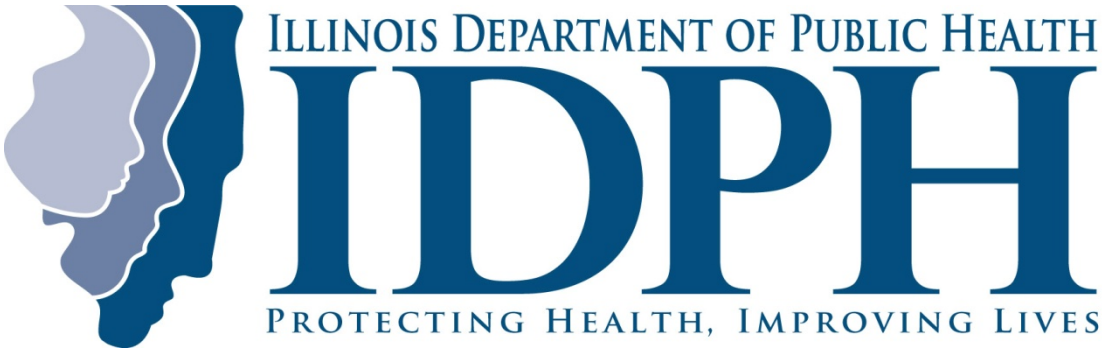


Illinois Emergency Department Utilization: Patterns and Trends in Access to Care and Health Equity, 2009-2013

BACKGROUND/INTRODUCTION

Emergency Departments (EDs) play a vital role in the health care of our nation, providing care for patients with emergent health needs and meeting the demands of public health emergencies, natural disasters, trauma, and infectious disease outbreaks. Open 24 hours a day, seven days a week with legal mandates to stabilize patients regardless of ability to pay, they are an integral component of the health care safety net. Demands on EDs have grown systematically over the last several decades. Visit rates increased 16% between 1995 and 2010, with visit volume rising from 97 to 130 million (1). In addition, the role of EDs has evolved in recent years. With the ability to provide advanced imaging and diagnostics, specialist consultations, and highly complex medical decision making, the ED is increasingly being used to evaluate patients for hospital admission. Approximately half of all hospital admissions are now coming through emergency departments, adding to visit intensity (2-5). While visit rates and intensity have increased, the number of EDs has declined. Between 1995 and 2010 EDs decreased by approximately 11 percent, causing issues with crowding and concerns about timeliness of care and quality of services (6).

In addition, EDs often serve as primary care providers. Studies have indicated that many ED visits are for non-urgent conditions, or conditions that could have been treated or prevented in a primary care setting (7-10). Estimates of these "primary care sensitive" visits average 30%, but vary between <10 % - 50% depending on study methods (11, 12). A variety of factors are contributing to this problem, including limited supply of primary care, availability of primary care after hours or weekends, limitations of health insurance coverage, and concerns about quality of local primary care compared to the ED (13-17). However, the ED is not an optimal site for treatment of "primary care sensitive" conditions. There is no typical follow up care or access to preventive services. Medical information is not shared consistently with other providers because of infrastructure limitations. This often results in duplication of services, fragmented and uncoordinated care, and excess costs. These challenges can affect the quality of healthcare services for patients, and add to the tensions of crowding in the EDs. Concerns about the costs and quality issues associated with inappropriate ED use have prompted quality improvement interventions across the country.

This report provides information about the magnitude and trends associated with primary care sensitive ED visits in Illinois, with special focus on the issue of access to care and inequities that exist. It also examines utilization of the ED for behavioral health-related conditions, which require ongoing management and crisis prevention. General patterns of ED use as well as associated patient demographics are provided. This information provides insight into current utilization of Illinois EDs, problem areas for further examination, and provides baseline data that can assist health planners and policy makers target and evaluate local quality improvement initiatives.

