SECTION VI.
SCIENTIFIC SOUNDNESS OF THE MEASURE

VALIDITY

VI.B.1 "Informing" Coverage through the natural experiment of appendicitis

Administrative data from the Medicaid Analytic eXtract (MAX) is the primary data source for states or government agencies wishing to assess Medicaid and CHIP programs, but there are several limitations to this type of data. Children who are eligible but not enrolled are not observed, and one cannot know why a child disappears from the enrollment files because the reason for disenrollment is not recorded (in contrast, survey methods allow accurate assumptions about continuing eligibility due to reported income data). For this reason, analysts using MAX must make assumptions about eligibility in order to make effective use of administrative data. Working within the shortcomings of MAX administrative data, "Informed Coverage" uses the results of a natural experiment to provide statewide guidance as to whether an observed lack of coverage during an interval should be assumed to be considered a period when a child is "presumed eligible" (in which case the lack of coverage would be counted against the state estimate of insurance coverage) or presumed ineligible (in which case a lack of coverage would not be counted against the state).

To be utilized in a metric for assigning statewide assumptions about eligibility, we sought a condition that: (1) has an acute onset (reflecting a discrete point in time); (2) has an incidence rate that is not influenced by the care provided prior to that condition and not influenced by insurance coverage, or factors that may influence obtaining or retaining insurance coverage, such as socioeconomic status; and, (3) would require definite hospitalization for all children with this condition, no matter their insurance status. Although the incidence rate of appendicitis is not influenced by insurance or socioeconomic status, there is good evidence that complications of appendicitis are influenced by both factors (Gadomski and Jenkins 2001; Guagliardo et al. 2003).

If children develop appendicitis, they will be hospitalized. If a child is hospitalized and generates a bill seen in the Medicaid claims, they must have been eligible for Medicaid. Such a condition would not require any assumption about eligibility since the fact that we observe the bill tells us this child was eligible. If a child was not enrolled at the time of developing acute appendicitis, but was eligible, the appendicitis should be observed in the MAX data because Medicaid and most CHIP programs allow up to 3 months of retroactive coverage (Medicaid.gov) and most states have policies of presumptive eligibility for their public insurance programs. Furthermore, appendicitis occurs at random and is not influenced by previous care (i.e., the fact someone had or did not have insurance would not influence the rate of appendicitis or prevent hospitalization) (Addiss et al. 1990; Bindman et al. 2005). Similarly, appendicitis is not influenced by child or parental characteristics or actions that may make insurance retention more or less likely. By identifying appendicitis hospitalizations, and by determining how many of these patients were already enrolled in Medicaid prior to admission, and how many were not, we can utilize the rate of insurance coverage at the specific time point of the event as a parallel way to estimate the coverage rate

for the state population. This is because at a random point in time, the percentage of children with appendicitis who are both eligible for insurance and who were enrolled before developing acute appendicitis should equal the fraction of months covered in those eligible months. Taking from the stochastic processes literature, under the general assumption of an alternating renewal process (Karlin and Taylor 1975), the proportion of eligible people enrolled at a random point in time equals the proportion of time an eligible child spends enrolled. We determine whether a state's enrollment ratio is best estimated by Coverage PE, PI, or PM (the average of the PE and PI) by choosing the assumption closest to the natural experiment of coverage in appendectomy. Whichever rate falls closest to the random point-in-time appendectomy coverage estimate will "inform" the estimate for Informed Coverage and determine whether the PE, PM or PI assumption should be used when estimating coverage for a given state in a given year.

Due to policies of presumptive eligibility and retroactive coverage, we needed to utilize a time point prior to the point of appendicitis admission to determine a child's enrollment status. In the case of presumptive eligibility, states certify designated provider sites to screen and temporarily enroll uninsured children (usually based on the patient or family's testimony). Final eligibility is determined by the state Medicaid office, but the care and services received during the period of presumptive eligibility are covered regardless of their decision (Brooks 2011). Although not all states have policies of presumptive eligibility, Medicaid programs also offer up to three months of retroactive coverage which helps to ensure virtually all appendicitis cases among eligible children will appear in the MAX dataset. In order to determine rates of true, pre-existing enrollment at the point of admission, we enacted a 4-month look-back period from the appendectomy event. Looking exactly 4 months prior to the appendicitis admission, we recorded whether a child was enrolled or not, as it would have been a great coincidence that a child developed appendicitis just as they disenrolled.

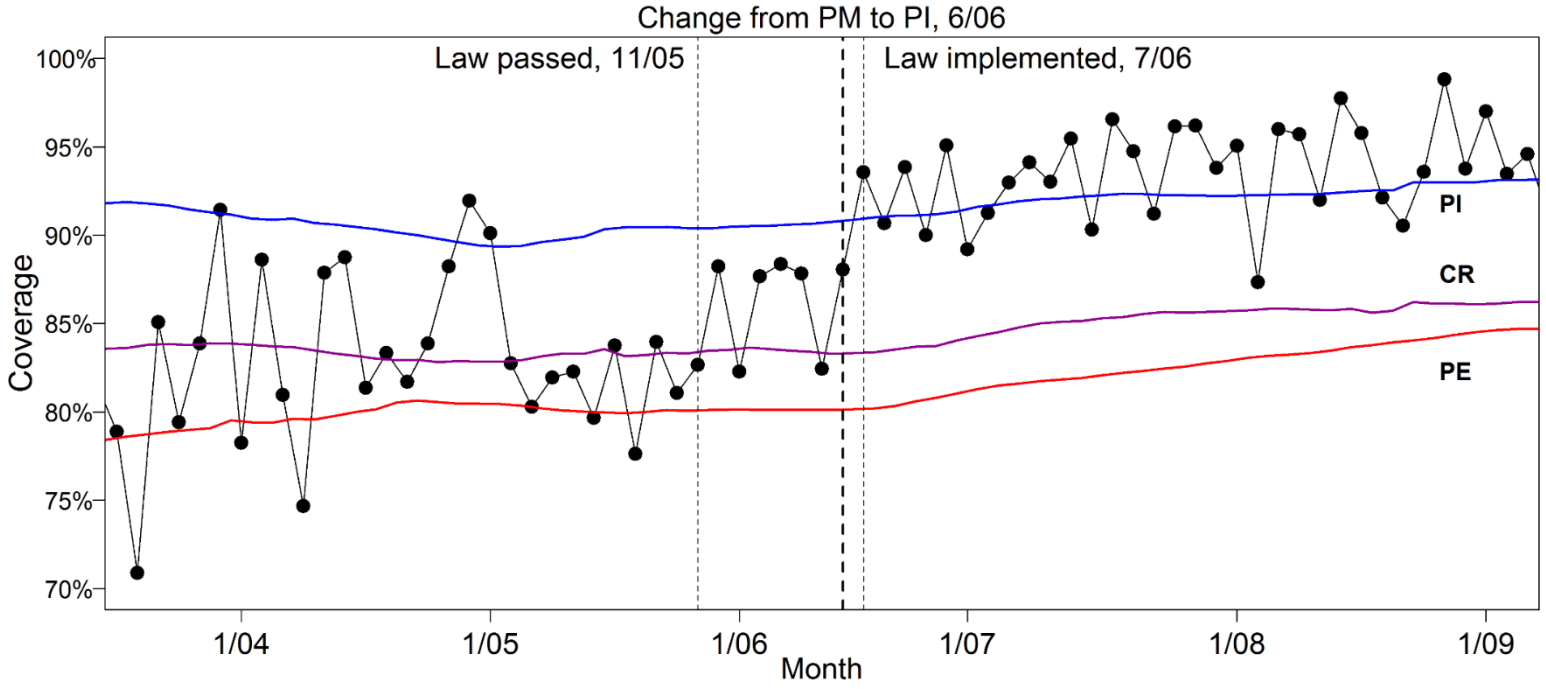
We defined appendicitis using ICD9CM codes for diagnoses or principal procedures (540-541 Appendicitis, 470-470.9, 472 Appendectomy). We also looked at a more restrictive definition, requiring both appendicitis diagnosis and an appendectomy as the principal procedure and found similar incidence rates and coverage fractions. We limited the population to children age 2-16 years, as appendicitis generally does not occur before 2 years of age, and age 16 is sufficiently far from the age-out at 18 that there was no need to utilize survival statistics when computing rates of Coverage.

Using the appendectomy coverage rate for each state, in the January 2008-June 2009 time period, we determined that 12 (28%) of the 43 states analyzed had Informed Coverage closest to the PE assumption, and 18 (42%) were closest to the PM assumption, and 13 (30%) were closest to the PI assumption (based on appendectomy coverage rates closest to each state assumption). In the July 2008-December 2009 time period, several states switched their designation: 13 (30%) were PE, 23 (54%) were PM, and 7 (16%) were PI.

APPENDIX IVa: State Informed Coverage designations in four time periods

Case Study: Illinois and the All Kids Insurance Act

As seen in the figure below, from 2003-2006, we observed Illinois to be a PE state (their appendectomy Coverage rates were most consistent with the PE assumption). In the summer of 2006, when Illinois implemented a program titled the All Kids Health Insurance Act (Illinois General Assembly 2006). The "All Kids" program provided access to health insurance for all Illinois children regardless of income, health status, or citizenship. Between 2006 and 2007, the appendicitis coverage rate was observed to increase, and Illinois switched from a rate similar to the state's overall PE Coverage estimate (children not covered were assumed to be eligible) to more closely resemble the states PI designation (children initially not covered were assumed to be ineligible). The PE, PI, and the Continuity Ratio (see below) was more stable during this period because it does not make any attempt to account for the different reasons a child may end enrollment. This indicates that "informing" Coverage with the appendicitis natural experiment increases the metric's sensitivity to policy changes in a given state.



VI.B.2 Construct Validity

To examine construct validity, we performed comparative analyses between our metrics and two existing metrics: the Continuity Ratio, also based on MAX administrative data (Ku 2009, Ku 2013), and a metric derived from the American Community Survey (Boudreaux 2013).

