

# Representativeness of Emergency Department Data Reported to the BioSense System

Patrick Minor, M.S.P.H., Roseanne English, B.S., Jerome Tokars, M.D, M.P.H.  
CDC, Division of Emergency of Preparedness and Response, Atlanta, GA

## OBJECTIVE

To assess the representativeness of BioSense ED data by comparing it with the NHAMCS results.

## BACKGROUND

In 2007, the CDC BioSense System received data from 450 non-federal hospitals. Hospitals provide data to Biosense based on their capability and willingness to supply electronic data. As of July 2008, Biosense is receiving data from 550 hospitals. The National Hospital Ambulatory Medical Care Survey (NHAMCS) is an annual national probability sample survey of hospitals that collects data on U.S. emergency department (ED) visits.

## METHODS

For 2005 (the most recent data available), NHAMCS[1] estimated a total of 115.3 million ED visits nationally and a yearly increase of 1.7 million visits; therefore we estimated 118.7 million ED visits in 2007. We compared 2005 NHAMCS data to 2007 BioSense data regarding total visits, patient ages, selected diagnosis categories, syndromes, and geographic area.

## RESULTS

In 2007, BioSense received 13.4 million ED visits, 11.3% of the estimated U.S. total. By age group, percent of total visits for NHAMCS vs BioSense respectively was: <15 years, 21.2% vs 18.2%; 15-44 years 45.1% vs 43.5%; 45-64 years 19.2% vs 20.4%; and >64 years 14.5% vs 14.7%. Among selected diagnosis groups, percent of total visits for NHAMCS vs BioSense were: infections (ICD-9 codes 001-139) 3.0% vs 2.6%; respiratory (codes 460-519) 11.0% vs 9.3%; digestive (codes 520-579) 6.0% vs 6.0%; injury and poisoning (codes 800-999) 24.9% vs 14.7%; and symptoms, signs, and ill-defined conditions (codes 780-999) 19.3% vs 20.4%. By geographic area, percent of total visits for NHAMCS vs BioSense were: Northeast, 19.3% vs 1.3%; Midwest, 24.9% vs 64.7%; South 38.0% vs 26.8%; and West 17.7% vs 7.3%. After applying BioSense syndrome mappings [2] to the NHAMCS diagnosis data, the percent of visits meeting syndrome definitions was generally similar for NHAMCS and Biosense, with minor differences for

the Neurological and Severe Illness or Death syndromes.

Syndrome	% of Visits Meeting Definition	
	NHAMES	BioSense
Botulism-like	0.2	0.7
Fever	4.1	4.5
Gastrointestinal	9.3	11.9
Hemorrhagic Illness	1.0	1.4
Localized Cutaneous Lesion	2.9	3.0
Lymphadenitis	0.2	0.3
Neurological	0.0	4.4
Rash	1.1	1.3
Respiratory	19.2	22.0
Specific Infection	1.6	1.3
Severe Illness or Death	2.9	0.1

Table 1 – Syndromic Rate Comparisons for NHAMCS (2005) and Biosense (2007)

## CONCLUSIONS

In 2007, BioSense received >11% of total U.S. ED visits; these data are automatically analyzed and displayed within hours of receipt. BioSense data are representative of age, most diagnosis groups, and most syndromes. Discrepancies between NHAMCS and BioSense in the Severe Illness or Death syndrome may be due to sampling error of this rare event. Currently, BioSense is not representative with respect to geographic area; initiatives to increase recruitment and improve representativeness of this national system are underway.

## REFERENCES

[1] National Hospital Ambulatory Medical Care Survey: 2005 Emergency Department Summary, Advance Data from Vital and Health and Statistics, Number 386, June 29, 2007. <http://www.cdc.gov/nchs/data/ad/ad386.pdf>

[2] Syndrome Definitions for Diseases Associated with Critical Bioterrorism-associated Agents, October 23, 2003. <http://www.bt.cdc.gov/surveillance/syndromedef/index.asp>

Further Information:  
Patrick Minor, [pfm3@cdc.gov](mailto:pfm3@cdc.gov)  
[www.cdc.gov/biosense](http://www.cdc.gov/biosense)