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| --- | --- |
| **glm(formula = YPLLRate ~ . - Region, data = Raw95naomit)**  (Dispersion parameter for gaussian family taken to be 207428.1)  Null deviance: 1.3068e+10 on 2332 degrees of freedom  Residual deviance: 4.6049e+08 on 2220 degrees of freedom  AIC: 35295  **Without State too:**  (Dispersion parameter for gaussian family taken to be 221333.7)  Null deviance: 1.3068e+10 on 2332 degrees of freedom  Residual deviance: 5.0110e+08 on 2264 degrees of freedom  AIC: 35404  \*\*Lower AIC ~ better fit (but penalizes number of parameters)  <https://statmath.wu.ac.at/courses/heather_turner/glmCourse_001.pdf>  Partial t-tests test the significance of each coefficient in the  presence of the others. The dispersion parameter for the gaussian  family is equal to the residual variance. | **Back AIC**  **glm(formula = YPLLRate ~ State + HealthBadDaysMentAvg + LBWPct +**  **FoodEnvirIX + PhysInactPct + DeathsDrinkDrivePct + ChlamydiaRate +**  **UninsuredPct + PhysPrimCareRate + HospPrevRate + MammAnnualPct +**  **VaccinatedPct + Population + CollegeSomePct + Income20thpcntl +**  **IncomeRatio + SocsAssRate + InjuryDeathRate + DailyPM25Avg +**  **HousSvrProbPct + HousSvrCostBurden + HousSvrOvercrowd + HousInadFacil +**  **DriveAloneWorkPct + DriveAloneLongPct + LifeExpect + DeathAgeAdjRate +**  **DistressFreqMentPct + UninsAdultPct + IncHousehldMedian +**  **Population2 + PopGE65Pct + PopNativePct + PopPacificPct +**  **EnglishNotProfPct + PopFemalePct + PopRuralPct, data = Raw95naomit)**  Deviance Residuals:  Min 1Q Median 3Q Max  -1917.41 -257.85 -13.67 226.83 2594.76  Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1  (Dispersion parameter for gaussian family taken to be 205669.6)  Null deviance: 1.3068e+10 on 2332 degrees of freedom  Residual deviance: 4.6317e+08 on 2252 degrees of freedom  AIC: **35244**  Number of Fisher Scoring iterations: 2 |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Coefficients:** | **Estimate** | **Std. Error** | **t value** | **Pr(>|t|)** | **Signif** | | InjuryDeathRate | 1.05E+01 | 8.23E-01 | 12.806 | < 2e-16 | \*\*\* | | LifeExpect | -1.62E+02 | 1.48E+01 | -10.995 | < 2e-16 | \*\*\* | | DeathAgeAdjRate | 1.63E+01 | 4.28E-01 | 38.171 | < 2e-16 | \*\*\* | | PopNativePct | 2.92E+01 | 3.04E+00 | 9.603 | < 2e-16 | \*\*\* | | PopGE65Pct | 4.80E+01 | 6.63E+00 | 7.24 | 6.15E-13 | \*\*\* | | LBWPct | 7.09E+01 | 1.06E+01 | 6.723 | 2.26E-11 | \*\*\* | | Income20thpcntl | 4.12E-02 | 1.00E-02 | 4.122 | 3.90E-05 | \*\*\* | | SocsAssRate | -1.15E+01 | 3.01E+00 | -3.84E+00 | 0.000129 | \*\*\* | | MammAnnualPct | 8.73E+00 | 2.30E+00 | 3.796 | 0.000151 | \*\*\* | | HousInadFacil | -8.62E+01 | 2.42E+01 | -3.567 | 0.000369 | \*\*\* | | PhysInactPct | -9.21E+00 | 3.01E+00 | -3.056 | 0.002268 | \*\* | | PopRuralPct | 2.43E+00 | 8.02E-01 | 3.031 | 0.002469 | \*\* | | (Intercept) | 1.09E+04 | 3.82E+03 | 2.844 | 0.0045 | \*\* | | HousSvrProbPct | 7.53E+01 | 2.78E+01 | 2.705 | 0.006892 | \*\* | | DailyPM25Avg | -3.02E+01 | 1.12E+01 | -2.687 | 0.007258 | \*\* | | DeathsDrinkDrivePct | 2.25E+00 | 8.57E-01 | 2.631 | 0.008578 | \*\* | | ChlamydiaRate | 2.15E-01 | 8.45E-02 | 2.541 | 0.011107 | \* | | HousSvrCostBurden | -6.73E+01 | 2.72E+01 | -2.476 | 0.013349 | \* | | EnglishNotProfPct | 2.35E+01 | 9.51E+00 | 2.471 | 0.01356 | \* | | CollegeSomePct | 4.88E+00 | 2.00E+00 | 2.437 | 0.014882 | \* | | IncomeRatio | 1.04E+02 | 4.78E+01 | 2.175 | 0.029748 | \* | | VaccinatedPct | 3.39E+00 | 1.63E+00 | 2.078 | 0.037827 | \* | | DriveAloneWorkPct | -5.21E+00 | 2.71E+00 | -1.919 | 0.055156 | . | | PopFemalePct | 1.58E+01 | 9.03E+00 | 1.747 | 0.080694 | . | | PopPacificPct | -1.01E+02 | 5.83E+01 | -1.728 | 0.08407 | . | | HousSvrOvercrowd | -4.45E+01 | 2.61E+01 | -1.706 | 0.088076 | . | | PhysPrimCareRate | -8.41E-01 | 5.09E-01 | -1.655 | 0.098099 | . | | UninsuredPct | 1.38E+02 | 8.69E+01 | 1.586 | 0.112839 |  | | UninsAdultPct | -9.50E+01 | 6.11E+01 | -1.554 | 0.120292 |  | | Population | -2.76E-03 | 1.83E-03 | -1.509 | 0.131399 |  | | HealthBadDaysMentAvg | -2.19E+02 | 1.53E+02 | -1.431 | 0.152618 |  | | PopLT18Pct | 1.38E+01 | 9.83E+00 | 1.405 | 0.160267 |  | | Population2 | 9.60E-04 | 6.95E-04 | 1.381 | 0.167285 |  | | IncHousehldMedian | -4.83E-03 | 3.76E-03 | -1.284 | 0.199205 |  | | HospPrevRate | -1.00E-02 | 7.82E-03 | -1.283 | 0.199789 |  | | DriveAloneLongPct | 1.81E+00 | 1.42E+00 | 1.275 | 0.202404 |  | | TeenBirthRate | -2.33E+00 | 1.85E+00 | -1.26 | 0.207837 |  | | ObeseAdultsPct | -3.19E+00 | 2.84E+00 | -1.122 | 0.261822 |  | | DiabetesAdultPct | 3.84E+00 | 3.66E+00 | 1.05 | 0.293666 |  | | LunchFreeReducedPct | 1.34E+00 | 1.41E+00 | 0.949 | 0.34294 |  | | ExerAccPct | 6.58E-01 | 7.34E-01 | 0.896 | 0.370246 |  | | TrafficVolume | -4.57E-02 | 5.32E-02 | -0.859 | 0.390313 |  | | HSGradRate | -1.63E+00 | 2.00E+00 | -0.815 | 0.415102 |  | | ViolsCrimeAnlAvg | 1.91E-02 | 2.41E-02 | 0.794 | 0.427229 |  | | UninsChildPct | -2.29E+01 | 2.98E+01 | -0.768 | 0.442816 |  | | UnemployedPct | 9.70E+00 | 1.33E+01 | 0.729 | 0.466365 |  | | Income80thpcntl | -1.65E-03 | 2.78E-03 | -0.594 | 0.55232 |  | | Deaths | -1.23E-02 | 2.07E-02 | -0.594 | 0.552573 |  | | SingsParsHshsldsPct | 1.09E+00 | 2.05E+00 | 0.532 | 0.594667 |  | | HousehldSvrCostPct | 3.54E+00 | 8.10E+00 | 0.437 | 0.661889 |  | | DistressFreqMentPct | 2.99E+01 | 7.53E+01 | 0.397 | 0.691087 |  | | DistressFreqPhysPct | 3.04E+01 | 7.72E+01 | 0.394 | 0.693405 |  | | WaterViolYes | -8.35E+00 | 2.22E+01 | -0.376 | 0.706827 |  | | HomeownersPct | -1.09E+00 | 3.02E+00 | -0.36 | 0.718625 |  | | HealthBadDaysPhysAvg | -6.13E+01 | 1.89E+02 | -0.324 | 0.745841 |  | | OthPrimCareProvRate | -7.03E-02 | 2.39E-01 | -0.294 | 0.768891 |  | | LaborForce | -2.49E-04 | 1.12E-03 | -0.222 | 0.824143 |  | | SleepPoorPct | -1.42E+00 | 6.67E+00 | -0.213 | 0.831693 |  | | FoodEnvirIX | -5.96E+01 | 3.34E+02 | -0.179 | 0.858296 |  | | HealthPoorPct | 1.90E+00 | 1.25E+01 | 0.153 | 0.878585 |  | | ViolCrimeRate | -1.03E-02 | 8.21E-02 | -0.126 | 0.900113 |  | | FIPS | 1.81E-02 | 1.47E-01 | 0.123 | 0.902149 |  | | ChildInPovertyPct | -4.61E-01 | 3.76E+00 | -0.123 | 0.902464 |  | | DrinkExcPct | -1.16E+00 | 1.03E+01 | -0.113 | 0.909885 |  | | FoodHealthLimAccPct | -1.72E+00 | 2.97E+01 | -0.058 | 0.953819 |  | | DentistRate | 2.45E-02 | 6.21E-01 | 0.039 | 0.968541 |  | | MentHProvRate | 2.98E-03 | 8.96E-02 | 0.033 | 0.973439 |  | | FoodInsecurePct | 1.91E+00 | 6.33E+01 | 0.03 | 0.975897 |  | | SmokersPct | 9.94E-02 | 1.26E+01 | 0.008 | 0.993705 |  | | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Coefficients:** | **Estimate** | **Std. Error** | **t value** | **Pr(>|t|)** | **Signif** | | InjuryDeathRate | 1.04E+01 | 7.95E-01 | 13.089 | < 2e-16 | \*\*\* | | LifeExpect | -1.61E+02 | 1.44E+01 | -11.172 | < 2e-16 | \*\*\* | | DeathAgeAdjRate | 1.63E+01 | 4.11E-01 | 39.732 | < 2e-16 | \*\*\* | | PopGE65Pct | 4.52E+01 | 3.83E+00 | 11.816 | < 2e-16 | \*\*\* | | PopNativePct | 2.96E+01 | 2.72E+00 | 10.879 | < 2e-16 | \*\*\* | | LBWPct | 7.53E+01 | 9.52E+00 | 7.909 | 4.02E-15 | \*\*\* | | (Intercept) | 1.03E+04 | 1.38E+03 | 7.488 | 1.00E-13 | \*\*\* | | Income20thpcntl | 3.86E-02 | 7.39E-03 | 5.225 | 1.90E-07 | \*\*\* | | MammAnnualPct | 9.18E+00 | 2.23E+00 | 4.116 | 3.99E-05 | \*\*\* | | SocsAssRate | -1.19E+01 | 2.91E+00 | -4.079 | 4.69E-05 | \*\*\* | | HousInadFacil | -8.26E+01 | 2.36E+01 | -3.501 | 0.000473 | \*\*\* | | PopFemalePct | 2.29E+01 | 6.70E+00 | 3.417 | 0.000644 | \*\*\* | | PopRuralPct | 2.34E+00 | 6.90E-01 | 3.391 | 0.000709 | \*\*\* | | EnglishNotProfPct | 2.68E+01 | 7.98E+00 | 3.361 | 0.000789 | \*\*\* | | PhysInactPct | -9.24E+00 | 2.81E+00 | -3.284 | 0.001039 | \*\* | | ChlamydiaRate | 2.31E-01 | 7.45E-02 | 3.105 | 0.001929 | \*\* | | IncomeRatio | 8.47E+01 | 3.07E+01 | 2.757 | 0.005886 | \*\* | | DailyPM25Avg | -2.93E+01 | 1.07E+01 | -2.727 | 0.006445 | \*\* | | DeathsDrinkDrivePct | 2.26E+00 | 8.44E-01 | 2.677 | 0.007484 | \*\* | | FoodEnvirIX | -5.50E+01 | 2.08E+01 | -2.644 | 0.008255 | \*\* | | HealthBadDaysMentAvg | -3.07E+02 | 1.19E+02 | -2.589 | 0.009676 | \*\* | | HousSvrProbPct | 6.96E+01 | 2.73E+01 | 2.555 | 0.010689 | \* | | CollegeSomePct | 4.64E+00 | 1.82E+00 | 2.544 | 0.011024 | \* | | UninsuredPct | 7.51E+01 | 3.00E+01 | 2.504 | 0.012339 | \* | | PhysPrimCareRate | -9.27E-01 | 4.13E-01 | -2.245 | 0.024835 | \* | | HousSvrCostBurden | -5.75E+01 | 2.59E+01 | -2.223 | 0.02631 | \* | | IncHousehldMedian | -6.79E-03 | 3.17E-03 | -2.141 | 0.032395 | \* | | UninsAdultPct | -5.30E+01 | 2.61E+01 | -2.033 | 0.042171 | \* | | DistressFreqMentPct | 8.29E+01 | 4.12E+01 | 2.011 | 0.044414 | \* | | VaccinatedPct | 2.88E+00 | 1.57E+00 | 1.84 | 0.065842 | . | | DriveAloneWorkPct | -4.47E+00 | 2.45E+00 | -1.825 | 0.068206 | . | | PopPacificPct | -1.03E+02 | 5.69E+01 | -1.802 | 0.071714 | . | | Population2 | 5.92E-04 | 3.54E-04 | 1.671 | 0.094896 | . | | Population | -2.00E-03 | 1.21E-03 | -1.65 | 0.099183 | . | | HousSvrOvercrowd | -3.85E+01 | 2.53E+01 | -1.522 | 0.128146 |  | | DriveAloneLongPct | 1.93E+00 | 1.31E+00 | 1.469 | 0.141929 |  | | HospPrevRate | -1.12E-02 | 7.67E-03 | -1.463 | 0.143701 |  |   Maybe consider a different result?   |  |  |  |  | | --- | --- | --- | --- | |  | AIC | Dispersion Rate | Adj R^2 | | YPLLRate | 35295 | 207428 | 0.963 | | DeathAgeAdjRate | 20105 | 308 | 0.9724 | | PopGE65Pct | 8441 | 2 | 0.8944 | | InjuryDeathRate | 18064 | 128 | 0.7443 | | LifeExpect | 4634 | 0.4 | 0.9461 | |
| Only picked top fit from all and back model (YPLLRate, FIPS, State, DeathAgeAdjRate, EnglishNotProfPct,  HousInadFacil,  Income20thpcntl,  InjuryDeathRate,  LBWPct,  LifeExpect,  MammAnnualPct,  PopFemalePct,  PopGE65Pct,  PopNativePct,  PopRuralPct,  SocsAssRate )  glm(formula = YPLLRate ~ ., data = Raw95TopFit)  Deviance Residuals:  Min 1Q Median 3Q Max  -1953.12 -270.57 -7.57 238.19 2879.83  (Dispersion parameter for gaussian family taken to be 219222.8)  Null deviance: 1.3068e+10 on 2332 degrees of freedom  Residual deviance: 4.9851e+08 on 2274 degrees of freedom  AIC: 35372 (a little higher than whole model) Backfit model did better on dispersion and residuals. | Outliers? YPLLRate(212, 304, 2030) for DeathAgeAdjRate (212, 304, 383)  Positive correlations  Strong (YPLLRate, DeathAgeAdjRate) (FIPS, State)  Weak (YPLLRate, (InjuryDeathRate, LBWPct)  Negative Correlations  Strong (LifeExpectancy, DeathAgeAdjRate)  Weak (YPLLRate, EnglishNotProfPct\*, Income20thpcntl\*, LifeExpect, MammAnnualPct)  \*- maybe a curve |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Coefficients:** | **Estimate** | **Std. Error** | **t value** | **Pr(>|t|)** | **Signif** | | DeathAgeAdjRate | 1.66E+01 | 3.97E-01 | 41.718 | < 2e-16 | \*\*\* | | InjuryDeathRate | 1.10E+01 | 7.90E-01 | 1.39E+01 | < 2e-16 | \*\*\* | | LBWPct | 9.61E+01 | 8.72E+00 | 11.011 | < 2e-16 | \*\*\* | | LifeExpect | -1.21E+02 | 1.39E+01 | -8.682 | < 2e-16 | \*\*\* | | PopGE65Pct | 4.04E+01 | 3.46E+00 | 11.675 | < 2e-16 | \*\*\* | | PopNativePct | 3.81E+01 | 2.15E+00 | 17.725 | < 2e-16 | \*\*\* | | PopFemalePct | 3.47E+01 | 5.79E+00 | 5.997 | 2.33E-09 | \*\*\* | | Income20thpcntl | 1.45E-02 | 2.47E-03 | 5.856 | 5.42E-09 | \*\*\* | | EnglishNotProfPct | 2.75E+01 | 5.03E+00 | 5.471 | 4.95E-08 | \*\*\* | | SocsAssRate | -1.48E+01 | 2.78E+00 | -5.31E+00 | 1.21E-07 | \*\*\* | | (Intercept) | 6.20E+03 | 1.27E+03 | 4.87 | 1.19E-06 | \*\*\* | | MammAnnualPct | 8.74E+00 | 2.10E+00 | 4.163 | 3.25E-05 | \*\*\* | | PopRuralPct | 1.39E+00 | 4.91E-01 | 2.828 | 0.00473 | \*\* | | HousInadFacil | -2.25E+01 | 1.36E+01 | -1.651 | 0.09878 | . | | FIPS | 1.94E-02 | 1.49E-01 | 0.13 | 0.89658 |  | | Tried different Results against all  InjuryDeathRate AIC 18064 Dispersion only 128 for lm adj R2 = 0.7443 |
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