

EVALUATION OF AGREEMENT BETWEEN INTERNET-BASED SELF- AND PROXY-REPORTED HEALTHCARE UTILIZATION AND ADMINISTRATIVE HEALTHCARE CLAIMS

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BACKGROUND

- Healthcare resource utilization (HRU) measures are widely used in health policy research and various methods are employed to capture this data.
- Mode of survey administration is an important determinant of the validity/accuracy of self-reported HRU.
- While Internet-based surveys are becoming more common, little is known about the agreement between administrative claims data and Internet-based survey self- and proxy-reported HRU.

STUDY OBJECTIVES

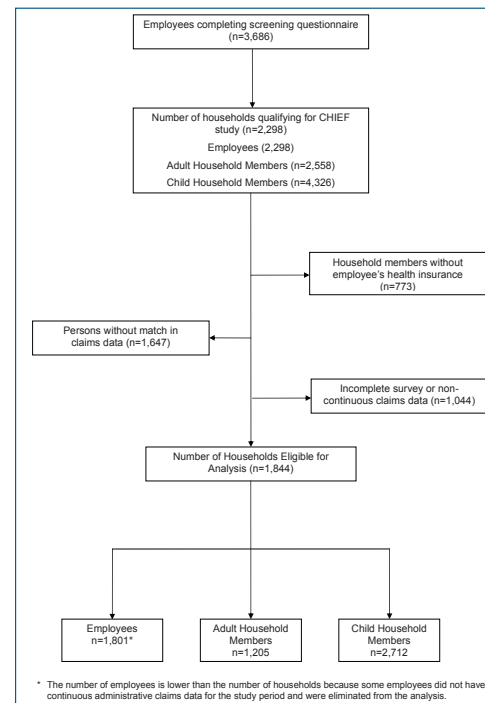
- To investigate the agreement of Internet-based survey self-reported HRU as compared to administrative-claims-based HRU data from three large self-insured U.S. employers
- To investigate the agreement of Internet-based survey proxy-reported HRU as compared to administrative-claims-based HRU
 - Respondent providing responses for other adult household members (HHM)
 - Respondent providing responses for child HHM

STUDY OVERVIEW

- The Child and Household Influenza-Illness and Employee Function (CHIEF) study was a monthly Internet-based survey administered to employees of three large employers between November 2007 and May 2008.
- The survey captured data on the presence and frequency of the following medical care services for both employees' own care and for HHM care through a proxy report:
 - Inpatient stays
 - Emergency department visits
 - Urgent care centers visits
 - Doctor's offices visits
- Employees' and HHMs' administrative claims from the *Thomson Reuters MarketScan® Commercial Database* for the same time period were evaluated relative to the employee self- and proxy-reported HRU measures.

- Employees and HHM were matched to claims using a step-wise approach.
 - Initial sample: 9,182 persons (employee + HHM) with any survey data
 - Step 1: 8,409 persons with employer-sponsored insurance
 - Step 2: 6,762 persons with unique identifier linkable to claims
 - Step 3: 5,718 persons with complete survey data AND continuous claims data during the survey reporting period
- Final sample for this analysis included 1,844 unique households (mean household size = 3.1 persons).
 - 1,801 employees
 - 1,205 adult HHM matched to claims data
 - 2,712 child HHM matched to claims data

Figure 1. Survey-Claims Matching Process



METHODS

- The Kappa (κ) statistic was used to evaluate visit presence concordance.
 - Kappa is an index that compares the agreement against what might be expected by chance.
 - Adult HHM and child HHM data were evaluated separately.
 - Fully unconditional multilevel models were conducted to evaluate the impact of clustering.
- Intraclass correlation coefficient (ICC) was used to describe visit frequency consistency.
 - ICC is a measure of the homogeneity of elements within clusters.
 - Employee model was estimated using one-way ANOVA to measure the between-subject variation and within-subject variation to calculate the ICC and associated confidence interval.
 - Adult and child models were estimated using multilevel regression analysis via a one-way ANOVA with random effects to calculate the ICC and associated confidence interval.

