

**Using Indirect Estimation
to Improve CMS Administrative
Information on Race/Ethnicity
and Estimate Plan-Level HEDIS
Performance by Race/Ethnicity**

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Self-Reported Race/Ethnicity: Important , but often Unavailable

- To address health disparities, we need to classify populations by race/ethnicity (R/E)
- Person's self-report is considered the gold standard
- But self-reports are often unavailable and infeasible
 - Most plans collect enrollee's name & address, but not R/E
 - At best, self-report available only for a fraction of health plan enrollees
 - CMS Administrative race/ethnicity is known to undercount Hispanics, Asians
 - Many other public records that might be valuable for research lack racial/ethnic information (but include name and address)

We Currently Recommend the Bayesian Improved Surname Geocoding (BISG) for General Purposes

- Combines block group racial/ethnic info from Census SF1 file
- Incorporates census latest surname list probabilities (Word et al. 2007), along with fixes for unlisted names, suppressed counts
- Produces a vector of 6 probabilities of being Hispanic, NH White, Black, API, AI/AN, Multiracial
- Described in Elliott, Morrison, et al. (2009, HSORM)
- Concordance of 92-98% for Hispanic, White, Black, API

CMS Administrative R/E

- Based on SSA form that did not allow options other than Black/White/Other before 1980
- Newer form meets current OMB standard
- Some updates from survey response
- How good is it?
 - Black: Excellent sensitivity, Very good specificity
 - White: Very good sensitivity, OK specificity
 - Hispanic, Asian: Poor sensitivity
- Would like to improve this to support MIPPA 185
 - Report HEDIS measures by race/ethnicity for Medicare Advantage Plans

CMS Admin Probability By Self-Reported R/E

Self-Report	P(CMS White)	P(CMS Black)	P(CMS Hisp)	P(CMS API)	P(CMS AI/AN)	P(CMS Other)	P(CMS Miss)
White 82.5%	99.3	0.1	0.0	0.1	0.1	0.4	0.1
Black 7.6%	1.0	98.0	0.1	0.1	0.1	0.7	0.1
Hisp 5.5%	65.0	3.6	26.6	0.5	0.2	4.0	0.1
API 2.1%	5.3	1.3	0.4	54.0	0.3	38.5	0.3
AI/AN 0.4%	51.0	10.4	1.0	1.9	29.1	6.4	0.3
Multi 2.0%	78.2	16.8	0.1	0.6	2.2	2.0	0.1

A further modification of BISG updates CMS' administrative race/ethnicity variable

- Turns CMS Administrative classification into a vector of probabilities using previous self-reported data
- Independently calculates a vector of BISG probabilities from name, address
- Uses similar Bayesian approach to integrate these 2 estimates, 3 information sources.
- Substantially improves the original CMS variable

SR Probability Given CMS Admin R/E

P(SR)	CMS White 85.6%	CMS Black 9.7%	CMS Hisp 1.8%	CMS API 1.3%	CMS AI/AN 0.3%	CMS Other 1.3%	CMS Missing 0.1%
White	93.7	1.1	2.0	5.8	18.4	22.1	72.6
Black	0.1	91.5	0.5	0.3	1.9	3.6	10.2
Hisp	4.1	2.5	96.5	2.2	4.2	15.1	8.4
API	0.1	0.3	0.6	90.1	2.7	54.9	5.5
AI/AN	0.2	0.5	0.3	0.6	52.2	1.7	1.2
Multi	1.8	4.1	0.2	1.0	20.7	2.6	2.1

Pearson Correlation of 3 Sets of Probabilities with Self-Report (n=257,518)

	BISG	Admin	Combined
White	.717	.763	.853 (c=94%)
Black	.729	.942	.946 (c=99%)
Hispanic	.773	.498	.778 (c=92%)
Asian/PI	.749	.731	.865 (c=98%)