METHODS

An algorithm developed by researchers at New York University Center for Public Service Research was used to help classify Emergency Department visits for this report. The algorithm was specifically designed to examine "primary care sensitive" visits and assess difficulties with access to primary care. It

has been well documented in the literature (18-21). Developed for use with emergency department discharge or claims data, the algorithm classifies visits into four categories based on visit necessity, three that are "primary care sensitive" and one that is truly emergent. Injury, drug, alcohol and mental health illness cases are isolated for separate study. Any cases not meeting any of these criteria are labeled "unclassified". This report groups the three primary care sensitive related visit categories and the three behavioral health-related visit categories together, to examine overall burden of these visits. All of the major visit categories as discussed in this report are outlined below:

New York University (NYU) Algorithm Categories of Study

Emergent - Not Preventable/Avoidable - Emergency department care was required and ambulatory care treatment could not have prevented the condition (e.g., trauma, appendicitis, myocardial Infarction, etc.)

Primary Care Sensitive (PCS) Categories

- Non-emergent - The patient's initial complaint, presenting symptoms, vital signs, medical history, and age indicated that immediate medical care was not required within 12 hours.
- Emergent/Primary Care Treatable - Based on information in the record, treatment was required within 12 hours, but care could have been provided effectively and safely in a primary care setting.
- Emergent - ED Care Needed - Preventable/Avoidable - Emergency department care was required based on the complaint or procedures performed/resources used, but the emergent nature of the condition was potentially preventable/avoidable if timely and effective ambulatory care had been received during the episode of illness (e.g., the flare-ups of asthma, diabetes, congestive heart failure, etc.)

Behavioral Health-Related Categories

- Mental health
- Alcohol
- **D**rugs/ Substance Abuse

Injury

Data analyzed in this report were obtained from the Illinois discharge data collection system and include all 2009 through 2013 calendar year outpatient discharges with an emergency department billing code. Data is submitted to the Illinois Department of Public Health as mandated by the Illinois Health Finance Reform Act (ILCS 2215) from all Illinois hospitals (excluding federal facilities), emergency departments and ambulatory surgery centers. All outpatient emergency department visits in Illinois without an admission were included in this analysis. The Illinois Hospital Discharge database collects diagnostic and procedure codes, demographic data, and charge data for all discharges from Illinois hospitals, EDs, and ambulatory surgery centers. The unit of analysis for this report is the visit versus the individual.

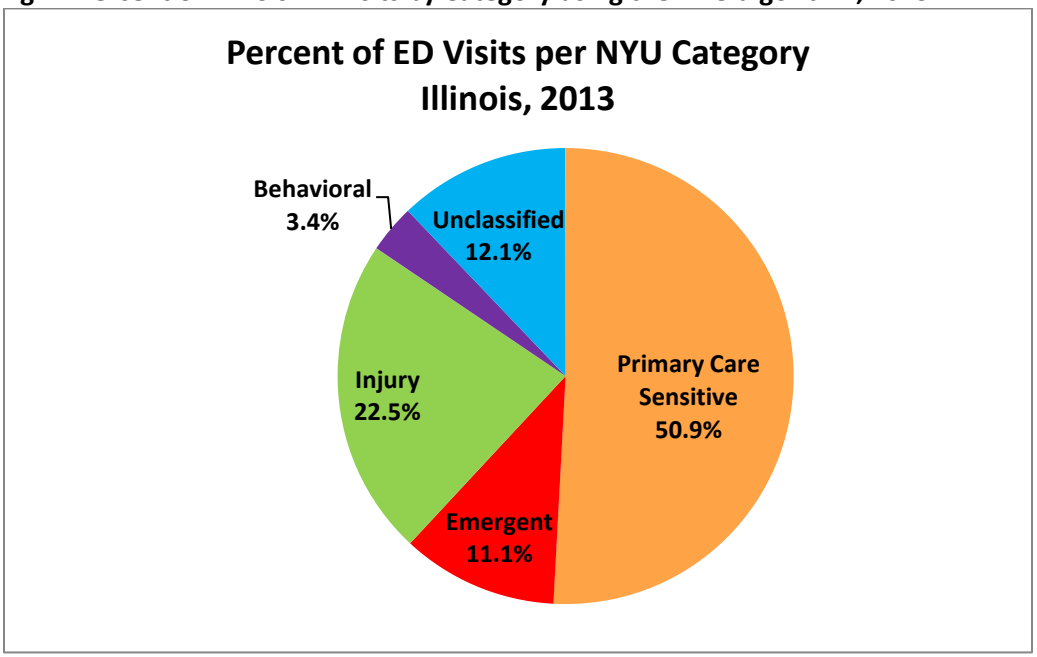
JoinPoint regression analysis was used to analyze trends in ED visits across calendar years 2009-2013 (See Appendix A). Poisson regression was used to compare visits across race/ethnicity.

