CHAPTER 20

Sexually Transmitted Diseases

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INTRODUCTION

This chapter focuses on the epidemiology and cost of sexually transmitted diseases (STDs) commonly seen in urologic practice in the United States. STDs generally comprise acute and/or chronic conditions attributed to acquisition of infectious agents during penile, anal, vaginal, and/or oral sex, but the emphasis in this chapter is on the urologic burden of these diseases.

The immediate and long-term disease burden and costs of STDs in the United States are immense, with severe and costly consequences for adolescents, adults, and their offspring. Infection with a bacterial STD may cause painful acute symptoms of urethritis, vaginitis, cervicitis, dysuria, or skin manifestations that require healthcare. If undetected and untreated, some bacterial STD infections may lead to serious and costly long-term consequences. For example, untreated bacterial STD in men may ascend to the upper genital tract, causing epididymitis, orchitis, or prostatitis. In women, untreated lower genital tract infection may lead to salpingitis or pelvic inflammatory disease (PID) that may result in infertility, life-threatening ectopic pregnancy, or chronic pelvic pain. Infection with a viral STD may become chronic, with single or relapsing episodes of painful or problematic symptoms and signs, as seen with genital herpes caused by herpes simplex virus (HSV) and genital warts and anogenital neoplasia caused by human papillomavirus (HPV). HSV infection also complicates the course and management of human immunodeficiency virus (HIV) infection. Infection by STDs during gestation or birth can result in eye infections (due to *Chlamydia trachomatis* or *Neisseriae gonorrhoeae*); pneumonia (from *C. trachomatis*); recurrent respiratory papillomatosis (from HPV); lifelong disability, including blindness, bone deformities, mental retardation (due to syphilis); or death (from syphilis or HSV).

The burden of disease and the trends for specific STDs vary considerably, but together these infections constitute a significant public health problem. The number of cases in the United States has been estimated to be in the tens of millions (Table 2), and as many as 15 million new (incident) STDs occur each year, of which 3 million are among teenagers (1).

GENERAL NOTES ON ANALYTIC APPROACH

In keeping with the goals and scope of this compendium, this assessment focused on the acute and chronic STD infections and clinical manifestations that are encountered commonly by urologists. Unlike patients with many other conditions associated with urinary tract pathology or dysfunction, those with STDs are not primarily referred to urologists for diagnosis and treatment. Accordingly, we quantified the burden of selected STDs that most commonly present with symptoms of the penis, urethra, bladder, and external genitalia. We focused on the numbers of cases of medical visits of inpatient and outpatient services for four pathogen-specific STDs (herpes, chlamydia, gonorrhea, and syphilis), genital warts (a presentation in which HPV is always implicated), and two syndromic presentations commonly due to STD infection (epididymitis/orchitis and urethritis).

Table 1. ICD-9 codes used in the diagnosis of sexually transmitted diseases[a]

Genital Herpes	
054.1	Genital herpes
054.10	Genital herpes unspecified
054.13	Herpetic infection of penis
054.19	Other genital herpes
Genital Warts	
078.11	Condyloma acuminatum
Chlamydia	
078.88	Other specified diseases due to Chlamydiae
079.88	Other specified chlamydial infection
079.98	Unspecified chlamydial infection
099.41	Other nongonococcal urethritis *Chlamydia trachomatis*
099.53	Other venereal diseases due to *Chlamydia trachomatis* lower genitourinary sites
099.54	Other venereal diseases due to *Chlamydia trachomatis* other genitourinary sites
099.55	Other venereal diseases due to *Chlamydia trachomatis* unspecified genitourinary site
Gonorrhea	
098.0	Gonococcal infection (acute) of lower genitourinary tract
098.1	Gonococcal infection (acute) of upper genitourinary tract
098.10	Gonococcal infection (acute) of upper genitourinary tract site unspecified
098.11	Gonococcal cystitis (acute)
098.12	Gonococcal prostatitis (acute)
098.13	Gonococcal epididymo-orchitis (acute)
098.14	Gonococcal seminal vesiculitis (acute)
098.15	Gonococcal cervicitis (acute)
098.16	Gonococcal endometritis (acute)
098.17	Gonococcal salpingitis specified as acute
098.19	Other gonococcal infection (acute) of upper genitourinary tract
098.2	Gonococcal infection (chronic) of lower genitourinary tract
098.30	Chronic gonococcal infection of upper genitourinary tract site unspecified
098.31	Gonococcal cystitis chronic
098.32	Gonococcal prostatitis chronic
098.33	Gonococcal epididymo-orchitis chronic
098.34	Gonococcal seminal vesiculitis chronic
Syphilis	
091.0	Genital syphilis (primary)
095.4	Syphilis of kidney
095.8	Other specified forms of late symptomatic syphilis
Epididymitis/orchitis not designated as due to Chlamydia or Gonococcus	
604	Orchitis and epididymitis
604.0	Orchitis, epididymitis, and epididymo-orchitis, with abscess
604.9	Other orchitis, epididymitis, and epididymo-orchitis, without mention of abscess [excludes gonococcal (098.13 and 098.33), mumps (072.0), tuberculous (016.4 and 016.50)]

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Table 1 (continued). ICD-9 codes used in the diagnosis of sexually transmitted diseases[a]

Epididymitis/orchitis (all codes)	
604	Orchitis and epididymitis
604.0	Orchitis, epididymitis, and epididymo-orchitis, with abscess
604.9	Other orchitis, epididymitis, and epididymo-orchitis, without mention of abscess [excludes gonococcal (098.13 and 098.33) (which is included below), mumps (072.0), tuberculous (016.4 and 016.50)]
098.13	Gonococcal epididymo-orchitis (acute)
098.33	Gonococcal epididymo-orchitis (chronic)
Urethritis not designated as due to Chlamydia trachomatis or gonococcus	
099.4	Other non-gonococcal urethritis (including 099.40 Unspecified, and 099.49 Other specified organism) but excluding 099.41 Urethritis due to *Chlamydia trachomatis*
Urethritis (all codes)	
098.0	Gonococcal infection (acute) of lower genitourinary tract
098.2	Gonococcal infection (chronic) of lower genitourinary tract
099.4	Other nongonococcal urethritis (including 099.40 Unspecified, and 099.49 Other specified organism) but excluding 099.41 Urethritis due to *Chlamydia trachomatis* (which is included below)
099.41	Other nongonococcal urethritis *Chlamydia trachomatis*

[a]Codes limited to acute manifestations of the lower genitourinary tract or external genitalia, or to sequelae due to ascension to the male upper genitourinary tract.

Epididymitis/orchitis and urethritis were included because of the likelihood of presentation to a urologist and the fact that STD pathogens are common etiologies. Sexually transmitted organisms are the most common cause of epididymitis in heterosexual men under 35 years of age (2); approximately two-thirds of the patients in this age group with acute epididymitis have epididymitis secondary to *N. gonorrhoeae* or *C. trachomatis* (3). Most urethritis is also the result of infection with a sexually transmitted organism (4). However, we excluded cases and visits for urethritis for Reiter Syndrome, urethritis designated as "not sexually transmitted," and urethral syndrome because their association with STDs is only partial. We also excluded acute or chronic prostatitis (unless there was a diagnosis code specifically linked to gonococcus in the data we examined) because the vast majority of prostatitis cases are not associated with an STD (5). We did not include proctocolitis, which may be due to sexual transmission of enteric pathogens, because this condition is rarely managed by urologists. Finally, we excluded common urinary tract infections (UTIs) of men or women that may be associated with sexual transmission, as these are addressed in another chapter.

