

Estudo de simulação - TCC

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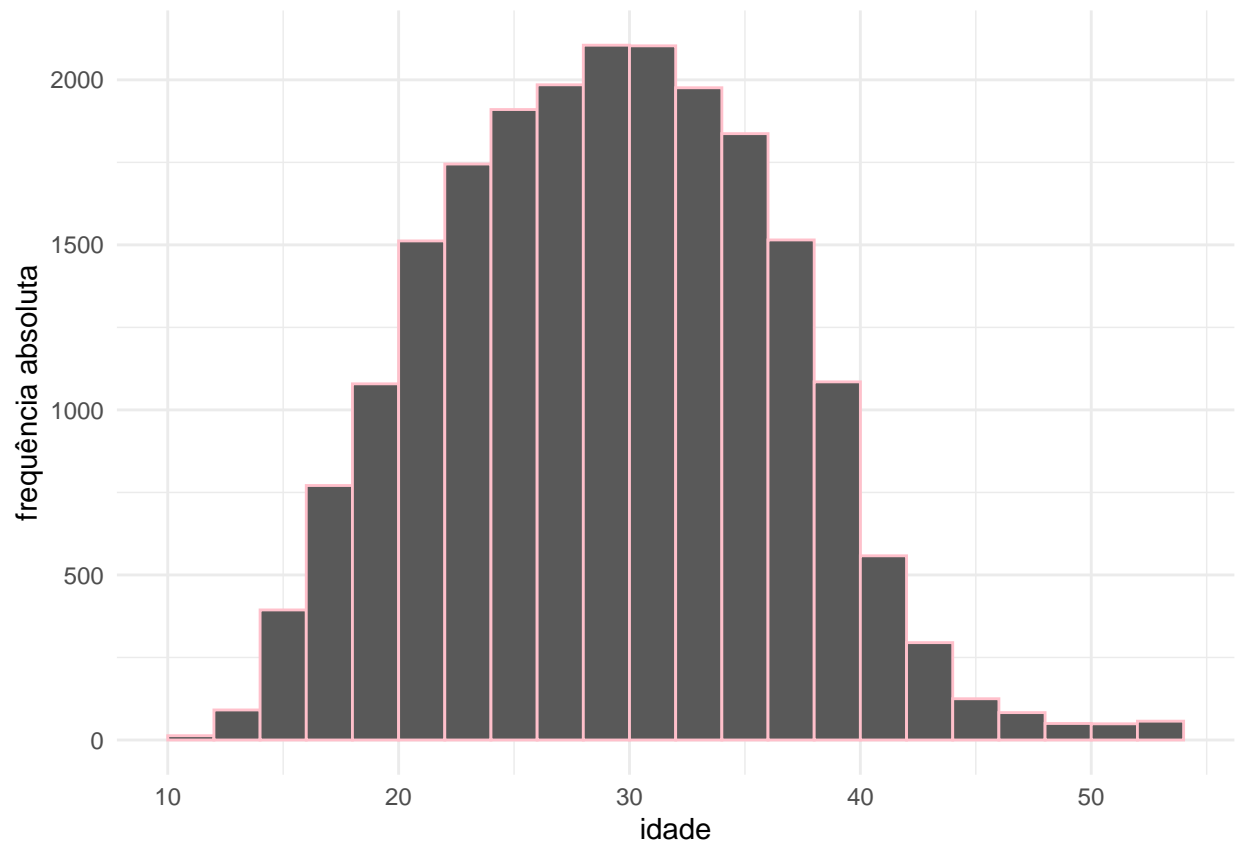
2022-11-01

```
## Frequencies
## dados$CLASSI_FIN
## Type: Numeric
##
##      Freq  % Valid  % Valid Cum.  % Total  % Total Cum.
## -----
##      1   1521    4.063      4.063    3.912    3.912
##      2    601    1.606      5.669    1.546    5.458
##      3    108    0.289      5.958    0.278    5.736
##      4   16048   42.874     48.831   41.279   47.015
##      5   19136   51.123     99.955   49.222   96.237
##      9     17    0.045    100.000    0.044   96.281
##      <NA>   1446             3.719   100.000
##      Total 38877  100.000    100.000  100.000  100.000
```