RESULTS

Highlights of All Emergency Department Visit Categories

In 2013 there were approximately 4.1 million outpatient (treat and release) Emergency Department visits in Illinois, with over $12.5 billion dollars in associated charges. Figure 1 provides a breakdown of these outpatient treat and release visits by category. As the graph below depicts, approximately 51 percent of these visits were Primary Care Sensitive and 3.4 percent were Behavioral. The distribution of primary care sensitive visits has remained stable for the past five years ranging between 50 and 52 percent of visits. Total ED visits fluctuated between 3.9 and 4.3 million visits during this same time period.

Fig. 1 Percent of Illinois ED Visits by Category using the NYU algorithm, 2013



Rates for each individual category of visits were analyzed annually for the years 2009 through 2013 and are highlighted in Table 1 below. Using Joinpoint analysis the average annual percent change in visit rate was calculated for each visit category together with statistical significance. This analysis gives a detailed description of change over time. Note that the average annual percent change in visit rates for alcohol (7.68%), mental health(6.51%), and emergent(3.46%) visit categories all increased and were statistically significant ($p<.05$). The rise in emergent ED visits may be indicative of increasing use of the ED as a diagnostic arena for determining hospital admission with associated visit complexity. (The percent of ED visits in Illinois resulting in admission rose from 40.9% in 1993 to 50.8% in 2013). Although the average annual percent change in visits for substance abuse and/or drugs was 10.10%, it was not statistically significant due to small numbers.

Table 1. Illinois Emergency Department Visit Rates by Category with Average Annual Percent Change (AAPC), 2009-2013

	Rates per 1,000 population					
Visit Category	**2009**	**2010**	**2011**	**2012**	**2013**	**AAPC**
Total ED Visits	307.01	309.28	322.97	333.68	319.09	1.56
Emergent (Not Avoidable)	31.02	31.97	34.14	36.17	35.28	**3.86***
Primary care sensitive						
- Non-Emergent	68.45	68.71	72.43	74.52	71.88	1.80
- Emergent-Primary Care Treatable	71.38	68.63	73.19	75.60	71.55	1.02
- Emergent - Preventable/Avoidable	19.42	18.60	19.25	19.77	18.84	0.00
Behavioral Health						
- Mental Health Related	5.18	5.65	6.13	6.69	6.56	**6.51***
- Alcohol Related	2.82	3.16	3.45	3.76	3.77	**7.68***
- Substance Abuse/Drug	0.39	0.45	0.52	0.56	0.57	10.10
Injury	73.61	76.94	76.11	76.81	71.93	-0.46

*statistically significant

Trends in Total, Primary Care Sensitive, and Behavioral Health Visits

To examine the overall impact of all primary care sensitive and behavioral health-related ED utilization, rates for these two major visit categories were calculated and compared to total ED visits. The chart below highlights rates for 2009 through 2013 for each of the three categories. Using Joinpoint analysis the average annual percent change in visit rates was calculated for each visit category. Note that the average annual percent change in total ED and Primary Care Sensitive visits rose modestly at 1.56 and 1.25 percent respectively. In contrast, the average annual percent change in Behavioral health visits rose 7.10 percent and was statistically significant ($p<.05$). Although visit volume is small for Behavioral Health in comparison to the other two categories, the volume of visits increased from 108,329 in 2009 to 140,374 in 2013 (30%) with consistent increases occurring each successive year.

Table 2. Illinois Emergency Department Visit Rates for Total, Primary Care Sensitive, and Behavioral Health with Average Annual Percent Change (AAPC), 2009-2013.

	2009	**2010**	**2011**	**2012**	**2013**	**Average Annual Percent Change (AAPC)**
Total	307.01	309.28	322.97	333.68	319.09	1.56
PCS	159.26	155.94	164.87	169.89	162.27	1.25
Behavioral	8.39	9.26	10.1	11	10.9	**7.10***

*statistically significant

Analysis of Total, Primary Care Sensitive, and Behavioral Health Visits by Race/Ethnicity

Visit rates for each of the three major ED visit categories were studied by race/ethnicity across time and the average annual percent change calculated using JoinPoint regression analysis. In addition, the rates

of ED utilization were compared between African Americans and white ED users. Results for each of the three major visit categories are presented in this section.

