Methodological Assumptions

**Calculation of local jail inmates related to prescription opioid crime:**

For the federal and state levels we used the same apportionment method used for criminal justice costs.For the local level, since Bureau of Justice Statistics no longer provided the number of local jail inmates after 2008, we made the following two assumptions: (1) the number of local inmates increased at an annual rate of 2.98%, as it did from 2000 to 2008(18) and (2) the ratio of local to state inmates incarcerated for crimes attributed to prescription opioid abuse equaled the ratio of local to state inmates.

**Use of property loss due to crime as a cost:**

In the economic literature, some have argued that property loss due to crime is simply a transfer payment (although an illegal one) from the victim to the perpetrator, and therefore does not reflect a net loss in social welfare. In the technical definition of a social cost in economics, this would not be a cost. However, the standard of practice in cost benefit analysis is to count these as a cost because perpetrators of crimes should not have “standing” in a cost benefit analysis. Please see Trumbull, W. N. (1990). Who has standing in cost-benefit analysis? Journal of Policy Analysis and Management, 9(2), 201-218 for details.

**Counting incarcerated person’s time as lost productivity:**

Some have argued that time for incarcerated persons should not count as a social cost if the economy is below full employment. This argument stems from the idea that these persons may be unemployed if not incarcerated. Please see Koopmanschap, M. A., Rutten, F. F. H., van Ineveld, B. M. and van Roijen, L. (1995). The friction cost method for estimating the indirect costs of disease. Journal of Health Economics, 14, 171-198 for details. However, since we are incorporating a measure of economic productivity that includes both market and nonmarket time, we assume that incarcerated persons would be employed in economic activity consistent with the mean for their age and sex.

Comparison of Characteristics of Cases, Controls and the General Population from the Propensity Score Matching Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 1a. MarketScan Commercial Databases, Propensity Score Match** | | | |
|  |  |  |  |
|  | **PDO (N=61,205) n (%)** | **Non-PDO (N=19,879,739) n (%)** | **Matched non-PDO (N=60,135) n (%)** |
| **Age (mean (95% CI))** | 36.5 (36.4-36.6) | 34.9 (34.9-34.9) | 36.3 (36.2-36.4) |
| **Age (median (range))** | 35.0 (0.0-64.0) | 37.0 (0.0-64.0) | 37.0 (0.0-64.0) |
| **Base pay (mean (95% CI))** | 1,242.9 (1,199.9-1,285.9) | 607.2 (605.8-608.7) | 1,062.9 (1,025.4-1,100.4) |
| **Base pay (median (range))** | 0.0 (0.0-389,525.2) | 0.0 (0.0-2,772,333.9) | 67.6 (0.0-365,542.4) |
| **sex** |  |  |  |
| Male | 35,383 (57.8) | 9,312,649 (46.8) | 34,750 (57.8) |
| Female | 25,822 (42.2) | 10,567,090 (53.2) | 25,385 (42.2) |
| **Region** |  |  |  |
| Northeast | 15,043 (24.6) | 3,702,385 (18.6) | 14,586 (24.3) |
| North central | 13,291 (21.7) | 4,987,519 (25.1) | 13,713 (22.8) |
| South | 20,359 (33.3) | 7,205,641 (36.2) | 20,992 (34.9) |
| West | 10,941 (17.9) | 3,466,890 (17.4) | 9,577 (15.9) |
| Unknown/missing | 1,571 (2.6) | 517,304 (2.6) | 1,267 (2.1) |
| **Plan Indicator** |  |  |  |
| Comprehesive | 1,887 (3.1) | 386,806 (1.9) | 1,444 (2.4) |
| EPO | 1,766 (2.9) | 526,647 (2.6) | 1,169 (1.9) |
| POS | 5,121 (8.4) | 1,604,342 (8.1) | 4,535 (7.5) |
| PPO | 42,975 (70.2) | 14,254,324 (71.7) | 44,639 (74.2) |
| CDHP | 2,598 (4.2) | 1,198,075 (6.0) | 2,240 (3.7) |
| HDHP | 1,781 (2.9) | 933,053 (4.7) | 1,359 (2.3) |
| Unknown/missing | 5,077 (8.3) | 976,492 (4.9) | 4,749 (7.9) |
| **Number of Comorbidity** |  |  |  |
| 0 | 57,200 (93.5) | 19,040,780 (95.8) | 55,771 (92.7) |
| 1 | 2,670 (4.4) | 586,088 (2.9) | 2,988 (5.0) |
| 2 | 731 (1.2) | 165,035 (0.8) | 862 (1.4) |
| 3 | 281 (0.5) | 45,932 (0.2) | 243 (0.4) |
| 4 | 117 (0.2) | 12,954 (0.1) | 88 (0.1) |
| 5 | 63 (0.1) | 5,445 (0.0) | 31 (0.1) |
| 6 | 47 (0.1) | 7,955 (0.0) | 51 (0.1) |
| 7 | 25 (0.0) | 1,858 (0.0) | 6 (0.0) |
| 8 | 43 (0.1) | 9,667 (0.0) | 69 (0.1) |
| 9 | 16 (0.0) | 2,776 (0.0) | 16 (0.0) |
| ≥10 | 12 (0.0) | 1,249 (0.0) | 10 (0.0) |
| **Coverage Indicator MHSA** |  |  |  |
| Not Covered/Claims Not Present | 11,886 (19.8) | 4,515,704 (23.2) | 10,633 (17.7) |
| Covered/Possible MHSA Claims | 48,249 (80.2) | 14,963,368 (76.8) | 49,502 (82.3) |

