



## Original Contribution

# A retrospective cross-sectional study of patients treated in US EDs and ambulatory care clinics with sexually transmitted infections from 2001 to 2010<sup>☆</sup>



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## ABSTRACT

**Introduction:** Sexually transmitted infections (STIs) are commonly seen in the ambulatory health care settings such as emergency departments (EDs) and outpatient clinics. Our objective was to assess trends over time in the incidence and demographics of STIs seen in the ED and outpatient clinics compared with office-based clinics using the National Hospital Ambulatory Medical Care Survey and National Ambulatory Medical Care Survey.

**Methods:** This study was conducted using 10 years of National Hospital Ambulatory Medical Care Survey and National Ambulatory Medical Care Survey data (2001–2010). We compared data from 2001–2005 to data from 2006–2010. Patients were included in analyses if they were 15 years and older and had an *International Classification of Diseases, Ninth Revision* code consistent with cervicitis, urethritis, chlamydia, gonorrhea, or trichomonas.

**Results:** We analyzed 82.4 million visits for STIs, with 16.5% seen in hospital-based EDs and 83.5% seen in office-based clinics between 2001 and 2010. Compared with patients seen in office-based clinics, ED patients were younger ( $P < .05$ ), more likely to be male ( $P < .001$ ) and nonwhite ( $P < .001$ ), and less likely to have private insurance ( $P < .05$ ). We found a significant increase in adolescent (15–18 years) ED visits ( $P < .05$ ) from 2001–2015 to 2006–2010 and a decrease in adolescent and male STI visits in office-based settings ( $P < .05$ ).

**Conclusion:** Although patients with STI are most commonly seen in office-based clinics, EDs represent an important site of care. In particular, ED patients are relatively younger, male, and nonwhite, and less likely to be private insured.

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## 1. Introduction

Patients with symptoms of sexually transmitted infections (STIs), including gonorrhea, chlamydia, and trichomonas, are treated in a variety of settings in the United States, from office-based clinics to hospital-based emergency departments (EDs) and outpatient clinics [1]. In 2008, the estimated number of incident cases in the United States was 2 860 000 (incidence rate 926.2/100 000) for chlamydia, 820 000 (incidence rate 265.5/100 000) for gonorrhea, and 1 090 000 (incidence rate

353.0/100 000) for trichomonas [2]. These STIs are treatable with antibiotics; however, STIs are often asymptomatic and still transmissible. When untreated, STIs can cause serious complications including infertility, ectopic pregnancy, pelvic inflammatory disease, premature labor, and low birth weight [2]. This makes the identification and treatment of patients with STIs a public health priority.

There are limited data regarding the epidemiology of where STIs are evaluated and treated, specifically when comparing office-based clinic settings, including sexually transmitted disease (STD) clinics, to hospital-based EDs [3]. A greater understanding of where patients are receiving STI treatment is important to determine where interventions such as educational campaigns can be used, how to improve the efficiency of STI treatment by ensuring adequate access to medical care, and cost reduction for both the patients and health care system, which has become increasingly important.

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The objective of this study was to assess trends over time in the incidence and demographics of STIs evaluated in the US EDs compared with office-based clinics using nationally representative data from 2001 to 2010.

**2. Materials and methods**

**2.1. Study design**

This was a retrospective cross-sectional study of patients treated in US EDs and outpatient clinics and office-based clinics with STIs from 2001 to 2010. We used data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) and National Ambulatory Medical Care Survey (NAMCS). Both are annual surveys conducted by the Center for Disease Control and Prevention National Center for Health Statistics (NCHS), using a multistage probabilistic sample of ED and outpatient visits, specifically noninstitutional and short-stay hospitals (NHAMCS) and office-based clinics (NAMCS)—including community health centers (starting in 2006) [4]—permitting national-level estimates of visit rates. Both the NHAMCS and NAMCS include the following data: patient demographics, sources of payment, reasons for visit, diagnoses, services used, medications administered and prescribed, and patient disposition. Also included in NHAMCS and NAMCS are facility-level data, including geographic region, metropolitan status, and hospital type. Data are de-identified and publicly available; therefore, this study was deemed not human subject research and exempt from institutional review board review by the George Washington University.

**2.2. Methods and measurements**

Visits involving patients 15 years and older were included in the analysis. Sexually transmitted infections were identified using the *International Classification of Diseases, Ninth Revision, Clinical Modification* codes: cervicitis (2725), urethritis (597.80), chlamydia (099.41, 099.5, 099.50, 099.53-099.56, 099.59, and 647.2), gonorrhea (098, 098.0-098.11, 098.15-098.17, 098.19, 098.2, 098.30, 098.31, 098.35-098.37, 098.30, and 647.1), and trichomonas (131, 131.0-131.02, 131.09, and 131.9). Visit codes related to STI screening were excluded from analysis due to limited use in the ED and focus on symptomatic STIs.

**2.3. Data analysis**

Data were analyzed at the patient and hospital/clinic levels. At the patient level, we examined patient age (15-18, 18-34, 35-64, and 65 years or older), sex, race, and payment source. At the hospital level, geographic region, metropolitan status, hospital type, and teaching status were examined.