The construct validity analyses were performed on 43 states which passed our filter for quality and completeness in the MAX dataset for the years 2008-2009. For details on the construction of this filter, please see the DATA AVAILABILITY section.

Continuity Ratio:

The Continuity Ratio calculates the average number of children enrolled per month divided by the number of children enrolled at any point in the year (Ku 2009, Ku 2013). Like Coverage PE, the continuity ratio will tend to underestimate continuity, as the implied assumption is that any child eligible during an interval of time is presumed to be eligible across the entire interval. Unlike Coverage PE, the Continuity Ratio makes no adjustments to the denominator for children who enroll for the first time mid-year or who age out of Medicaid.

ACS Metric:

For the purpose of using survey data to validate our metric, we selected the American Community Survey conducted by the U.S. Census. The ACS provides the largest national sample, with over 2.8 million households interviewed annually, and is aggregated at the state level, allowing us to most accurately compare survey-based findings with our metrics utilizing administrative data (Call et al. 2013; Davern et al. 2009). The ACS contains one health insurance question, and details of respondent's annual income and employment status, from which we can define eligibility (U. S. Census Bureau). Because the logical edits to reported Medicaid enrollment (to correct the documented issue with Medicaid undercounting) in the ACS were only implemented in 2009, we also coded these same edits into the 2008 ACS data (Lynch, Boudreaux, and Davern).

Although primarily based on one question in the survey, there are nevertheless several ways of defining a metric for the ACS. We opted to use a definition similar to that used in a study by the Census Bureau which linked ACS data with administrative records (Boudreaux et al. 2013), because it would create a denominator most similar to what we see in the MAX data. In MAX, children who have dual eligibility or dual enrollment in Medicaid/CHIP and other insurance types are included in the records, and we allowed similar reports of dual enrollment in the ACS. Using the ACS health insurance question, we measured the ratio of children who reported enrollment in "Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low incomes or a disability", or children who reported enrollment in other types of insurance in addition to Medicaid (the numerator) to those children plus those who reported no enrollment in any of the options listed in the survey question (the denominator). For inclusion in the denominator, each child's reported household income also had to be below the age-specific income thresholds in a given state.

Using survey data to validate our metrics allows us to ensure accuracy despite one of the primary problems with using administrative datasets like MAX: the inability to observe children who are eligible but not enrolled.

Methods

In order to maximize the significance of our comparisons, we expanded these analyses to 43 states which passed a filter test developed to determine whether a state's managed care claims were sufficiently complete to assess appendicitis coverage, and thus generate an Informed Coverage metric. See DATA AVAILABILITY section for a description of the filter.

To examine construct validity, we report Pearson correlations and absolute errors between the external standard of the ACS-based metric and the various metrics now used to assess insurance enrollment in the pediatric Medicaid/CHIP population. We used data from an initial time period, January 2008-June 2009, compared to the 2008 ACS, in order to construct our metrics. A second time period, July 2008-December 2009, was used with the 2009 ACS for validation.

Results

APPENDIX Va describes Coverage PE, Coverage PI, Informed Coverage, ACS, the Continuity Ratio, Appendicitis Coverage, and Duration as measured in the 43 states.

APPENDIX Vb describes the correlations between all metrics based on the 43 states included in the analysis. Informed Coverage was well correlated with the ACS metric across the 43 states ($r = 0.81$ (0.66, 0.89)), and showed similar correlation with ACS in the validation set ($r = 0.75$ (0.57, 0.85)). Duration displayed lower correlations with all metrics ($r = 0.44$ (0.15, 0.65) and ($r = 0.50$ (0.23, 0.69) respectively.

APPENDIX Vc describes the median absolute errors between Informed Coverage, Coverage PE, Coverage PI, and the Continuity Ratio relative to the ACS survey and Appendicitis coverage rates. In the development set, the median absolute errors between IC or CR and the ACS survey were similar. However, in the validation set, the median absolute error between the 2009 ACS estimate and IC was 2.69%, and 4.09% between ACS and the Continuity Ratio, with significant difference between these errors ($P < 0.05$). Of note, the median absolute errors in the "uninformed" PE and PI versus 2009 ACS were 6.39% and 5.54% respectively, with a significant difference between the PI error versus the error associated with IC ($P < 0.0001$). In other words, using appendectomy to inform coverage reduced the error with respect to the ACS survey.

APPENDIX Vd shows Bland-Altman plots for Informed Coverage versus the ACS metric, compared to those for the Continuity Ratio versus the ACS metric. We find that there appears to be some differences between the IC metric and the CR metric, especially in the slope of difference between measures versus the average measure value. The slope of the IC-ACS Bland-Altman plot is flatter than the CR-ACS slope, suggesting little relationship between the error and the average value for IC, whereas for CR there is a larger negative slope, suggesting that in states with low average enrollment rates, Continuity Ratio overstates the ACS estimates and in states with high rates of enrollment, the Continuity Ratio understates the ACS estimates. After removing the one obvious outlier state, Nevada, we observed similar results.

VI.B.3 Predictive Validity

We also measure validity in terms of predictive validity (whether the measures of coverage predict an outcome of interest) (McDowell, 2006). To this end we have completed regressions to demonstrate the probability that an individual child will be achieve selected healthcare outcomes from the initial pediatric core quality measurement set (also termed the CHIPRA core quality metrics) after controlling for other known risk factors for these outcomes available in the MAX data, and completed regression models to demonstrate the statistical association of the metric and the probability that an individual child will be at risk for an ambulatory care sensitive condition (ACSC), after controlling for other known risk factors for ACSCs.

CHIPRA Core Measures: Positive Outcomes & Utilization

Methods

First, we examined how the Duration and Coverage metrics related to seven of the CHIPRA core set measures: Preventive Dental, Emergency Dental, Well-child visits (15 months), Asthma, and ADHD follow-up (Centers for Medicare and CHIP Services, 2011). We selected these measures out of the full 24-measure CHIPRA core set because they affect a wide swath of the pediatric population and/or are sensitive to continuity of insurance (Halterman, 2008; Cassedy, 2008; DeVoe, 2008; Federico, 2007; Lavarreda, 2008; Olson, 2005; Schoen, 2000, Jones, 2008; Ortega, 2001, Shatin, 1998). They are also evaluable with standard administrative claims datasets, such as MAX. Patient outcomes (0, 1 denoting achievement or non-achievement of a specific core measure) were the dependent variables. The independent variables included the continuity metric of interest, as well as specific patient level variables such as neighborhood education level, neighborhood percent poverty, and specific chronic diseases versus a reference of no chronic disease. Tables in the appendix (one for each of the seven analyzed core measures) are displayed with seven models each, each model adding additional patient characteristics. As most of the outcomes are dichotomous variables, we report logit models and their C-statistics.

In the validation models using the CHIPRA quality outcomes, two different sampling schemes were used to avoid the mathematical tautology of using a patient characteristic as an explanatory and outcome variable. Specifically, since the metrics were stratified by county, using a patient in the calculation for their respective county and then applying that estimate to that patient is cyclical, in that the patient affects the estimate which affects the patient, and thus biases the resulting regression coefficients.

For some of the CHIPRA measures in the validation studies applicable to a particular subset of patients (i.e. those with asthma, ADHD, etc.), we used the classic method of applying the estimation set to the validation set such that all patients who did not possess the specific CHIPRA outcome were used as the estimation set for the coverage and duration metric numbers which were then applied to the patients who had the specific CHIPRA outcome. Another sampling scheme was used for the dental and well child visit outcomes that are applicable to all patients. For these outcomes, the patients were randomly split into two samples and the coverage and duration metrics were calculated in each outcome stratum. Then, the

estimates from each of the samples were applied to the other sample, thus avoiding the mathematical tautology that a patient did not influence or contribute to the estimate used for that patient in the modeling process. After the estimates for each sample were applied to the other sample, the models were calculated at each step. Using these two sampling schemes for the metric estimates provided a way to avoid a cyclical estimation process between the metrics and the patient outcomes that would alter the estimates within each outcome stratum and thus biased the regression coefficients from the CHIPRA validation models.

Results

As seen in the Appendix, for Illinois and Louisiana, all metrics demonstrated predictive validity, with higher Coverage and Duration each generally being significantly associated with better outcomes ($p<0.05$). One unexpected exception was that better Coverage was associated with a higher likelihood of Asthma-related emergency room visits in Illinois and Louisiana in the single item base models (i.e. including the average county-level coverage measure as the sole predictor), however this association reversed in the fully adjusted models for both states. We posit that patients with better insurance continuity may be more willing to make discretionary visits to the ED, a hypothesis that is supported by the literature (Jones, 2008; Ortega, 2001; Shatin, 1998). Another unexpected exception was that in both the single item base model and the fully adjusted models, increased coverage was found to be significantly associated with decreased odds of having at least 5 well-child visits by 15 months (adjusted OR 1.04; $p<0.01$) in Louisiana.

APPENDIX VIa: CHIPRA Core Set outcome tables

Ambulatory Care-Sensitive Conditions: Negative Outcomes and Unnecessary Hospitalization

We predicted that hospitalizations related to ambulatory care-sensitive conditions would be positively associated with poor performance on both the Duration and Coverage metrics. From the pediatric literature, we identified 22 ACSCs for use in our analysis: asthma, pediatric gastroenteritis, bacterial pneumonia, dehydration, UTIs, perforated appendix, seizure disorders, skin infection/cellulitis, failure to thrive, severe ENT infection, pelvic inflammatory disease, diabetes mellitus (short-term complications), immunization-preventable conditions, tuberculosis, anemia, congenital syphilis, congestive heart failure, dental conditions, hypoglycemia, nutritional deficiencies, and meningitis (Flores, 2003; Gadomski, 1998, Garg, 2003; Herrod, 2008; Parker, 2000; Tom, 2010). We divided the population into those who had at least one inpatient admission associated with any of these conditions (=1) and those who did not (=0), and looked for correlations with their Duration and/or Coverage metrics.