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 2a. MarketScan Medicaid Databases, Propensity Score Match** | | | |
|  |  |  |  |
|  | **PDO (N=15,961) n (%)** | **Non-PDO (N=1,707,122) n (%)** | **Matched non-PDO (N=15,961) n (%)** |
| **Age (mean (95% CI))** | 44.0 (43.8-44.2) | 34.0 (33.9-34.0) | 44.5 (44.2-44.8) |
| **Age (median (range))** | 46.0 (0.0-90.0) | 25.0 (0.0-90.0) | 49.0 (0.0-90.0) |
| **Base pay (mean (95% CI))** | 13,084.3 (12,588.8-13,579.8 | 4,495.0 (4,466.6-4,523.3) | 9,981.5 (9,506.4-10,456.5) |
| **Base pay (median (range))** | 4,241.5 (0.0-631,923.6) | 594.7 (0.0-6,395,813.1) | 2,315.7 (0.0-1,058,178.2) |
| **sex** |  |  |  |
| Male | 6,359 (39.8) | 721,971 (42.3) | 6,364 (39.9) |
| Female | 9,602 (60.2) | 985,151 (57.7) | 9,597 (60.1) |
| **Race** |  |  |  |
| White | 11,103 (69.6) | 874,130 (51.2) | 10,701 (67.0) |
| Black | 3,040 (19.0) | 524,669 (30.7) | 3,211 (20.1) |
| Hispanic | 149 (0.9) | 113,980 (6.7) | 143 (0.9) |
| Other | 1,669 (10.5) | 194,343 (11.4) | 1,906 (11.9) |
| **Plan Indicator** |  |  |  |
| Comprehesive | 15,634 (98.0) | 1,669,884 (97.8) | 15,581 (97.6) |
| HMO | 240 (1.5) | 29,432 (1.7) | 305 (1.9) |
| POS with capitation | 83 (0.5) | 5,798 (0.3) | 73 (0.5) |
| Unknown/missing | 4 (0.0) | 2,008 (0.1) | 2 (0.0) |
| **Number of Comorbidity** |  |  |  |
| 0 | 7,152 (44.8) | 1,185,457 (69.4) | 7,597 (47.6) |
| 1 | 4,071 (25.5) | 279,780 (16.4) | 3,722 (23.3) |
| 2 | 1,928 (12.1) | 102,512 (6.0) | 1,752 (11.0) |
| 3 | 1,053 (6.6) | 58,429 (3.4) | 1,091 (6.8) |
| 4 | 592 (3.7) | 30,512 (1.8) | 562 (3.5) |
| 5 | 385 (2.4) | 18,137 (1.1) | 363 (2.3) |
| 6 | 311 (1.9) | 14,010 (0.8) | 322 (2.0) |
| 7 | 187 (1.2) | 7,430 (0.4) | 199 (1.2) |
| 8 | 123 (0.8) | 5,030 (0.3) | 152 (1.0) |
| 9 | 80 (0.5) | 2,990 (0.2) | 98 (0.6) |
| ≥10 | 79 (0.5) | 2,835 (0.2) | 103 (0.6) |
| **BOE Category** |  |  |  |
| Aged Individual | 622 (3.9) | 211,176 (12.4) | 638 (4.0) |
| Blind/Disabled Individual | 11,720 (73.4) | 598,948 (35.1) | 12,103 (75.8) |
| Child (not Child of Unemployed Adult, not Foster Care Child) | 285 (1.8) | 394,532 (23.1) | 260 (1.6) |
| Adult (not based on unemployed status) | 964 (6.0) | 107,578 (6.3) | 981 (6.1) |
| Child of Unemployed Adult (optional) | 4 (0.0) | 214 (0.0) | 4 (0.0) |
| Foster Care Child | 55 (0.3) | 29,693 (1.7) | 55 (0.3) |
| Eligibility status Unknown (counts against error tolerance) | 2,304 (14.4) | 363,846 (21.3) | 1,911 (12.0) |
| Individual covered under the Breast and Cervical | 7 (0.0) | 1,135 (0.1) | 9 (0.1) |
| **Medicare Eligibility** |  |  |  |
| Not dual eligible for Medicare | 9,574 (60.0) | 1,123,801 (65.8) | 9,460 (59.3) |
| Dual eligible for Medicare | 6,387 (40.0) | 583,321 (34.2) | 6,501 (40.7) |