Idade

```
## *****
## Family:  c("GG", "generalised Gamma Lopatatsidis-Green")
##
## Call:  gamlss(formula = idade ~ 1, family = GG, data = data_categorico)
##
## Fitting method: RS()
##
## -----
## Mu link function:  log
## Mu Coefficients:
##      Estimate Std. Error t value Pr(>|t|)
## (Intercept)  3.42199    0.00276   1240  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Sigma link function:  log
## Sigma Coefficients:
##      Estimate Std. Error t value Pr(>|t|)
## (Intercept) -1.426859    0.005525 -258.3  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Nu link function:  identity
```

```
## Nu Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)  2.13339    0.08046   26.52  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## No. of observations in the fit:  21366
## Degrees of Freedom for the fit:   3
##      Residual Deg. of Freedom: 21363
##                      at cycle:  17
##
## Global Deviance:      145008.7
##           AIC:        145014.7
##           SBC:        145038.6
## *****
```



	n	media	DP	mediana	q25	q75	IQR
COVID-19	19136.00	29.90	7.23	30.00	25.00	35.00	10.00
Não COVID-19	2230.00	27.44	7.05	27.00	22.00	32.00	10.00

Raça

```
## não branca    branca  em branco  ignorado
## 0.50126369 0.35734344 0.01502387 0.12636900
```

Escolaridade

```
## Cross-Tabulation, Column Proportions
## escolaridade * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## escolaridade
## até fundamental      2307 ( 12.1%)      432 ( 19.4%)      2739 ( 12.8%)
##          médio      4423 ( 23.1%)      716 ( 32.1%)      5139 ( 24.1%)
##          superior      1552 (  8.1%)      246 ( 11.0%)      1798 (  8.4%)
##          em branco      5708 ( 29.8%)      300 ( 13.5%)      6008 ( 28.1%)
##          ignorado      5146 ( 26.9%)      536 ( 24.0%)      5682 ( 26.6%)
##          Total      19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----

## até fundamental      médio      superior      em branco      ignorado
##      0.12819433      0.24052233      0.08415239      0.28119442      0.26593653
```

Vacina

```
## Cross-Tabulation, Column Proportions
## vacina * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## vacina
## não      5998 ( 31.3%)      1159 ( 52.0%)      7157 ( 33.5%)
## sim      2775 ( 14.5%)      609 ( 27.3%)      3384 ( 15.8%)
## em branco      3862 ( 20.2%)      121 (  5.4%)      3983 ( 18.6%)
## ignorado      6501 ( 34.0%)      341 ( 15.3%)      6842 ( 32.0%)
## Total      19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Febre

```
## Cross-Tabulation, Column Proportions
## febre * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## febre
## não      6308 ( 33.0%)      374 ( 16.8%)      6682 ( 31.3%)
## sim      10129 ( 52.9%)      1803 ( 80.9%)      11932 ( 55.8%)
## em branco      2527 ( 13.2%)      39 (  1.7%)      2566 ( 12.0%)
## ignorado      172 (  0.9%)      14 (  0.6%)      186 (  0.9%)
## Total      19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Tosse

```
## Cross-Tabulation, Column Proportions
## tosse * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
##      tosse
##      não          4250 ( 22.2%)      173 (  7.8%)      4423 ( 20.7%)
##      sim          12901 ( 67.4%)      2019 ( 90.5%)      14920 ( 69.8%)
##      em branco      1841 (  9.6%)       32 (  1.4%)      1873 (  8.8%)
##      ignorado        144 (  0.8%)       6 (  0.3%)       150 (  0.7%)
##      Total          19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Garganta

```
## Cross-Tabulation, Column Proportions
## garganta * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
##      garganta
##      não          10660 ( 55.7%)      1189 ( 53.3%)      11849 ( 55.5%)
##      sim           3918 ( 20.5%)       913 ( 40.9%)       4831 ( 22.6%)
##      em branco      4273 ( 22.3%)       76 (  3.4%)       4349 ( 20.4%)
##      ignorado         285 (  1.5%)       52 (  2.3%)       337 (  1.6%)
##      Total          19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Dispneia

```
## Cross-Tabulation, Column Proportions
## dispneia * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
##      dispneia
##      não          5858 ( 30.6%)       719 ( 32.2%)      6577 ( 30.8%)
##      sim          10738 ( 56.1%)      1435 ( 64.3%)      12173 ( 57.0%)
##      em branco      2397 ( 12.5%)       56 (  2.5%)       2453 ( 11.5%)
##      ignorado         143 (  0.7%)       20 (  0.9%)       163 (  0.8%)
##      Total          19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Desconforto respiratório