Because of the limitations of the datasets used to quantify much of the burden of other diseases in this compendium, we relied heavily on the peer-reviewed literature for most of the summary statements about incidence and prevalence of the STDs and syndromic presentations. Several of these datasets are valuable for quantifying the overall healthcare burden for STDs, changes in demographic characteristics of persons with STDs, and the impact of STDs on minority populations. However, they do not readily allow for analyses restricted to cases seen exclusively by urologists.

We briefly discuss available data on the burden of other STDs that are rarely managed by urologists or are rare in general; these include HIV infection or its clinical manifestations, infection with HPV types associated with anogenital dysplasia and cancer, and hepatitis B. We also briefly discuss trichomoniasis, which was not included in the list of STDs fully investigated for burden of illness because of resource limitations. Although *Trichomonas vaginalis* infection commonly presents as a vaginitis, it is a frequent cause of lower urogenital tract infection that urologists may see and should think of when evaluating the etiology of urethritis in men or women. We briefly discuss

Table 2. Estimated incidence and prevalence of sexually transmitted diseases in the United States, 1996, by strength of evidence[a]

STD	Incidence[b]	Prevalence[c]
Chlamydia	3 million -II	2 million - II
Gonorrhea	650,000 - II	
Syphilis	70,000 - II	
Herpes	1 million - II	45 million - I
Human papilloma virus	5.5 million - III	20 million - III
Hepatitis B	77,000 - II	750,000 -I
Trichomoniasis	5 million - III	
Bacterial vaginosis	No estimates	
HIV	20,000 - II	560,000 - II
Total	15.3 million	

[a]Level I (good) surveillance data come from either representative national surveys or from national reporting systems with nearly complete counts. Level II (fair) surveillance data are derived from composite prevalence figures obtained from multiple populations over time or from less complete national reporting systems. Level III (poor) surveillance data are based on even weaker evidence and rough extrapolations.

[b]Incidence is the number of new cases in a given time period.

[c]Prevalence is the total number of cases in the population.

SOURCE: Adapted from ASHA Panel to Estimate STD Incidence, Prevalence, and Cost. Available at: http://www.kff.org/womenshealth/1445-std_rep2.cfm.

chancroid, but because they occur rarely, we excluded lymphogranuloma venereum and granuloma inguinale. We excluded pediculosis pubis, scabies, hepatitis A virus (HAV) infection, bacterial vaginosis, and vulvovaginal candidiasis because these conditions are not necessarily the result of sexual exposure and are not usually associated with long-term sequelae managed by urologists. Finally, we excluded infection with hepatitis C virus (HCV) because it is rarely acquired through sexual exposure.

We used many claims databases to estimate aspects of the burden of STDs. Surveillance systems that capture national STD incidence data rely on cases, not medical visits; however, an episode of infection may result in more than one visit or claim. In interpreting analyses with various datasets, one must keep in mind that counts of medical visits are not the same as case counts, and that counts of both cases and office visits can reflect incident cases, prevalent cases, or a combination of the two. Given the nature of the datasets on which we performed primary analyses and given the reliance on International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) coding in these datasets, the summary statements they permit concern relative burden of disease referent to office visits rather than to case counts or numbers of infected persons. Using claims data, we counted medical visit claims as a measure of burden, since they, in association with drug claims and procedure claims, constitute a large part of the economic burden of STDs.

Databases we used include hospital claims data for all inpatient care in many states, analysis and review data for Medicare patients, VA data, and inpatient and outpatient claims data for privately insured patients. Because most of those databases included only ICD-9 diagnostic codes, not procedure codes or drug codes, we used ICD-9 codes to capture the burden of STDs for three pathogen-specific STDs (herpes, chlamydia, and gonorrhea), genital warts, and two syndromic presentations of STD infection (epididymitis/orchitis and urethritis) measured by patient visits. There were too few visits for syphilis in these datasets to allow for reliable estimates. The following are brief descriptions of the databases used in the analyses discussed here.

DEFINITION AND DIAGNOSIS

To capture aspects of the burden of various STDs, we applied selected ICD-9 codes to datasets reflecting inpatient and outpatient visits to healthcare providers; these datasets and the methods of analysis are described in the methods chapter of this compendium. Our analyses of all datasets included visits associated with diagnostic codes for acute manifestations of the lower genitourinary tract or external genitalia and for selected sequelae due to ascension to the male upper genitourinary tract. Table 1 lists the codes used in the diagnosis of STDs. Except in the case of syphilis, we excluded visits associated with non-genitorurinary tract diagnostic codes or procedures, herpetic infections of the oropharynx, herpetic vulvovaginitis, herpetic ulceration of the vulva, herpetic infection without specification of anatomic site, gonoccoccal arthritis, neurosyphilis, salpingitis, oophoritis, endometritis, and pelvic inflammatory disease (PID) (unless specifically associated with gonococcal or chlamydial infection). We included ICD-9 codes for chlamydial infection of other and unspecified genitourinary sites and for gonococcal infection of

the *upper genital tract* in order to include infections of the male genitourinary tract that urologists would be likely to manage. There are specific ICD-9 codes for cervicitis, endometritis, and salpingitis associated with gonorrheal infection but none for chlamydial infections specific to the cervix, endometrium, or Fallopian tubes. Because we wanted to address gonorrhea and chlamydial infections of the upper genital tract as consistently as possible, and because we did not restrict our analysis to male patients, the ICD-9 codes we included may have represented cases of cervicitis, endometritis, salpingitis, and oophoritis that urologists are unlikely to manage. However, a review of data from MarketScan show that patient visits associated with ICD-9 codes for chlamydial infection of *other* and *unspecified* anatomic sites and gonorrheal cervicitis, endometritis, and salpingitis are quite rare (Table 3). Therefore, our estimates of chlamydial and gonorrheal infection should largely represent lower urogenital tract infections that urologists may encounter.

In addition, the following three points should be noted:

1. We used the National Electronic Telecommunications Surveillance System (NETSS) as the sole data source for primary and secondary cases of syphilis in adolescents and adults in this project. None of the other available datasets contained sufficient numbers of syphilis cases to describe with any confidence the demographic and geographic distribution of the disease in the population. Because many cases of primary and secondary syphilis are diagnosed only with a serologic test and because the anatomic site of signs or symptoms is not reported, we were unable to exclude from NETSS data the cases of primary and secondary syphilis that lacked genitourinary symptoms and signs (e.g., palmar rash) and that urologists would, therefore, be unlikely to encounter.