Results

In brief, both the Coverage and Duration measures often showed a significant association with ACSC hospitalizations, but in the direction of increased Coverage and Duration leading to increased likelihood of hospitalization. Specific results from the single item and fully adjusted models are described in the ensuing paragraphs. Notably, statistically significant results using conventional thresholds for p-values of <0.05 should be interpreted with caution because the sample sizes in each of the analyzed states are quite large.

In single item base models (i.e. including the average county-level coverage measure as the sole predictor), the average county-level coverage was significantly associated ($p < 0.01$) with an increase in a child's probability of an ACSC hospitalization in Illinois, North Carolina, New York, and Oregon of ~2% to 4%. These associations were not significant in Louisiana, Montana, New Hampshire and Utah.

In the fully adjusted models, the average county-level coverage was significantly associated with an increase in a child's probability of an ACSC hospitalization in Illinois and Oregon. Specifically, for every 1% increase in the average county-level coverage, there was a 1.5-3.3% increase in a child's odds of hospitalization for an ACSC. However, the opposite association was found in North Carolina and New York such that the average county level coverage was significantly associated ($p<0.05$) with a 0.9-1.1% decreased odds of hospitalization for an ACSC condition. Finally, these associations were not significant in Louisiana, Montana, New Hampshire, and Utah.

APPENDIX VIb: ACSC VALIDATION TABLES

APPENDIX IV: State Informed Coverage designations in four time periods

Gray highlights denote a PE/PM/PI designation change from the previous time period.

	January 2005-June 2006	July 2006-December 2007	January 2008-June 2009	July 2008-December 2009
AK	PI	PI	PI	PM
AL	PI	PI	PI	PM
AR	PM	PM	PI	PM
AZ	PM	PM	PM	PM
CA	PM	PM	PM	PM
CO	PE	PM	PE	PE
CT	PE	PE	PE	PE
DE	PE	PE	PE	PE
FL	PE	PE	PE	PM
GA	PM	PM	PM	PM
HI	PM	PI	PM	PE
IA	PM	PI	PI	PM
ID	PI	PI	PE	PM
IL	PM	PI	PI	PI
IN	PM	PM	PM	PM
KS	PM	PM	PM	PM
LA	PI	PI	PI	PI
MD	PM	PM	PM	PM
MI	PE	PE	PE	PE
MN	PE	PE	PE	PE
MO	PI	PI	PM	PM
MT	PI	PI	PM	PM
NC	PE	PE	PE	PE
ND	PI	PI	PM	PM
NE	PI	PI	PM	PM
NH	PI	PI	PI	PI

NJ	PI	PI	PI	PM
NM	PM	PM	PM	PM
NV	PM	PE	PE	PE
NY	PI	PI	PI	PI
OK	PI	PI	PI	PM
OR	PI	PI	PM	PM
RI	PI	PI	PI	PI
SC	PI	PM	PE	PE
SD	PM	PI	PI	PM
TN	PM	PM	PM	PM
TX	PE	PE	PE	PE
UT	PE	PE	PE	PE
VA	PE	PM	PM	PE
VT	PI	PI	PI	PI
WA	PM	PI	PM	PI
WI	PI	PI	PM	PM
WY	PI	PI	PI	PM

APPENDIX V: Construct Validity

APPENDIX Va: **Measured rates for Coverage PE, Coverage PI, Appendicitis Coverage, Informed Coverage, Continuity Ratio, ACS, and Duration in 43 states**

State	Coverage PE	Coverage PI	Appendicitis Coverage	Informed Coverage	Continuity Ratio	ACS	Duration
AK	0.699 (0.697,0.701)	0.853 (0.852,0.855)	0.829 (0.725,0.906)	0.853 (0.852,0.855)	0.755 (0.753,0.757)	0.931 (0.902,0.953)	0.371 (0.365,0.377)
AL	0.765 (0.764,0.766)	0.905 (0.904,0.905)	0.868 (0.821,0.907)	0.905 (0.904,0.905)	0.814 (0.814,0.815)	0.840 (0.827,0.853)	0.572 (0.569,0.575)
AR	0.780 (0.779,0.781)	0.877 (0.876,0.878)	0.881 (0.835,0.919)	0.877 (0.876,0.878)	0.809 (0.808,0.810)	0.867 (0.853,0.879)	0.497 (0.495,0.500)
AZ	0.729 (0.728,0.730)	0.862 (0.862,0.863)	0.752 (0.723,0.780)	0.794 (0.793,0.794)	0.764 (0.763,0.764)	0.728 (0.714,0.740)	0.412 (0.410,0.414)
CA	0.693 (0.693,0.693)	0.851 (0.851,0.851)	0.795 (0.782,0.808)	0.772 (0.772,0.772)	0.764 (0.764,0.764)	0.767 (0.762,0.772)	0.414 (0.413,0.415)
CO	0.733 (0.732,0.734)	0.872 (0.872,0.873)	0.656 (0.585,0.723)	0.727 (0.726,0.728)	0.770 (0.769,0.771)	0.648 (0.628,0.668)	0.473 (0.470,0.475)
CT	0.824 (0.822,0.825)	0.927 (0.926,0.928)	0.512 (0.355,0.667)	0.824 (0.822,0.825)	0.847 (0.846,0.848)	0.833 (0.813,0.851)	0.682 (0.678,0.686)
DE	0.756 (0.754,0.758)	0.879 (0.876,0.879)	0.889 (0.518,0.997)	0.756 (0.754,0.758)	0.785 (0.783,0.787)	0.811 (0.768,0.850)	0.464 (0.458,0.469)
FL	0.710 (0.710,0.711)	0.873 (0.872,0.873)	0.594 (0.558,0.628)	0.710 (0.710,0.711)	0.753 (0.752,0.753)	0.647 (0.638,0.657)	0.471 (0.470,0.473)
GA	0.707 (0.706,0.707)	0.860 (0.860,0.861)	0.711 (0.656,0.762)	0.774 (0.773,0.774)	0.763 (0.762,0.764)	0.763 (0.753,0.772)	0.424 (0.423,0.426)
HI	0.813 (0.811,0.815)	0.928 (0.927,0.929)	0.889 (0.708,0.977)	0.871 (0.869,0.872)	0.855 (0.853,0.857)	0.891 (0.862,0.916)	0.711 (0.705,0.717)
IA	0.743 (0.742,0.745)	0.896 (0.895,0.897)	0.866 (0.782,0.927)	0.896 (0.895,0.897)	0.790 (0.789,0.792)	0.873 (0.855,0.890)	0.525 (0.521,0.529)
ID	0.787 (0.786,0.789)	0.901 (0.900,0.902)	0.729 (0.647,0.800)	0.786 (0.784,0.787)	0.813 (0.812,0.815)	0.740 (0.713,0.765)	0.668 (0.663,0.673)

IL	0.848 (0.848,0.849)	0.934 (0.934,0.935)	0.941 (0.924,0.955)	0.930 (0.930,0.930)	0.867 (0.867,0.867)	0.889 (0.882,0.897)	0.722 (0.720,0.724)
IN	0.790 (0.789,0.790)	0.911 (0.910,0.911)	0.805 (0.746,0.855)	0.850 (0.849,0.850)	0.821 (0.821,0.822)	0.765 (0.752,0.777)	0.560 (0.597,0.602)
KS	0.673 (0.672,0.674)	0.848 (0.847,0.849)	0.752 (0.668,0.824)	0.761 (0.760,0.762)	0.748 (0.747,0.750)	0.766 (0.743,0.787)	0.460 (0.456,0.464)
LA	0.811 (0.810,0.811)	0.944 (0.943,0.944)	0.921 (0.890,0.946)	0.943 (0.943,0.944)	0.882 (0.881,0.882)	0.870 (0.859,0.880)	0.728 (0.725,0.731)
MD	0.801 (0.780,0.801)	0.917 (0.917,0.918)	0.837 (0.785,0.881)	0.859 (0.858,0.860)	0.830 (0.830,0.831)	0.818 (0.802,0.832)	0.640 (0.637,0.643)
MI	0.810 (0.809,0.810)	0.916 (0.915,0.916)	0.668 (0.602,0.730)	0.810 (0.809,0.810)	0.831 (0.830,0.831)	0.880 (0.871,0.888)	0.632 (0.630,0.634)
MN	0.723 (0.722,0.724)	0.874 (0.873,0.874)	0.702 (0.641,0.759)	0.723 (0.722,0.724)	0.778 (0.777,0.779)	0.776 (0.759,0.793)	0.461 (0.458,0.464)
MO	0.772 (0.771,0.773)	0.893 (0.892,0.894)	0.844 (0.802,0.880)	0.832 (0.832,0.833)	0.814 (0.814,0.815)	0.807 (0.795,0.818)	0.572 (0.569,0.575)
MT	0.725 (0.722,0.727)	0.870 (0.868,0.871)	0.653 (0.504,0.783)	0.798 (0.796,0.800)	0.778 (0.776,0.780)	0.659 (0.610,0.706)	0.461 (0.454,0.468)
NC	0.811 (0.811,0.812)	0.915 (0.915,0.916)	0.761 (0.723,0.796)	0.808 (0.807,0.808)	0.831 (0.830,0.831)	0.808 (0.798,0.818)	0.610 (0.608,0.611)
ND	0.706 (0.703,0.709)	0.866 (0.864,0.869)	0.821 (0.631,0.939)	0.750 (0.748,0.753)	0.755 (0.752,0.758)	0.831 (0.771,0.881)	0.378 (0.370,0.386)
NE	0.739 (0.738,0.741)	0.882 (0.881,0.883)	0.798 (0.692,0.880)	0.811 (0.809,0.812)	0.796 (0.795,0.797)	0.773 (0.743,0.801)	0.513 (0.508,0.518)
NH	0.781 (0.779,0.783)	0.891 (0.890,0.893)	0.927 (0.801,0.985)	0.891 (0.890,0.892)	0.807 (0.805,0.809)	0.831 (0.796,0.862)	0.548 (0.541,0.554)
NJ	0.777 (0.776,0.778)	0.909 (0.909,0.910)	0.843 (0.807,0.874)	0.836 (0.836,0.837)	0.839 (0.838,0.839)	0.771 (0.758,0.784)	0.598 (0.595,0.600)
NM	0.823 (0.822,0.824)	0.926 (0.926,0.927)	0.850 (0.806,0.887)	0.875 (0.874,0.875)	0.849 (0.848,0.850)	0.837 (0.819,0.854)	0.593 (0.590,0.597)
NV	0.641 (0.640,0.643)	0.831 (0.830,0.833)	0.389 (0.276,0.511)	0.641 (0.640,0.643)	0.696 (0.695,0.698)	0.453 (0.425,0.482)	0.358 (0.355,0.362)
NY	0.754 (0.753,0.754)	0.900 (0.900,0.901)	0.894 (0.876,0.911)	0.900 (0.900,0.901)	0.816 (0.816,0.817)	0.859 (0.852,0.865)	0.613 (0.611,0.614)
OK	0.750 (0.749,0.751)	0.869 (0.868,0.870)	0.846 (0.808,0.879)	0.869 (0.868,0.870)	0.789 (0.788,0.790)	0.839 (0.824,0.852)	0.486 (0.483,0.489)