Total ED Visits

Total ED visits rates for African Americans, Hispanics and white people are highlighted in Table 3 below for years 2009-2013. Note that the average annual percent change in visit rate was highest for African Americans, increasing on average 2.46% per year, which was statistically significant (p<.05). Using Poisson regression analysis, African Americans had higher rates of total ED visits compared to white people (RR =2.28) on average between 2009-2013. This was statistically significant (p<.0001).

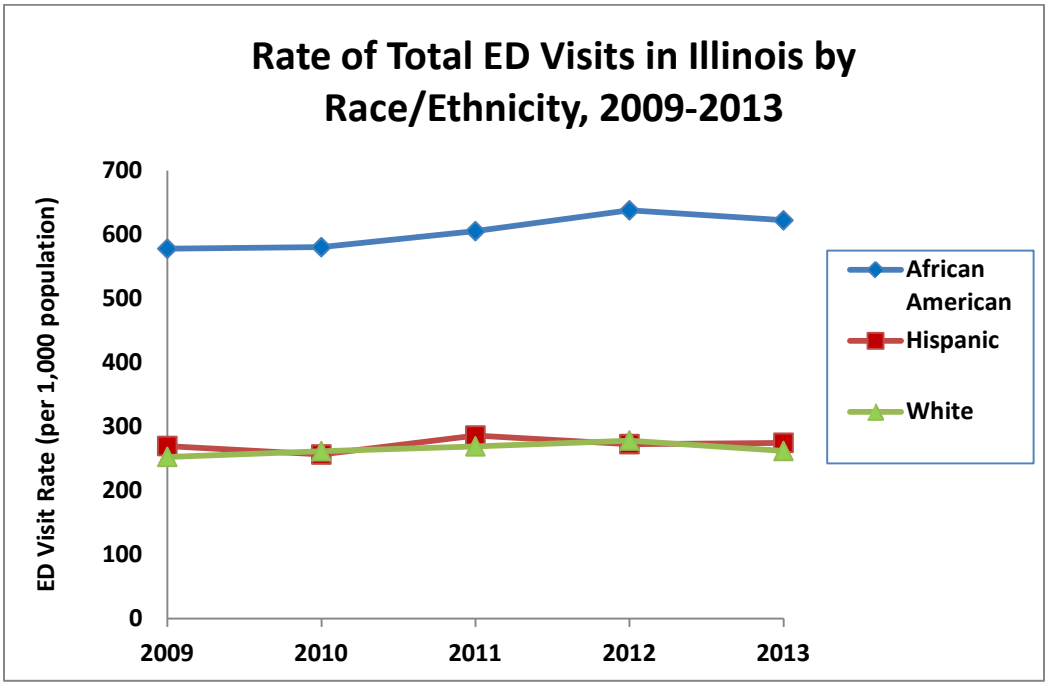
Table 3. Total Illinois Emergency Department Visit Rates by Race/Ethnicity with Average Annual Percent Change (AAPC), 2009-2013.

Race/Ethnicity	2009	2010	2011	2012	2013	Average Annual Percent Change (AAPC)
African American	578.12	580.49	605.53	638.05	622.46	2.46 *
Hispanic or Latino	269.63	256.37	285.96	272.63	274.66	0.96
White	252.76	261.67	269.17	278.28	261.95	1.36

* statistically significant

Figure 3 illustrates the trends in total ED visits rates by race/ethnicity.

Figure 3. Trends in Total Illinois Emergency Department Visit Rates by Race/Ethnicity Rates, 2009-2013