2. Some patients have multiple diagnoses and could potentially have diagnoses of both the syndromic presentation of epididymitis/orchitis and an STD (e.g., a chlamydial or gonococcal infection). Therefore, we chose to analyze the available data in a way that enabled us to evaluate both aggregate data restricted to ICD-9 codes for epididymitis/orchitis not designated as due to chlamydia or gonococcus and aggregate data for all ICD-9 codes for epididymitis/orchitis. (If one were doing a straight addition, codes not designated as due to chlamydia or gonococcus would not be included in the numbers of visits for infection with chlamydia or gonococcus in which one of these organisms was likely the etiology of the patient's disease.) Accordingly, we used two different schemes for including visits for epididymitis/orchitis, according to ICD-9 codes, as indicated in Table 1.

3. Because urethritis is often observed in association with cystitis and pyelonephritis in acute, community-acquired urinary tract infections (UTIs), most clinicians commonly code urethritis as cystitis. Some patients with urethritis of probable STD etiology have multiple diagnoses and in the datasets examined could have both a diagnosis of the syndromic presentation of urethritis and a diagnosis of an STD (e.g., herpetic, chlamydial, or gonococcal infection). We chose to analyze the available data in such a way that one could evaluate both aggregate data restricted to both ICD-9 codes for urethritis not designated as due to chlamydia or gonococcus and aggregate data for all ICD-9 codes for urethritis. No specific ICD-9 code exists for urethritis secondary to herpetic infection. Accordingly, we used two different schemes for including visits for urethritis according to ICD-9 codes, as indicated in Table 1.

Unfortunately, the use of ICD-9 coding to assess the urologic burden of disease is limited because STD pathogens can cause pathology of multiple organ systems, and diagnoses linked with specific syndromes may or may not be related to infection with an STD pathogen. Linking ICD-9 codes with Current Procedural Terminology (CPT) codes for STD tests or surgical treatments, or with National Drug Codes (NDCs) for anti-infective treatment, can help identify diagnoses more likely to be related to an STD pathogen. However, CPT codes and NDCs were analyzed in only one of the datasets examined, MarketScan. Even in MarketScan, linking CPT codes or NDCs to establish a more specific definition of a visit is problematic because the dates associated with these codes may not always coincide with those of the ICD-9 codes, raising questions about the actual clinical association of the diagnostic and procedure codes. In analyzing MarketScan data, we made assumptions about time periods of infection and constructed dates around which overlap of ICD-9 codes, CPT codes,

Table 3. The numbers of inpatient and outpatient visits identified by ICD-9 codes for genital herpes, genital warts, chlamydial infection, gonorrhea, epididymitis/orchitis, and urethritis[a]

ICD-9 codes	Number of Inpatient Visits	Number of Outpatient Visits
Genital herpes		
054.1Genital herpes (total)	33	1,505
054.10 Genital herpes, unspecified	33	1,369
054.13 Herpetic infection of penis	0	93
054.19 Other	0	43
Genital warts		
078.11 Condyloma acuminatum	18	3,813
Chlamydia		
079.98 Chlamydia	11	373
099.53 Chlamydial cystitis, lower genitourinary sites	0	91
099.54 Other genitourinary sites	0	9
099.55 Unspecified genitourinary site	0	5
099.41 *Chlamydia trachomatis*	0	45
078.88 Other specified disease due to chlamydia	9	148
079.88 Other specified chlamydia infection	1	75
Gonorrhea		
098.0 Gonococcal infection (acute) of lower genitourinary tract	7	420
098.1 Gonococcal infection (acute) of upper genitourinary tract		
098.10 Gonococcal infection (acute) of upper genitourinary tract site unspecified	0	7
098.11 Gonococcal cystitis (acute)	0	6
098.12 Gonococcal prostatitis (acute)	0	10
098.13 Gonococcal epididymo-orchitis (acute)	0	2
098.14 Gonococcal seminal vesiculitis (acute)	0	0
098.15 Gonococcal cervicitis (acute)	1	42
098.16 Gonococcal endometritis (acute)	0	1
098.17 Gonococcal salpingitis specified as acute	0	8
098.19 Other gonococcal infection (acute) of upper genitourinary tract	2	5
098.2 Gonococcal infection (chronic) of lower genitourinary tract	0	85
098.33 Gonococcal epididymo-orchitis chronic	0	3
098.31 Gonococcal cystitis chronic	0	0
098.30 Chronic gonococcal infection of upper genitourinary tract site unspecified	0	0
098.32 Gonococcal prostatitis chronic	0	3
098.34 Gonococcal seminal vesiculitis chronic	0	0
Epididymitis/orchitis not designated as due to Chlamydia or gonococcus		
604 Orchitis and epididymitis		
604.0 Orchitis, epididymitis, and epididymo-orchitis, with abscess of epididymis or testis		
604.9 Other orchitis, epididymitis, and epididymo-orchitis, without mention of abscess	0	28

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Table 3 (continued). The numbers of inpatient and outpatient visits identified by ICD-9 codes for genital herpes, genital warts, chlamydial infection, gonorrhea, epididymitis/orchitis, and urethritis[a]

ICD-9 Codes	Number of Inpatient Visits	Number of Outpatient Visits
Epididymitis/orchitis regardless of whether or not due to Chlamydia or gonococcus		
604 Orchitis and epididymitis		
604.0 Orchitis, epididymitis, and epididymo-orchitis, with abscess of epididymis or testis		
604.9 Other orchitis, epididymitis, and epididymo-orchitis, without mention of abscess	0	28
098.13 Gonococcal orchitis	14	1,552
098.33 Chronic gonococcal orchitis	0	1
Urethritis not designated as due to Chlamydia or gonococcus:		
099.40 Unspecified	0	355
099.49 Other specified organism	0	7
Urethritis regardless of whether or not due to Chlamydia or gonococcus:		
099.40 Unspecified	0	354
099.49 Other specified organism	0	7
099.41 Urethritis due to *Chlamydia trachomatis*	0	45
098.0 Acute gonococcal infection of the lower genitourinary tract	7	419
098.2 Chronic gonococcal infection of the lower genitourinary tract	0	85

[a]Numbers limited to enrollees who were continuously enrolled in a health plan throughout 1999.
[b]Males ages 16-35 years only.
SOURCE: MarketScan, 1999.

and/or NDCs could reasonably reflect a clinical association.

Finally, in interpreting the various claims and office visit datasets, it is important to keep in mind that ICD-9 codes for bacterial STDs tend to reflect incident cases that are treatable, whereas ICD-9 codes for viral STDs such as HPV and HSV tend to reflect prevalent cases with chronic manifestations that may involve extended therapy.

INCIDENCE, PREVALENCE, AND RISK FACTORS

Herpes Simplex

Background

An estimated 1 million people in the United States are newly infected each year with herpes simplex virus type two (HSV-2), the most common genital type. Since the late 1970s, the prevalence of HSV-2 infection has increased by 30%, and HSV-2 is now detectable in roughly one of every five persons over 11 years of age nationwide (6). The National Health and Nutrition Examination Surveys (1988–1994) (NHANES-III) reported that more than 25% of adults between 30 and 39 years of age were positive on serology for HSV-2 in those years (6). NHANES-III indicates that HSV-2 infection is more common in women than in men, affecting approximately one out of every four women, in contrast to fewer than one out of every five men (6). This may reflect differences in sexual behavior or more efficient transmission from male to females than from females to males (6).

