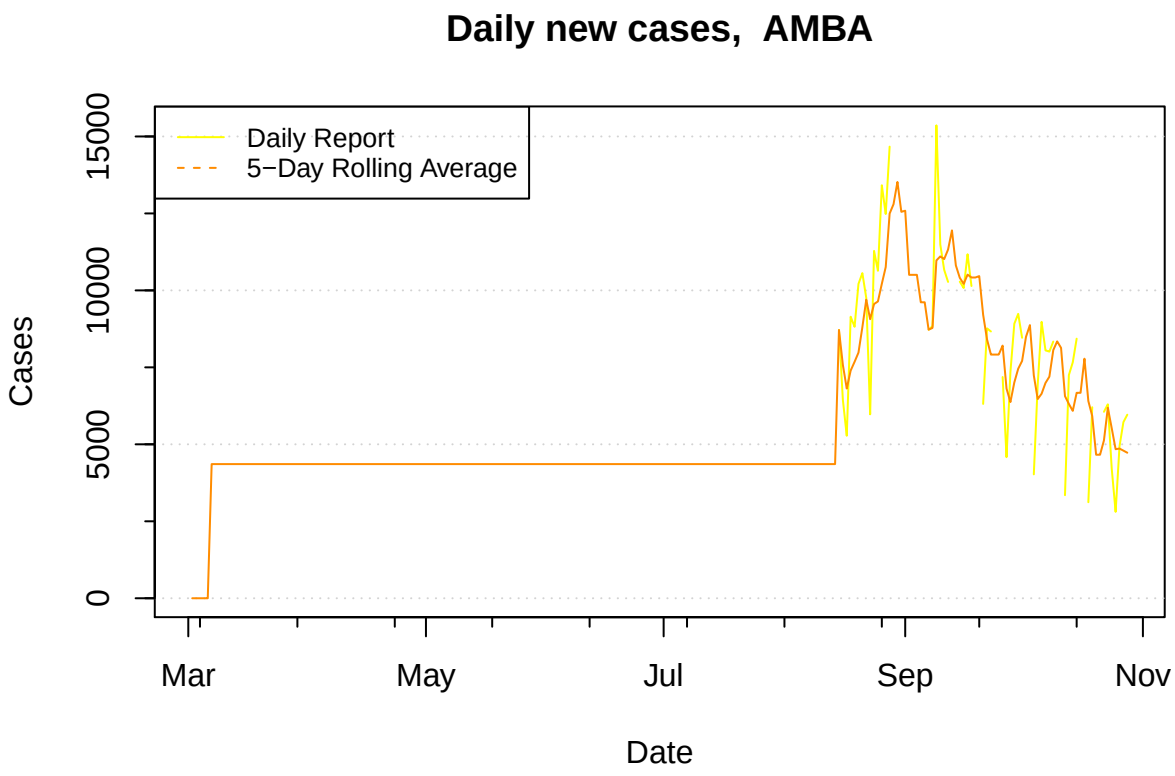
New Cases

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
Nov
Date


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

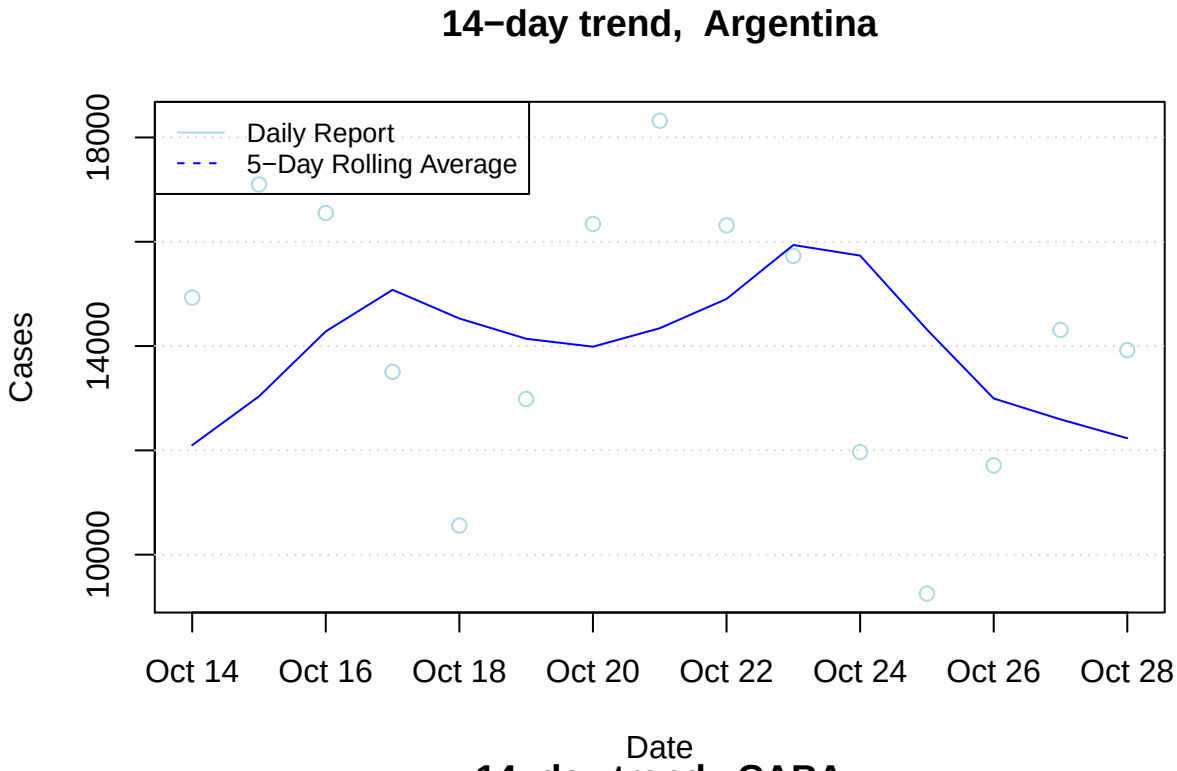


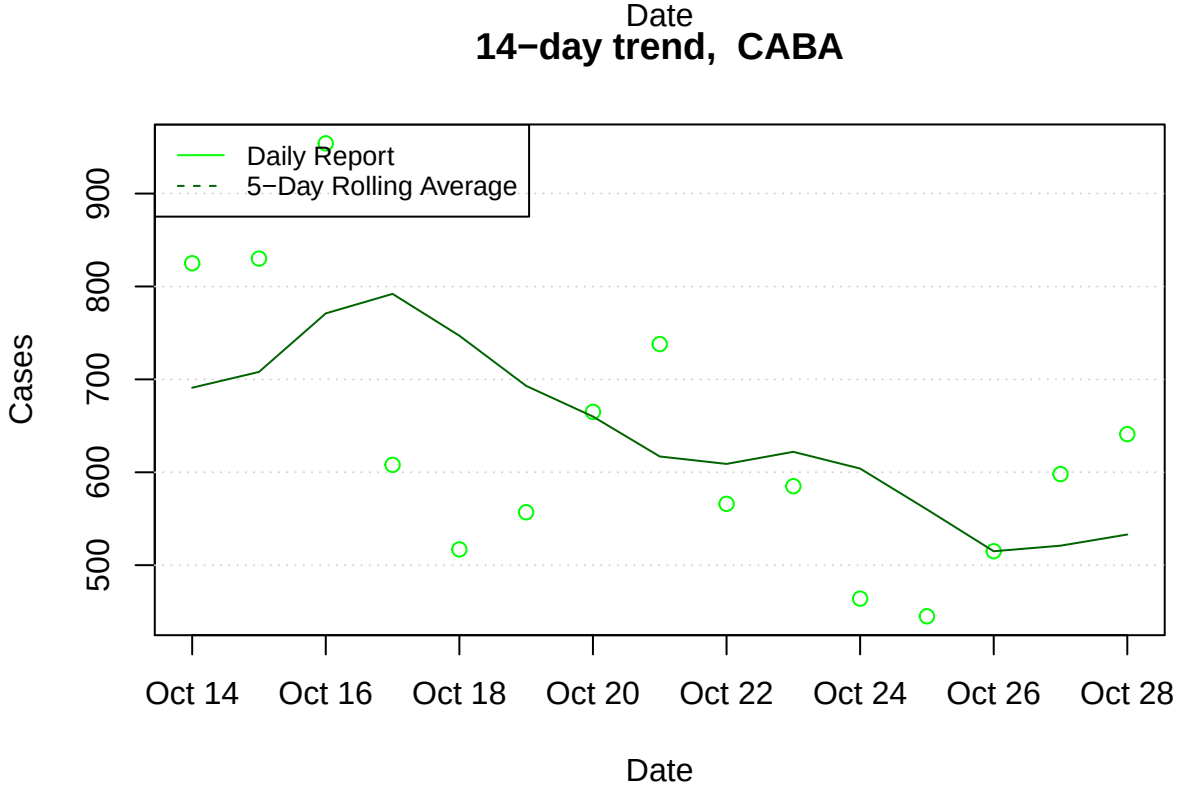

```
##           Date TotalCasesNational NewCasesNational AvgCasesNational
## 227 2020-10-14             931959            14929            12099
## 228 2020-10-15             949058            17099            13035
## 229 2020-10-16             965609            16551            14281
## 230 2020-10-17             979115            13506            15078
## 231 2020-10-18             989674            10559            14529
## 232 2020-10-19            1002658            12984            14140
## 233 2020-10-20            1018999            16341            13988
## 234 2020-10-21            1037320            18321            14342
## 235 2020-10-22            1053635            16315            14904
## 236 2020-10-23            1069364            15729            15938
## 237 2020-10-24            1081332            11968            15735
## 238 2020-10-25            1090585             9253            14317
## 239 2020-10-26            1102297            11712            12995
## 240 2020-10-27            1116605            14308            12594
## 241 2020-10-28            1130528            13923            12233
##     TotalCasesCABA NewCasesCABA AvgCasesCABA TotalCasesPBA NewCasesPBA
## 227         137059          825          691        480489        5173
## 228         137889          830          708        486247        5758
## 229         138843          954          771        491449        5202
## 230         139451          608          792        495866        4417
## 231         139968          517          747        498248        2382
## 232         140525          557          693        502455        4207
## 233         141190          665          660        507438        4983
## 234         141928          738          617        512615        5177
## 235         142494          566          609        517469        4854
## 236         143079          585          622        522118        4649
## 237         143543          464          604        525148        3030
## 238         143988          445          560        527318        2170
## 239         144503          515          515        531012        3694
```

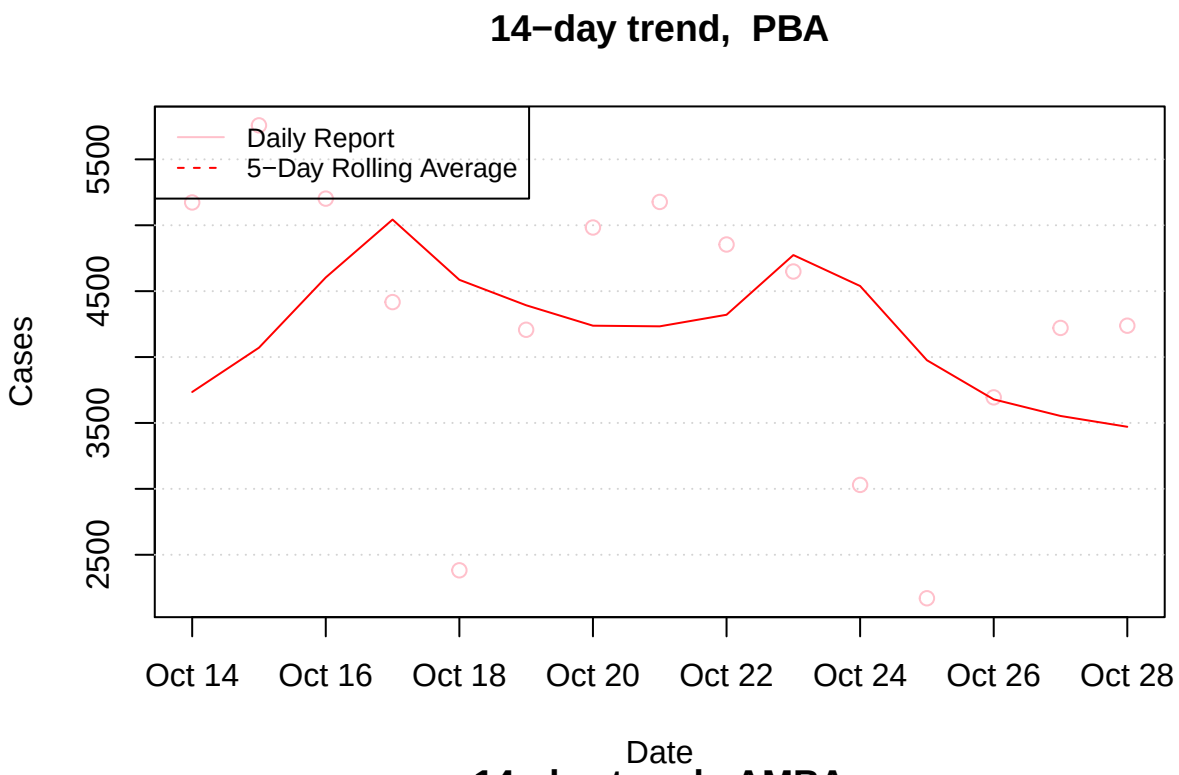
```
## 240         145101          598          521        535233        4221
## 241         145742          641          533        539471        4238
##     AvgCasesPBA TotalCasesAMBA NewCasesAMBA AvgCasesAMBA
## 227        3735         937051         7663         6087
## 228        4071         945483         8432         6673
## 229        4604             NA           NA         6673
## 230        5043         959149           NA         7782
## 231        4586         962268         3119         6405
## 232        4393         968473         6205         5919
## 233        4238             NA           NA         4662
## 234        4233         982744           NA         4662
## 235        4321         988800         6056         5127
## 236        4774         995099         6299         6187
## 237        4539         999309         4210         5522
## 238        3976        1002114         2805         4842
## 239        3679        1007053         4939         4862
## 240        3553        1012773         5720         4795
## 241        3471        1018736         5963         4727
```