For all variables, we computed survey-weighted estimates of the proportion of STI patients in each year range. Comparisons across care settings were done using survey-weighted  $\chi^2$  analysis. To ensure a sufficient number of observations, survey-weighted estimates were generated in accordance with NCHS recommendations, we grouped data from 2001-2005 and compared results with data from 2006-2010. To compare proportions from 2001-2005 vs 2006-2010, we used survey-weighted linear combinations of estimators. Post hoc hypothesis testing following  $\chi^2$  analysis was also conducted using survey-weighted linear combinations of estimators. A P value less than .05 was considered significant. All analyses were performed using Stata, version 12 (College Station, TX).

**3. Results**

From 2001 to 2010, there were 82.4 million visits to EDs and office-based clinics for STIs in the United States. Of those, 13.6 million (16.5%) were seen in hospital-based EDs and 68.8 million (83.5%) in office-

based clinics. The rates of STI visits decreased 27.8% from 2001 to 2010 in EDs and 36.4% in office-based clinics (data not shown).

**3.1. Demographic differences in STI visits (2001-2010)**

Comparing patients seen in the ED and outpatient clinics to office-based visits for STIs from 2001 to 2010, ED patients were, on average, younger (37.0 years vs 43.0 years,  $P < .001$ ), more likely to be male (28.2% vs 20.6%,  $P < .001$ ), more likely to be nonwhite (43.5% vs 23.2%,  $P < .001$ ), and less likely to have private insurance ( $P < .05$ ) compared with office-based settings (Table 1). A smaller proportion of ED visits occurred in the Northeast region and urban areas compared with office-based settings ( $P < .005$ ; Table 1).

**3.2. Demographic differences in the ED from 2001 to 2005 vs 2006 to 2010**

Comparing ED visits from 2001-2005 to 2006-2010, there was an increase in the proportion of visits for adolescents (15-18 years, 5.7% vs 6.3%,  $P < .012$ ) and young adults (18-34 years, 45.0% vs 51.3%,  $P < .012$ ) and a decrease in adults (35-64 years, 37% vs 34%,  $P < .012$ ) and seniors (>65 years., 8.4% vs 11.5%; Table 2). There were no significant differences in sex distribution of ED visits or in the proportion of visits to the ED for both whites and nonwhites ( $P = .642$ ) comparing the 2 study periods (Table 2).

The proportion of ED patients with private insurance (44.1% vs 35.6%,  $P < .001$ ) and Medicare (14.2% vs 11.9%,  $P < .001$ ) visits decreased from 2001-2005 to 2006-2010, whereas Medicaid (18.7% vs 26.6%,  $P < .001$ ) visits to the ED for STIs increased (Table 2). There were no significant changes in regional and urban-nonurban distribution from 2001 to 2005 and 2006 to 2010 ( $P = .648$ ; Table 2).

**3.3. Demographic differences in office-based clinics from 2001 to 2005 vs 2006 to 2010**

In contrast, the proportion of office-based clinic visits, when comparing 2001-2005 to 2006-2010, decreased in both adolescents (4.3% vs 3.6%,  $P = .036$ ) and seniors (19.4% vs 13.0%,  $P = .036$ ) and increased in both young adults (45.2% vs 46.1%,  $P = .036$ ) and older adults

**Table 1**  
Demographic characteristics for patient visits to ED compared with office-based clinics in 2000-2010

	ED	95% CI	Outpatient clinic	95% CI	P
<b>Patient</b>					
Age (y)					
15-18	6.0%	(4.9-7.3)	4.0%	(3.0-5.3)	.001
18-34	48.1%	(45.7-50.4)	33.9%	(30.8-37.2)	
35-64	36.0%	(34.0-37.9)	45.6%	(42.3-49.0)	
65+	10.0%	(8.8-11.3)	16.5%	(14.0-19.3)	
Sex					
Male	28.2%	(26.5-29.9)	20.6%	(18.1-23.3)	.001
Female	71.8%	(70.1-73.5)	79.4%	(76.7-81.9)	
Race					
White	56.5%	(53.0-60.0)	76.8%	(72.5-80.5)	.001
Nonwhite	43.5%	(40.0-47.0)	23.2%	(19.5-27.5)	
Source of payment					
Private insurance	40.0%	(37.8-42.2)	65.8%	(61.8-69.6)	.001
Medicaid	22.5%	(20.4-24.8)	12.4%	(9.7-15.8)	
Medicare	13.1%	(11.5-14.9)	15.4%	(12.9-18.3)	
Self-pay	24.4%	(22.4-26.6)	6.4%	(4.1-9.8)	
<b>Hospital</b>					
Geographic region					
Northeast	17.2%	(13.7-21.4)	19.9%	(15.8-24.9)	.003
Midwest	25.8%	(20.6-31.9)	18.8%	(14.2-24.4)	
South	41.0%	(35.1-47.2)	41.1%	(34.7-47.8)	
West	15.9%	(12.4-20.3)	20.2%	(15.3-26.3)	
Location					
Urban	85.4%	(78.5-90.4)	89.0%	(83.4-92.8)	.006
Nonurban	14.6%	(9.6-21.5)	11.1%	(7.2-16.6)	

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