We Have Developed Efficient Analytic Methods for Indirect Estimates of R/E

- Don't dichotomize for analysis
 - Categorizing individual race/ethnicity before estimating population disparities needlessly loses information
 - Much like dichotomizing continuous outcomes
 - Can also bias estimates
- Use the vector of six probabilities directly
- Predict health measure in linear regression from vector of 5 r/e probabilities
 - Omit White
 - Can interpret betas as if were 1/0 dummies
 - Unbiased under reasonable assumptions that seem to hold in example that follows (see McCaffrey & Elliott, 2008 HSR)

Validation for Estimating Disparities: Medicare CAHPS Measures

- 257,518 cases from 2007 Medicare CAHPS survey
- 10 measures of health care experiences (5 global ratings, 5 composite measures)
- For each of 3 largest non-White groups, compute disparities vs. whites (3x10=30 estimates)
 - Using observed self-report (gold standard)
 - Using combined Admin/BISG

CAHPS Disparities Estimates Similar for Self-Reported, Indirect R/E

- Signs of indirect disparity matched self-reported 30/30 times
- Significance at .05 matched self-report 29/30 times
- Largest errors in estimates on 0-100 scale
 - 0.4 units Black vs. White
 - 0.9 units Hispanic vs. White
 - 1.0 units API vs. White

Application to 2008-2009 HEDIS Data

- Calculates indirect estimates incorporating CMS administrative race/ethnicity for a census of 44 million beneficiaries
- Merged onto individual-level HEDIS records
- Allows estimation of number of Hispanic, Black, API, and White eligibles for each HEDIS measure in each plan in combined data
- Allows estimation of performance by plan for each of these four racial/ethnic groups

Establishing Reporting Thresholds for Highly Reliable Plan-Level Estimates

- Mixed logistic regression models had fixed effects for racial/ethnic probabilities, random effects for plans, interactions of r/e and plan
- Allowed us to calculate thresholds for high plan-level reliability
 - Requiring 100 or more estimated completes for a given racial/ethnic group within the plan for reporting on a given measure
 - Results in median plan-level reliabilities of 83-99% for Hispanics, Blacks, API, and Whites for 7 selected HEDIS measures
- Many of the 382 reporting contracts could report for subgroups
 - 272-357 for Whites; 90-260 for Blacks; 80-179 for Hispanics; 15-112 for API

Conclusions

- Bayesian combination of surname and address info is a powerful means to infer race/ethnicity from administrative records
 - Works well by itself when no administrative measures exist
 - Can be used to improve incomplete administrative info
 - Identifying AI/AN and multiracial nationally by these methods still needs work
- Medicare CAHPS validation suggests similar estimates to self-report for Black-White, Hispanic-White, and API-White differences
- Supports plan-level estimation of HEDIS performance by race/ethnicity

Support

- CMS: HHSM-500-2005-000281

References Cited

- **Elliott MN, Morrison PA, Fremont A, McCaffrey DM, Pantoja P, Lurie N. (2009).** “Using the Census Bureau’s Surname List to Improve Estimates of Race/Ethnicity and Associated Disparities.” *Health Services and Outcomes Research Methodology*, 9(2):69-83.
- **Elliott MN, Fremont A, et al. (2008).** “A New Method for Estimating Race/Ethnicity and Associated Disparities Where Administrative Records Lack Self-Reported Race/Ethnicity.” *Health Services Research*, 43(5p1): 1722-1736.
- **McCaffrey D & Elliott MN. (2008).** “Power of Tests for a Dichotomous Independent Variable Measured with Error.” *Health Services Research*, 43(3): 1085-1101.

BISG Is Currently Impractical for AI/AN, Multiracial

- Performance is above chance but weak/impractical for AI/AN, multiracial
 - Surnames are of little use for either group
 - Residential information not that useful either
 - Low prevalence inherently difficult prediction problem
 - Some evidence of inconsistency in multiracial endorsements
 - For some purposes, may want to create “other” category
- Might be able to extend to Asian, Hispanic national-origin subgroups with high accuracy