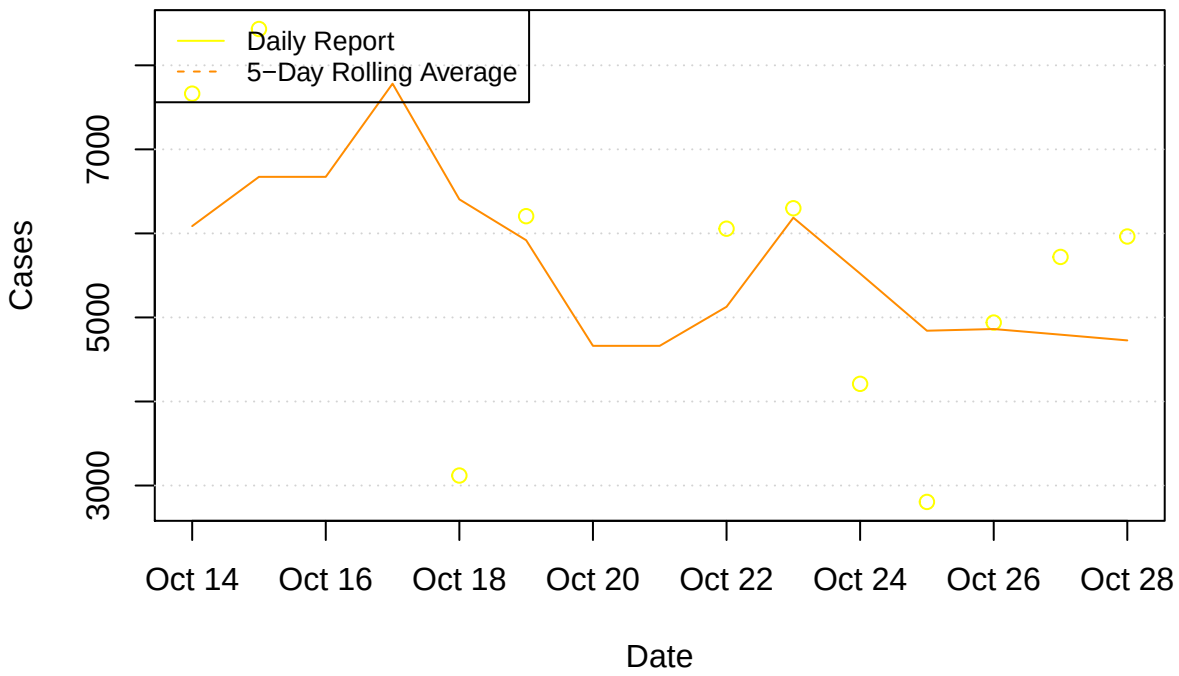
14-day trend

Phase 1: 14-day trend lines



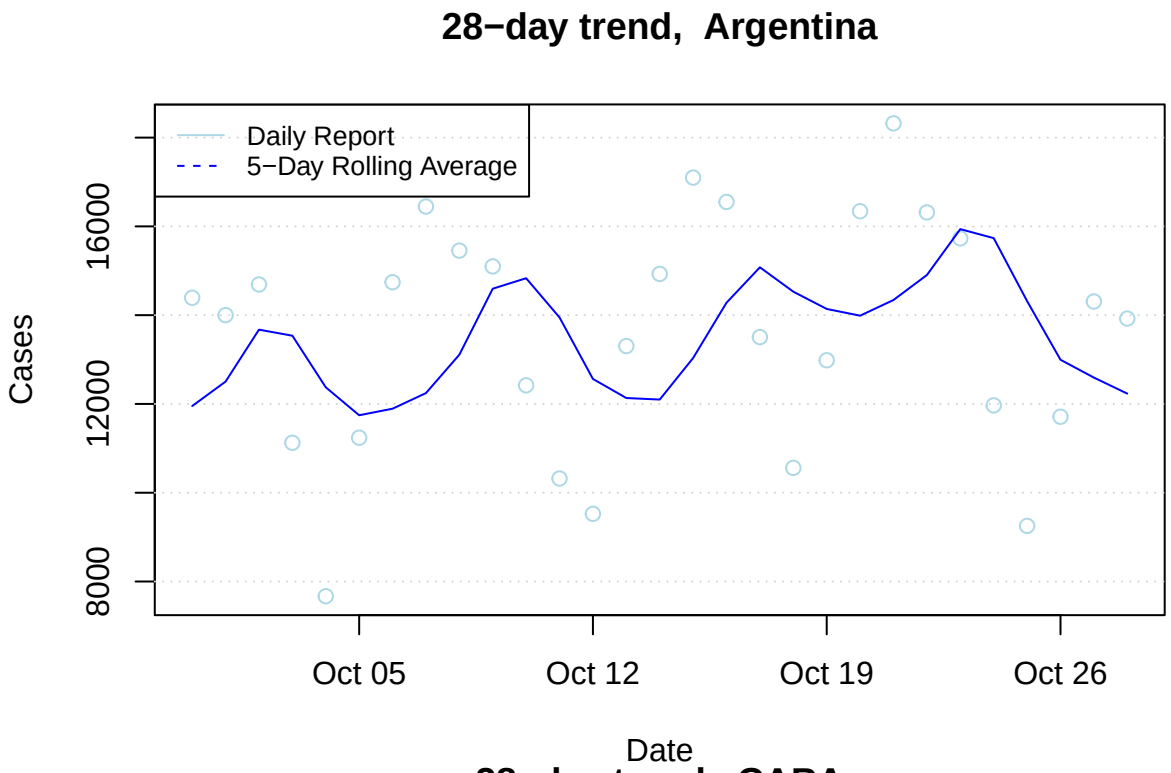


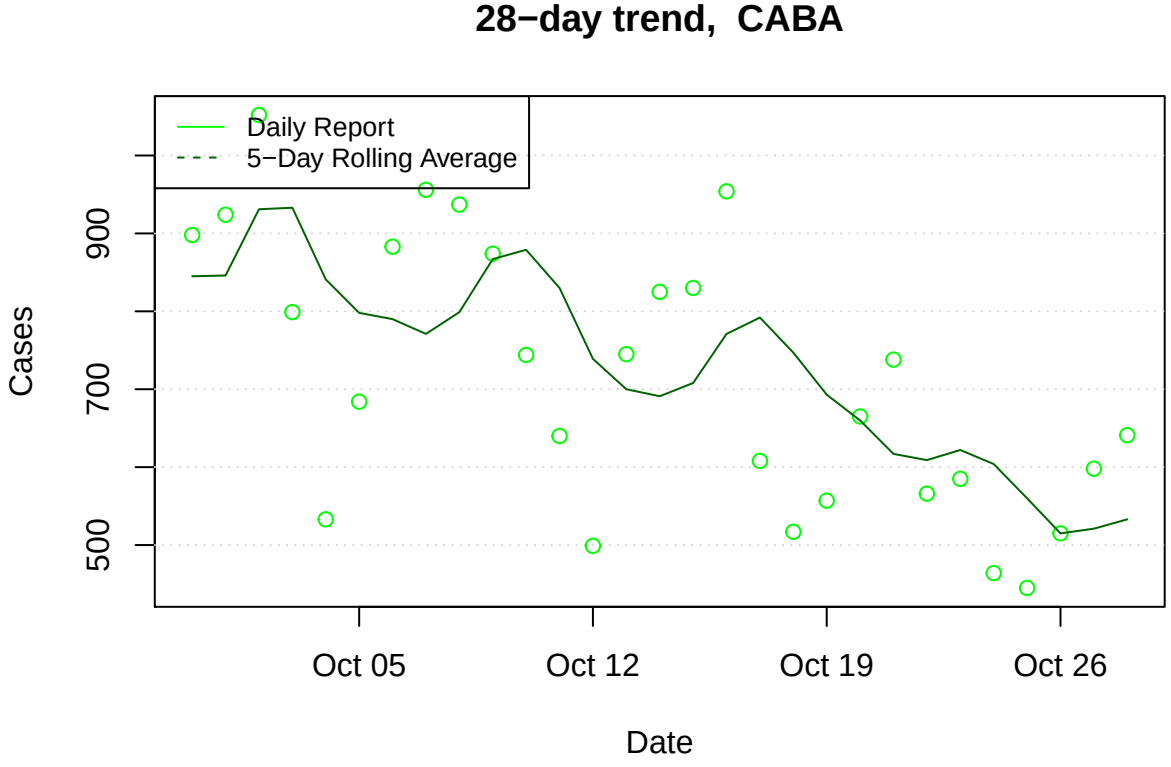


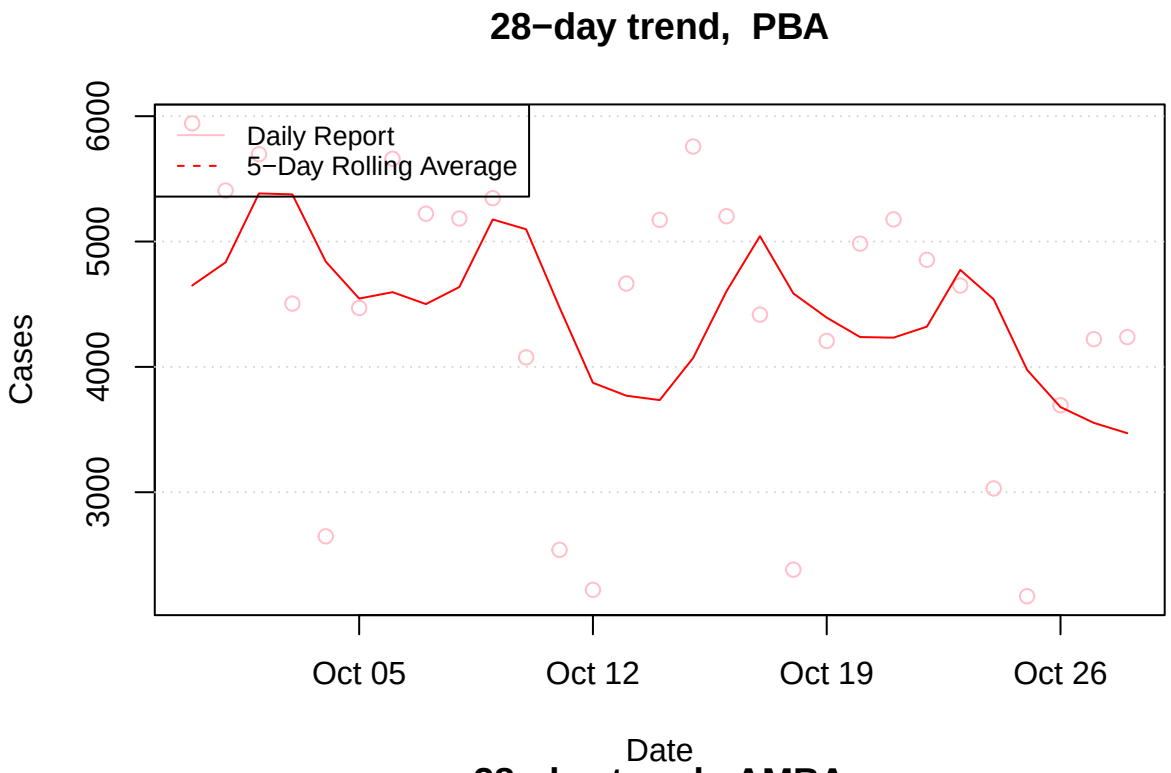


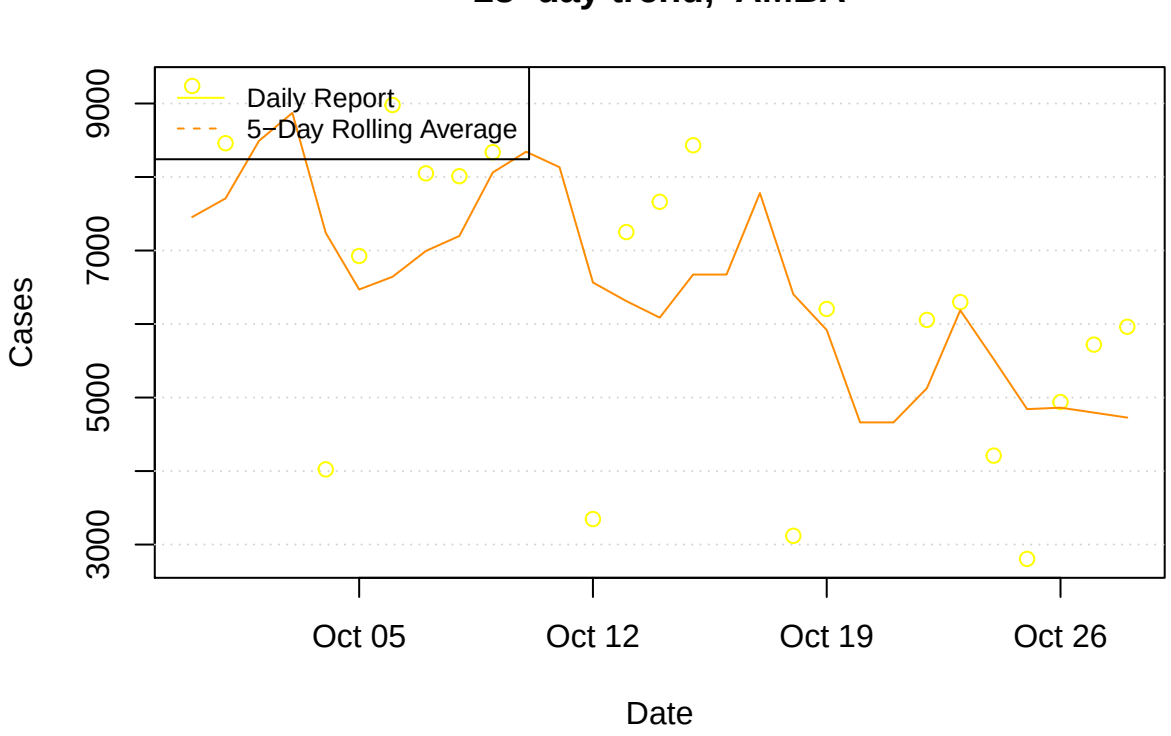
##

Phase 2 decisions


28−day trend, Argentina
Daily Report
5−Day Rolling Average
Cases
8000
12000
16000
Oct 05
Oct 12
Oct 19
Oct 26
Date


28−day trend, CABA
Daily Report
5−Day Rolling Average
Cases
500
700
900
Oct 05
Oct 12
Oct 19
Oct 26
Date


28−day trend, PBA
Daily Report
5−Day Rolling Average
Cases
3000
4000
5000
6000
Oct 05
Oct 12
Oct 19
Oct 26
Date


28−day trend, AMBA
Daily Report
5−Day Rolling Average
Cases
3000
5000
7000
9000
Oct 05
Oct 12
Oct 19
Oct 26
Date

Log graphs

The following graphs are generated by:

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

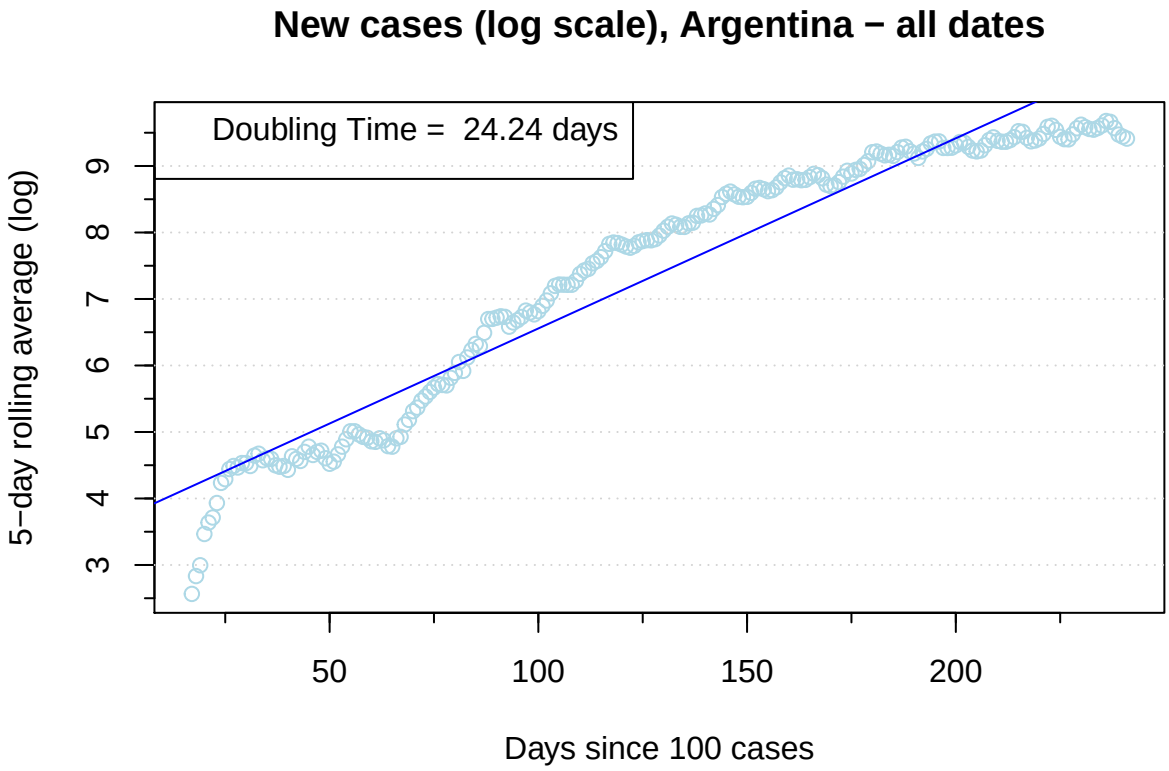
$$y = log(Number\ of\ New\ Cases\ this\ day)$$