Primary Care Sensitive ED Visits

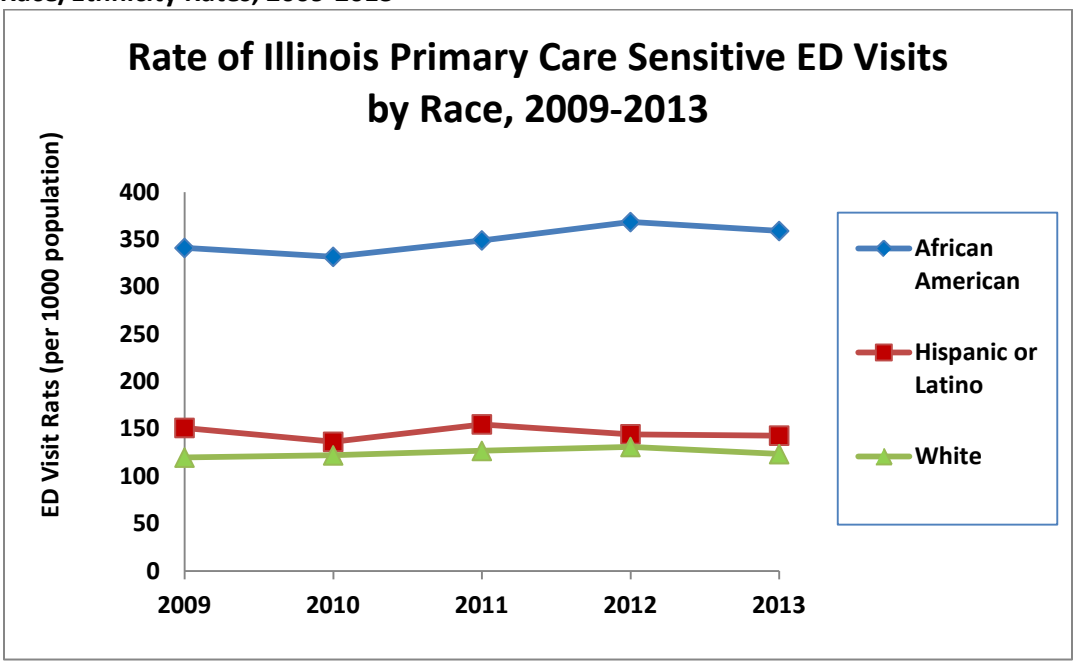
Primary Care Sensitive ED visits rates for African Americans, Hispanics and white people are highlighted in Table 4 below. Note that the average annual percent change of ED Primary Care Sensitive visits increased by 2.09% per year for African Americans, and 1.33% per year for the white population during the 5 year period of 2009 - 2013. The rate of ED visits decreased by 0.59% per year for Hispanics. None of the rate increases/decreases are statistically significant for any race/ethnic group. However, using Poisson regression analysis African Americans had notably higher Primary Care sensitive visit rates compared to white people (RR =2.81) on average between 2009-2013. This was statistically significant (p<.0001).

Table 4. Total Illinois PCS Emergency Department Visit Rates by Race/Ethnicity with Average Annual Percent Change (AAPC), 2009-2013.

Race/ethnicity	2009	2010	2011	2012	2013	Average Annual Percent Change (AAPC)
African American	341.03	331.66	349.02	368.35	358.92	2.09
Hispanic	151.01	136.33	154.77	144.28	142.89	-0.59
White	119.74	122.05	126.76	130.93	123.38	1.33

Figure 4 illustrates the trends in Primary Care Sensitive ED visits rates by race/ethnicity.

Figure 4. Trends in Total Primary Care Sensitive Illinois Emergency Department Visit Rates by Race/Ethnicity Rates, 2009-2013



Behavioral Health-Related ED Visits

Behavioral health-related ED visit rates for African Americans, Hispanics and white people are highlighted in Table 5 below. Note that the average annual percent change of ED visit rates increased 8.13% per year for African Americans, 9.49% per year for Hispanics and 5.99% per year for the white population during the five year period of 2009-2013. The rate increases are statistically significant ($p<.05$) for all three groups. Using Poisson regression analysis, on average African Americans had higher rates of behavioral health-related ED visits (RR=1.67) compared to white Americans during the study period. This was statistically significant ($p<.0001$).