OR	0.695 (0.694,0.696)	0.842 (0.841,0.842)	0.745 (0.679,0.804)	0.769 (0.768,0.769)	0.756 (0.755,0.757)	0.687 (0.664,0.709)	0.361 (0.358,0.364)
RI	0.768 (0.766,0.770)	0.881 (0.880,0.883)	0.831 (0.733,0.905)	0.881 (0.880,0.883)	0.811 (0.809,0.813)	0.824 (0.787,0.857)	0.388 (0.382,0.393)
SC	0.772 (0.771,0.773)	0.909 (0.909,0.910)	0.800 (0.730,0.859)	0.772 (0.771,0.773)	0.812 (0.811,0.813)	0.756 (0.741,0.772)	0.577 (0.574,0.579)
SD	0.751 (0.749,0.753)	0.884 (0.882,0.885)	0.844 (0.705,0.935)	0.884 (0.882,0.885)	0.802 (0.800,0.804)	0.873 (0.838,0.902)	0.533 (0.526,0.539)
TN	0.809 (0.808,0.810)	0.910 (0.910,0.911)	0.881 (0.834,0.919)	0.860 (0.859,0.860)	0.842 (0.841,0.842)	0.824 (0.812,0.835)	0.685 (0.683,0.688)
TX	0.677 (0.676,0.677)	0.828 (0.828,0.828)	0.695 (0.678,0.712)	0.677 (0.676,0.677)	0.738 (0.737,0.738)	0.685 (0.679,0.692)	0.357 (0.356,0.358)
UT	0.642 (0.641,0.644)	0.836 (0.835,0.837)	0.611 (0.505,0.709)	0.640 (0.639,0.642)	0.710 (0.709,0.711)	0.614 (0.587,0.640)	0.388 (0.385,0.392)
VA	0.807 (0.806,0.808)	0.919 (0.918,0.919)	0.814 (0.753,0.865)	0.860 (0.860,0.861)	0.827 (0.826,0.828)	0.788 (0.773,0.803)	0.628 (0.625,0.630)
VT	0.837 (0.835,0.839)	0.925 (0.923,0.926)	0.954 (0.842,0.994)	0.924 (0.923,0.925)	0.848 (0.846,0.850)	0.940 (0.914,0.961)	0.492 (0.484,0.500)
WA	0.796 (0.796,0.797)	0.912 (0.911,0.912)	0.862 (0.827,0.893)	0.854 (0.853,0.855)	0.822 (0.821,0.822)	0.813 (0.800,0.825)	0.615 (0.612,0.617)
WI	0.784 (0.783,0.785)	0.892 (0.891,0.892)	0.845 (0.795,0.888)	0.837 (0.837,0.838)	0.788 (0.787,0.789)	0.831 (0.817,0.845)	0.517 (0.514,0.519)
WY	0.675 (0.672,0.678)	0.854 (0.852,0.856)	0.871 (0.702,0.964)	0.854 (0.852,0.856)	0.751 (0.749,0.754)	0.792 (0.736,0.841)	0.462 (0.454,0.470)

APPENDIX Vb: **Correlations between all metrics, across 43 states in two time periods**

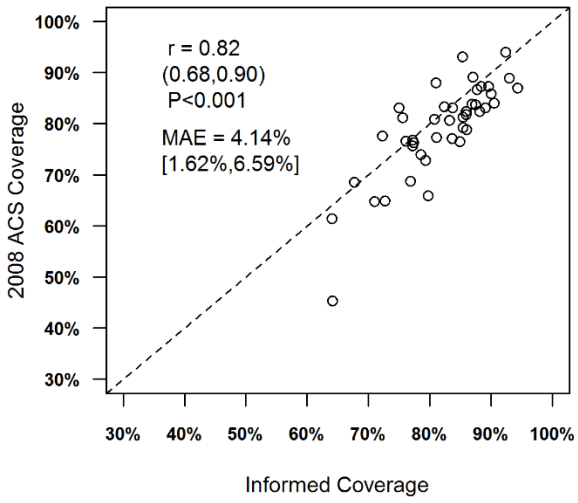
		Coverage PE	Coverage PI	Informed Coverage	Continuity Ratio	Appendicitis Coverage	Duration	ACS
Coverage PE	**Development**	1	0.92[d] (0.85, 0.96)	0.71[d] (0.51, 0.83)	0.94[d] (0.89, 0.97)	0.42[b] (0.13, 0.63)	0.84[d] (0.72, 0.91)	0.60[d] (0.36, 76)
	Validation		0.89[d] (0.80, 0.94)	0.79[d] (0.64, 0.88)	0.88[d] (0.79, 0.93)	0.66[d] (0.45, 0.80)	0.73[d] (0.54, 0.84)	0.64[d] (0.42, 0.79)
Coverage PI	**Development**		1	0.69[d] (0.49, 0.82)	0.95[d] (0.91, 0.97)	0.41[b] (0.12, 0.63)	0.90[d] (0.81, 0.94)	0.60[d] (0.36, 0.76)
	Validation			0.80[d] (0.64, 0.88)	0.96[d] (0.92, 0.98)	0.62[d] (0.39, 0.77)	0.87[d] (0.76, 0.92)	0.65[d] (0.43, 0.79)
Informed Coverage	**Development**			1	0.78[d] (0.62, 0.87)	.74[d] (0.55, 0.85)	0.59[d] (0.34, 0.75)	0.81[d] (0.66, 0.89)
	Validation				0.84[d] (0.71, 0.91)	0.86[d] (0.75, 0.92)	0.64[d] (0.41, 0.78)	0.75[d] (0.57, 0.85)
Continuity Ratio	**Development**				1	0.51[c] (0.25, 0.70)	0.87[d] (0.76, 0.92)	0.69[d] (0.49, 0.82)
	Validation					0.73[d] (0.54, 0.84)	0.85[d] (0.73, 0.91)	0.75[d] (0.57, 0.85)
Appendicitis Coverage*	**Development**					1	0.29 (-0.01, 0.54)	0.72[d] (0.53, 0.83)
	Validation						0.48[b] (0.20, 0.68)	0.76[d] (0.59, 0.86)
Duration	**Development**						1	0.44[d] (0.15, 0.65)
	Validation							0.50[c] (0.23, 0.69)

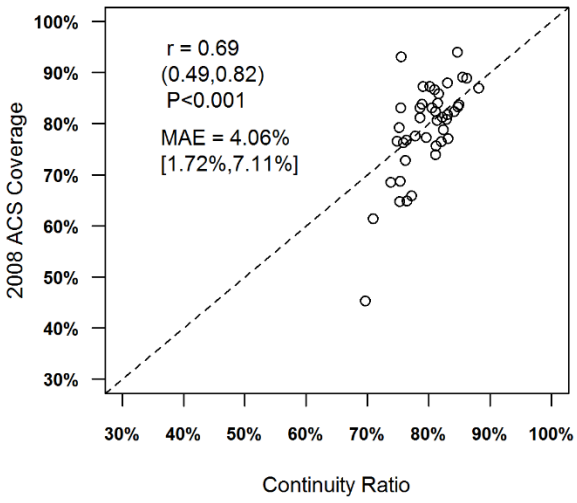
APPENDIX Vc: **Median Absolute Errors**

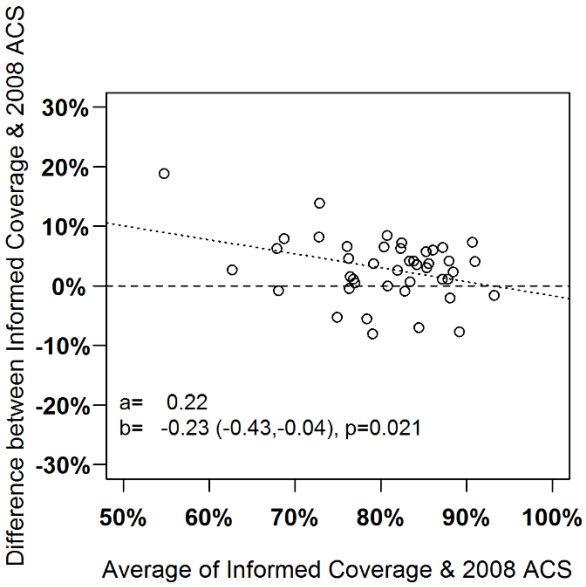
		Informed Coverage	Continuity Ratio	Coverage PE	Coverage PI	Appendicitis Coverage
ACS	**Development**	4.14%	4.06%	5.17%	9.38%	4.49%
			IC vs. CR P = 0.962	IC vs. PE P = 0.1355	IC vs PI P < 0.0001	
	Validation	2.69%	4.09%	6.39%	5.54%	3.76%
			IC vs. CR P = 0.035	IC vs. PE P < 0.0001	IC vs PI P = 0.0022	
Appendicitis	**Development**	2.33%	4.06%	7.93%	5.05%	N/A
			IC vs. CR P < 0.0001	IC vs. PE P < 0.0001	IC vs PI P < 0.0001	
	Validation	2.75%	5.69%	7.42%	5.58%	N/A
			IC vs. CR P < 0.0001	IC vs. PE P < 0.0001	IC vs PI P < 0.0001	