HSV-2 infection increased fivefold among Caucasian teens (aged 12 to 19 years) between the 1970s and the 1990s, faster than among any other age or racial/ethnic group (6). Among Caucasians 20 to 29 years of age, the prevalence of HSV-2 infection increased twofold over that period. The percentage of people infected with either HSV-1 or HSV-2 increases with age, because people remain infected throughout their lives (7). Among persons 15 to 39 years of age, annual incidence of HSV-2 infection has been projected to increase steadily between 2000 and 2025, from 9 to 26 infections per 1,000 men and from 12 to 32 infections per 1,000 women; prevalence is projected to

increase to 39% among men and 49% among women (8).

HSV-2 infection continues to spread across all social, economic, racial, and ethnic groups and is common in both urban and rural areas. There are no significant differences in prevalence among geographic regions of the United States. Although HSV-2 infection is increasing among young Caucasians, who have a seroprevalence of approximately 17%, infection is more common among African-Americans, who have a seroprevalence of 45% (6).

The principal symptoms of herpes—recurrent painful ulcers of the genitalia, perineum, and perianal area—can be treated, but the infection cannot be eliminated. However, most people with positive HSV serology do not have symptomatic infection that results in medical visits or in costs to the healthcare system (9). In NHANES-III, fewer than 10% who tested positive for HSV-2 had been symptomatic with genital herpes and knew they were infected (6); these numbers do not take into account the sizable percentage of genital herpes cases caused by HSV-1. With or without recognizable symptoms, HSV infection can be transmitted between sex partners and from mothers to newborns, and it is potentially fatal in infants born to infected women (6). Genital herpes can be particularly severe in people with HIV infection; it may cause genital ulcers and may increase HIV viral load, which increases the risk of HIV transmission (10).

The cost of incident herpes infections in the United States in 2000 was estimated to be $1.8 billion, but because of the increasing incidence, this cost has been predicted to rise to $2.5 billion by 2015 and $2.7 billion by 2025 (8).

In the National Disease and Therapeutic Index (NDTI), the number of initial visits to clinicians' offices per year for genital herpes rose from fewer than 10,000 in 1966–1970 to more than 150,000 in 1995–2001. In the NDTI and in the other datasets we analyzed, the unit of analysis is healthcare system contacts, not the actual numbers of genital herpes cases; the exception to this is the Veterans Health Administration (VA) claims data in which the unit of analysis is the individual patient. Patients with genital herpes may seek care in public healthcare facilities or from private ambulatory care providers and, as a consequence, may not be captured in certain datasets. However, the datasets we analyzed are useful for describing trends in care-seeking behavior for genital herpes. For any population in a given dataset, the total numbers of patient visits for genital herpes are minimum estimates of contacts with healthcare providers; thus, patient visits for initial episodes do not necessarily reflect incident cases.

The Data

Healthcare Cost and Utilization Project (HCUP) data indicate that hospitalization for genital herpes is a rare event that has decreased in frequency over time, possibly due to the increased availability of outpatient medication that reduces the severity and duration of symptoms (Table 4). In 1994, 930 patients were hospitalized with a primary diagnosis of genital herpes, of whom 716 (77%) were 18 to 44 years of age. Hospitalizations decreased progressively after 1994, declining to 388 in 2000, of which 295 (76%) were women, 161 (42%) resided in the South, and 339 (87%) resided in urban areas.

Hospital outpatient and inpatient data generated by the Centers for Medicare and Medicaid Services (CMS) from 1992 through 1998 contained too few claims for genital herpes to permit detailed interpretation. According to the Medicare outpatient files, physician office visit rates increased from 12 visits per 100,000 beneficiaries in 1992 to 17 per 100,000 in 1998 (Table 5). It is likely that this increase reflects the greater use of outpatient management of genital herpes with drugs that reduce the severity and duration of symptoms. In 1998, the rates seen among male and female Medicare beneficiaries were identical (17 per 100,000); the highest rates were seen among persons under 65 years of age (42 per 100,000), those residing in the West (23 per 100,000), and Hispanics (40 per 100,000). Note that Medicare beneficiaries under age 65 include the disabled and persons with end-stage renal disease and are distinct from Medicare beneficiaries 65 and older.

Genital herpes was the most common pathogen-specific STD presentation in 2001 VA data, with a total of 118 cases per 100,000 unique outpatients (Table 6). The highest rates were seen among women (426 per 100,000), persons 25 to 34 years of age (543 per 100,000), African Americans (214 per 100,000), and those residing in the West (176 per 100,000) (Table 7). Progressive increases were noted in the counts and

Table 4. Inpatient hospital stays by individuals with genital herpes listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total[b]	930	0.4 (0.3–0.4)	441	0.2 (0.1–0.2)	517	0.2 (0.1–0.2)	388	0.1 (0.1–0.2)
Age								
< 14	*	*	*	*	*	*	*	*
14–17	*	*	*	*	*	*	*	*
18–24	188	0.8 (0.5–1.0)	*	*	*	*	*	*
25–34	314	0.8 (0.5–1.0)	*	*	*	*	*	*
35–44	214	0.5 (0.3–0.7)	*	*	*	*	*	*
45–54	*	*	*	*	*	*	*	*
55–64	*	*	*	*	*	*	*	*
65–74	*	*	*	*	*	*	*	*
75–84	*	*	*	*	*	*	*	*
85+	*	*	*	*	*	*	*	*
Race/ethnicity								
White	359	0.2 (0.1–0.2)	220	0.1 (0.1–0.2)	151	0.1 (0–0.1)	*	*
Black	318	1.0 (0.6–1.4)	*	*	156	0.5 (0.3–0.7)	*	*
Asian/Pacific Islander	*	*	*	*	*	*	*	*
Hispanic	*	*	*	*	*	*	*	*
Gender								
Male	401	0.3 (0.2–0.4)	164	0.1 (0.1–0.2)	*	*	*	*
Female	529	0.4 (0.3–0.5)	277	0.2 (0.2–0.3)	400	0.3 (0.2–0.4)	295	0.2 (0.2–0.3)
Region								
Midwest	173	0.3 (0.2–0.4)	*	*	*	*	*	*
Northeast	196	0.4 (0.2–0.5)	*	*	*	*	*	*
South	494	0.6 (0.4–0.8)	*	*	234	0.2 (0.1–0.4)	161	0.2 (0.1–0.2)
West	*	*	*	*	*	*	*	*
MSA								
Rural	*	*	*	*	*	*	*	*
Urban	807	0.4 (0.3–0.5)	411	0.2 (0.2–0.2)	449	0.2 (0.2–0.3)	339	0.2 (0.1–0.2)

*Figure does not meet standard for reliability or precision; MSA, metropolitan statistical area.

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US civilian non-institutionalized population.

[b]Persons of other race/ethnicity are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

rates of patients diagnosed with genital herpes from 1999 through 2001 in most strata (age, gender, race/ethnicity, insurance status, and region).