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 3a. MarketScan Medicare Databases, Propensity Score Match** | | | |
|  |  |  |  |
|  | **PDO (N=3,607) n (%)** | **Non-PDO (N=2,142,226) n (%)** | **Matched non-PDO (N=3,607) n (%)** |
| **Age (mean (95% CI))** | 71.2 (70.9-71.5) | 75.3 (75.3-75.3) | 71.6 (71.3-71.8) |
| **Age (median (range))** | 70.0 (38.0-100.0) | 74.0 (19.0-113.0) | 70.0 (25.0-100.0) |
| **Base pay (mean (95% CI))** | 7,249.5 (6,695.0-7,804.1) | 3,045.9 (3,032.4-3,059.3) | 6,084.0 (5,451.8-6,716.1) |
| **Base pay (median (range))** | 3,363.6 (0.0-382,783.2) | 1,144.3 (0.0-1,971,465.0) | 1,766.2 (0.0-364,792.1) |
| **sex** |  |  |  |
| Male | 1,507 (41.8) | 965,663 (45.1) | 1,545 (42.8) |
| Female | 2,100 (58.2) | 1,176,563 (54.9) | 2,062 (57.2) |
| **Region** |  |  |  |
| Northeast | 403 (11.2) | 367,473 (17.2) | 449 (12.4) |
| North central | 1,223 (33.9) | 755,780 (35.3) | 1,196 (33.2) |
| South | 989 (27.4) | 617,006 (28.8) | 992 (27.5) |
| West | 992 (27.5) | 401,967 (18.8) | 970 (26.9) |
| **Plan Indicator** |  |  |  |
| Comprehesive | 1,884 (52.2) | 1,112,372 (51.9) | 1,906 (52.8) |
| EPO | 84 (2.3) | 27,252 (1.3) | 88 (2.4) |
| POS | 150 (4.2) | 85,020 (4.0) | 163 (4.5) |
| PPO | 1,486 (41.2) | 908,070 (42.4) | 1,448 (40.1) |
| CDHP | 1 (0.0) | 8,014 (0.4) | 0 (0.0) |
| HDHP | 2 (0.1) | 1,498 (0.1) | 2 (0.1) |
| **Number of Comorbidity** |  |  |  |
| 0 | 1,205 (33.4) | 1,107,243 (51.7) | 1,284 (35.6) |
| 1 | 930 (25.8) | 458,250 (21.4) | 776 (21.5) |
| 2 | 547 (15.2) | 269,965 (12.6) | 535 (14.8) |
| 3 | 382 (10.6) | 151,732 (7.1) | 352 (9.8) |
| 4 | 210 (5.8) | 67,733 (3.2) | 182 (5.0) |
| 5 | 121 (3.4) | 37,496 (1.8) | 127 (3.5) |
| 6 | 88 (2.4) | 18,566 (0.9) | 79 (2.2) |
| 7 | 38 (1.1) | 9,146 (0.4) | 61 (1.7) |
| 8 | 35 (1.0) | 10,058 (0.5) | 96 (2.7) |
| 9 | 24 (0.7) | 6,110 (0.3) | 63 (1.7) |
| 10 | 27 (0.7) | 5,927 (0.3) | 52 (1.4) |
| **Coverage Indicator MHSA** |  |  |  |
| Not Covered/Claims Not Present | 647 (18.7) | 311,992 (15.5) | 581 (16.8) |
| Covered/Possible MHSA Claims | 2,818 (81.3) | 1,698,392 (84.5) | 2,871 (83.2) |