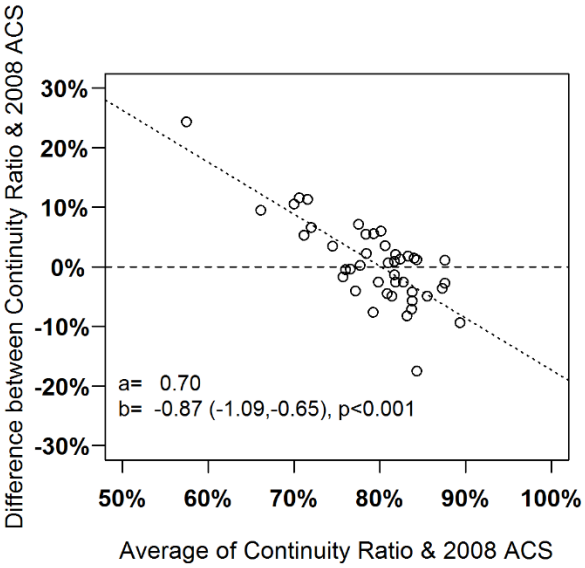
APPENDIX Vd: Bland-Altman plots comparing Informed Coverage and the ACS, and the Continuity Ratio vs. the ACS

Vd.A. January 2008-June 2009, with the 2008 ACS

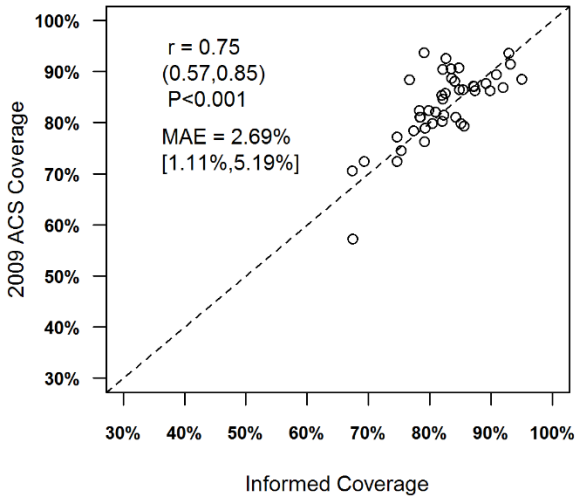


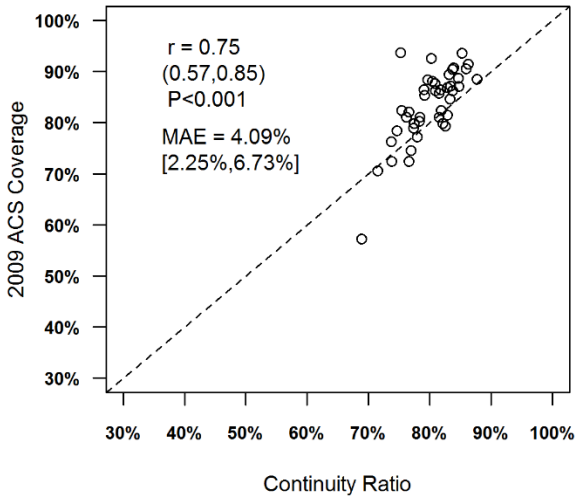


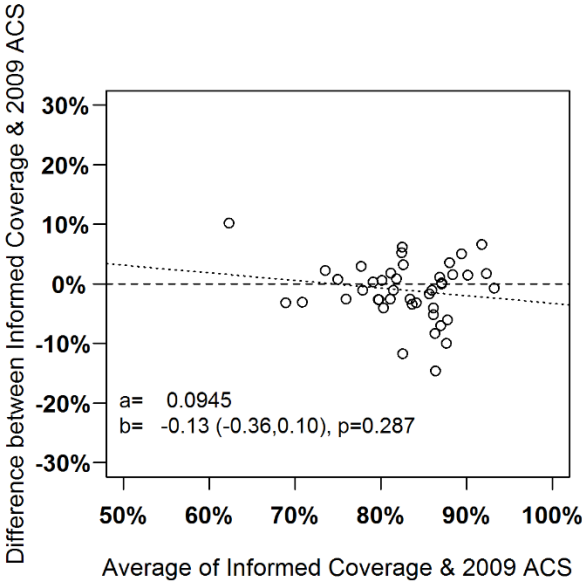


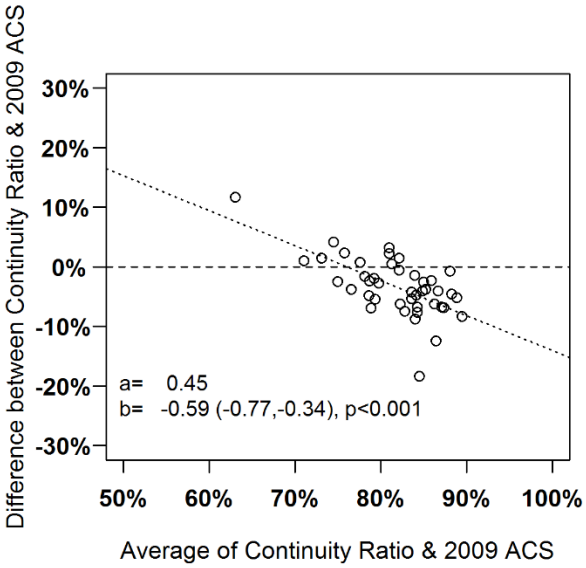


Vd.B. June 2008-December 2009, with the 2009 ACS









Appendix VIa: CHIPRA Core Measures: Positive Outcomes & Utilization

ADHD

Dependent variable: *likelihood to receive at least three follow-up care visits within 10 months after the first prescription of medication for ADHD, one of which occurred within the first 30 days. We coded the receiving of follow-up care as a 1, and lack or care as a 0.*

Illinois (N= 31,703)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.533	0.533	0.526	0.537	0.575	0.585	0.595
Intercept	-0.4227[d]	-0.4231[d]	-0.4086[d]	-0.4981[d]	-0.7623[d]	-0.9408[d]	-0.7250[d]
Centered Coverage	1.027[d]	1.027[d]	1.027[d]	1.020[d]	1.017[d]	1.019[d]	1.014[c]
Age							
6-12 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
1-5 years old	/	5.740[a]	5.754[a]	5.451[a]	5.540[a]	5.921[a]	5.537[a]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.949[a]	0.960	0.978	0.982	0.983
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.162[d]	1.142[d]	1.004	0.973
Hispanic	/	/	/	1.445[d]	1.412[d]	1.242[d]	1.112[a]
Other	/	/	/	1.221[c]	1.221[c]	1.119	1.061
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	1.592[d]	1.598[d]	1.602[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	2.824	2.884
Urban Cluster	/	/	/	/	/	1.051	1.117[a]
Urbanized Area	/	/	/	/	/	1.380[d]	1.217[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.902[a]
Missing income level	/	/	/	/	/	/	0.826[a]
25-50% income level	/	/	/	/	/	/	0.768[d]
< 25% income level	/	/	/	/	/	/	0.531[d]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	0.997
25-50% with HS Degree	/	/	/	/	/	/	1.037
< 25% with HS Degree	/	/	/	/	/	/	1.199[c]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.029
50-75% below FPL	/	/	/	/	/	/	1.114[a]
≥ 75% below FPL	/	/	/	/	/	/	1.502[d]

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

ADHD

Dependent variable: *likelihood to receive at least three follow-up care visits within 10 months after the first prescription of medication for ADHD, one of which occurred within the first 30 days. We coded the receiving of follow-up care as a 1, and lack or care as a 0.*

Louisiana (N= 33,109)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.508	0.508	0.509	0.528	0.554	0.561	0.564
Intercept	-0.4087[d]	-0.4089[d]	-0.4293[d]	-0.3412[d]	-0.4864[d]	-0.6873[d]	-0.6942[d]
Centered Coverage	0.991	0.991	0.991	1.019	1.019	1.019	1.019
Age							
6-12 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
1-5 years old	/	2.507	2.452	2.569	2.517	2.574	2.564
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.071[b]	1.058[a]	1.074[b]	1.075[b]	1.076[b]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.819[d]	0.808[d]	0.786[d]	0.775[d]
Hispanic	/	/	/	1.135	1.145	1.101	1.104
Other	/	/	/	0.917	0.889[a]	0.867[a]	0.864[a]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	1.396[d]	1.395[d]	1.393[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.999	0.926
Urban Cluster	/	/	/	/	/	1.172[d]	1.181[d]
Urbanized Area	/	/	/	/	/	1.326[d]	1.307[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.971
Missing income level	/	/	/	/	/	/	1.111
25-50% income level	/	/	/	/	/	/	0.924
< 25% income level	/	/	/	/	/	/	1.007
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.038
25-50% with HS Degree	/	/	/	/	/	/	0.956
< 25% with HS Degree	/	/	/	/	/	/	0.909
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.082
50-75% below FPL	/	/	/	/	/	/	1.102
≥ 75% below FPL	/	/	/	/	/	/	1.126

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Asthma-Related Emergency Room Visits

Dependent variable: *likelihood of never experiencing an asthma-related emergency room visit.*