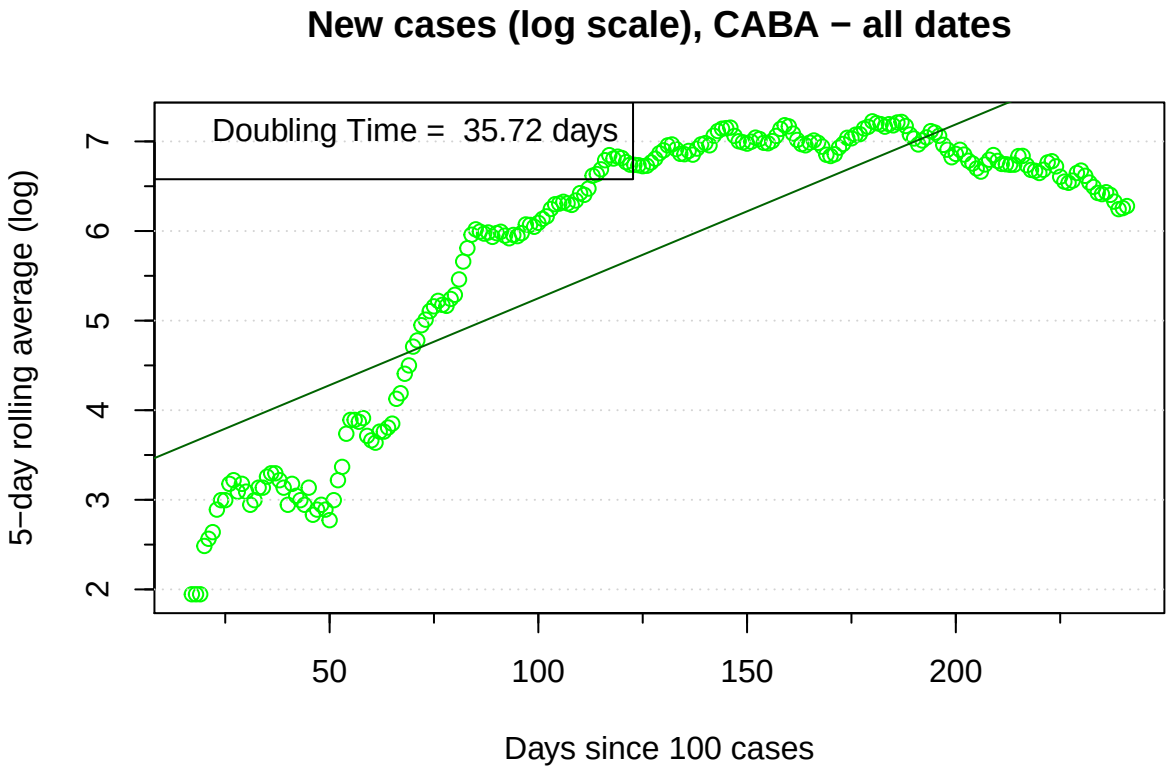
The regression line is drawn using the R "lm()" function over the x values.

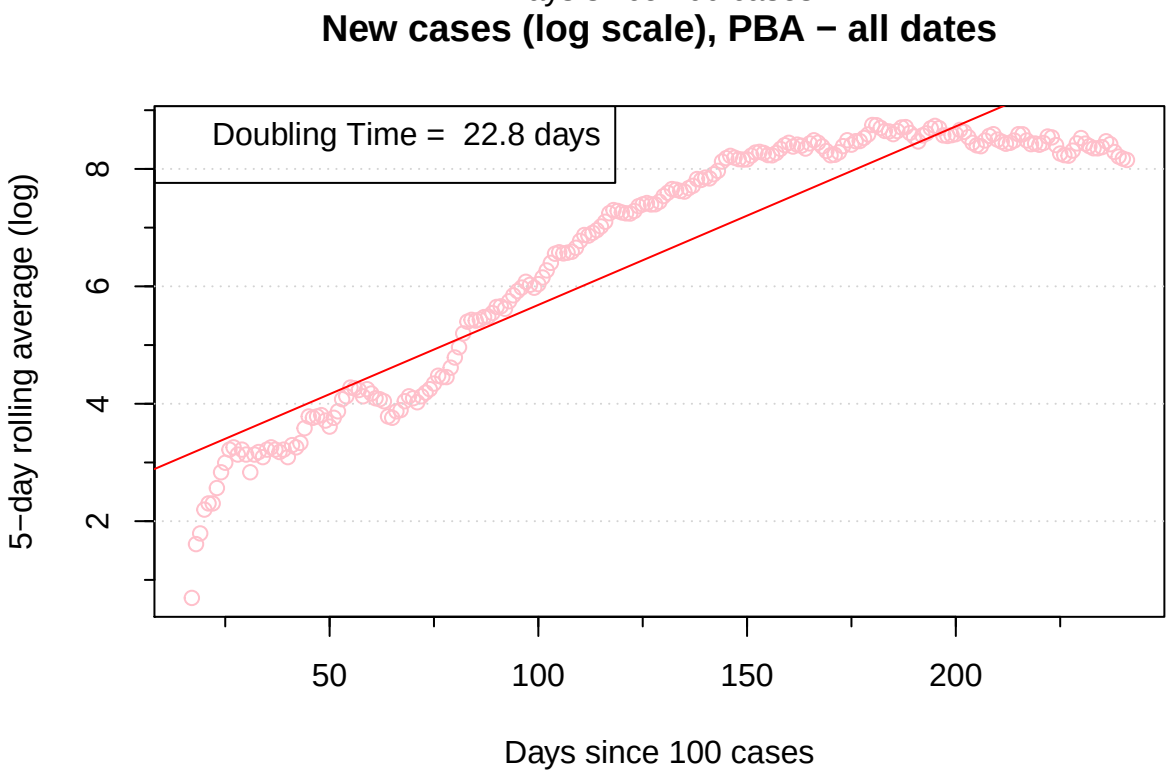
R0 is estimated from the slope of the regression line:

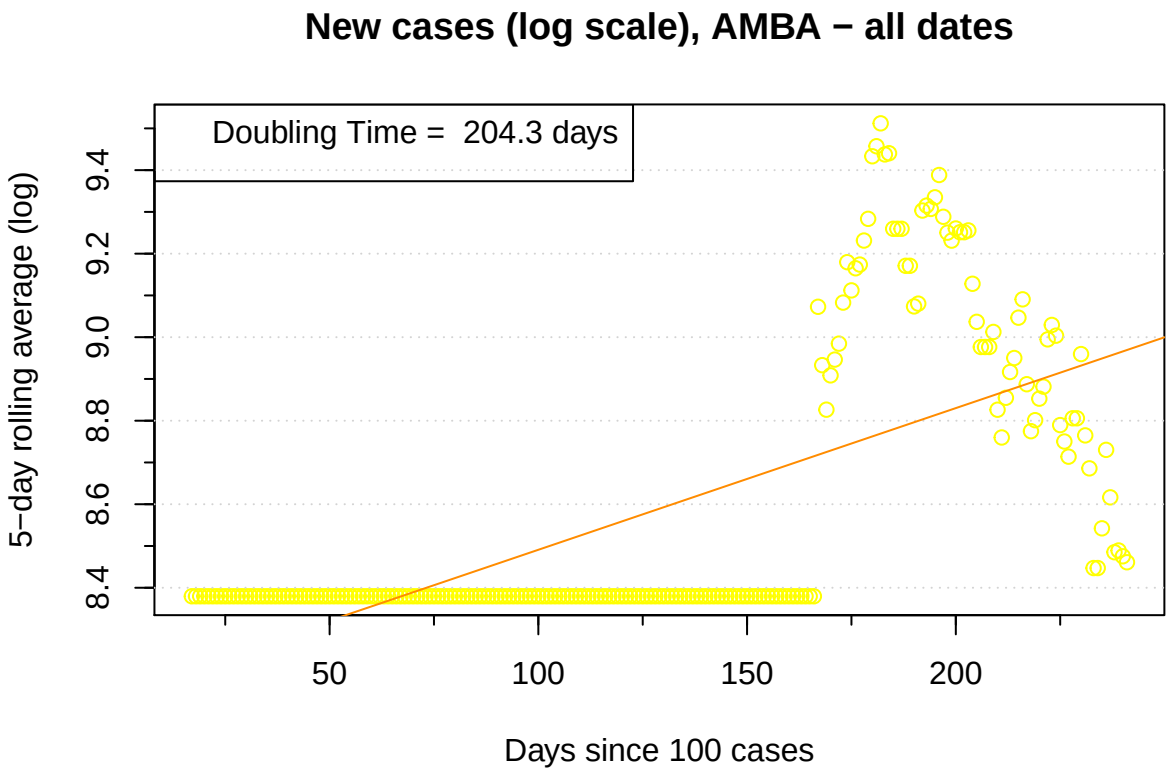
$$y = a + bx$$

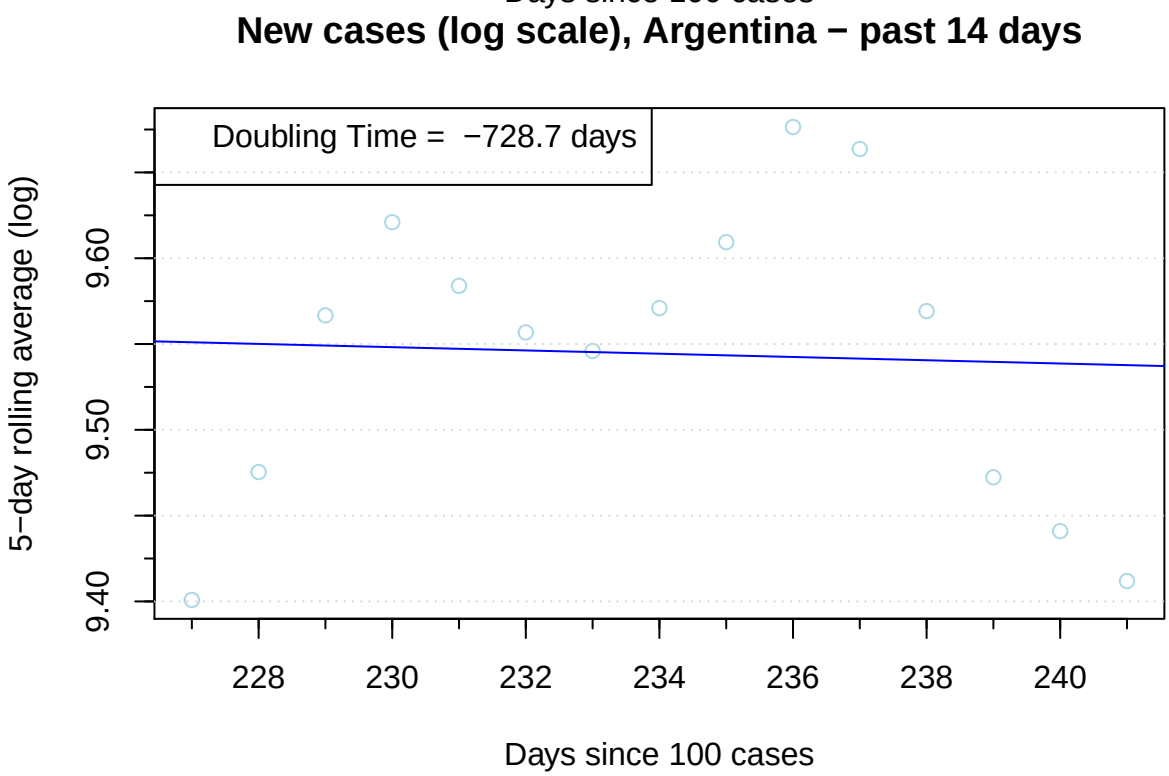
$$dt = log(2)/b$$

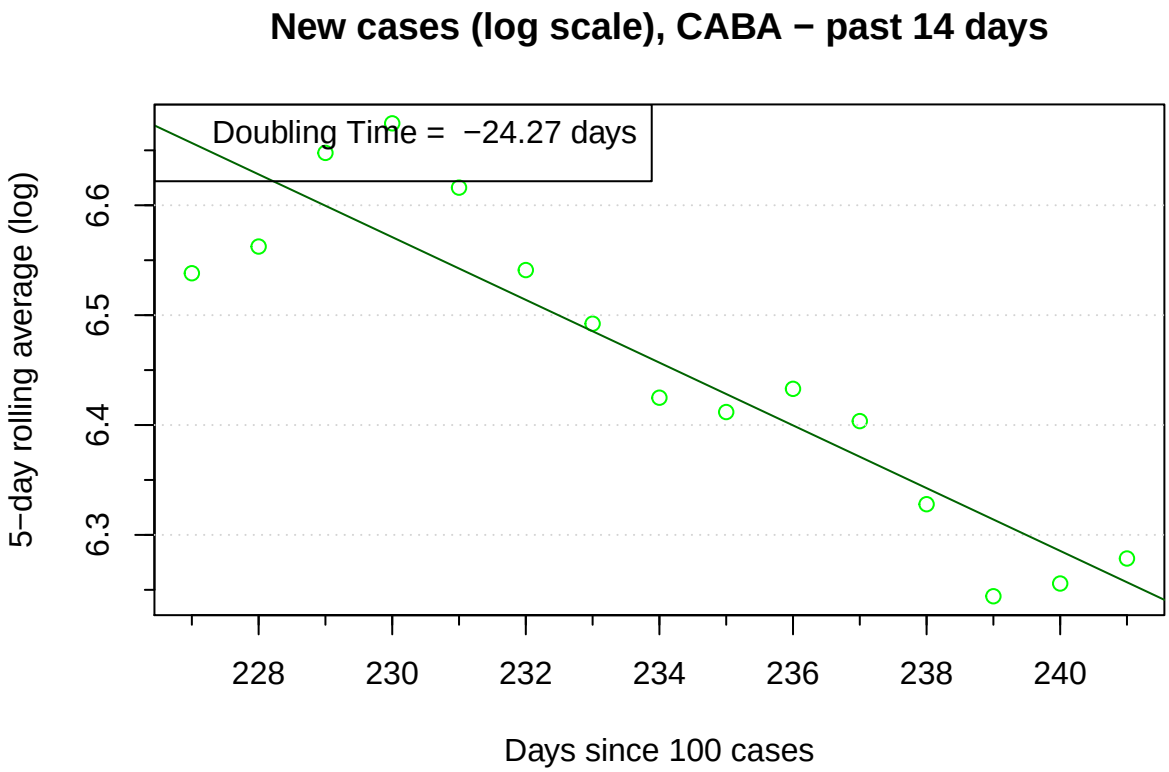


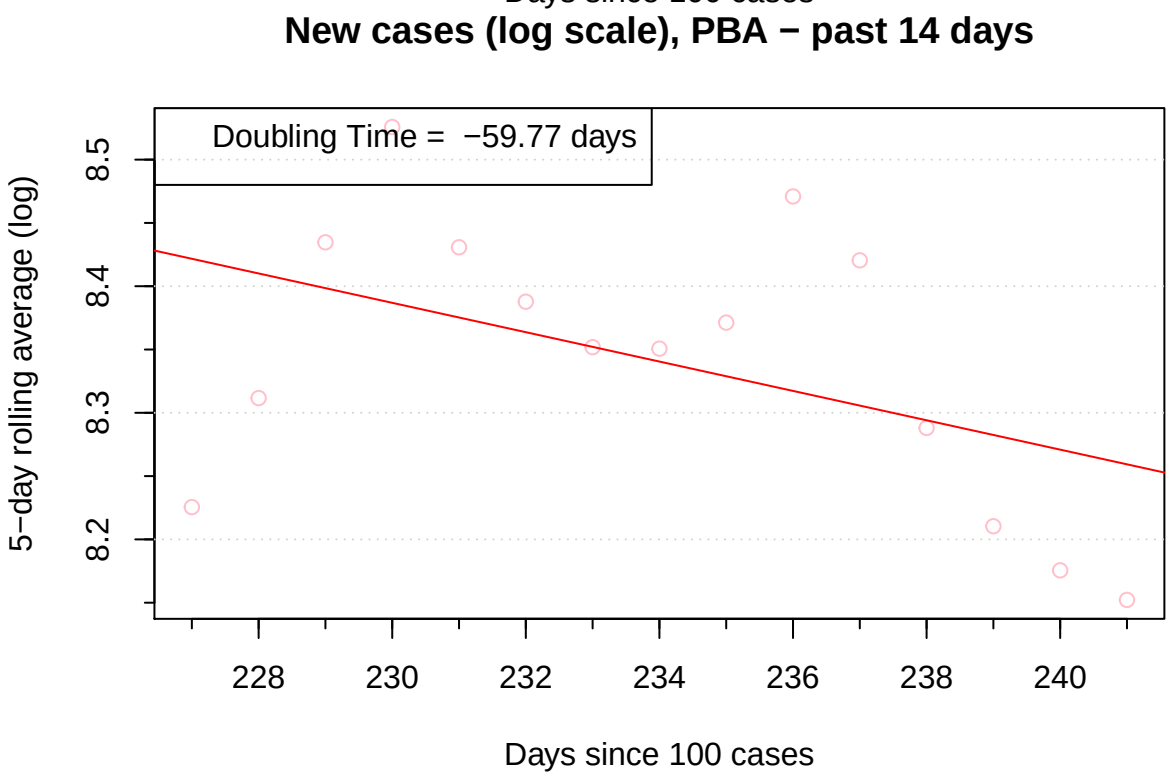

New cases (log scale), CABA − all dates
Doubling Time = 35.72 days
5−day rolling average (log)
2
3
4
5
6
7
50
100
150
200
Days since 100 cases