The 1999 MarketScan data reported 1,505 outpatient visits and 33 inpatient visits accompanied by a claim for services associated with one of the ICD-9 codes listed in Table 3. A much higher rate of visits was observed among women enrollees (88 per 100,000) than among men (50 per 100,000) (Table 8). The highest rates were seen among persons aged 25 to 29 years of age (182 per 100,000). This is consistent with the serologic findings discussed below and may reflect additional diagnoses made through screening of pregnant women by medical history or HSV serologic testing. It should be noted that initial episodes of genital herpes, which tend to be most symptomatic, are more likely to prompt medical care and to represent incident infections. Later episodes are less likely to have severe symptoms, and patients with recurrent episodes who are aware of genital herpes

Table 5. Physician office visits by Medicare beneficiaries with genital herpes listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[c]	4,200	12 (12–13)	5,980	17 (16–17)	5,720	17 (17–17)
Total < 65	1,280	23 (22–25)	2,220	36 (35–38)	2,580	42 (40–43)
Total 65+	2,920	10 (9.7–10)	3,760	13 (12–13)	3,140	11 (11–12)
Age						
65–74	1,980	12 (12–13)	2,440	15 (14–16)	1,820	13 (12–13)
75–84	880	9.3 (8.7–9.9)	1,180	12 (12–13)	1,180	12 (12–13)
85–94	60	2.1 (1.6–2.6)	140	4.6 (3.8–5.3)	140	4.5 (3.8–5.3)
95+	0	0	0	0	0	0
Race/ethnicity						
White	3,320	11 (11–12)	4,540	15 (15–15)	4,000	14 (14–15)
Black	520	18 (16–19)	1,000	31 (29–33)	1,100	35 (33–38)
Asian	…	…	40	24 (17–31)	100	32 (25–38)
Hispanic	…	…	160	40 (34–46)	280	40 (35–45)
N. American Native	…	…	…	…	…	…
Gender						
Male	2,220	15 (14–16)	2,440	16 (15–17)	2,460	17 (16–18)
Female	1,980	10 (9.6–10)	3,540	18 (17–18)	3,260	17 (17–18)
Region						
Midwest	620	7.1 (6.5–7.7)	980	11 (10–12)	820	9.5 (8.9–10)
Northeast	580	7.5 (6.9–8.1)	1,160	15 (14–16)	1,120	17 (16–18)
South	1,860	15 (15–16)	2,240	18 (17–18)	2,500	20 (19–21)
West	1,100	22 (20–23)	1,400	27 (26–28)	1,160	23 (22–25)

…data not available.

[a]Unweighted counts multiplied by 20 to arrive at values in the table.

[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.

[c]Persons of other races, unknown race and ethnicity, and other region are included in the totals.

NOTE: Counts less than 600 should be interpreted with caution.

SOURCE: Centers for Medicare and Medicaid Services, 5% Carrier and Outpatient Files, 1992, 1995, 1998.

Table 6. Frequency of sexually transmitted diseases as a diagnosis in VA patients seeking outpatient care, 2001, count[a], rate[b]

	Primary Diagnosis		*Any Diagnosis*	
Sexually Transmitted Disease	**Count**	**Rate**	**Count**	**Rate**
Genital herpes	2,324	63	4,357	118
Genital warts	2,224	60	2,846	77
Chlamydia	380	10	515	14
Gonorrhea	473	13	634	17
Syphilis	71	2	100	3
Epididymitis (organism unspecified)[c]	1,519	41	1,833	50
Epididymitis (all cases)[c]	1,557	42	1,889	51
Urethritis (organism unspecified)	185	5	233	6
Urethritis (all cases)	590	16	771	21

[a]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[b]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

[c]Includes males only.

SOURCE: Outpatient Clinic File (OPC), VA Austin Automation Center, 2001.

Table 7. Frequency of genital herpes[a] listed as any diagnosis in VA patients seeking outpatient care, count[b], rate[c]

	1999		2000		2001	
	Count	Rate	Count	Rate	Count	Rate
Total	2,918	96	3,433	105	4,357	118
Age						
18–24	89	351	103	438	116	504
25–34	576	382	621	437	738	543
35–44	724	219	823	264	943	315
45–54	865	126	956	133	1,262	168
55–64	340	68	491	89	693	107
65–74	245	32	309	37	445	47
75–84	73	14	124	19	148	18
85+	6	12	6	10	12	15
Race/ethnicity						
White	1,122	82	1,321	90	1,587	99
Black	598	179	649	189	758	214
Hispanic	128	112	150	122	212	164
Other	11	57	16	79	23	105
Unknown	1,059	88	1,297	98	1,777	113
Gender						
Male	2,439	84	2,844	91	3,655	104
Female	479	339	589	390	702	426
Region						
Midwest	587	85	629	84	708	85
Northeast	550	75	576	74	701	81
South	1037	102	1,326	119	1,717	133
West	744	124	902	142	1,231	176
Insurance status						
No insurance/self-pay	2,241	123	2,521	139	3,114	164
Medicare/Medicare supplemental	256	37	350	38	478	40
Medicaid	6	121	8	101	18	200
Private insurance/HMO/PPO	377	78	495	97	675	122
Other insurance	38	150	57	198	66	198
Unknown	0	0	2	81	6	66

HMO, health maintenance organization; PPO, preferred provider organization.

[a]Represents diagnosis codes for genital erpes.

[b]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[c]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from observation only; note large number of unknown values.

Source: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 8. Medical visits[a] for genital herpes in 1999, count, rate[b] (95% CI)

	Count	Rate
Age		
<10	8	3 (1–6)
10–14	8	5 (1-8)
15–19	106	57 (46–67)
20–24	162	141 (119–163)
25–29	179	182 (156–209)
30–34	244	171 (150–192)
35–39	238	125 (110–141)
40–44	198	92 (79–104)
45–54	287	61 (54–68)
55–64	105	29 (24–35)
65+	3	32 (0–69)
Gender		
Male	529	50 (46–54)
Female	1,009	88 (82–93)
Region		
Midwest	352	68 (61–75)
Northeast	271	72 (64–81)
South	644	69 (63–74)
West	111	100 (82–119)
Unknown	160	61 (51–70)
Urban/rural		
MSA	1,152	79 (74–83)
Non-MSA	226	47 (41–54)
Unknown	160	61 (51–70)

[a]The number of medical visits includes both inpatient visits and outpatient visits; however, most medical visits were outpatient visits.

[b]Rate per 100,000 enrollees who were continuously enrolled in a health plan throughout 1999.

SOURCE: MarketScan, 1999.

symptoms may be less likely to seek care. Recurrent episodes of genital herpes also tend to become less frequent over time. This may explain why claims and visits for symptomatic genital herpes tend to peak in the younger age groups, as visits are generated for incident cases soon after infection, while HSV infection is more prevalent in older ages, as noted above. In MarketScan data, rates of inpatient and outpatient visits for genital herpes varied by geographical region, ranging from 100 per 100,000 enrollees in the West to 61 to 72 per 100,000 in the other regions. A marked difference in rates was also seen between urban areas (79 per 100,000) and rural areas (47 per 100,000).