Illinois (N=1,161,865)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	**	0.544	0.567	0.645	0.854	0.855	0.855
Intercept	4.6694[d]	4.9444[d]	4.7807[d]	5.2109[d]	7.9963[d]	8.1973[d]	8.2625[d]
Centered Coverage	0.993	0.992	0.992	1.012[b]	1.010[b]	1.011[b]	1.009[a]
Age							
≥ 13 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.779[d]	0.783[d]	0.729[d]	0.765[d]	0.765[d]	0.764[d]
1-5 years old	/	0.639[d]	0.643[d]	0.561[d]	0.685[d]	0.686[d]	0.686[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.423[d]	1.429[d]	1.115[d]	**1.115**[d]	1.115[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.409[d]	0.385[d]	0.402[d]	0.417[d]
Hispanic	/	/	/	1.208[d]	1.105[b]	1.153[d]	1.132[c]
Other	/	/	/	0.946	0.811[d]	0.842[c]	0.832[c]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	0.023[d]	0.023[d]	0.023[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	1.303	1.206
Urban Cluster	/	/	/	/	/	0.802[c]	0.816[c]
Urbanized Area	/	/	/	/	/	0.783[d]	0.770[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	1.011
Missing income level	/	/	/	/	/	/	0.999
25-50% income level	/	/	/	/	/	/	0.976
< 25% income level	/	/	/	/	/	/	0.990
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.062
25-50% with HS Degree	/	/	/	/	/	/	1.044
< 25% with HS Degree	/	/	/	/	/	/	1.178[d]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	0.868[c]
50-75% below FPL	/	/	/	/	/	/	0.892[a]
≥ 75% below FPL	/	/	/	/	/	/	0.812[c]

**Note: Measures of association between the observed and predicted values were not calculated because the predicted probabilities are indistinguishable when they are classified into intervals of length 0.002.

[a] $p<0.05$, [b] $p<0.01$, [c] $p<0.001$, [d] $p<0.0001$

Asthma-Related Emergency Room Visits

Dependent variable: *likelihood of never experiencing an asthma-related emergency room visit.*

Louisiana (N= 595,268)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.507	0.582	0.601	0.650	0.867	0.868	0.869
Intercept	4.5234[d]	4.9926[d]	4.8154[d]	5.4615[d]	8.4934[d]	8.6837[d]	8.8307[d]
Centered Coverage	0.881[d]	0.877[d]	0.876[d]	1.014	1.009	1.014	1.048[a]
Age							
≥ 13 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.646[d]	0.650[d]	0.640[d]	0.775[d]	0.777[d]	0.777[d]
1-5 years old	/	0.469[d]	0.472[d]	0.452[d]	0.694[d]	0.696[d]	0.697[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.472[d]	1.480[d]	1.200[d]	1.200[d]	1.202[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.389[d]	0.362[d]	0.373[d]	0.395[d]
Hispanic	/	/	/	1.095	0.909	0.960	0.957
Other	/	/	/	0.735[d]	0.789[c]	0.818[b]	0.829[b]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	0.015[d]	0.015[d]	0.015[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.810	0.753
Urban Cluster	/	/	/	/	/	0.899[a]	0.857[b]
Urbanized Area	/	/	/	/	/	0.756[d]	0.718[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.711[d]
Missing income level	/	/	/	/	/	/	0.902
25-50% income level	/	/	/	/	/	/	0.844[a]
< 25% income level	/	/	/	/	/	/	0.728[c]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.028
25-50% with HS Degree	/	/	/	/	/	/	1.181[b]
< 25% with HS Degree	/	/	/	/	/	/	1.245[d]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.133
50-75% below FPL	/	/	/	/	/	/	0.880
≥ 75% below FPL	/	/	/	/	/	/	0.911

[a] $p<0.05$, [b] $p<0.01$, [c] $p<0.001$, [d] $p<0.0001$

Preventive Dental Services

Dependent variable: *likelihood of receiving at least one preventive dental service per calendar year.*

Illinois (N=1,432,414)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.549	0.626	0.626	0.650	0.656	0.656	0.659
Intercept	-1.2106[d]	-1.6291[d]	-1.6480[d]	-1.8752[d]	-1.9930[d]	-2.0595[d]	-2.1156[d]
Centered Coverage	1.090[d]	1.093[d]	1.093[d]	1.067[d]	1.066[d]	1.064[d]	1.053[d]
Age							
≥ 13 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	2.155[d]	2.156[d]	2.098[d]	2.087[d]	2.087[d]	2.091[d]
1-5 years old	/	1.636[d]	1.637[d]	1.542[d]	1.501[d]	1.499[d]	1.502[d]
0-1 years old	/	0.138[d]	0.139[d]	0.128[d]	0.125[d]	0.124[d]	0.124[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.037[d]	1.035[d]	1.067[d]	1.067[d]	1.067[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.133[d]	1.134[d]	1.086[d]	1.042[d]
Hispanic	/	/	/	1.934[d]	1.957[d]	1.876[d]	1.729[d]
Other	/	/	/	1.342[d]	1.370[d]	1.319[d]	1.302[d]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	1.395[d]	1.398[d]	1.393[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.402[c]	0.423[c]
Urban Cluster	/	/	/	/	/	0.996	0.987
Urbanized Area	/	/	/	/	/	1.121[d]	1.122[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.993
Missing income level	/	/	/	/	/	/	1.047[c]
25-50% income level	/	/	/	/	/	/	1.016
< 25% income level	/	/	/	/	/	/	1.036[b]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	0.982[a]
25-50% with HS Degree	/	/	/	/	/	/	1.086[d]
< 25% with HS Degree	/	/	/	/	/	/	1.238[d]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.022[b]
50-75% below FPL	/	/	/	/	/	/	1.067[d]
≥ 75% below FPL	/	/	/	/	/	/	0.958[b]

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Preventive Dental Services

Dependent variable: *likelihood of receiving at least one preventive dental service per calendar year.*

Louisiana (N= 668,924)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.513	0.593	0.596	0.598	0.605	0.610	0.613
Intercept	-0.8399[d]	-0.9311[d]	-0.9859[d]	-0.9380[d]	-1.0103[d]	-1.0254[d]	-0.9132[d]
Centered Coverage	1.079[d]	1.080[d]	1.080[d]	1.095[d]	1.095[d]	1.096[d]	1.122[d]
Age							
≥ 13 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	1.489[d]	1.491[d]	1.492[d]	1.476[d]	1.480[d]	1.479[d]
1-5 years old	/	1.077[d]	1.078[d]	1.079[d]	1.046[d]	1.048[d]	1.048[d]
0-1 years old	/	0.071[d]	0.0791[d]	0.071[d]	0.069[d]	0.068[d]	0.068[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.114[d]	1.115[d]	1.133[d]	1.132[d]	1.133[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.918[d]	0.922[d]	0.909[d]	0.950[d]
Hispanic	/	/	/	0.800[d]	0.811[d]	0.798[d]	0.796[d]
Other	/	/	/	1.052[d]	1.045[c]	1.029[a]	1.041[c]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	1.258[d]	1.256[d]	1.257[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.297[d]	0.279[d]
Urban Cluster	/	/	/	/	/	0.945[d]	0.975[a]
Urbanized Area	/	/	/	/	/	1.075[d]	1.032[c]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.903[d]
Missing income level	/	/	/	/	/	/	0.928[d]
25-50% income level	/	/	/	/	/	/	0.834[d]
< 25% income level	/	/	/	/	/	/	0.945[b]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.055[d]
25-50% with HS Degree	/	/	/	/	/	/	1.133[d]
< 25% with HS Degree	/	/	/	/	/	/	1.080[d]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	0.941[d]
50-75% below FPL	/	/	/	/	/	/	0.889[d]
≥ 75% below FPL	/	/	/	/	/	/	0.809[d]

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Dental Treatment Services

Dependent variable: *likelihood of receiving at least one dental treatment service per calendar year.*

Illinois (N= 1,432,414)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.524	0.613	0.613	0.650	0.654	0.654	0.657
Intercept	-2.0244[d]	-2.0260[d]	-2.0438[d]	-2.1331[d]	-2.2212[d]	-2.2974[d]	-2.2364[d]
Centered Coverage	1.053[d]	1.053[d]	1.053[d]	1.041[d]	1.040[d]	1.038[d]	1.034[d]
Age							
≥ 13 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	1.431[d]	1.431[d]	1.361[d]	1.353[d]	1.352[d]	1.349[d]
1-5 years old	/	0.792[d]	0.792[d]	0.718[d]	0.702[d]	0.701[d]	0.698[d]
0-1 years old	/	0.013[d]	0.013[d]	0.012[d]	0.011[d]	0.011[d]	0.011[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.035[d]	1.033[d]	1.057[d]	1.057[d]	1.057[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.801[d]	0.801[d]	0.765[d]	0.804[d]
Hispanic	/	/	/	1.788[d]	1.802[d]	1.722[d]	1.653[d]
Other	/	/	/	1.242[d]	1.261[d]	1.210[d]	1.198[d]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	1.291[d]	1.293[d]	1.295[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.629	0.586
Urban Cluster	/	/	/	/	/	1.004	1.023
Urbanized Area	/	/	/	/	/	1.135[d]	1.093[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.971[b]
Missing income level	/	/	/	/	/	/	1.009
25-50% income level	/	/	/	/	/	/	0.910[d]
< 25% income level	/	/	/	/	/	/	0.844[d]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	0.989
25-50% with HS Degree	/	/	/	/	/	/	1.039[c]
< 25% with HS Degree	/	/	/	/	/	/	1.179[d]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.025[a]
50-75% below FPL	/	/	/	/	/	/	1.014
≥ 75% below FPL	/	/	/	/	/	/	0.919[d]

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Dental Treatment Services

Dependent variable: *likelihood of receiving at least one dental treatment service per calendar year.*