Definition of Variables for Propensity Score Matching Regressions

pdo

0 = "Comparison Patients"

1 = "Diagnosed Patients"

sexgrp

1 = 'Male'

2 = 'Female'

racegrp

1 = "White"

2 = "Black"

4 = "Hispanic"

9 = "Other"

10 = "Unknown/missing"

region

1 = "Northeast"

2 = "North central"

3 = "South"

4 = "West"

5 = "Unknown/missing"

;

plantyp

2 = 'Comprehesive'

3 = 'EPO'

4 = 'HMO'

5 = 'POS'

6 = 'PPO'

7 = 'POS with capitation'

8 = 'CDHP'

9 = 'HDHP'

11 = 'Unknown/missing'

mhsacovgn (Mental Health Services Coverage)

0 = "Not Covered/Claims Not Present"

1 = "Covered/Possible MHSA Claims"

Drugcovgn (drug coverage)

0 = "Not covered/claims not present"

1 = "Covered/Possible claims"

medicaren (Medicaid data only)

0 = "Not dual eligible for Medicare"

1 = "Dual eligible for Medicare"

Boen (Medicaid data only)

1 = "Aged Individual"

2 = "Blind/Disabled Individual"

3 = "Child"

4 = "Child (not Child of Unemployed Adult, not Foster Care Child)"

5 = "Adult (not based on unemployed status)"

6 = "Child of Unemployed Adult (optional)"

7 = "Unemployed Adult (optional)"

8 = "Foster Care Child"

9 = "Eligibility status Unknown (counts against error tolerance)"

10 = "Individual covered under the Breast and Cervical"

11 = "Missing"

MarketScan Commercial Databases, Logistic Regression for Propensity Score

The LOGISTIC Procedure

Model Information

Data Set TEMP2.B4MATCHDATA

Response Variable pdo

Number of Response Levels 2

Model binary logit

Optimization Technique Fisher's scoring

Number of Observations Read 19940944

Number of Observations Used 19539207

Response Profile

Ordered Total

Value pdo Frequency

1 1 60135

2 0 19479072

Probability modeled is pdo=1.

NOTE: 401737 observations were deleted due to missing values for the response or explanatory

variables.