For the 1,505 outpatient visits for genital herpes reported in the 1999 MarketScan data, 537 drug claims were filed for acyclovir, famcyclovir, or valacyclovir on the same date as an outpatient medical claim for genital herpes, and a total of 1,025 drug claims were filed for one of these drugs within 30 days after the outpatient visit. Drug claims were not analyzed for the small number of inpatient visits ICD-9 coded for genital herpes. In addition, 87,029 drug claims were filed for one of these three same drugs, regardless of ICD-9 codes for patient visits. Another recent study has underscored the difficulty of using drug claims for acyclovir as a way to estimate the burden of symptomatic genital herpes (11). Only 2% of the persons with acyclovir claims had ICD-9 codes for genital herpes, 9% had ICD-9 codes for herpes in nongenital sites (ICD-9 code 054 excluding 054.1), 6% had ICD-9 codes for herpes zoster (ICD-9 code 053), and 80% had ICD-9 codes for other medical care. Of those with ICD-9 codes for genital herpes, 27% did not have acyclovir claims.

Genital Warts

Background

Most genital warts are the result of infection with HPV type 6 or 11. Genital warts occur in sites on the external genitalia and can also occur in the vagina, urethra, and anus. Overall, the best estimates of the prevalence of genital warts are based on selected studies with extrapolations. Approximately 1% of sexually active adults in the United States are estimated to have genital warts. This estimate is based on levels of infection ranging from 1.5% among female college students treated in student health centers to 13% of patients in selected STD clinics (12, 13). A recent analysis of healthcare claims data from a private US health plan found that the prevalence of (and health plan costs associated with) genital warts billed through the health plan were highest among women 20 to 24 years of age (6.2 cases and $1,692 in costs per 1,000 person-years) and men 25 to 29 years of age (5.0 cases and $1,717 in costs per 1,000 person-years) (14). Risk factors for developing genital warts have been difficult to assess because of the lack of a marketed diagnostic test specific for HPV types 6 and 11 or other types associated with warts. However, urologists and other clinicians who engage in procedures directed at

Table 9. Inpatient hospital stays by individuals with genital warts listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total[b]	562	0.2 (0.2–0.3)	337	0.1 (0.1–0.2)	296	0.1 (0.1–0.1)	315	0.1 (0.1–0.2)
Age								
< 14	*	*	*	*	*	*	*	*
14–17	*	*	*	*	*	*	*	*
18–24	*	*	*	*	*	*	*	*
25–34	173	0.4 (0.2–0.6)	*	*	*	*	*	*
35–44	*	*	*	*	*	*	*	*
45–54	*	*	*	*	*	*	*	*
55–64	*	*	*	*	*	*	*	*
65–74	*	*	*	*	*	*	*	*
75–84	*	*	*	*	*	*	*	*
85+	*	*	*	*	*	*	*	*
Race/ethnicity								
White	298	0.2 (0.1–0.2)	162	0.1 (0–0.1)	*	*	*	*
Black	*	*	*	*	*	*	*	*
Asian/Pacific Islander	*	*	*	*	*	*	*	*
Hispanic	*	*	*	*	*	*	*	*
Gender								
Male	325	0.3 (0.2–0.3)	167	0.1 (0.1–0.2)	171	0.1 (0.1–0.2)	207	0.2 (0.1–0.2)
Female	237	0.2 (0.1–0.2)	170	0.1 (0.1–0.2)	*	*	*	*
Region								
Midwest	*	*	*	*	*	*	*	*
Northeast	195	0.4 (0.2–0.6)	*	*	*	*	*	*
South	232	0.3 (0.2–0.4)	*	*	*	*	*	*
West	*	*	*	*	*	*	*	*
MSA								
Rural	*	*	*	*	*	*	*	*
Urban	515	0.3 (0.2–0.4)	310	0.2 (0.1–0.2)	268	0.1 (0.1–0.2)	280	0.1 (0.1–0.2)

MSA, metropolitan statistical area.

*Figure does not meet standard for reliability or precision.

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US civilian non-institutionalized population.

[b]Persons of other race/ethnicity are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

ameliorating genital warts lesions should note that the possibility exists for nosocomial disease transmission through exposure to an aerosolized plume from HPV-infected tissue when using a carbon-dioxide laser (15, 16).

The primary goal in the treatment of visible genital warts is the removal of those that obstruct the urethra, vagina, anus, or oral cavity; cause discomfort, pain, or bleeding in the anogenital areas; or cause cosmetic problems. In the National Disease and Therapeutic Index (NDTI), the number of initial visits to physicians' offices for genital warts has risen from about 80,000 per year in 1966–1969 to more than 150,000 in every year since 1972. As with genital herpes, data from the NDTI and the other datasets used in this analysis (with the exception of the VA claims data) reflect healthcare system contacts, not the actual numbers of cases. However, year-to-year NDTI

data are useful for describing trends in care-seeking in private physician's offices, although not in public healthcare facilities or from other private ambulatory care providers. Therefore, for any population in a given dataset, the total numbers of patient visits for genital warts are minimum estimates of healthcare contacts.

The Data

According to HCUP data, hospitalization for genital warts (ICD-9 code 078.11 only) is a very rare event that has remained stable over time (Table 9). In 2000, there was a weighted frequency of 315 hospitalizations with a primary diagnosis of genital warts, of which 207 (66%) were men and 280 (89%) resided in urban areas.

In all CMS databases examined, the diagnosis of genital warts was too rare to permit statistically meaningful interpretation (Table 10). Hospital outpatient visit rates for genital warts increased from 1.5 per 100,000 beneficiaries in 1995 to 4.0 per 100,000 in 1998; of an estimated 1,340 visits in 1998, the highest rates were seen among men (5.7 per 100,000) and persons under 65 years of age (16 per 100,000). ICD-9 codes for genital warts were revised substantially after 1992, resulting in increased specificity.

Table 10. Hospital outpatient visits by Medicare beneficiaries with genital warts listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992[c]		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[d]	7,440	22 (21–22)	520	1.5 (1.3–1.6)	1,340	4.0 (3.8–4.2)
Total < 65	3,320	61 (59–63)	420	6.8 (6.2–7.5)	980	16 (15–17)
Total 65+	4,120	14 (14–15)	100	0.3 (0.3–0.4)	360	1.3 (1.2–1.5)
Age						
65–74	2,380	14 (14–15)	40	0.2 (0.2–0.3)	300	2.1 (1.9–2.3)
75–84	1,320	14 (13–15)	60	0.6 (0.5–0.8)	60	0.6 (0.5–0.8)
85–94	360	13 (11–14)	0	0	0	0
95+	60	18 (13–22)	0	0	0	0
Race/ethnicity						
White	5,460	19 (18–19)	400	1.3 (1.2–1.4)	900	3.2 (3.0–3.4)
Black	920	31 (29–33)	100	3.1 (2.5–3.7)	260	8.4 (7.4–9.4)
Asian	…	…	…	…	…	…
Hispanic	…	…	…	…	60	8.5 (6.4–11)
N. American Native	…	…	…	…	…	…
Gender						
Male	3,740	25 (25–26)	380	2.5 (2.2–2.7)	820	5.7 (5.3–6.1)
Female	3,700	19 (18–19)	140	0.7 (0.6–0.8)	520	2.7 (2.5–3.0)
Region						
Midwest	2,260	26 (25–27)	240	2.7 (2.3–3.0)	420	4.9 (4.4–5.3)
Northeast	2,000	26 (25–27)	140	1.8 (1.5–2.1)	280	4.2 (3.7–4.7)
South	1,080	8.8 (8.3–9.4)	60	0.5 (0.4–0.6)	420	3.4 (3.1–3.7)
West	2,080	41 (39–43)	80	1.5 (1.2–1.9)	220	4.4 (3.9–5.0)

… data not available.