Louisiana (N= 668,924)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.505	0.596	0.604	0.609	0.614	0.617	0.620
Intercept	-1.5080[d]	-1.3231[d]	-1.3891[d]	-1.3105[d]	-1.3668[d]	-1.3217[d]	-1.2425[d]
Centered Coverage	1.016[d]	1.013[b]	1.012[b]	1.036[d]	1.036[d]	1.037[d]	1.059[d]
Age							
≥ 13 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	1.104[d]	1.106[d]	1.105[d]	1.095[d]	1.098[d]	1.097[d]
1-5 years old	/	0.632[d]	0.633[d]	0.632[d]	0.616[d]	0.618[d]	0.617[d]
0-1 years old	/	0.024[d]	0.024[d]	0.023[d]	0.023[d]	0.023[d]	0.023[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.138[d]	1.139[d]	1.153[d]	1.152[d]	1.152[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.870[d]	0.873[d]	0.871[d]	0.902[d]
Hispanic	/	/	/	0.795[d]	0.804[d]	0.804[d]	0.802[d]
Other	/	/	/	1.042[b]	1.034[a]	1.032[a]	1.046[b]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	1.196[d]	1.193[d]	1.195[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.318[d]	0.310[d]
Urban Cluster	/	/	/	/	/	0.912[d]	0.937[d]
Urbanized Area	/	/	/	/	/	0.979[a]	0.958[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.947[c]
Missing income level	/	/	/	/	/	/	0.921[d]
25-50% income level	/	/	/	/	/	/	0.932[c]
< 25% income level	/	/	/	/	/	/	1.100[d]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.048[d]
25-50% with HS Degree	/	/	/	/	/	/	1.114[d]
< 25% with HS Degree	/	/	/	/	/	/	1.037[a]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	0.921[d]
50-75% below FPL	/	/	/	/	/	/	0.848[d]
≥ 75% below FPL	/	/	/	/	/	/	0.752[d]

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Well-child Visits, 15 months

Dependent variable: *likelihood of each child 15 months of age to have had at least 5 well-child visits.*

Illinois (N=109,085)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.469	0.505	0.503	0.546	0.609	0.617	0.622
Intercept	0.6356[d]	0.6128[d]	0.6334[d]	0.8167[d]	0.5316[d]	0.8071[d]	0.6855[d]
Centered Coverage	1.003	1.003	1.003	1.014[d]	1.014[d]	1.016[d]	1.021[d]
Age							
0-1 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
1-5 years old	/	1.099[d]	1.099[d]	1.101[d]	1.085[d]	1.085[d]	1.084[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.960[b]	0.960[b]	1.031[a]	1.031[a]	1.030[a]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.657[d]	0.642[d]	0.755[d]	0.800[d]
Hispanic	/	/	/	0.853[d]	0.866[d]	1.016	1.063[b]
Other	/	/	/	0.796[d]	0.826[d]	0.955	0.984
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	2.256[d]	2.248[d]	2.247[d]
Geography							
Urbanized Area	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.097[a]	0.107[a]
Rural	/	/	/	/	/	1.046	1.007
Urban Cluster	/	/	/	/	/	0.637[d]	0.695[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.978
Missing income level	/	/	/	/	/	/	1.100[a]
25-50% income level	/	/	/	/	/	/	1.135[d]
< 25% income level	/	/	/	/	/	/	1.229[d]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.040
25-50% with HS Degree	/	/	/	/	/	/	0.948[a]
< 25% with HS Degree	/	/	/	/	/	/	0.982
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.143[d]
50-75% below FPL	/	/	/	/	/	/	0.941[a]
≥ 75% below FPL	/	/	/	/	/	/	0.767[d]

[a] $p<0.05$, [b] $p<0.01$, [c] $p<0.001$, [d] $p<0.0001$

Well-child Visits, 15 months

Dependent variable: *likelihood of each child 15 months of age to have had at least 5 well-child visits.*

Louisiana (N= 51,719)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.517	0.522	0.523	0.532	0.584	0.593	0.601
Intercept	0.5060[d]	0.4693[d]	0.4633[d]	0.4940[d]	0.2444[d]	-0.0102	-0.1578[d]
Centered Coverage	0.951[d]	0.950[d]	0.950[d]	0.949[d]	0.947[d]	0.940[d]	0.963[b]
Age							
0-1 years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
1-5 years old	/	1.163[d]	1.162[d]	1.161[d]	1.150[d]	1.150[d]	1.150[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.012	1.013	1.059[b]	1.058[b]	1.058[b]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.992	0.993	0.957[a]	0.972
Hispanic	/	/	/	0.685[d]	0.718[d]	0.687[d]	0.698[d]
Other	/	/	/	0.909[a]	0.934	0.898[a]	0.904[a]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	1.784[d]	1.789[d]	1.777[d]
Geography							
Urbanized Area	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.700[d]	0.658[d]
Rural	/	/	/	/	/	1.262[d]	1.222[d]
Urban Cluster	/	/	/	/	/	1.422[d]	1.465[d]
ZIP CODE-LEVEL SES VARIABLES: REPORTED IN QUARTILES							
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.971
Missing income level	/	/	/	/	/	/	1.248[c]
25-50% income level	/	/	/	/	/	/	1.001
< 25% income level	/	/	/	/	/	/	0.807[c]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.005
25-50% with HS Degree	/	/	/	/	/	/	1.174[d]
< 25% with HS Degree	/	/	/	/	/	/	1.097[a]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.269[d]
50-75% below FPL	/	/	/	/	/	/	1.198[c]
≥ 75% below FPL	/	/	/	/	/	/	1.084

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Appendix VIb: Unnecessary hospitalization for Ambulatory Care-Sensitive Conditions

Illinois

(N=1,660,024)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.503	0.637	0.637	0.648	0.785	0.785	0.786
Intercept	-4.3176[d]	-4.3334[d]	-4.3034[d]	-4.3650[d]	-5.3915[d]	-5.4129[d]	-5.5542[d]
Centered Coverage	1.025[d]	1.026[d]	1.026[d]	1.023[d]	1.019[d]	1.019[d]	1.015[d]
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.502[d]	0.502[d]	0.513[d]	0.485[d]	0.485[d]	0.486[d]
1-5 years old	/	0.969	0.968	1.008	0.846[d]	0.846[d]	0.848[d]
0-1 years old	/	2.187[d]	2.185[d]	2.280[d]	2.307[d]	2.308[d]	2.311[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.942[d]	0.943[d]	1.114[d]	1.114[d]	1.113[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.277[d]	1.240[d]	1.261[d]	1.195[d]
Hispanic	/	/	/	0.889[d]	0.934[c]	0.950[a]	0.915[d]
Other	/	/	/	0.795[d]	0.893[c]	0.907[b]	0.910[b]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	7.002[d]	6.995[d]	6.963[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.813	0.966
Urban Cluster	/	/	/	/	/	1.078[a]	1.054
Urbanized Area	/	/	/	/	/	1.003	1.038
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.015
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	1.058
≥ 75% below FPL	/	/	/	/	/	/	1.023
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.024
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	1.080[b]
< 25% with HS Degree	/	/	/	/	/	/	1.060[a]
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	1.060[a]
Missing	/	/	/	/	/	/	0.976
25-50% income level	/	/	/	/	/	/	1.162[d]
< 25% income level	/	/	/	/	/	/	1.114[b]

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Louisiana
(N=775,256)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.499	0.666	0.665	0.668	0.765	0.769	0.771
Intercept	-3.6882[d]	-4.1036[d]	-4.0845[d]	-4.0384[d]	-4.8009[d]	-4.5851[d]	-4.7662[d]
Centered Coverage	0.991	0.998	0.998	1.004	1.003	1.008	0.987
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.665[d]	0.665[d]	0.665[d]	0.603[d]	0.606[d]	0.608[d]
1-5 years old	/	1.692[d]	1.691[d]	1.706[d]	1.364[d]	1.377[d]	1.381[d]
0-1 years old	/	3.481[d]	3.479[d]	3.535[d]	3.121[d]	3.153[d]	3.163[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.962[b]	0.963[a]	1.078[d]	1.076[d]	1.076[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	0.945 [c]	0.960[a]	1.005	0.953[b]
Hispanic	/	/	/	0.558[d]	0.629[d]	0.689[d]	0.697[d]
Other	/	/	/	0.885[c]	0.888[c]	0.948	0.938
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	5.001[d]	4.956[d]	4.950[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.447[d]	0.439[d]
Urban Cluster	/	/	/	/	/	0.949[a]	0.913[c]
Urbanized Area	/	/	/	/	/	0.690[d]	0.741[d]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.035
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	1.049
≥ 75% below FPL	/	/	/	/	/	/	1.082
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.064[a]
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	0.916[b]
< 25% with HS Degree	/	/	/	/	/	/	0.919[b]
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	1.058
Missing	/	/	/	/	/	/	1.246[d]
25-50% income level	/	/	/	/	/	/	1.298[d]
< 25% income level	/	/	/	/	/	/	1.333[d]

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Montana
(N= 102,287)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.498	0.667	0.667	0.688	0.817	0.818	0.819
Intercept	-4.3607[d]	-4.4707[d]	-4.4580[d]	-4.6317[d]	-5.4722[d]	-5.4764[d]	-5.6293[d]
Centered Coverage	1.017	1.019	1.019	1.009	0.996	0.995	0.992
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.463[d]	0.463[d]	0.466[d]	0.426[d]	0.426[d]	0.428[d]
1-5 years old	/	0.970	0.970	0.972	0.742[c]	0.742[b]	0.743[c]
0-1 years old	/	2.958[d]	2.957[d]	2.947[d]	2.619[d]	2.621[d]	2.619[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.975	0.973	1.127[a]	1.128[a]	1.128[a]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.117	1.005	1.043	1.023
Hispanic	/	/	/	1.093	1.065	1.088	1.056
Other	/	/	/	1.776[d]	1.746[d]	1.735[d]	1.524[d]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	8.045[d]	8.050[d]	7.948[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.680	0.728
Urban Cluster	/	/	/	/	/	1.084	1.156
Urbanized Area	/	/	/	/	/	0.904	0.999
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.080
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	0.974
≥ 75% below FPL	/	/	/	/	/	/	1.006
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	0.856
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	0.995
< 25% with HS Degree	/	/	/	/	/	/	1.119
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	1.104
Missing	/	/	/	/	/	/	1.125
25-50% income level	/	/	/	/	/	/	1.168
< 25% income level	/	/	/	/	/	/	1.294