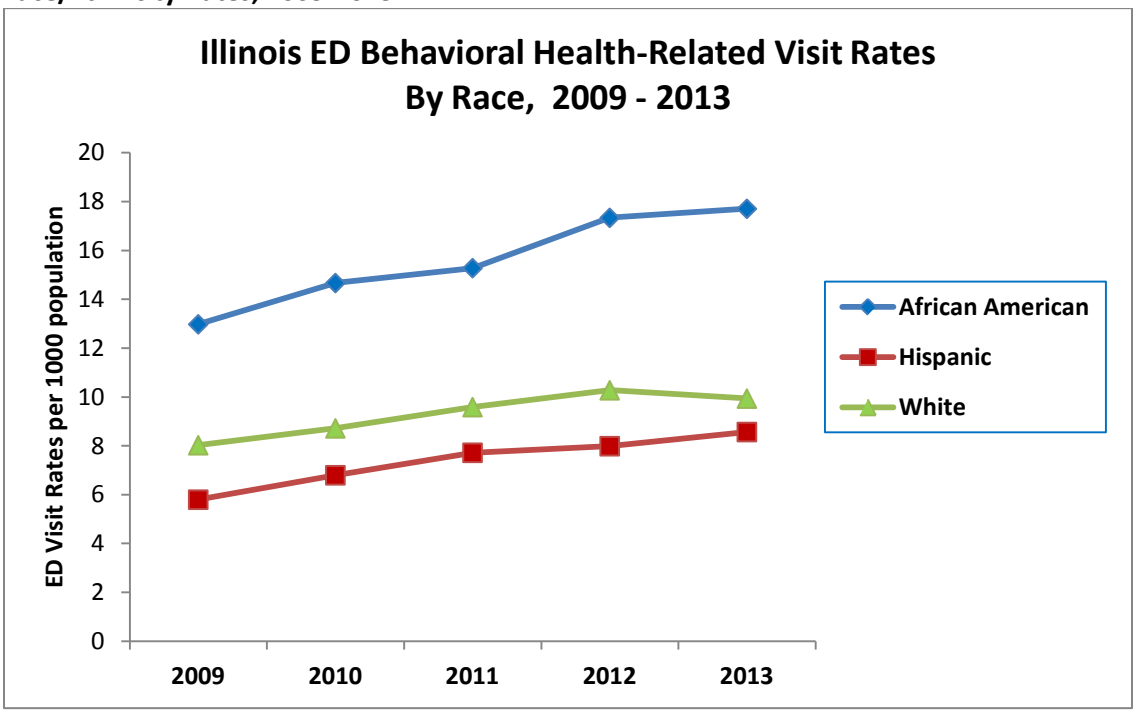
Table 5. Total Illinois Behavioral Health Emergency Department Visit Rates by Race/Ethnicity with Average Annual Percent Change (AAPC), 2009-2013.

Race/Ethnicity	2009	2010	2011	2012	2013	Average Annual Percent Change (AAPC)
African American	12.98	14.67	15.28	17.34	17.71	8.13*
Hispanic	5.8	6.8	7.72	7.99	8.57	9.49*
White	8.03	8.72	9.59	10.28	9.94	5.99*

* statistically significant

Figure 5 illustrates the trends in Behavioral Health-Related ED visits rates by race/ethnicity.

Figure 5. Trends in Total Behavioral Health-Related Illinois Emergency Department Visit Rates by Race/Ethnicity Rates, 2009-2013



Demographic Characteristics of Patients Visiting Illinois Emergency Departments

Examination of demographic characteristics of ED visitors for calendar year (CY) 2013 revealed use by a higher percentage of women compared to men for total ED visits (57%) and primary care sensitive visits (61%). In contrast, a greater percentage of men (55%) utilized the ED for behavioral health-related visits than women (45%). African Americans had the highest visit rates for all three categories of ED visits, as highlighted earlier. Respectively, their percent of visits for each ED visit category was disproportionate compared to the 2013 census data for the Illinois African American population, which was 14.7%. Rates were also calculated by age group for each of the three visit categories, with children under age 10 having the highest rates for total and primary care sensitive visits. Adults age 25-44 years old have the highest behavioral health- related ED visit rates. Table 6 below summarizes these patient characteristics.

Table 6. Patient Characteristics for Total, Primary Care Sensitive, and Behavioral Health-Related ED visits, calendar year 2013.