```
## Cross-Tabulation, Column Proportions
```

```
## desc_resp * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## desc_resp
##      não          7245 ( 37.9%)      641 ( 28.7%)      7886 ( 36.9%)
##      sim          8431 ( 44.1%)      1493 ( 67.0%)      9924 ( 46.4%)
## em branco          3251 ( 17.0%)       70 (  3.1%)      3321 ( 15.5%)
## ignorado           209 (  1.1%)       26 (  1.2%)       235 (  1.1%)
##      Total          19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Saturação

```
## Cross-Tabulation, Column Proportions
## saturacao * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## saturacao
##      não          8291 ( 43.3%)      1387 ( 62.2%)      9678 ( 45.3%)
##      sim          7199 ( 37.6%)       673 ( 30.2%)      7872 ( 36.8%)
## em branco          3404 ( 17.8%)       93 (  4.2%)      3497 ( 16.4%)
## ignorado           242 (  1.3%)       77 (  3.5%)       319 (  1.5%)
##      Total          19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Diarreia

```
## Cross-Tabulation, Column Proportions
## diarreia * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## diarreia
##      não          12244 ( 64.0%)       781 ( 35.0%)      13025 ( 61.0%)
##      sim          1851 (  9.7%)       54 (  2.4%)      1905 (  8.9%)
## em branco          4766 ( 24.9%)      1369 ( 61.4%)      6135 ( 28.7%)
## ignorado           275 (  1.4%)       26 (  1.2%)       301 (  1.4%)
##      Total          19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Cardiopatia

```
## Cross-Tabulation, Column Proportions
## cardiopatia * classi_fin
## Data Frame: data_categorico
##
## -----
```

```
##          classi_fin      COVID-19      Não COVID-19      Total
## cardiopatia
##      não          5950 ( 31.1%)      1515 ( 67.9%)      7465 ( 34.9%)
##      sim          1163 (  6.1%)        54 (  2.4%)      1217 (  5.7%)
## em branco      11884 ( 62.1%)       616 ( 27.6%)     12500 ( 58.5%)
## ignorado        139 (  0.7%)        45 (  2.0%)       184 (  0.9%)
##      Total      19136 (100.0%)      2230 (100.0%)     21366 (100.0%)
## -----
```

Pneumopatia

```
## Cross-Tabulation, Column Proportions
## pneumonia * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## pneumonia
##      não          6671 ( 34.9%)      1450 ( 65.0%)      8121 ( 38.0%)
##      sim          115 (  0.6%)       115 (  5.2%)       230 (  1.1%)
## em branco      12200 ( 63.8%)       619 ( 27.8%)     12819 ( 60.0%)
## ignorado        150 (  0.8%)        46 (  2.1%)       196 (  0.9%)
##      Total      19136 (100.0%)      2230 (100.0%)     21366 (100.0%)
## -----
```

Renal

```
## Cross-Tabulation, Column Proportions
## renal * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## renal
##      não          6608 ( 34.5%)      1551 ( 69.6%)      8159 ( 38.2%)
##      sim          127 (  0.7%)        8 (  0.4%)       135 (  0.6%)
## em branco      12256 ( 64.0%)       626 ( 28.1%)     12882 ( 60.3%)
## ignorado        145 (  0.8%)        45 (  2.0%)       190 (  0.9%)
##      Total      19136 (100.0%)      2230 (100.0%)     21366 (100.0%)
## -----
```