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

North Carolina
(N= 1,296,473)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.506	0.660	0.661	0.664	0.788	0.789	0.791
Intercept (log odds)	-4.4036[d]	-4.4669[d]	-4.4784[d]	-4.5488[d]	-5.3517[d]	-5.2505[d]	-5.4901[d]
Centered Coverage (odds ratio)	1.031[d]	1.035[d]	1.035[d]	1.036[d]	1.022[d]	1.009[a]	0.991[a]
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.467[d]	0.467[d]	0.468[d]	0.391[d]	0.392[d]	0.393[d]
1-5 years old	/	0.972	0.973	0.979	0.651[d]	0.654[d]	0.656[d]
0-1 years old	/	2.577[d]	2.578[d]	2.582[d]	2.065[d]	2.071[d]	2.077[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.023	1.024	1.174[d]	1.174[d]	1.174[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.106[d]	1.042[a]	1.052[b]	1.030
Hispanic	/	/	/	0.995	1.072[b]	1.085[b]	1.084[b]
Other	/	/	/	1.300[d]	1.236[d]	1.245[d]	1.235[d]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	6.721[d]	6.688[d]	6.671[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.606[d]	0.608[d]
Urban Cluster	/	/	/	/	/	0.964	0.981
Urbanized Area	/	/	/	/	/	0.859[d]	0.937[a]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.052
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	1.004
≥ 75% below FPL	/	/	/	/	/	/	1.001
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.246[d]
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	1.346[d]
< 25% with HS Degree	/	/	/	/	/	/	1.382[d]
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.899[b]
Missing	/	/	/	/	/	/	1.260[d]
25-50% income level	/	/	/	/	/	/	0.895[b]
< 25% income level	/	/	/	/	/	/	1.043

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

New Hampshire
(N= 99,095)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.500	0.650	0.652	0.652	0.808	0.810	0.810
Intercept	-4.8917[d]	-5.1897[d]	-5.1566[d]	-5.1688[d]	-6.2256[d]	-6.4181[d]	-6.4500[d]
Centered Coverage	1.060	1.067	1.067	1.067	1.046	1.106	1.030
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.686[b]	0.685[b]	0.684[b]	0.654[c]	0.653[c]	0.651[c]
1-5 years old	/	1.466[c]	1.466[c]	1.461[c]	1.093	1.086	1.074
0-1 years old	/	3.206[d]	3.205[d]	3.188[d]	2.771[d]	2.750[d]	2.703[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.933	0.934	1.093	1.091	1.088
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.441	1.467	1.381	1.282
Hispanic	/	/	/	1.249	1.254	1.164	1.022
Other	/	/	/	0.479	0.579	0.553	0.552
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	9.023[d]	8.982[d]	8.904[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	1.224	1.589
Urban Cluster	/	/	/	/	/	1.220	1.165
Urbanized Area	/	/	/	/	/	1.346[b]	1.257[a]
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	0.860
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	0.805
≥ 75% below FPL	/	/	/	/	/	/	0.993
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.056
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	1.137
< 25% with HS Degree	/	/	/	/	/	/	1.335
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	1.004
Missing	/	/	/	/	/	/	0.824
25-50% income level	/	/	/	/	/	/	1.192
< 25% income level	/	/	/	/	/	/	1.102

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

New York
(N= 1,957,955)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.497	0.636	0.636	0.652	0.779	0.779	0.780
Intercept	-3.9285[d]	-4.1895[d]	-4.1367[d]	-4.5153[d]	-5.3588[d]	-5.4095[d]	-5.4057[d]
Centered Coverage	1.022[d]	1.031[d]	1.031[d]	1.017[d]	1.005	1.000	0.989[b]
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.680[d]	0.678[d]	0.678[d]	0.595[d]	0.595[d]	0.596[d]
1-5 years old	/	1.383[d]	1.381[d]	1.386[d]	0.962[a]	0.961[a]	0.967[a]
0-1 years old	/	2.610[d]	2.606[d]	2.715[d]	2.305[d]	2.303[d]	2.318[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.898[d]	0.896[d]	1.023[a]	1.023[a]	1.023[a]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.682[d]	1.684[d]	1.648[d]	1.535[d]
Hispanic	/	/	/	1.799[d]	1.680[d]	1.642[d]	1.501[d]
Other	/	/	/	1.205[d]	1.272[d]	1.246[d]	1.194[d]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	6.395[d]	6.391[d]	6.385[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.868	1.034
Urban Cluster	/	/	/	/	/	0.985	0.993
Urbanized Area	/	/	/	/	/	1.081[b]	1.015
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	0.992
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	0.912[c]
≥ 75% below FPL	/	/	/	/	/	/	1.164[d]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.122[d]
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	1.219[d]
< 25% with HS Degree	/	/	/	/	/	/	1.209[d]
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.944[b]
Missing	/	/	/	/	/	/	0.879
25-50% income level	/	/	/	/	/	/	0.940[a]
< 25% income level	/	/	/	/	/	/	0.951

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Oregon
(N= 411,300)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	0.500	0.683	0.683	0.690	0.801	0.801	0.802
Intercept	-4.9739 [d]	-5.0288[d]	-5.0267[d]	-5.1421[d]	-5.8821[d]	-5.8177[d]	-5.9159[d]
Centered Coverage	1.042[b]	1.045[b]	1.045[b]	1.050[b]	1.034[a]	1.033[a]	1.033[a]
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.405[d]	0.405[d]	0.397[d]	0.374[d]	0.374[d]	0.374[d]
1-5 years old	/	0.838[b]	0.838[b]	0.816[c]	0.652[d]	0.651[d]	0.651[d]
0-1 years old	/	2.854[d]	2.854[d]	2.757[d]	2.486[d]	2.484[d]	2.493[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	0.996	0.995	1.129[b]	1.129[b]	1.129[b]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.353[c]	1.243[a]	1.205[a]	1.190
Hispanic	/	/	/	1.400[d]	1.447[d]	1.437[d]	1.463[d]
Other	/	/	/	1.204[c]	1.269[d]	1.259[d]	1.267[d]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	6.811[d]	6.822[d]	6.824[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.997	1.683
Urban Cluster	/	/	/	/	/	0.868	0.833[a]
Urbanized Area	/	/	/	/	/	0.975	1.001
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	1.250[b]
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	1.269[b]
≥ 75% below FPL	/	/	/	/	/	/	1.226[a]
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.206[b]
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	1.054
< 25% with HS Degree	/	/	/	/	/	/	0.952
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.841[a]
Missing	/	/	/	/	/	/	0.587[b]
25-50% income level	/	/	/	/	/	/	0.858
< 25% income level	/	/	/	/	/	/	0.866

[a] p<0.05, [b] p<0.01, [c] p<0.001, [d] p<0.0001

Utah
(N= 300,225)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
C-statistic	**	0.711	0.710	0.726	0.834	0.834	0.838
Intercept (log odds)	-4.7169[d]	-5.0560[d]	-5.0742[d]	-5.2087[d]	-5.885[d]	-5.8401[d]	-6.0957[d]
Centered Coverage (odds ratio)	0.999	0.999	0.999	0.997	1.001	1.000	1.008
Age							
13+ years old	/	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
6-12 years old	/	0.434[d]	0.434[d]	0.432[d]	0.448[d]	0.448[d]	0.455[d]
1-5 years old	/	0.992	0.993	0.984	0.811[b]	0.812[b]	0.826[b]
0-1 years old	/	4.187[d]	4.189[d]	4.088[d]	3.126[d]	3.132[d]	3.177[d]
Sex							
Male	/	/	Ref.	Ref.	Ref.	Ref.	Ref.
Female	/	/	1.037	1.035	1.186[d]	1.185[d]	1.184[d]
Race							
Non-Hispanic White	/	/	/	Ref.	Ref.	Ref.	Ref.
Non-Hispanic Black	/	/	/	1.537[c]	1.448[b]	1.443[c]	1.302[a]
Hispanic	/	/	/	1.422[d]	1.488[d]	1.481[d]	1.340[d]
Other	/	/	/	1.564[d]	1.668[d]	1.663[d]	1.535[d]
Chronic Condition							
No	/	/	/	/	Ref.	Ref.	Ref.
Yes	/	/	/	/	7.665[d]	7.665[d]	7.665[d]
Geography							
Rural	/	/	/	/	/	Ref.	Ref.
Missing	/	/	/	/	/	0.852	1.064
Urban Cluster	/	/	/	/	/	0.905	1.012
Urbanized Area	/	/	/	/	/	0.963	1.073
Poverty							
< 25% below FPL	/	/	/	/	/	/	Ref.
25-50% below FPL	/	/	/	/	/	/	0.982
Missing	/	/	/	/	/	/	--
50-75% below FPL	/	/	/	/	/	/	1.226[a]
≥ 75% below FPL	/	/	/	/	/	/	0.904
Education							
≥ 75% with HS Degree	/	/	/	/	/	/	Ref.
50-75% with HS Degree	/	/	/	/	/	/	1.090
Missing	/	/	/	/	/	/	--
25-50% with HS Degree	/	/	/	/	/	/	1.116
< 25% with HS Degree	/	/	/	/	/	/	1.638[d]
Income							
≥ 75% income level	/	/	/	/	/	/	Ref.
50-75% income level	/	/	/	/	/	/	0.930
Missing	/	/	/	/	/	/	1.055
25-50% income level	/	/	/	/	/	/	0.913
< 25% income level	/	/	/	/	/	/	1.028

**Note: Measures of association between the observed and predicted values were not calculated because the predicted probabilities are indistinguishable when they are classified into intervals of length 0.002.
[a] $p<0.05$, [b] $p<0.01$, [c] $p<0.001$, [d] $p<0.0001$