[a]Unweighted counts multiplied by 20 to arrive at values in the table.

[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.

[c]ICD-9 codes for genital warts were revised substantially after 1992, resulting in increased specificity. Counts for 1992 reflect the relative lack of specificity in coding for that year as compared to subsequent years.

[d]Persons of other races, unknown race and ethnicity, and other region are included in the totals.

NOTE: Counts less than 600 should be interpreted with caution.

SOURCE: Centers for Medicare and Medicaid Services, 5% Carrier and Outpatient Files, 1992, 1995, 1998.

Table 11. Frequency of genital warts[a] listed as any diagnosis in VA patients seeking outpatient care, count[b], rate[c]

	1999		2000		2001	
	Count	Rate	Count	Rate	Count	Rate
Total	2,673	88	2,809	86	2,846	77
Age						
18–24	71	280	64	272	62	269
25–34	434	288	421	296	409	301
35–44	647	196	657	210	622	207
45–54	829	120	939	131	938	125
55–64	369	74	402	73	465	72
65–74	231	30	223	27	253	27
75–84	87	16	96	15	86	11
85+	5	10	7	12	11	14
Race/ethnicity						
White	1,356	99	1,378	94	1,373	85
Black	480	144	502	147	500	141
Hispanic	59	52	76	62	81	63
Other	11	57	13	64	6	27
Unknown	767	64	840	64	886	56
Gender						
Male	2,522	87	2,635	84	2,697	76
Female	151	107	174	115	149	90
Region						
Midwest	647	94	701	94	673	81
Northeast	488	67	483	62	461	53
South	983	97	1,032	92	1,098	85
West	555	92	593	93	614	88
Insurance status						
No insurance/self-pay	2,037	112	2,139	118	2,142	113
Medicare/Medicare supplemental	315	45	324	35	359	30
Medicaid	12	242	12	152	13	145
Private insurance/HMO/PPO	278	57	302	59	304	55
Other insurance	29	115	31	108	28	84
Unknown	2	105	1	41	0	0

HMO, health maintenance organization; PPO, preferred provider organization.

[a]Represents diagnosis codes for genital warts.

[b]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[c]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from observation only; note large number of unknown values.

Source: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 12. Medical visits[a] for genital warts in 1999, count, rate[b] (95% CI)

	Count	Rate
Age		
<10	61	25 (19–31)
10–14	92	53 (42–64)
15–19	390	209 (188–229)
20–24	597	520 (478–562)
25–29	458	466 (424–509)
30–34	498	349 (318–380)
35–39	445	235 (213–256)
40–44	374	173 (156–191)
45–54	601	127 (117–137)
55–64	309	87 (77–96)
65+	6	64 (13–116)
Gender		
Male	1,722	163 (156–171)
Female	2,109	183 (176–191)
Region		
Midwest	1,030	199 (187–211)
Northeast	756	201 (187–216)
South	1,475	158 (149–166)
West	141	127 (106–148)
Unknown	429	163 (147–178)
Urban/rural		
MSA	2,717	186 (179–192)
Non-MSA	685	144 (133–154)
Unknown	429	163 (147–178)

[a]The number of medical visits includes both inpatient visits and outpatient visits; however, most medical visits were outpatient visits.

[b]Rate per 100,000 enrollees who were continuously enrolled in a health plan throughout 1999.

SOURCE: MarketScan, 1999.

In 2001 VA data, genital warts were the second most common pathogen-specific STD presentation, with a total of 77 cases per 100,000 unique outpatients (Table 6). As with genital herpes, the highest rates of genital warts in 2001 were seen among women (90 cases per 100,000 unique outpatients), persons 25 to 34 years of age (301 per 100,000), and African Americans (141 per 100,000) (Table 11). However, unlike genital herpes, no consistent trend was seen when comparing case counts and rates from 1999 through 2001 across age groups, gender, race/ethnicity, insurance status, and region (Table 11).

The 1999 data from MarketScan had 3,813 outpatient visits and 18 inpatient visits for genital warts accompanied by a claim for services associated with ICD-9 code 078.11 (Table 3). There were 2,109 medical visits for genital warts by women and 1,722 by men, the rates per 100,000 enrollees being 183 and 163, respectively (Table 12). The highest rates were seen among those 20 to 24 years of age (520 per 100,000). Rates varied by geographical region, from 127 per 100,000 in the West to 201 per 100,000 in the Northeast. A difference was also seen between urban (186 per 100,000) and rural (144 per 100,000) residents.

By defining an episode of genital warts with ICD-9 code 078.10 (wart–common, digitate, filiform, infectious, viral) or 078.19 (other specified viral warts–genital warts, verruca plana, verruca plantaris) linked with CPT procedure codes for the destruction or excision of a lesion of the anus, penis, vulva, perineum, vagina, or introitus, one might identify more patients with genital warts. Claims for drugs used principally to treat genital warts could also identify many patients with the condition: in the 1999 Marketscan data, there were 5,056 drug claims for imiquimod (where the prescription was obtained from a urologist or gynecologist), podofilox, or podophyllin, and 1,356 claims in which the visits included ICD-9 code 078.10 or 78.19 accompanied by CPT codes for procedures to destroy or excise a lesion of the anus, penis, vulva, perineum, vagina, or introitus.

Using National Ambulatory Medical Care Survey (NAMCS) data, we estimated that of the 4.5 million medical visits per year for genital warts, many more were for possible cases (4 million) than for definite cases (0.25 million) or probable cases (0.25 million). Please see the methods chapter for a detailed discussion of definite, probable, and possible cases. Further exploration of this dataset as a source of information on genital warts will require an in-depth understanding of the coding practices of office-based clinicians with respect to diagnoses and procedures.

In both the MarketScan and NAMCS datasets, women made the majority of outpatient visits for genital warts. Further exploration of the datasets will be necessary to determine if this preponderance represents a greater incidence or prevalence among women, or whether it merely reflects differences in care-seeking behavior. For example, genital warts in women are more likely to come to medical

attention than genital warts in men, if only because women periodically seek Pap smears. In contrast, in the HCUP data, men made the majority of inpatient visits. One possible explanation for the difference in the sex distribution of inpatients and outpatients receiving wart care may be that ablative procedures for anogenital warts in men are more commonly performed by hospital-based surgeons, while anogenital warts in women are more commonly managed with ablative and nonablative procedures by office-based gynecologists.