Obesidade

```
## Cross-Tabulation, Column Proportions
## obesidade * classi_fin
## Data Frame: data_categorico
##
## -----
##          classi_fin      COVID-19      Não COVID-19      Total
## obesidade
##      não          5870 ( 30.7%)      1487 ( 66.7%)      7357 ( 34.4%)
##      sim          1188 (  6.2%)        61 (  2.7%)      1249 (  5.8%)
```

```
##      em branco          11910 ( 62.2%)      638 ( 28.6%)      12548 ( 58.7%)
##      ignorado           168 (  0.9%)       44 (  2.0%)       212 (  1.0%)
##      Total              19136 (100.0%)      2230 (100.0%)      21366 (100.0%)
## -----
```

Modelo logístico

```
##
## Call:
## glm(formula = classi_fin ~ raca + escolaridade + vacina + febre +
##       tosse + garganta + dispneia + desc_resp + saturacao + diarreia +
##       cardiopatia + pneumopatia + renal + obesidade + idade, family = "binomial",
##       data = data_categorico)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.1964  -0.3416  -0.2055  -0.1031   4.8317
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -1.706694   0.167168 -10.209 < 2e-16 ***
## racabranca       0.213210   0.066978   3.183 0.001456 **
## racaem branco    1.094691   0.225053   4.864 1.15e-06 ***
## racaignorado     0.134671   0.115365   1.167 0.243070
## escolaridademedio -0.231833   0.092027  -2.519 0.011763 *
## escolaridadesuperior -0.191324   0.125371  -1.526 0.126993
## escolaridadeem branco -0.611459   0.107559  -5.685 1.31e-08 ***
## escolaridadeignorado -0.211632   0.098974  -2.138 0.032495 *
## vacinasim        0.186167   0.077452   2.404 0.016232 *
## vacinaem branco  -0.922549   0.118532  -7.783 7.08e-15 ***
## vacinaignorado   -0.852195   0.083852 -10.163 < 2e-16 ***
## febresim         0.485043   0.076968   6.302 2.94e-10 ***
## febreem branco   -0.645445   0.204147  -3.162 0.001569 **
## febreignorado    -0.127235   0.424891  -0.299 0.764594
## tossesim         1.092429   0.102242  10.685 < 2e-16 ***
## tosseem branco    0.496279   0.238720   2.079 0.037625 *
## tosseignorado     0.038483   0.545222   0.071 0.943730
## gargantasim       0.224965   0.071137   3.162 0.001565 **
## gargantaem branco -2.303476   0.153490 -15.007 < 2e-16 ***
## gargantaignorado   0.411057   0.303467   1.355 0.175565
## dispneiasim      -0.074573   0.079181  -0.942 0.346292
## dispneiaem branco -0.534725   0.199468  -2.681 0.007346 **
## dispneiaignorado  -0.391028   0.440492  -0.888 0.374699
## desc_respsim      0.704799   0.078411   8.989 < 2e-16 ***
## desc_respem branco -0.352505   0.184641  -1.909 0.056245 .
## desc_respignorado -0.095164   0.388630  -0.245 0.806556
## saturacaosim      -0.998427   0.082777 -12.062 < 2e-16 ***
## saturacaoem branco -2.143251   0.170560 -12.566 < 2e-16 ***
## saturacaoignorado  0.013224   0.287640   0.046 0.963330
## diarreiasim       -0.871435   0.148149  -5.882 4.05e-09 ***
## diarreiaem branco  3.587028   0.085769  41.822 < 2e-16 ***
## diarreiaignorado   0.772503   0.318426   2.426 0.015266 *
## cardiopatiasim    -0.642803   0.182809  -3.516 0.000438 ***
```

```
## cardiopatiaem branco -0.029868 0.341084 -0.088 0.930221
## cardiopatiaignorado 0.504096 0.815607 0.618 0.536534
## pneumopatiasim 1.090215 0.241794 4.509 6.52e-06 ***
## pneumopatiaem branco -0.551476 0.355636 -1.551 0.120980
## pneumopatiaignorado 0.301314 0.808202 0.373 0.709282
## renalsim -0.933535 0.542251 -1.722 0.085143 .
## renalem branco -0.685236 0.394158 -1.738 0.082127 .
## renalignorado 0.056807 0.887850 0.064 0.948984
## obesidadesim -0.787215 0.177953 -4.424 9.70e-06 ***
## obesidadeem branco 0.505342 0.257939 1.959 0.050095 .
## obesidadeignorado -0.763917 0.620364 -1.231 0.218173
## idade -0.050623 0.004608 -10.985 < 2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 14297.4 on 21365 degrees of freedom
## Residual deviance: 7900.9 on 21321 degrees of freedom
## AIC: 7990.9
##
## Number of Fisher Scoring iterations: 7
```