Class Level Information

Class Value Design Variables

sexgrp 1 1

2 -1

regionn 1 1 0 0 0

2 0 1 0 0

3 0 0 1 0

4 0 0 0 1

5 -1 -1 -1 -1

plantyp 2 1 0 0 0 0 0

3 0 1 0 0 0 0

5 0 0 1 0 0 0

6 0 0 0 1 0 0

8 0 0 0 0 1 0

9 0 0 0 0 0 1

11 -1 -1 -1 -1 -1 -1

mhsacovgn 0 1

The LOGISTIC Procedure

Class Level Information

Class Value Design Variables

1 -1

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Intercept

Intercept and

Criterion Only Covariates

AIC 815678.66 807923.05

SC 815693.45 808159.66

-2 Log L 815676.66 807891.05

Testing Global Null Hypothesis: BETA=0

Test Chi-Square DF Pr > ChiSq

Likelihood Ratio 7785.6112 15 <.0001

Score 9349.6759 15 <.0001

Wald 8343.4712 15 <.0001

Type 3 Analysis of Effects

Wald

Effect DF Chi-Square Pr > ChiSq

AGE 1 375.2486 <.0001

basepay 1 575.4623 <.0001

cccci 1 192.7762 <.0001

sexgrp 1 2849.9891 <.0001

regionn 4 911.0350 <.0001

plantyp 6 1804.8289 <.0001

mhsacovgn 1 303.0362 <.0001

The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates

Standard Wald

Parameter DF Estimate Error Chi-Square Pr > ChiSq

Intercept 1 -5.9791 0.0124 230874.652 <.0001

AGE 1 0.00433 0.000223 375.2486 <.0001

basepay 1 0.000012 4.926E-7 575.4623 <.0001

cccci 1 0.1003 0.00722 192.7762 <.0001

sexgrp 1 1 0.2209 0.00414 2849.9891 <.0001

regionn 1 1 0.1597 0.00961 276.0097 <.0001

regionn 2 1 -0.1776 0.00937 359.2124 <.0001

regionn 3 1 -0.0995 0.00823 146.3810 <.0001

regionn 4 1 0.0531 0.00969 30.0286 <.0001

plantyp 2 1 0.4426 0.0217 415.9348 <.0001

plantyp 3 1 -0.00460 0.0216 0.0452 0.8316

plantyp 5 1 -0.0399 0.0139 8.1827 0.0042

plantyp 6 1 -0.00478 0.00847 0.3178 0.5729

plantyp 8 1 -0.3386 0.0182 346.4325 <.0001

plantyp 9 1 -0.4684 0.0214 480.1389 <.0001

mhsacovgn 0 1 -0.0954 0.00548 303.0362 <.0001

Odds Ratio Estimates

Point 95% Wald

Effect Estimate Confidence Limits

AGE 1.004 1.004 1.005

basepay 1.000 1.000 1.000

cccci 1.105 1.090 1.121

sexgrp 1 vs 2 1.555 1.530 1.581

regionn 1 vs 5 1.100 1.041 1.162

regionn 2 vs 5 0.785 0.744 0.829

regionn 3 vs 5 0.849 0.805 0.895

regionn 4 vs 5 0.989 0.937 1.043

plantyp 2 vs 11 1.029 0.974 1.088

plantyp 3 vs 11 0.658 0.623 0.695

plantyp 5 vs 11 0.635 0.611 0.661

plantyp 6 vs 11 0.658 0.638 0.679

plantyp 8 vs 11 0.471 0.449 0.495

plantyp 9 vs 11 0.414 0.392 0.437

mhsacovgn 0 vs 1 0.826 0.809 0.844

The LOGISTIC Procedure

Association of Predicted Probabilities and Observed Responses

Percent Concordant 31.6 Somers' D 0.153

Percent Discordant 16.3 Gamma 0.319

Percent Tied 52.1 Tau-a 0.001

Pairs 1.171374E12 c 0.577

**MarketScan Medicaid Databases, Logistic Regression for Propensity Score**

The LOGISTIC Procedure

Model Information

Data Set TEMP.B4MATCHDATA

Response Variable pdo

Number of Response Levels 2

Model binary logit

Optimization Technique Fisher's scoring

Number of Observations Read 1723083

Number of Observations Used 1723083

Response Profile

Ordered Total

Value pdo Frequency

1 1 15961

2 0 1707122

Probability modeled is pdo=1.