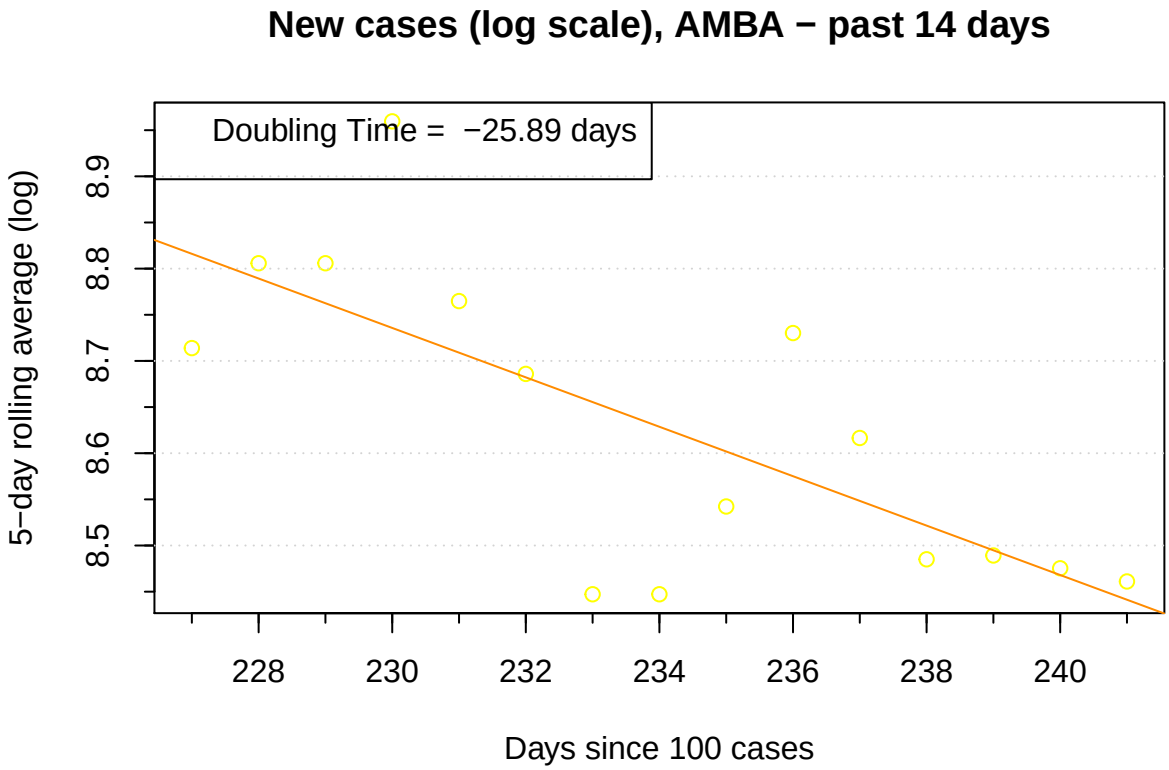

New cases (log scale), PBA − all dates
Doubling Time = 22.8 days
5−day rolling average (log)
2
4
6
8
50
100
150
200
Days since 100 cases

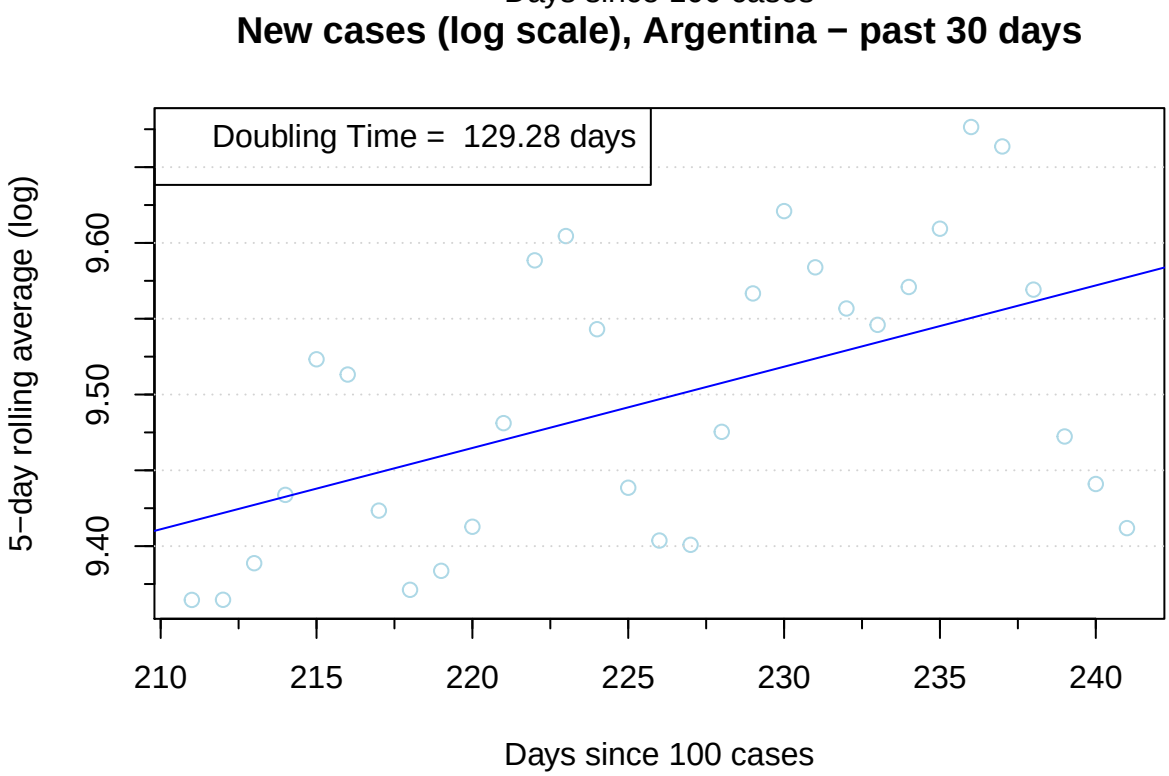

New cases (log scale), AMBA − all dates
Doubling Time = 204.3 days
5−day rolling average (log)
8.4
8.6
8.8
9.0
9.2
9.4
50
100
150
200
Days since 100 cases

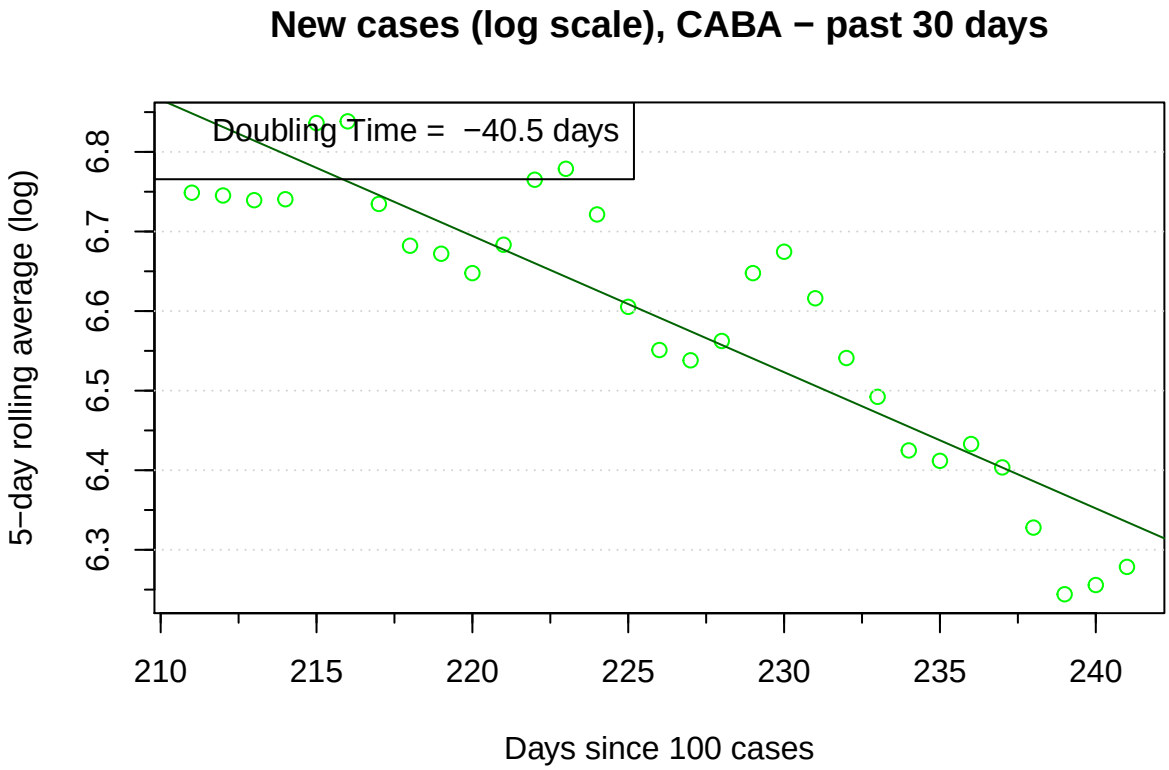

New cases (log scale), Argentina − past 14 days
Doubling Time = −728.7 days
5−day rolling average (log)
9.40
9.50
9.60
228
230
232
234
236
238
240
Days since 100 cases

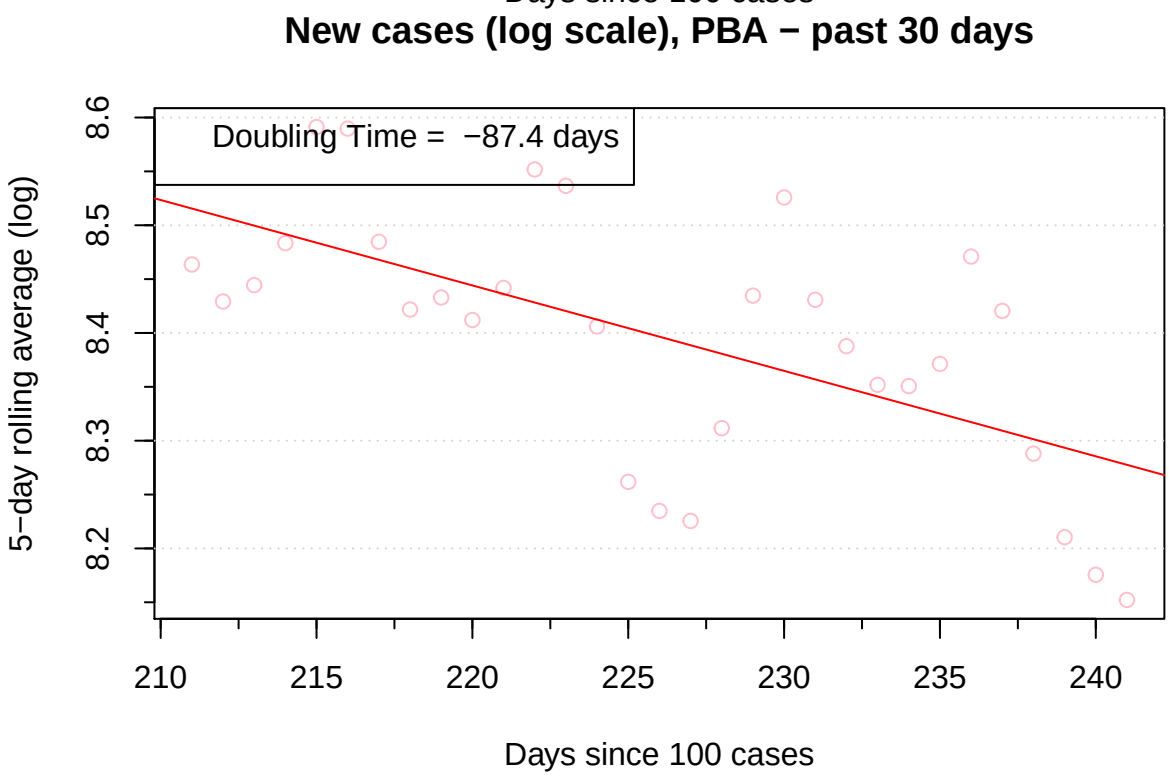

New cases (log scale), CABA − past 14 days
Doubling Time = −24.27 days
5−day rolling average (log)
6.3
6.4
6.5
6.6
228
230
232
234
236
238
240
Days since 100 cases

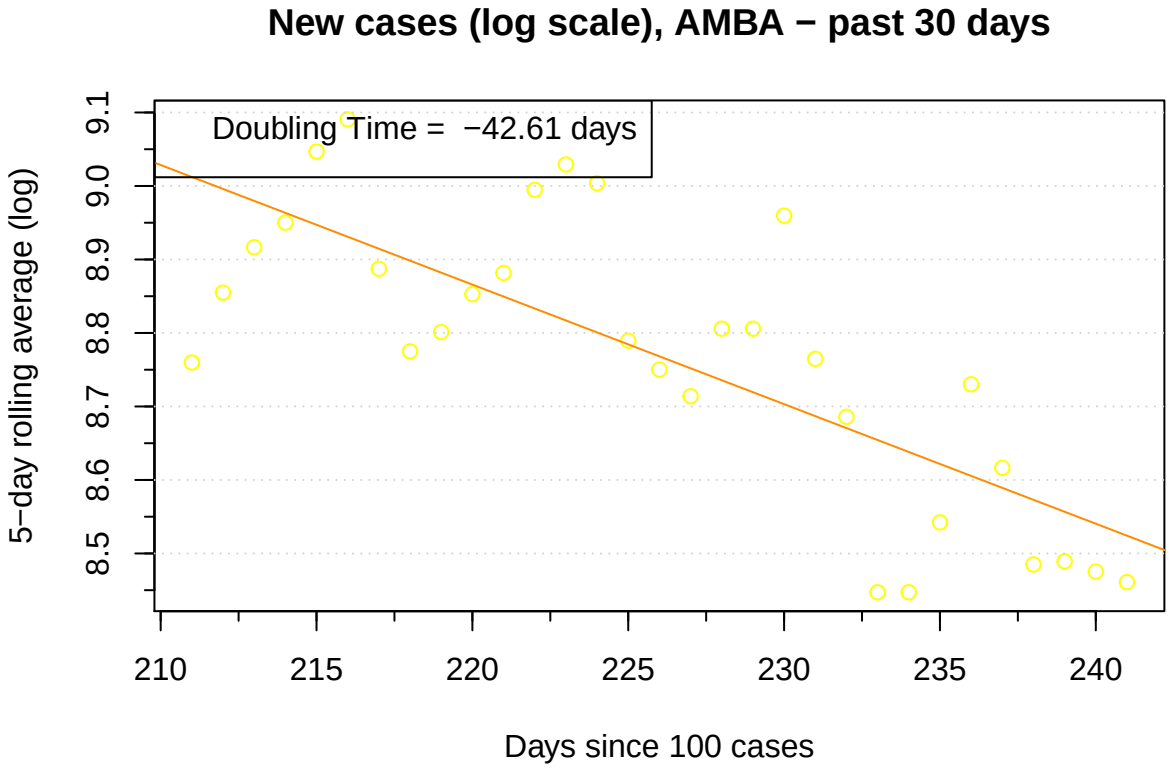

New cases (log scale), PBA − past 14 days
Doubling Time = −59.77 days
5−day rolling average (log)
8.2
8.3
8.4
8.5
228
230
232
234
236
238
240
Days since 100 cases