calculo p

```
##
## Call:
## glm(formula = classi_fin_sim ~ ., family = "binomial", data = data4)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.3943  -0.3386  -0.1594  -0.0592   3.7465
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.256152   0.182756  -6.873 6.27e-12 ***
## raca2         0.184749   0.057997   3.186 0.001445 **
## raca3         1.082141   0.197585   5.477 4.33e-08 ***
## raca4         0.239400   0.082187   2.913 0.003581 **
## escolaridade2 -0.316406   0.087906  -3.599 0.000319 ***
## escolaridade3 -0.344915   0.117754  -2.929 0.003399 **
## escolaridade4 -0.669286   0.087654  -7.636 2.25e-14 ***
## escolaridade5 -0.261860   0.086448  -3.029 0.002453 **
## vacina2       0.120315   0.074650   1.612 0.107025
## vacina3      -0.902648   0.078590 -11.486 < 2e-16 ***
## vacina4      -0.926288   0.067849 -13.652 < 2e-16 ***
## febre2        0.547836   0.060063   9.121 < 2e-16 ***
## febre3       -0.588078   0.099309  -5.922 3.19e-09 ***
## febre4        0.168270   0.304832   0.552 0.580942
## tosse2        0.964988   0.072239  13.358 < 2e-16 ***
## tosse3        0.213706   0.117650   1.816 0.069300 .
## tosse4       -0.923955   0.406827  -2.271 0.023139 *
## garganta2     0.184154   0.060601   3.039 0.002375 **
```



```

## garganta3      -2.467825   0.101424 -24.332 < 2e-16 ***
## garganta4       0.205443   0.191209   1.074 0.282627
## dispneia2      -0.160683   0.058393  -2.752 0.005928 **
## dispneia3      -0.599869   0.094703  -6.334 2.39e-10 ***
## dispneia4      -0.939346   0.382560  -2.455 0.014072 *
## desc_resp2       0.719906   0.058653  12.274 < 2e-16 ***
## desc_resp3      -0.495202   0.089154  -5.554 2.78e-08 ***
## desc_resp4      -0.313429   0.276842  -1.132 0.257567
## saturacao2      -1.001497   0.059349 -16.875 < 2e-16 ***
## saturacao3      -2.174549   0.098530 -22.070 < 2e-16 ***
## saturacao4      -0.058516   0.194405  -0.301 0.763415
## diarreia2       -0.893230   0.199600  -4.475 7.64e-06 ***
## diarreia3        3.670733   0.067691  54.228 < 2e-16 ***
## diarreia4        0.757099   0.236698   3.199 0.001381 **
## cardiopatia2    -0.485672   0.127373  -3.813 0.000137 ***
## cardiopatia3    -0.070887   0.056091  -1.264 0.206304
## cardiopatia4     0.498879   0.243743   2.047 0.040683 *
## pneumopatia2     0.877913   0.210145   4.178 2.95e-05 ***
## pneumopatia3    -0.560049   0.054595 -10.258 < 2e-16 ***
## pneumopatia4     0.098545   0.270098   0.365 0.715226
## renal2          -1.279633   0.341304  -3.749 0.000177 ***
## renal3          -0.789627   0.054620 -14.457 < 2e-16 ***
## renal4          -0.050822   0.259219  -0.196 0.844565
## obesidade2      -0.670573   0.142887  -4.693 2.69e-06 ***
## obesidade3       0.555552   0.057937   9.589 < 2e-16 ***
## obesidade4      -0.591221   0.291614  -2.027 0.042621 *
## idade          -0.057886   0.003775 -15.334 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##    Null deviance: 16996.3  on 21365  degrees of freedom
## Residual deviance:  9540.4  on 21321  degrees of freedom
## AIC: 9630.4
##
## Number of Fisher Scoring iterations: 7

```