Class Level Information

Class Value Design Variables

sexgrp 1 1

2 -1

racegrp 1 1 0 0

2 0 1 0

4 0 0 1

9 -1 -1 -1

medicaren 0 1

1 -1

boen 1 1 0 0 0 0 0 0

2 0 1 0 0 0 0 0

4 0 0 1 0 0 0 0

5 0 0 0 1 0 0 0

6 0 0 0 0 1 0 0

8 0 0 0 0 0 1 0

9 0 0 0 0 0 0 1

10 -1 -1 -1 -1 -1 -1 -1

plantyp 2 1 0 0

The LOGISTIC Procedure

Class Level Information

Class Value Design Variables

4 0 1 0

7 0 0 1

11 -1 -1 -1

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Intercept

Intercept and

Criterion Only Covariates

AIC 181225.63 164201.84

SC 181237.99 164436.67

-2 Log L 181223.63 164163.84

Testing Global Null Hypothesis: BETA=0

Test Chi-Square DF Pr > ChiSq

Likelihood Ratio 17059.7891 18 <.0001

Score 17882.1699 18 <.0001

Wald 11997.7066 18 <.0001

Type 3 Analysis of Effects

Wald

Effect DF Chi-Square Pr > ChiSq

age 1 454.4351 <.0001

basepay 1 213.4694 <.0001

mdcci 1 850.5438 <.0001

sexgrp 1 44.3483 <.0001

racegrp 3 2375.7079 <.0001

medicaren 1 478.8738 <.0001

boen 7 6101.2570 <.0001

plantyp 3 24.5491 <.0001

The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates

Standard Wald

Parameter DF Estimate Error Chi-Square Pr > ChiSq

Intercept 1 -6.3518 0.1546 1687.9589 <.0001

age 1 0.0105 0.000493 454.4351 <.0001

basepay 1 2.585E-6 1.77E-7 213.4694 <.0001

mdcci 1 0.1266 0.00434 850.5438 <.0001

sexgrp 1 1 -0.0557 0.00837 44.3483 <.0001

racegrp 1 1 0.7157 0.0234 933.9521 <.0001

racegrp 2 1 -0.2011 0.0258 60.7745 <.0001

racegrp 4 1 -0.5679 0.0628 81.7087 <.0001

medicaren 0 1 0.2118 0.00968 478.8738 <.0001

boen 1 1 -0.7852 0.0906 75.0365 <.0001

boen 2 1 1.3394 0.0821 266.1143 <.0001

boen 4 1 -1.5740 0.0970 263.2969 <.0001

boen 5 1 0.5555 0.0865 41.2101 <.0001

boen 6 1 1.3641 0.4452 9.3894 0.0022

boen 8 1 -0.7266 0.1428 25.8742 <.0001

boen 9 1 0.3863 0.0835 21.3758 <.0001

plantyp 2 1 0.0282 0.1297 0.0472 0.8280

plantyp 4 1 0.2590 0.1378 3.5329 0.0602

plantyp 7 1 0.4075 0.1521 7.1825 0.0074

Odds Ratio Estimates

Point 95% Wald

Effect Estimate Confidence Limits

age 1.011 1.010 1.012

basepay 1.000 1.000 1.000

mdcci 1.135 1.125 1.145

sexgrp 1 vs 2 0.895 0.866 0.924

racegrp 1 vs 9 1.940 1.839 2.045

racegrp 2 vs 9 0.775 0.730 0.824

racegrp 4 vs 9 0.537 0.453 0.637

medicaren 0 vs 1 1.528 1.471 1.587

boen 1 vs 10 0.798 0.377 1.688

boen 2 vs 10 6.678 3.171 14.064

boen 4 vs 10 0.363 0.171 0.771

boen 5 vs 10 3.049 1.444 6.440

boen 6 vs 10 6.845 1.982 23.640

boen 8 vs 10 0.846 0.384 1.866

boen 9 vs 10 2.575 1.221 5.428

plantyp 2 vs 11 2.060 0.771 5.506

plantyp 4 vs 11 2.596 0.963 6.996

plantyp 7 vs 11 3.011 1.099 8.247

The LOGISTIC Procedure

Association of Predicted Probabilities and Observed Responses

Percent Concordant 75.9 Somers' D 0.566

Percent Discordant 19.3 Gamma 0.594

Percent Tied 4.7 Tau-a 0.010

Pairs 27247374242 c 0.783

**MarketScan Medicare Databases, Logistic Regression for Propensity Score**

The LOGISTIC Procedure

Model Information

Data Set TEMP.B4MATCHDATA

Response Variable pdo

Number of Response Levels 2

Model binary logit

Optimization Technique Fisher's scoring

Number of Observations Read 2145833

Number of Observations Used 2013849

Response Profile

Ordered Total

Value pdo Frequency

1 1 3465

2 0 2010384

Probability modeled is pdo=1.