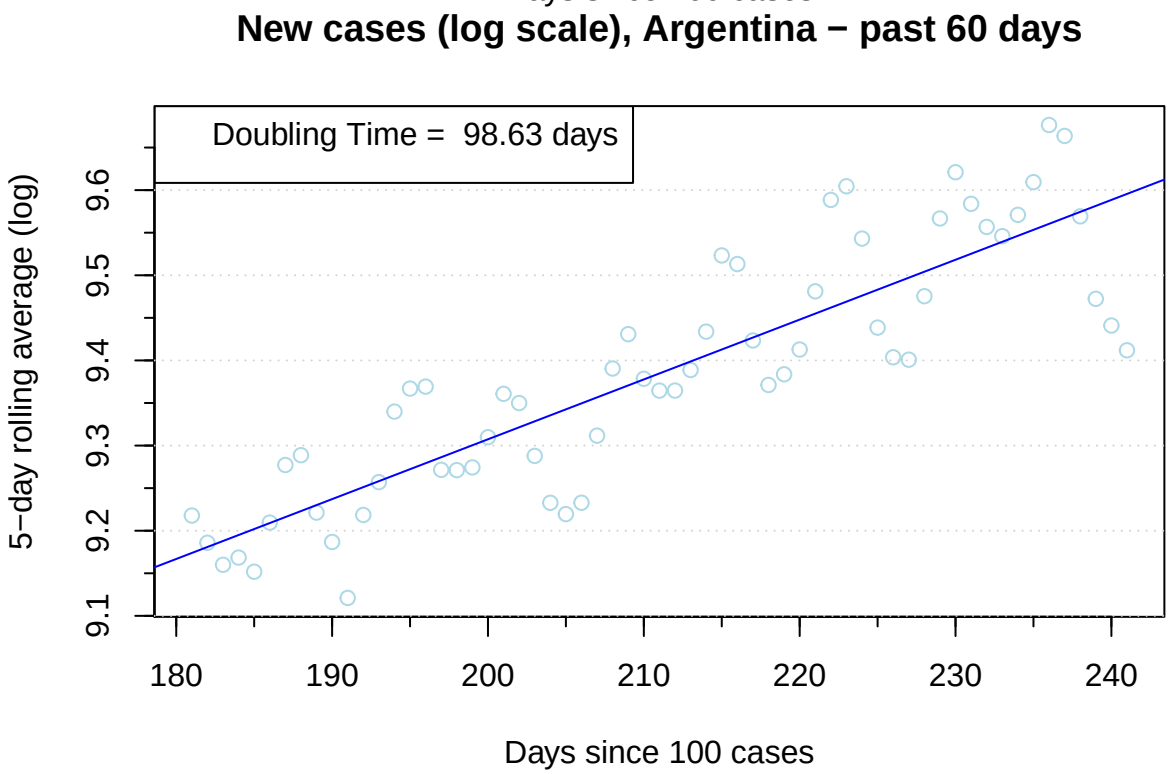

New cases (log scale), AMBA − past 14 days
Doubling Time = −25.89 days
5−day rolling average (log)
8.5
8.6
8.7
8.8
8.9
228
230
232
234
236
238
240
Days since 100 cases

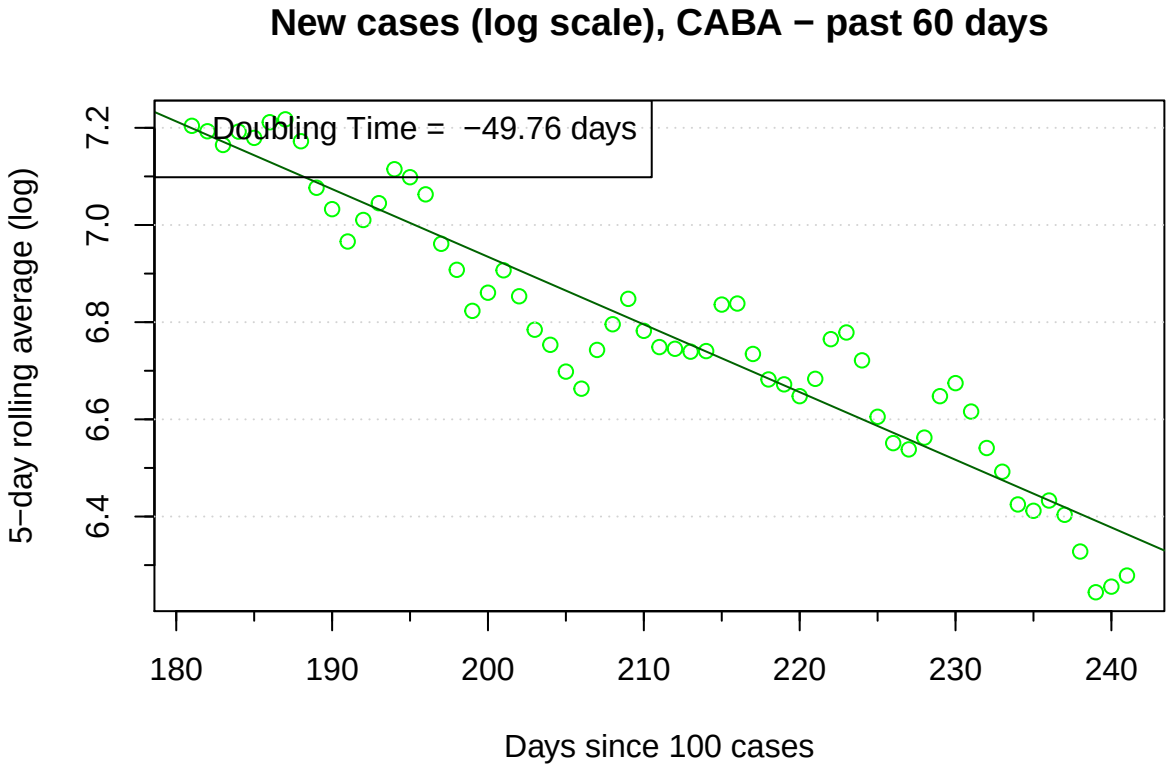

New cases (log scale), Argentina − past 30 days
Doubling Time = 129.28 days
5−day rolling average (log)
9.40
9.50
9.60
210
215
220
225
230
235
240
Days since 100 cases

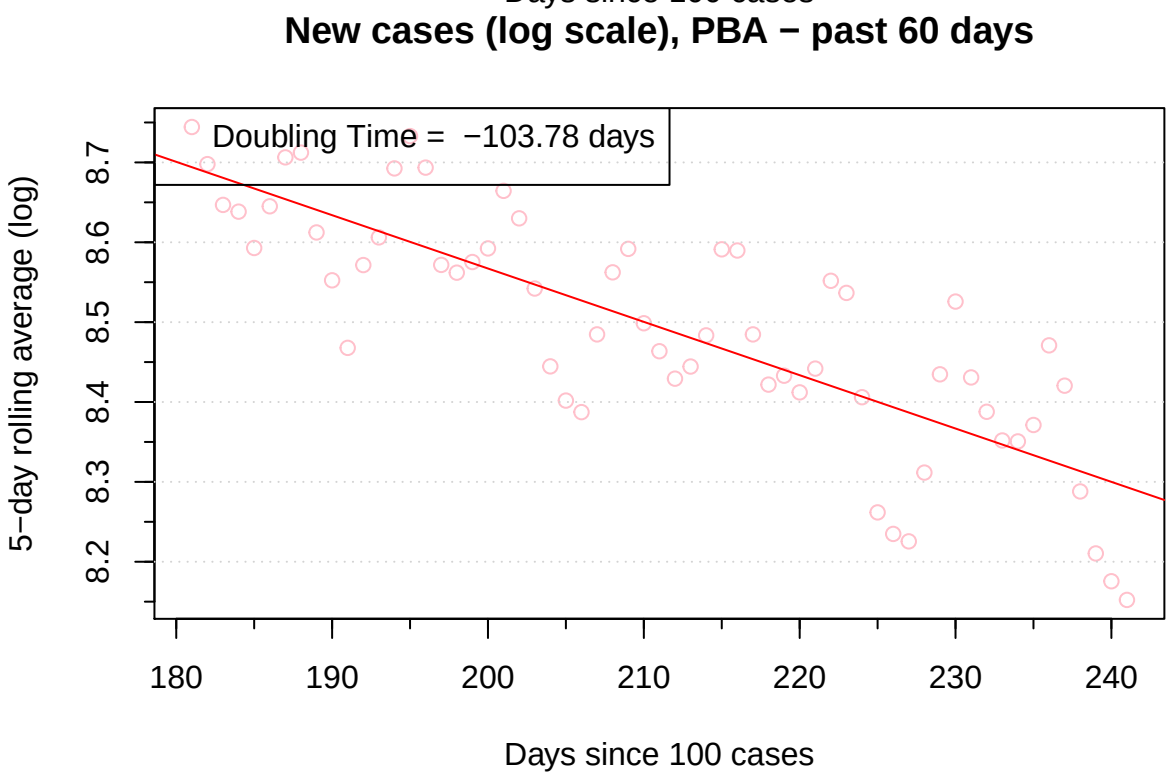

New cases (log scale), CABA − past 30 days
Doubling Time = −40.5 days
5−day rolling average (log)
6.3
6.4
6.5
6.6
6.7
6.8
210
215
220
225
230
235
240
Days since 100 cases

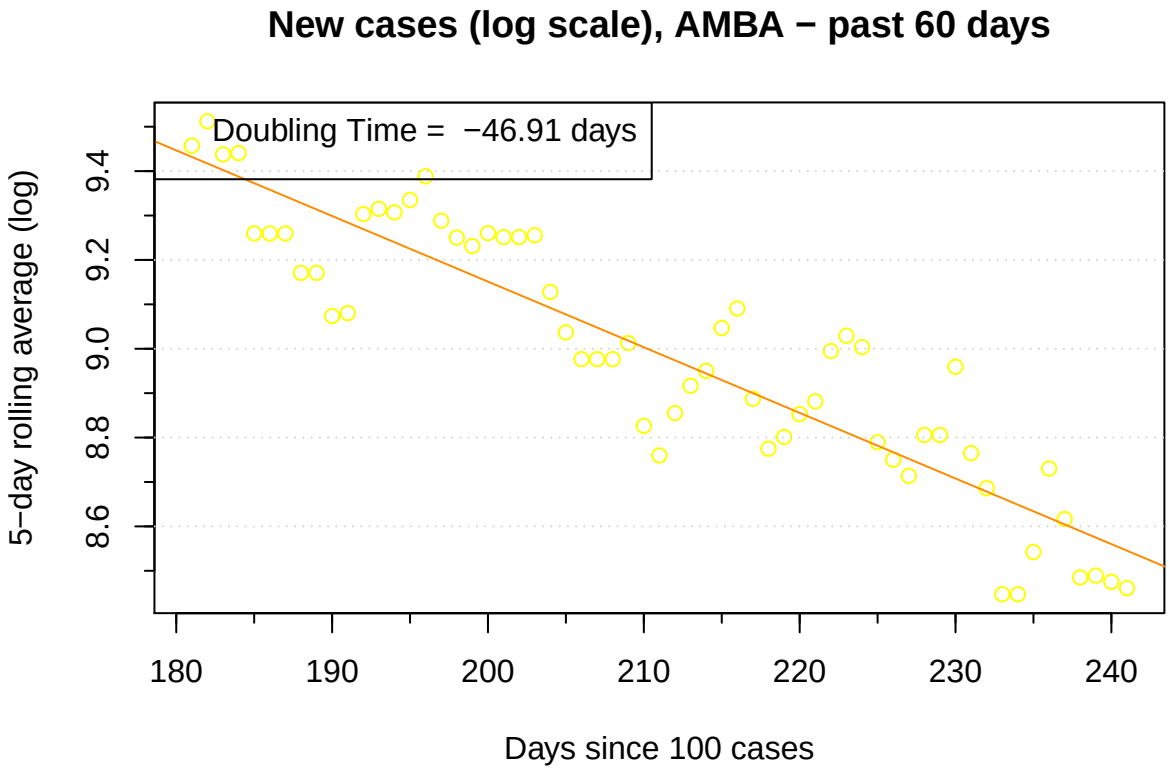

New cases (log scale), PBA − past 30 days
Doubling Time = −87.4 days
5−day rolling average (log)
8.2
8.3
8.4
8.5
8.6
210
215
220
225
230
235
240
Days since 100 cases

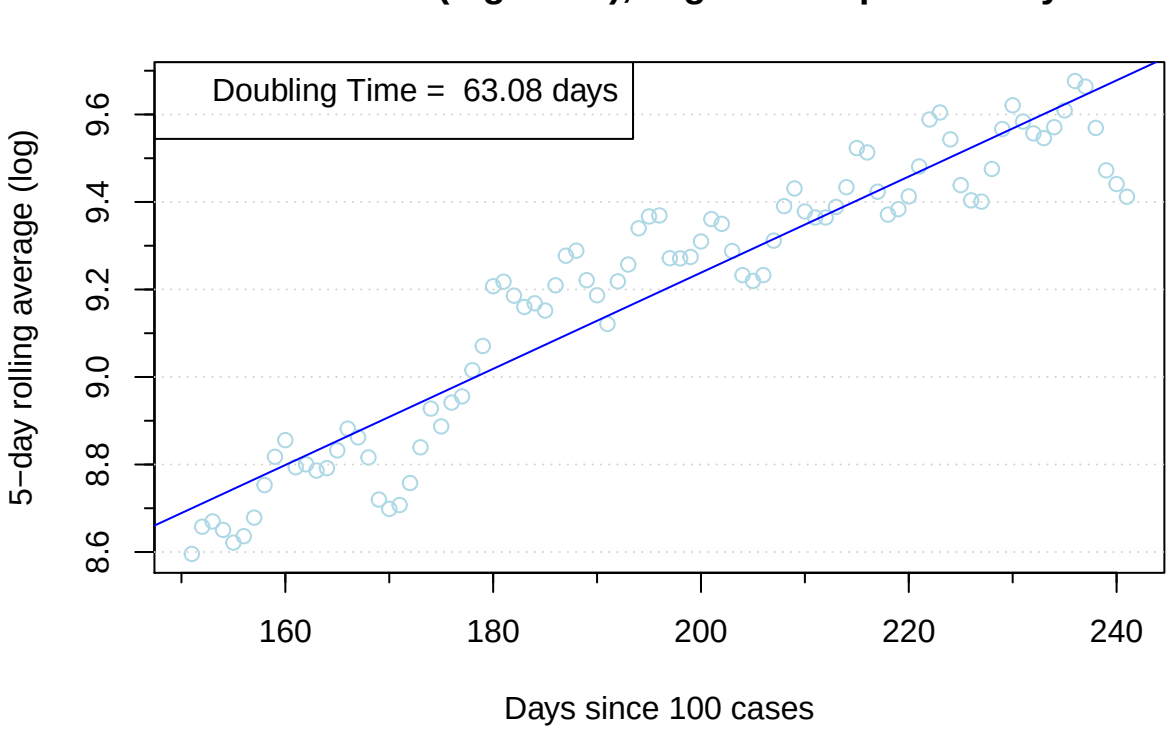

New cases (log scale), AMBA − past 30 days
Doubling Time = −42.61 days
5−day rolling average (log)
8.5
8.6
8.7
8.8
8.9
9.0
9.1
210
215
220
225
230
235
240
Days since 100 cases