CY 2013	Total ED Visits		Primary Care Sensitive		Behavioral Health	
Category	Rate of Visits (per 1,000 pop)	% of ED Visits	Rate of Visits (per 1,000 pop)	% of ED Visits	Rate of Visits (per 1,000 pop)	% of ED Visits
Race/Ethnicity						
White	261.95	51%	123.38	48%	9.94	57%
African American	622.46	27%	358.92	31%	17.71	23%
Hispanic	274.66	14%	142.89	14%	8.57	13%
Other/Unknown	327.30	7%	161.91	7%	11.33	7%
Gender						
Female	354.84	57%	193.48	61%	9.63	45%
Male	282.04	43%	129.93	39%	12.21	55%
Age Group						
Under 10 years	416.44	17%	245.39	19%	1.04	1%
10-24 years	319.59	21%	154.3	20%	13.55	26%
25-44 years	349.08	30%	181.61	30%	15.15	37%
45-64 years	258.37	21%	125.74	20%	12.02	29%
65 and older	285.08	12%	128.71	11%	5.46	7%

Payer Mix of ED Visits

Emergency department visits were also analyzed by payer for calendar year 2013 for each of three major visit categories. The largest percentage of Total ED and Primary Care Sensitive visits was associated with Medicaid, followed by private insurance. In contrast, the highest percentage of behavioral health-related ED visits occurred among the uninsured at 32.97%. The rate of uninsured for all Illinoisans under age 65 in 2013 was 14.6%

Table 7. Percent of Total, Primary Care Sensitive, and Behavioral Health-Related ED visits by payer, calendar year 2013

Payer Mix	Total ED Visits	Percent of Total Cases	Primary Care Sensitive Visits	Primary Care Sensitive (% of Total)	Behavioral Health Visits	Behavioral Health (% of Total)
Private Insurance	1,321,822	32.20%	600,904	28.74%	35,576	25.34%
Medicaid	1,404,932	34.20%	810,462	38.78%	38,002	27.07%
Medicare	634,011	15.40%	299,585	14.33%	20,510	14.61%
Uninsured/Other	749,769	18.20%	379,404	18.15%	46,286	32.97%

CONCLUSION

The primary health care system in the U.S. has not been regarded as reliably available for all. Improving access to high quality affordable health care is one of the major aims of the Affordable Care Act and the National Quality Strategy, and is essential for improving the health of the nation (22). A healthy primary care system integrates quality behavioral health services, as both are inextricably linked in promoting well-being and healthy productive lives. The burden of disability from behavioral health problems is among the highest of all diseases in the country (23), yet is still not well recognized.

The data in this report indicate difficulty with access to primary and behavioral health care in Illinois, particularly for African Americans. During 2009-2013, total ED visits and primary care sensitive ED visits increased modestly with an average annual percent change of 1.56 and 1.25 per year respectively. However primary care sensitive visits consistently accounted for 50-52% of total visits. Although behavioral health-related visits accounted for <4% of total ED visits, they increased significantly with an average annual percent change of 7.10 per year during the report period. This mirrors national data on ED trends reported by the Agency for Healthcare Research and Quality. (24). African Americans had a disproportionate visit burden compared to whites across the three major visit categories examined – total ED visits, primary care sensitive and behavioral health-related visits. This inequity was significant across categories ($p<.0001$) and over time. It is consistent with nationally reported inequities in infant mortality, chronic disease burden and premature death amongst African Americans (25). One of the foundational goals of Healthy People 20/20 is to achieve health equity, eliminate disparities, and improve the health of all populations (26).

This report provides information about patterns and trends in the utilization of Emergency Departments in Illinois, with particular focus on primary care sensitive and behavioral health-related visits. The data provide a tool for statewide health care assessment and planning, a basis for further study, and can be used to evaluate promising quality improvement interventions. Data should be used for action – whether it is a platform for generating ideas, advocacy, policy or planning.

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Appendix A

JoinPoint Analysis

The Joinpoint regression program is trend analysis software developed by the US National Cancer Institute for the analysis of data from the Surveillance Epidemiology and End Results Program (SEERS). The Joinpoint program is used to find the best-fit linear line through several years of data. This method describes changes in data trends by connecting several different line segments on a log-scale at ‘‘joinpoints.’’ [1]

Tests of significance use a Monte Carlo permutation method with each joinpoint denoting a statistically significant (P = .05) change in trend. An average annual percent change (AAPC) in the ED visit category rate and the corresponding 95% confidence interval are estimated and tested to determine whether a difference exists from the null hypothesis of no change (0%). In the final model, each joinpoint informs a statistically significant change in trends (increase or decrease) and each of those trends is described by an AAPC.[1]

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