RESULTS

Table 1. Baseline Characteristics of Sample

	Employee	Adult HHM	Child HHM
Age (mean)	41.9	39.5	9.9
Gender: Female	28.5	81.9	48.7
Race/Ethnicity			
White	86.0	89.5	83.8
Black	7.3	5.6	7.3
Other	6.7	4.9	8.9
Hispanic	6.4	5.4	9.1
Education			
High School or Less	16.8	16.7	99.7
Some College	43.9	38.7	0.3
College Graduate or Higher	39.2	43.7	0
Doctor Visit in Past Year	61.1	62.0	74.1
Smoker	12.2	10.5	0
Presence of High Risk Condition	10.9	10.5	2.6
Pregnant	0.4	1.7	0

- For employees' self-reported HRU, the percentage agreement for presence of a particular visit was:
 - Inpatient stay: 98.9%
 - Emergency department visit: 96.4%
 - Urgent care center visit: 95.4%
 - Outpatient office visit: 76.6%
- For proxy-reported HHM HRU, the percentage agreement for presence of a particular visit was:
 - Inpatient stay: 98.8% (adult); 99.6% (child)
 - Emergency department visit: 97.9% (adult); 96.6% (child)
 - Urgent care center visit: 95.7% (adult); 95.9% (child)
 - Outpatient office visit: 75.5% (adult); 76.6% (child)

RESULTS

- Kappa statistics
 - Results for employee self-reported/administrative claims indicate moderate agreement for outpatient office and emergency department visits and substantial agreement for inpatient stays (Table 3).
 - Agreement for proxy-reported visit presence for adult HHM ranged from fair to substantial; similarly, results for child HHM ranged from moderate to substantial (Table 3).
- Intraclass correlation coefficients
 - The magnitude of visit frequency agreement between employee self-reports and administrative claims ranged from fair to moderate (Table 4).
 - The ICC for adult household members also ranged from fair to moderate; the ICC for child household members ranged from slight to moderate (Table 4).

Table 2. Level of Agreement Between Self- and Proxy-Reported Survey Data and Administrative Claims Data by Medical Service Type

	Employee		Adult HHM		Child HHM	
	Claims (+) Survey (-)	Claims (-) Survey (+)	Claims (+) Survey (-)	Claims (-) Survey (+)	Claims (+) Survey (-)	Claims (-) Survey (+)
Inpatient Stay	0.94%	0.11%	0.83%	0.41%	0.41%	0.37%
Emergency Department Visits	1.67%	1.89%	0.58%	1.49%	0.55%	2.84%
Urgent Care Visits	4.16%	0.44%	3.73%	0.58%	3.32%	0.77%
Outpatient Office Visits	12.27%	11.16%	9.63%	14.85%	11.50%	11.84%

Table 3. Kappa Statistics

	Employee	Adult HHM	Child HHM
Inpatient Stay	0.61 (0.47–0.76)	0.77 (0.66–0.87)	0.55 (0.34–0.77)
Emergency Department Visits	0.57 (0.48–0.65)	0.71 (0.62–0.81)	0.67 (0.61–0.73)
Urgent Care Visits	0.37 (0.27–0.47)	0.28 (0.15–0.41)	0.45 (0.38–0.53)
Outpatient Office Visits	0.47 (0.47–0.51)	0.46 (0.43–0.51)	0.50 (0.48–0.53)

Kappa coefficient ≤ 0 = poor, 0.01–0.20 = slight, 0.21–0.40 = fair, 0.41–0.60 = moderate, 0.61–0.80 = substantial, and 0.81–1.0 = almost perfect (Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977; 33: 159–174.)

Table 4. Intraclass Correlation Coefficients

	Employee	Adult HHM	Child HHM
Inpatient Stay	0.39 (0.35–0.42)	0.44 (0.39–0.48)	0.14 (0.11–0.17)
Emergency Department Visits	0.57 (0.53–0.60)	0.71 (0.68–0.74)	0.48 (0.46–0.50)
Urgent Care Visits	0.28 (0.24–0.32)	0.27 (0.22–0.32)	0.37 (0.34–0.40)
Outpatient Office Visits	0.51 (0.46–0.53)	0.61 (0.57–0.64)	0.62 (0.60–0.64)

ICC will approach 1.0 when there is no variance within the metrics for the items of interest.

STUDY LIMITATIONS

- Agreement results reported here may not be generalizable to survey respondents who did not complete all surveys or who could not be linked to claims data.
- Kappa statistics assume independence and to our knowledge there is no similar test that allows for clustering (e.g., single rater providing responses for several children).
 - While clustering effects were minimal, κ values may be slightly overestimated.
- The survey was administered on a monthly basis; results may not hold for less frequent assessment.

CONCLUSIONS

- There was moderate to substantial visit presence agreement between survey-based and claims-based HRU for all service categories.
 - Some types of services may be more difficult to measure using self-reporting.
- Frequency agreement was lower than presence agreement.
- Agreement values are similar to or higher than HRU measures elicited from paper and telephone survey methods.^{1,2,3}
- Adults living in a household can act as proxy respondents for other adult and child HHMs.
- Results suggest that Internet-based surveys are an effective method that can be used by policy analysts to collect self- and proxy-reported HRU.

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