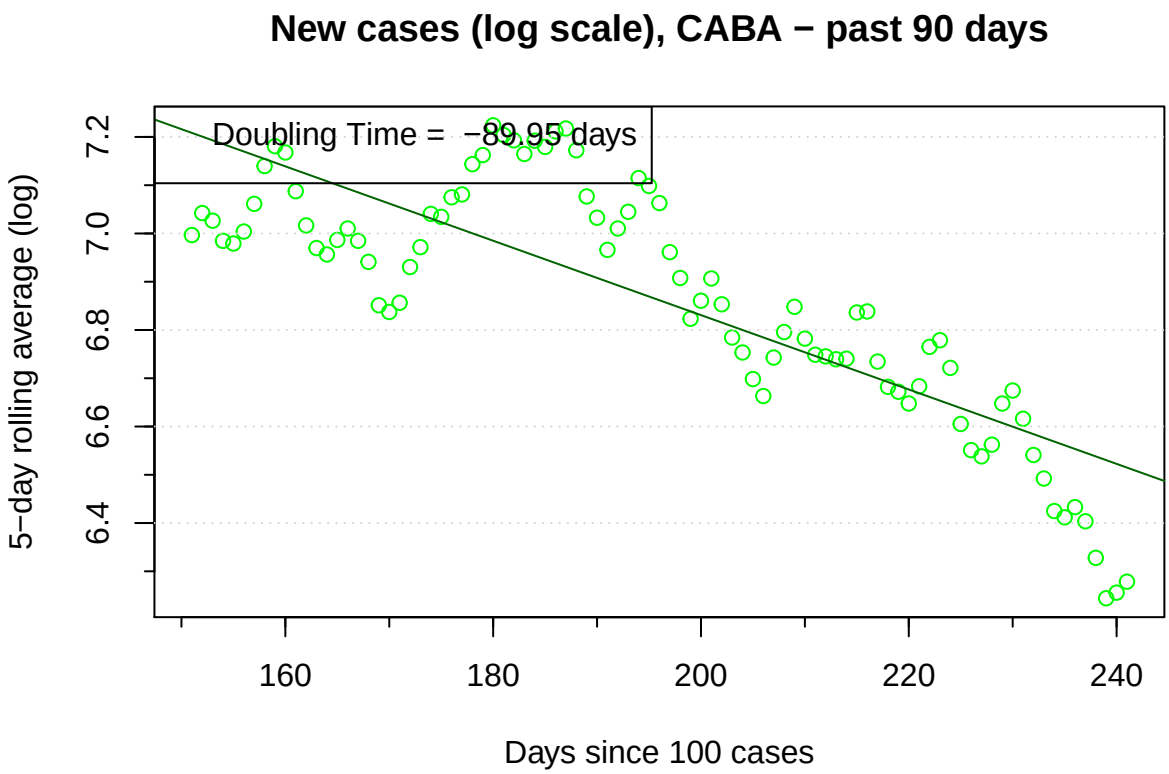

New cases (log scale), Argentina − past 60 days
Doubling Time = 98.63 days
5−day rolling average (log)
9.1
9.2
9.3
9.4
9.5
9.6
180
190
200
210
220
230
240
Days since 100 cases

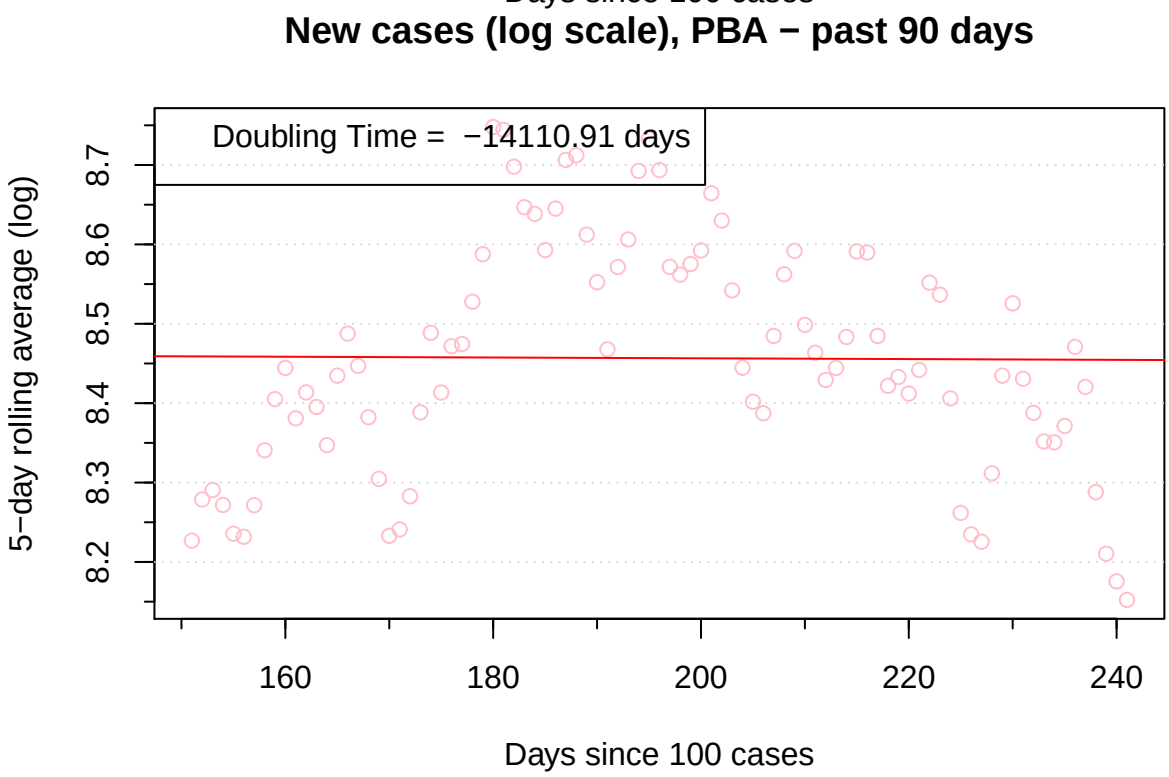

New cases (log scale), CABA − past 60 days
Doubling Time = −49.76 days
5−day rolling average (log)
7.2
7.0
6.8
6.6
6.4
180
190
200
210
220
230
240
Days since 100 cases

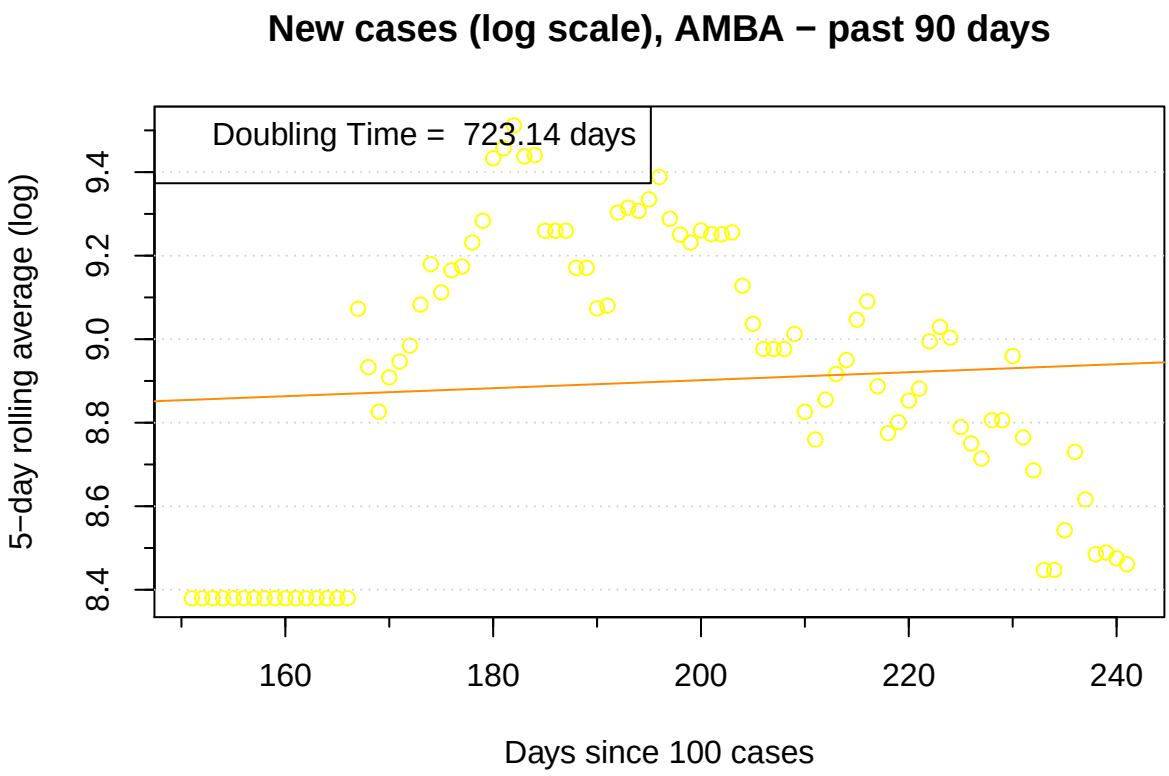

New cases (log scale), PBA − past 60 days
Doubling Time = −103.78 days
5−day rolling average (log)
8.7
8.6
8.5
8.4
8.3
8.2
180
190
200
210
220
230
240
Days since 100 cases


New cases (log scale), AMBA − past 60 days
Doubling Time = −46.91 days
5−day rolling average (log)
8.6
8.8
9.0
9.2
9.4
180
190
200
210
220
230
240
Days since 100 cases


New cases (log scale), Argentina − past 90 days
Doubling Time = 63.08 days
5−day rolling average (log)
8.6
8.8
9.0
9.2
9.4
9.6
160
180
200
220
240
Days since 100 cases


New cases (log scale), CABA − past 90 days
Doubling Time = −89.95 days
5−day rolling average (log)
7.2
7.0
6.8
6.6
6.4
160
180
200
220
240
Days since 100 cases


New cases (log scale), PBA − past 90 days
Doubling Time = −14110.91 days
5−day rolling average (log)
8.7
8.6
8.5
8.4
8.3
8.2
160
180
200
220
240
Days since 100 cases




```
##              Argentina   CABA       PBA   AMBA
## all dates        24.24  35.72     22.80 204.30
## past 14 days   -728.70 -24.27    -59.77 -25.89
## past 30 days    129.28 -40.50    -87.40 -42.61
## past 60 days     98.63 -49.76   -103.78 -46.91
## past 90 days     63.08 -89.95 -14110.91 723.14
```

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.

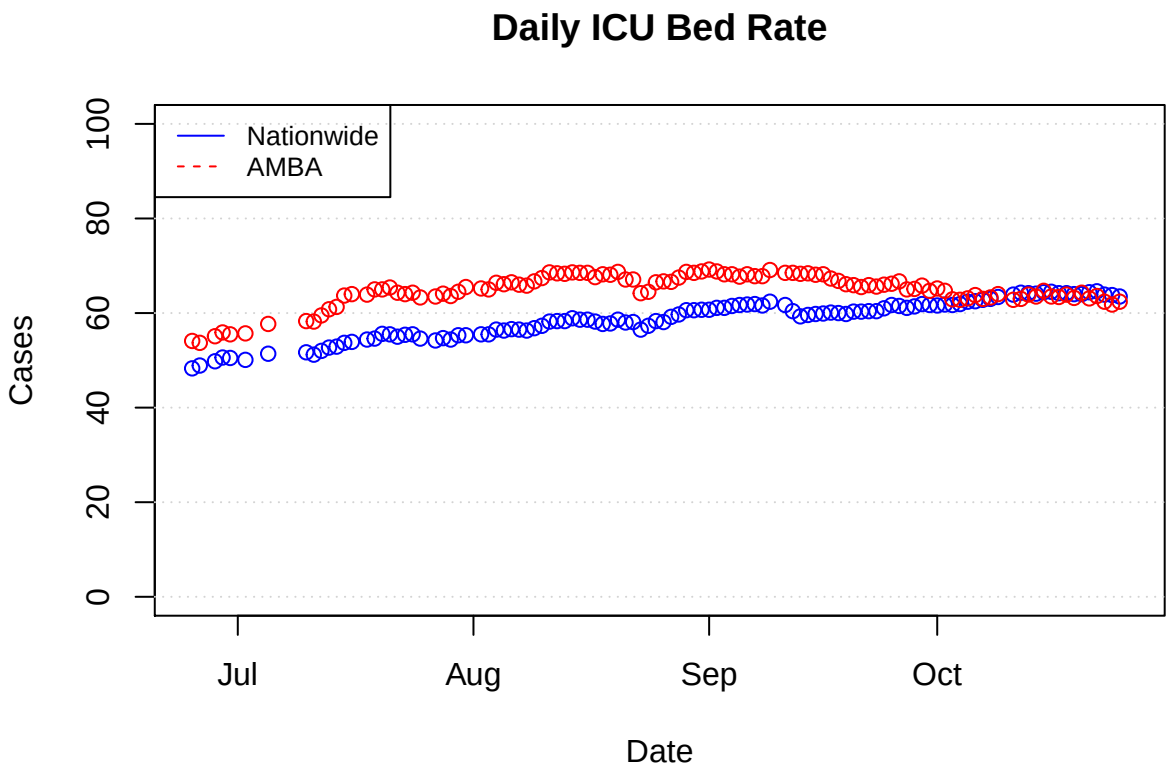
The following data on serial incidence are drawn from a meta analysis of COVID-19: https://doi.org/10.1002/jmv.26041

$$\mu = 5.08\ days$$

$$\sigma = .18$$

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



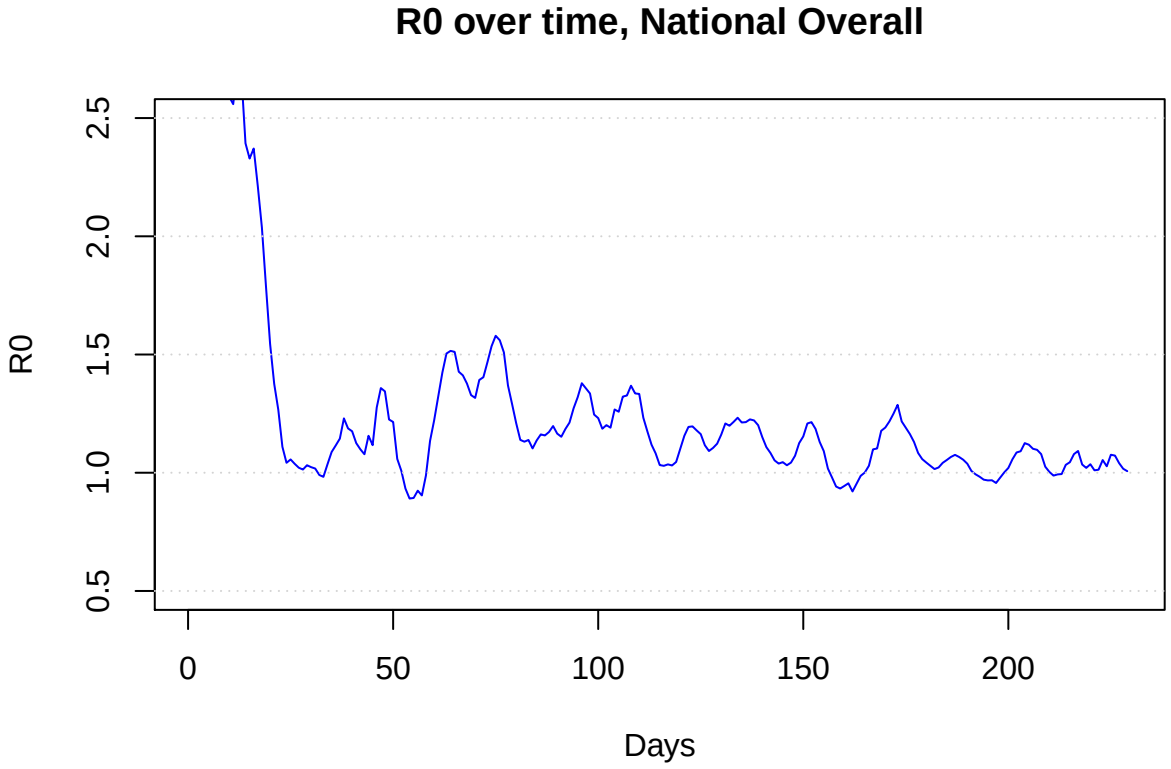

```
##           Date ICUBeds ICUPctNation ICUPctAMBA
## 95  2020-09-27    3604         61.1         65
## 96  2020-09-28    3678         61.4       65.1
## 97  2020-09-29    3768         61.9       65.8
## 98  2020-09-30    3792         61.7       64.7
## 99  2020-10-01    3799         61.6       65.2
## 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    4316         64.1       63.5
## 113 2020-10-15    4278         64.4       64.7
## 114 2020-10-16    4346         64.5       63.5
## 115 2020-10-17    4386         64.2       63.4
## 116 2020-10-18    4387         64.2       63.9
## 117 2020-10-19    4392           64       63.2
## 118 2020-10-20    4451           64       64.3
## 119 2020-10-21    4573         64.4       63.1
## 120 2020-10-22    4611         64.6       63.6
## 121 2020-10-23    4696         63.9       62.4
```