NOTE: 131984 observations were deleted due to missing values for the response or explanatory

variables.

Class Level Information

Class Value Design Variables

sexgrp 1 1

2 -1

regionn 1 1 0 0

2 0 1 0

3 0 0 1

4 -1 -1 -1

plantyp 2 1 0 0 0 0

3 0 1 0 0 0

5 0 0 1 0 0

6 0 0 0 1 0

8 0 0 0 0 1

9 -1 -1 -1 -1 -1

mhsacovgn 0 1

1 -1

The LOGISTIC Procedure

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Intercept

Intercept and

Criterion Only Covariates

AIC 51036.112 48933.203

SC 51048.627 49108.421

-2 Log L 51034.112 48905.203

Testing Global Null Hypothesis: BETA=0

Test Chi-Square DF Pr > ChiSq

Likelihood Ratio 2128.9087 13 <.0001

Score 2469.0530 13 <.0001

Wald 2266.7268 13 <.0001

Type 3 Analysis of Effects

Wald

Effect DF Chi-Square Pr > ChiSq

AGE 1 1261.8384 <.0001

basepay 1 55.3225 <.0001

mccci 1 654.9488 <.0001

sexgrp 1 64.9653 <.0001

regionn 3 250.2026 <.0001

plantyp 5 67.3451 <.0001

mhsacovgn 1 2.5147 0.1128

The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates

Standard Wald

Parameter DF Estimate Error Chi-Square Pr > ChiSq

Intercept 1 -0.7043 0.2703 6.7898 0.0092

AGE 1 -0.0881 0.00248 1261.8384 <.0001

basepay 1 4.693E-6 6.31E-7 55.3225 <.0001

mccci 1 0.1975 0.00772 654.9488 <.0001

sexgrp 1 1 -0.1397 0.0173 64.9653 <.0001

regionn 1 1 -0.4207 0.0404 108.4286 <.0001

regionn 2 1 -0.0197 0.0294 0.4484 0.5031

regionn 3 1 -0.0460 0.0294 2.4451 0.1179

plantyp 2 1 0.5987 0.2067 8.3858 0.0038

plantyp 3 1 0.7135 0.2263 9.9425 0.0016

plantyp 5 1 0.3591 0.2166 2.7492 0.0973

plantyp 6 1 0.3193 0.2068 2.3847 0.1225

plantyp 8 1 -1.9407 0.8420 5.3121 0.0212

mhsacovgn 0 1 0.0388 0.0245 2.5147 0.1128

Odds Ratio Estimates

Point 95% Wald

Effect Estimate Confidence Limits

AGE 0.916 0.911 0.920

basepay 1.000 1.000 1.000

mccci 1.218 1.200 1.237

sexgrp 1 vs 2 0.756 0.707 0.809

regionn 1 vs 4 0.404 0.358 0.456

regionn 2 vs 4 0.603 0.549 0.662

regionn 3 vs 4 0.587 0.535 0.644

plantyp 2 vs 9 1.913 0.477 7.668

plantyp 3 vs 9 2.146 0.526 8.753

plantyp 5 vs 9 1.506 0.372 6.089

plantyp 6 vs 9 1.447 0.361 5.802

plantyp 8 vs 9 0.151 0.014 1.667

mhsacovgn 0 vs 1 1.081 0.982 1.190

Association of Predicted Probabilities and Observed Responses

Percent Concordant 47.6 Somers' D 0.334

Percent Discordant 14.2 Gamma 0.540

Percent Tied 38.1 Tau-a 0.001

Pairs 6965980560 c 0.667

Health Care Expenditure Regressions

Variable Definitions:

Totpay – Total payments by health insurance

Pdo – equals 1 for diagnosed patients, and 0 for controls

**Commerical claims**

. glm totpay pdo if match=="PS" & vistype==4,family(gamma) link(log)