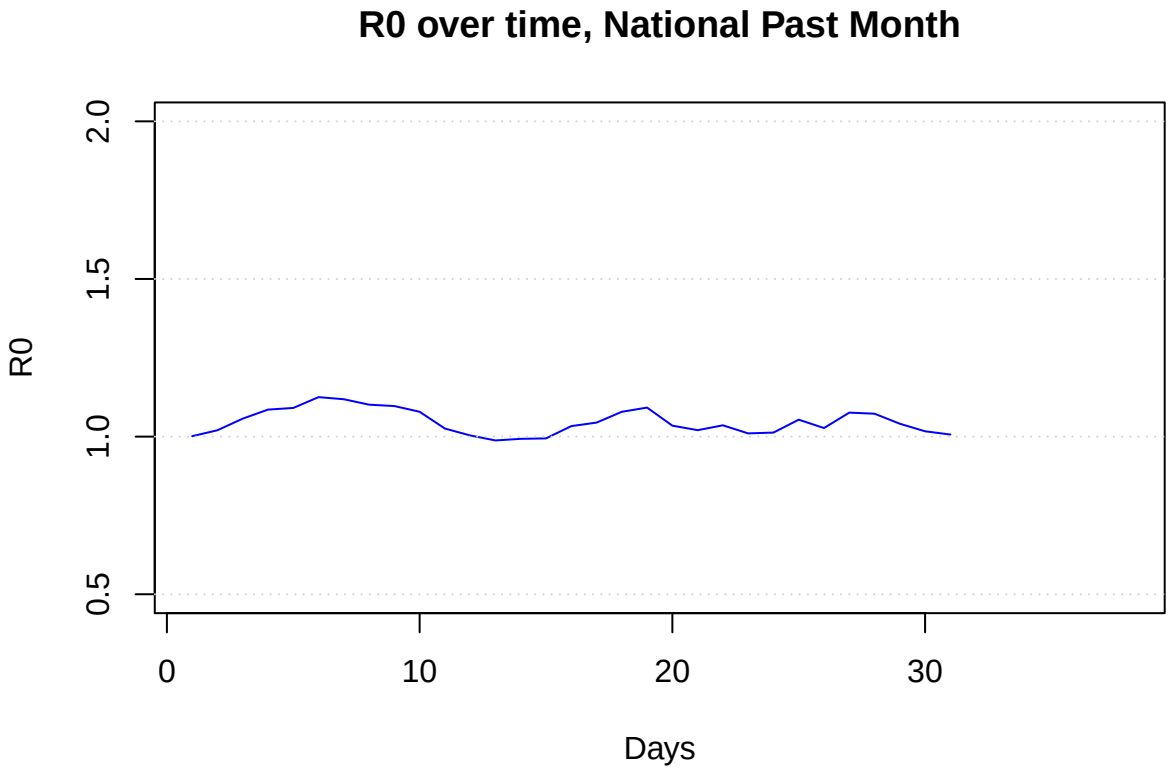
```
## 122 2020-10-24    4850         63.8       61.8
## 123 2020-10-25    4863         63.5       62.4
## 124 2020-10-26      NA         <NA>       <NA>
```

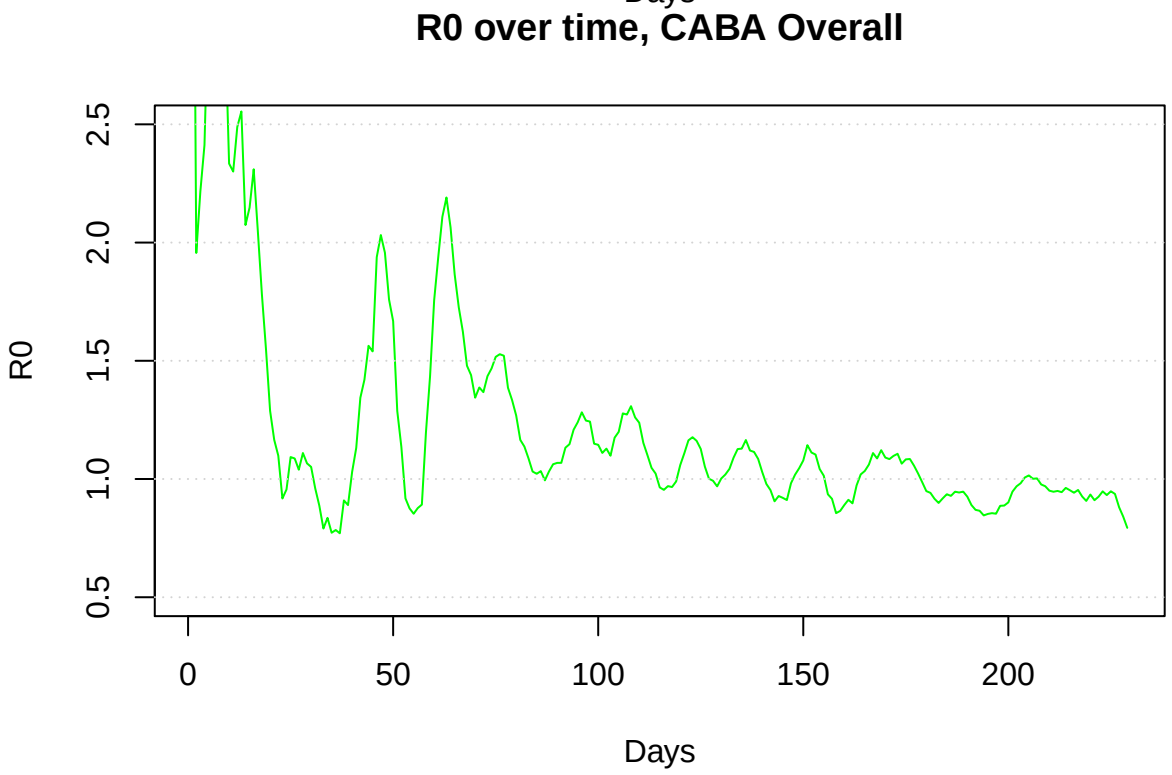
Better R Estimate

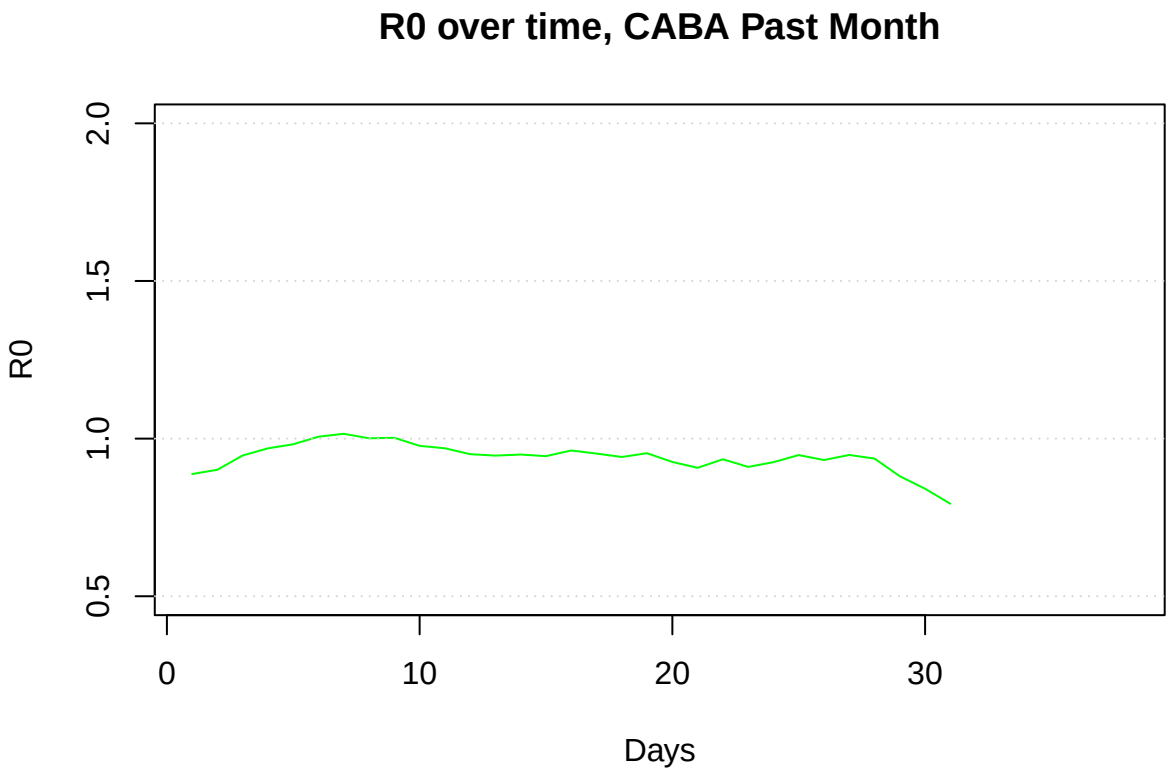
This data is drawn from over 1 million epidemiological records, indexed by the date the case was registered with the Ministry of Health. Cases are often registered prior to a confirmed diagnosis; therefore, this data "lags".

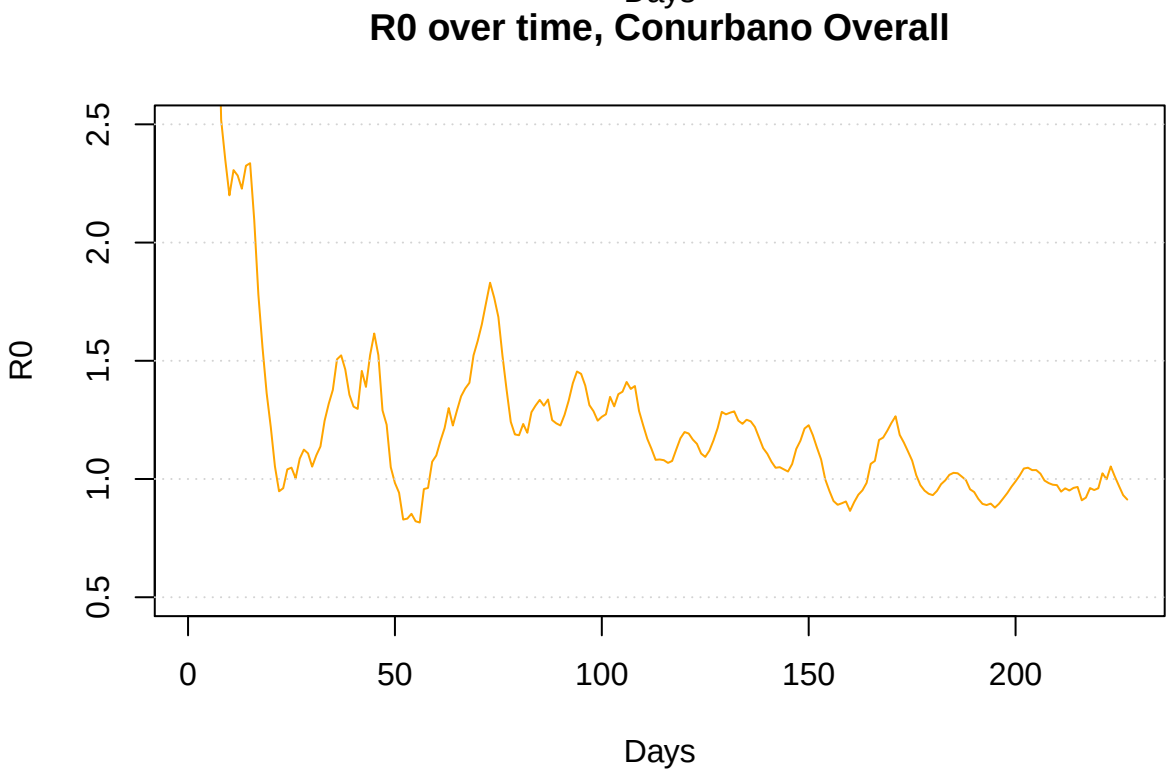
An incidence object is created using all confirmed cases in Argentina. The estimate_R() function from the EpiEstim package is used with the serial interval as described in the R estimate section above. While the estimate_R() function uses a rolling 7-day window, we also force the estimate away from the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

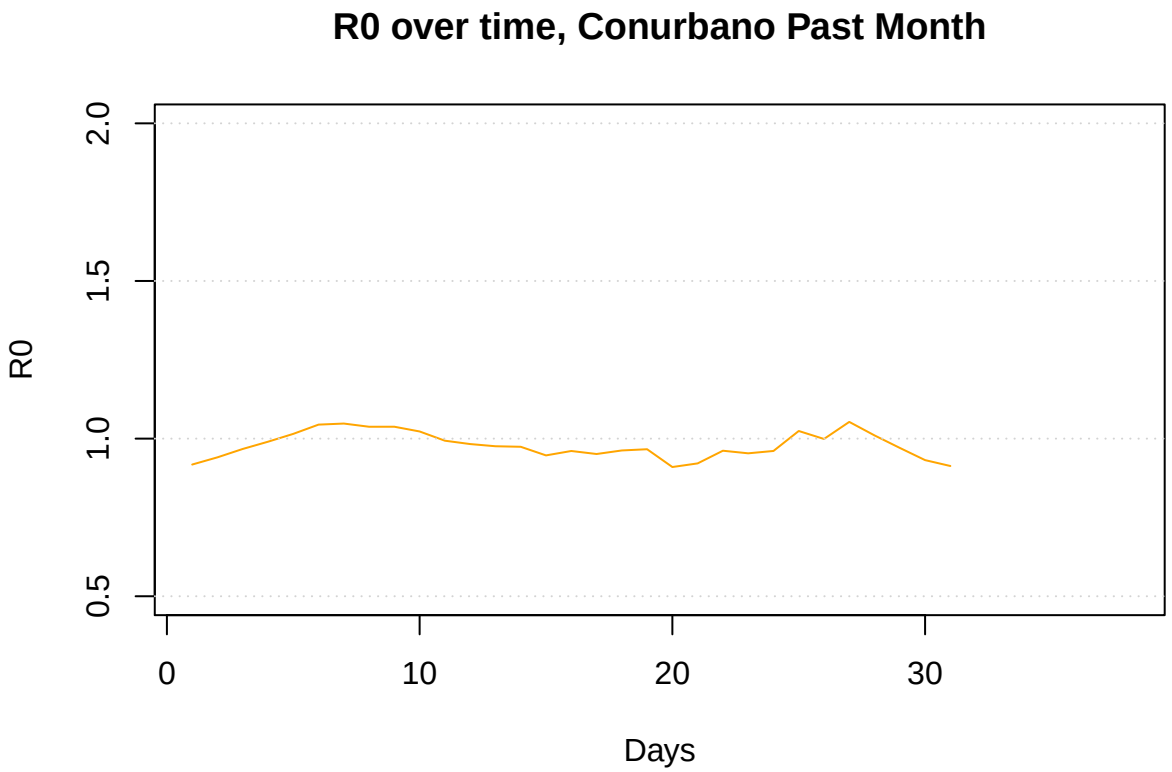


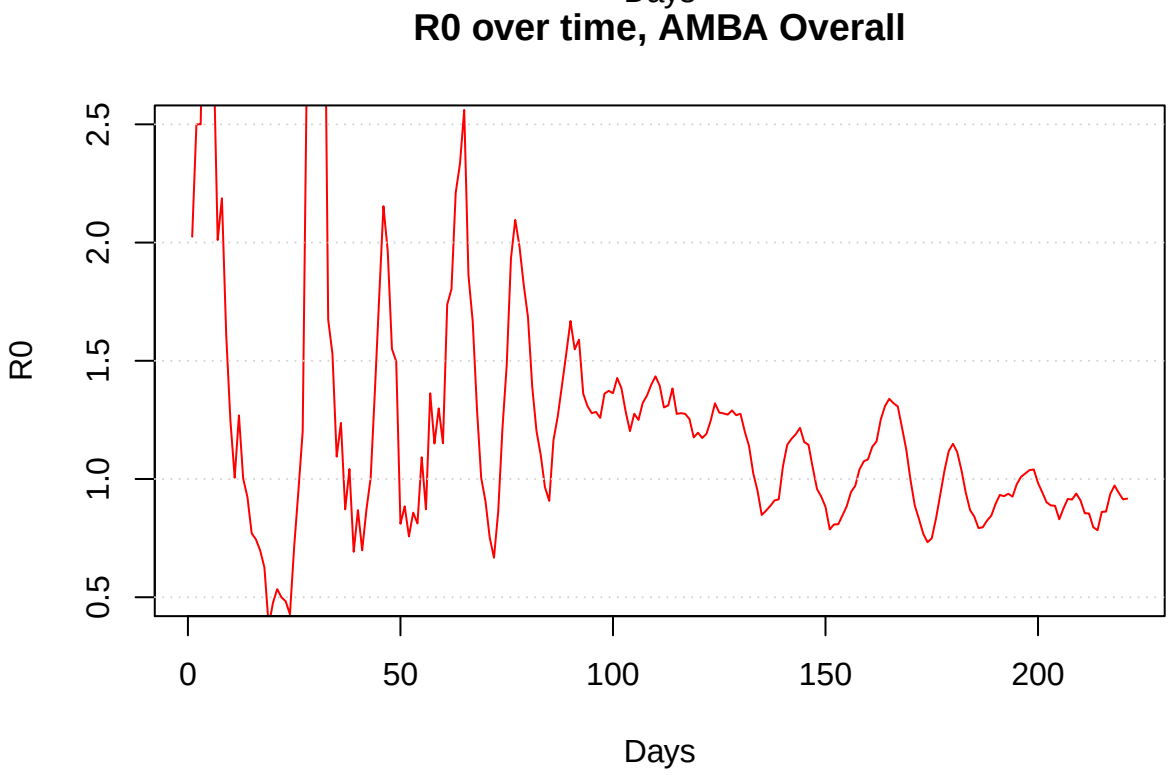

R0 over time, National Past Month
R0
2.0
1.5
1.0
0.5
0
10
20
30
Days

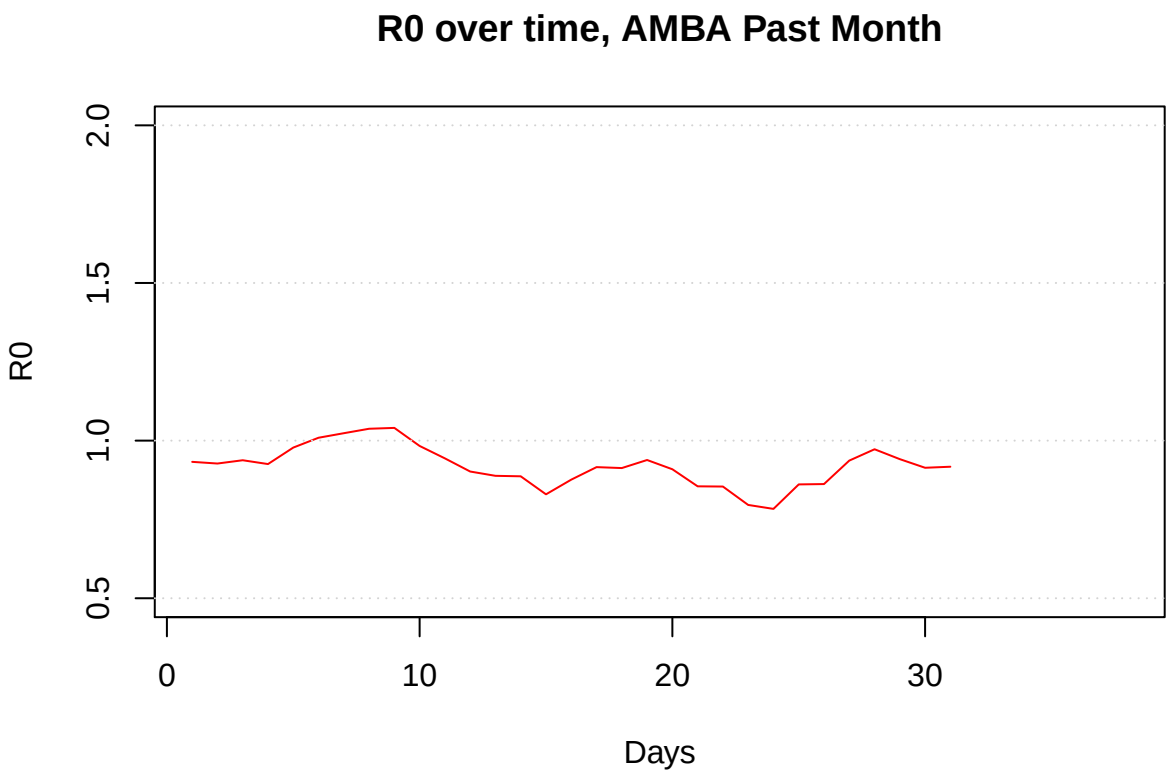

R0 over time, CABA Overall
R0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
Days


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

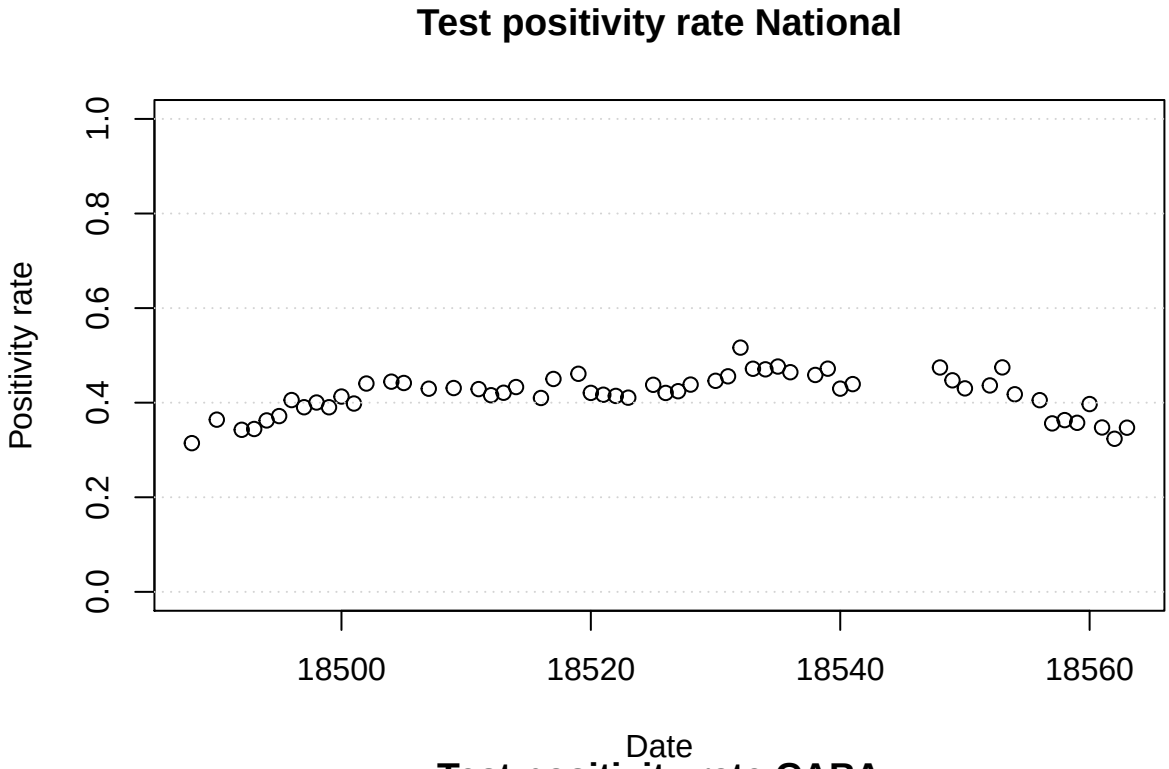

R0 over time, Conurbano Overall
R0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
Days

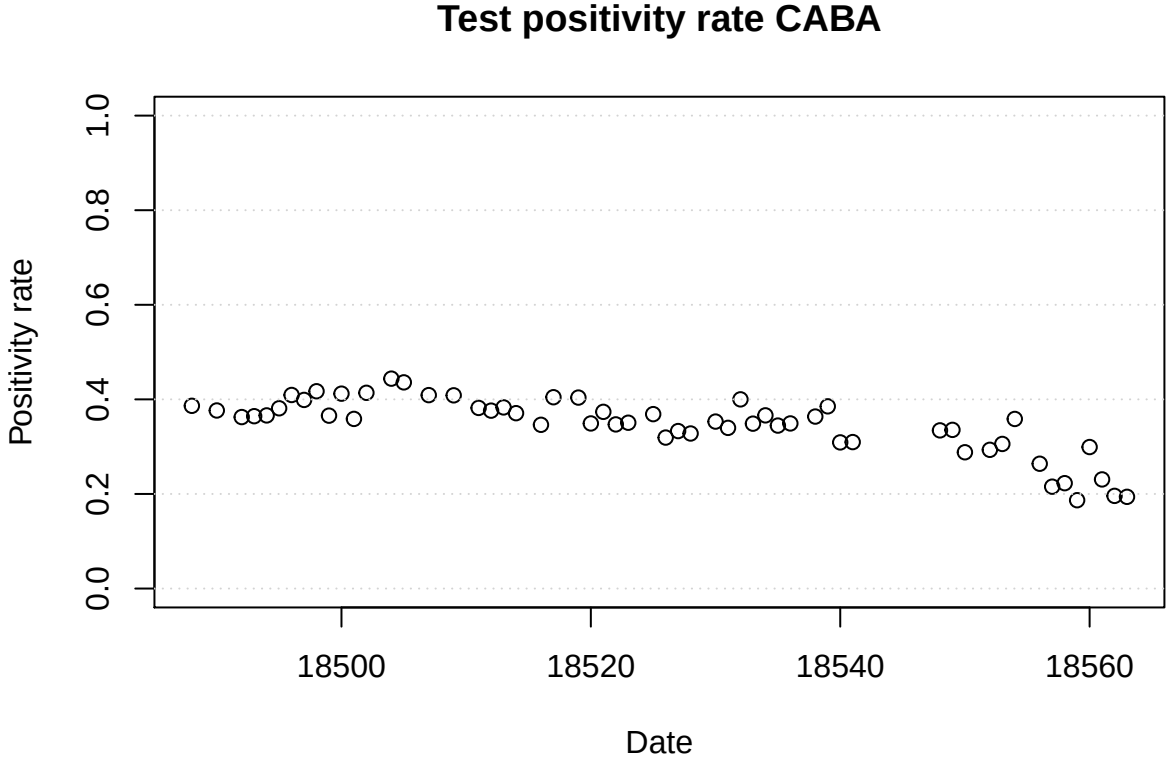

R0 over time, Conurbano Past Month
R0
2.0
1.5
1.0
0.5
0
10
20
30
Days

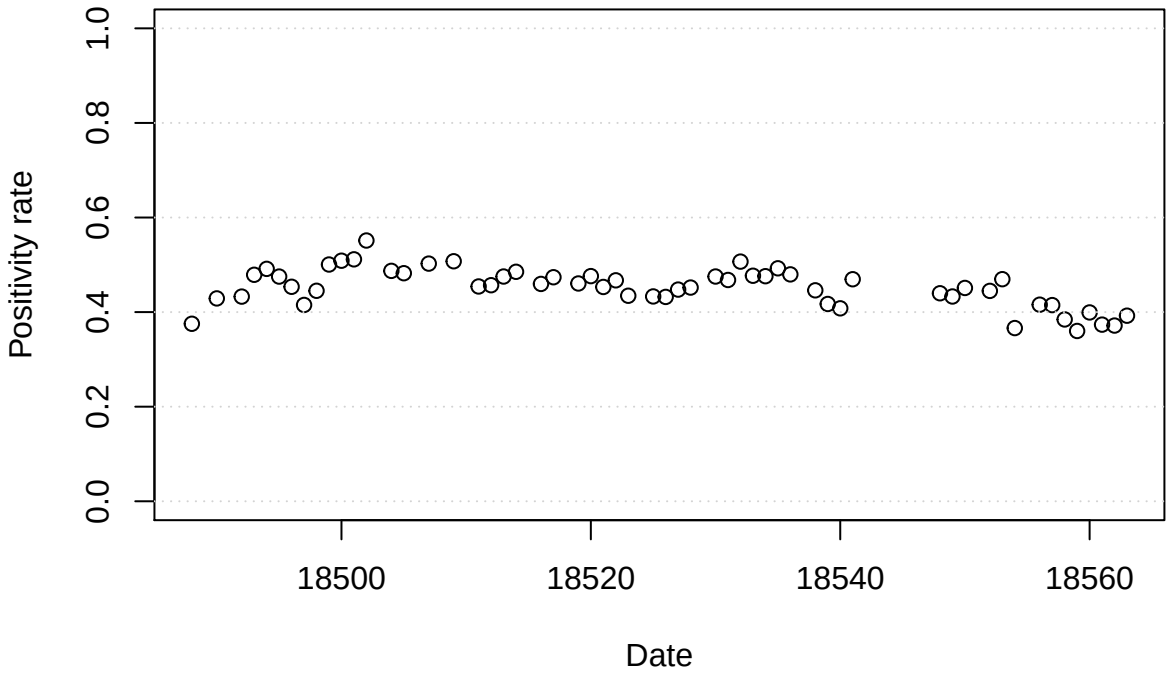

R0 over time, AMBA Overall
R0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
Days


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
## 46 18550            25678               11048          0.4302516         8461
## 47 18552            57710               25188          0.4364582        19394
## 48 18553            35625               16908          0.4746105        11393
## 49 18554             6173                2579          0.4177871         2047
## 50 18556            76743               31104          0.4053008        24102
## 51 18557            28614               10193          0.3562242        10584
## 52 18558            27370                9939          0.3631348         9856
## 53 18559            22549                8060          0.3574438         7828
## 54 18560            16083                6386          0.3970652         4967
## 55 18561            22011                7651          0.3475989         7601
## 56 18562            25031                8101          0.3236387         8707
## 57 18563            25814                8961          0.3471372         9370
##    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
## 46   2438 0.2881456  5534  2496 0.4510300
## 47   5689 0.2933381 12689  5645 0.4448735
## 48   3483 0.3057140  7121  3344 0.4695970
## 49    734 0.3585735  1439   527 0.3662265
## 50   6360 0.2638785 15237  6334 0.4156986
## 51   2280 0.2154195  5359  2223 0.4148162
## 52   2196 0.2228084  5038  1937 0.3844780
## 53   1462 0.1867655  4313  1553 0.3600742
## 54   1486 0.2991746  2700  1078 0.3992593
## 55   1754 0.2307591  4281  1599 0.3735109
## 56   1706 0.1959343  5259  1954 0.3715535
## 57   1817 0.1939168  5367  2106 0.3923980
```