Iteration 0: log likelihood = -1183470.6

Iteration 1: log likelihood = -1163527.5

Iteration 2: log likelihood = -1163470.8

Iteration 3: log likelihood = -1163470.8

Generalized linear models No. of obs = 116225

Optimization : ML Residual df = 116223

Scale parameter = 8.605197

Deviance = 265919.3159 (1/df) Deviance = 2.288009

Pearson = 1000121.806 (1/df) Pearson = 8.605197

Variance function: V(u) = u^2 [Gamma]

Link function : g(u) = ln(u) [Log]

AIC = 20.02104

Log likelihood = -1163470.752 BIC = -1089622

------------------------------------------------------------------------------

| OIM

totpay | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

pdo | 1.477621 .0172292 85.76 0.000 1.443853 1.51139

\_cons | 8.249158 .0123673 667.01 0.000 8.224918 8.273397

------------------------------------------------------------------------------

. margin,dydx(pdo)

Average marginal effects Number of obs = 116225

Model VCE : OIM

Expression : Predicted mean totpay, predict()

dy/dx w.r.t. : pdo

------------------------------------------------------------------------------

| Delta-method

| dy/dx Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

pdo | 15499.84 294.9133 52.56 0.000 14921.82 16077.86

------------------------------------------------------------------------------

**Medicare Claims**

. glm totpay pdo if match=="PS" & vistype==4,family(gamma) link(log)

Iteration 0: log likelihood = -82336.929

Iteration 1: log likelihood = -81503.815

Iteration 2: log likelihood = -81497.094

Iteration 3: log likelihood = -81497.091

Generalized linear models No. of obs = 7214

Optimization : ML Residual df = 7212

Scale parameter = 5.141039

Deviance = 12445.64069 (1/df) Deviance = 1.725685

Pearson = 37077.17314 (1/df) Pearson = 5.141039

Variance function: V(u) = u^2 [Gamma]

Link function : g(u) = ln(u) [Log]

AIC = 22.5947

Log likelihood = -81497.09073 BIC = -51624.17

------------------------------------------------------------------------------

| OIM

totpay | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

pdo | .5538124 .0534528 10.36 0.000 .4490468 .6585781

\_cons | 10.02017 .0377968 265.11 0.000 9.946087 10.09425

------------------------------------------------------------------------------

. margin,dydx(pdo)

Average marginal effects Number of obs = 7214

Model VCE : OIM

Expression : Predicted mean totpay, predict()

dy/dx w.r.t. : pdo

------------------------------------------------------------------------------

| Delta-method

| dy/dx Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

pdo | 17051.66 1826.619 9.34 0.000 13471.55 20631.76

------------------------------------------------------------------------------

**Medicaid Claims**

. glm totpay pdo if match=="PS" & vistype==4,family(gamma) link(log)

Iteration 0: log likelihood = -343104.11

Iteration 1: log likelihood = -337959.4

Iteration 2: log likelihood = -337939.54

Iteration 3: log likelihood = -337939.53

Generalized linear models No. of obs = 30454

Optimization : ML Residual df = 30452

Scale parameter = 5.013848

Deviance = 73439.27428 (1/df) Deviance = 2.41164

Pearson = 152681.6978 (1/df) Pearson = 5.013848

Variance function: V(u) = u^2 [Gamma]

Link function : g(u) = ln(u) [Log]

AIC = 22.19357

Log likelihood = -337939.527 BIC = -240946.3

------------------------------------------------------------------------------

| OIM

totpay | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

pdo | .5460905 .0256983 21.25 0.000 .4957228 .5964582

\_cons | 9.813436 .018509 530.20 0.000 9.777159 9.849713

------------------------------------------------------------------------------

. margin,dydx(pdo)

Average marginal effects Number of obs = 30454

Model VCE : OIM

Expression : Predicted mean totpay, predict()

dy/dx w.r.t. : pdo

------------------------------------------------------------------------------

| Delta-method

| dy/dx Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

pdo | 13742.88 715.348 19.21 0.000 12340.82 15144.93

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