Chlamydia

Background

Chlamydia trachomatis infection causes inflammation of the lower and upper genital tract and presents commonly as cervicitis, salpingitis, endometritis, and urethritis in women, and urethritis, epididymitis, orchitis, prostatitis, and proctitis in men. *C. trachomatis* also causes asymptomatic infection that can result in serious and costly sequelae if acute infection is not treated promptly and properly. Congenitally exposed infants may develop neonatal inclusion conjunctivitis and pneumonitis syndromes. Over the past two decades, there has been a dramatic increase in the use of various measures for diagnostic testing of symptomatic patients and screening of asymptomatic patients. Tests include rapid, nonculture monoclonal antibody-based tests, enzyme immunoassays (EIAs), nucleic acid probe tests, and nucleic acid amplification tests (NAATs). These tests may detect *C. trachomatis* in endocervical or urethral specimens or in urine (17).

Primarily because of increased efforts to screen and treat women for chlamydial infection, the incidence of chlamydia is estimated to have decreased from well over 4 million annual infections in the early 1980s to the current level of 3 million new cases annually, of which up to 75% are asymptomatic (1). The annual economic burden of sexually transmitted chlamydial infections and related sequelae, including PID, ectopic pregnancies, and tubal infertility, was estimated to exceed $2 billion in 1994 (18).

Of the reportable STDs in the United States, chlamydia is the most widespread. In 2001, a total of 783,242 cases (278 per 100,000 population) were reported to the Centers for Disease Control and Prevention (CDC). These included cases with and without symptoms or signs detected during medical examinations or routine screening. Forty percent of the cases of chlamydia were reported among persons 15 to 19 years of age. Reported prevalence among routinely screened, sexually active women is

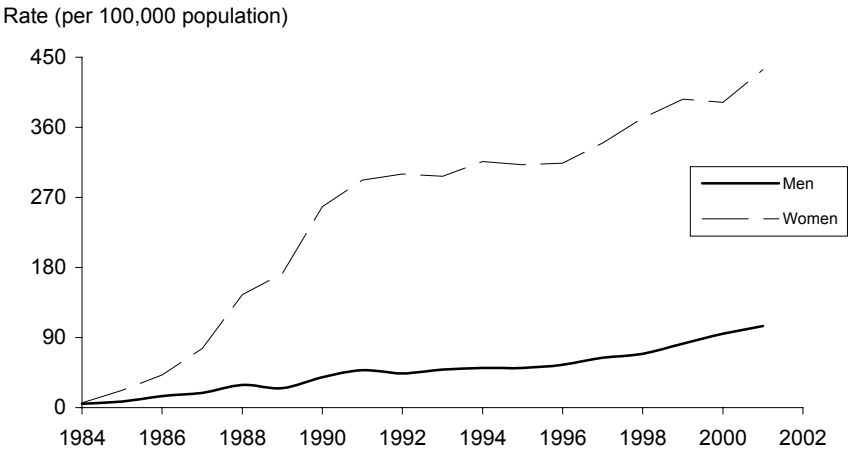

Figure 1. *Chlamydia* – Rates by gender: United States, 1984–2001.

SOURCE: Centers for Disease Control and Prevention. Adapted from Sexually Transmitted Disease Surveillance 2001 Supplement. Chlamydia Prevalence Monitoring Project - Annual Report 2001. Available at: http://www.cdc.gov/std/chlamydia2001/CT2001text.pdf.

consistently greater than 5%, and prevalence among teenage girls often exceeds 10%. In 1996–1999, 9.5% of the women 17 to 37 years of age routinely screened for STDs during their induction into the US Army tested positive for chlamydial infection (19). In addition, 15.6% of adolescent girls entering juvenile detention facilities where chlamydia screening was routine tested positive (20). Prevalence rates tend to be high in STD clinics or other settings where clients present with symptoms. Chlamydial infection is common among all races and ethnic groups, but prevalence is generally higher among women than among men (Figure 1). Using the LCx assay (Abbott Laboratories, Abbott Park, IL) for *C. trachomatis*, urine samples have been tested on a representative sample of participants 14 to 39 years of age in the 1999-2000 NHANES data (21). The prevalence of *C. trachomatis* infection was 2.6% with no significant difference between male and females. Routine screening in family planning clinics reveals that chlamydial infection is more prevalent in areas without long-standing screening and treatment programs; in 1999, 7 of the 10 states with the highest rates were in the South (13).

The advent of routine screening programs for female adolescents and young women has greatly influenced estimates of the distribution of infection. For example, there are more cases or visits based on positive laboratory tests in women than in men because of the large number of infections detected through female screening programs. Also, high rates of chlamydial infection in certain jurisdictions or among certain populations may indicate more effective screening programs and use of more sensitive tests, rather than a higher underlying incidence of disease. However, screening is not comprehensive. A Health Plan Employer Data and Information Set (HEDIS) report recently indicated that of women eligible for chlamydia screening under national screening guidelines (22), 19% of those 16 to 20 years of age and 16% of those 21 to 26 years of age received screening in managed care organizations that reported screening rates to the National Committee of Quality Assurance (NCQA) in 2000 (23). Selected public sector programs (STD clinics, prenatal clinics, and family planning clinics) screen higher percentages of women. Inclusion of screening costs for patients with positive test results must be considered in analyses of the overall economic burden of STDs.

The Data

HCUP data indicate that hospitalization for chlamydial infection is a rare event that has decreased over time (Table 13). In 1994, a total of 2,278 patients were hospitalized with a primary diagnosis of chlamydial infection; the number decreased to 183 in 2000.

Medicare data on hospital outpatient and inpatient visits for chlamydial infection from 1995 through 1998 were too sparse to permit meaningful interpretation (Table 14). For example, Medicare hospital outpatient visit rates decreased from 2.8 per 100,000 beneficiaries in 1995 to 1.4 per 100,000 in 1998.

In 2001 VA data, chlamydial infection was the fourth most common pathogen-specific STD presentation, with a total of 14 cases per 100,000 unique outpatients (Table 6). The highest rates were seen among women (76 per 100,000), persons under 25 years of age (226 per 100,000), African Americans (52 per 100,000), and persons residing in the West (16 per 100,000) (Table 15). The higher rates observed among women and persons under 25 years of age may be due in part to higher rates of screening of younger women who are asymptomatic, especially in family planning, prenatal, and STD clinics. No consistent trend was seen when comparing case counts and rates from 1999 through 2001 across age groups, gender, race/ethnicity, insurance status, and region.

The 1999 MarketScan data had 746 outpatient visits and 21 inpatient visits accompanied by a claim for services associated with one of the ICD-9 codes for chlamydial infection listed in Table 3. Of these 767 visits, 558 were by women and 209 were by men, the rates being 49 and 20 per 100,000 enrollees, respectively (Table 16). The highest rates of visits were by persons 20 to 24 years of age (105 per 100,000). The higher rates observed among women and persons under 25 years of age may be due in part to higher rates of screening of younger asymptomatic women during family planning and prenatal care. Rates did not vary greatly by geographical region, ranging from 31 per 100,000 in the Midwest to 39 per 100,000 in the Northeast. However, a marked difference was seen between urban (38 per 100,000) and rural (24 per 100,000) residents. The higher rates observed among urban residents may be due in part to higher rates

Table 13. Inpatient hospital stays by individuals with *Chlamydia* listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total[b]	2,278	0.9 (0.6–1.2)	684	0.3 (0.2–0.3)	272	0.1 (0.1–0.1)	183	0.1 (0–0.1)
Age								
< 14	1,548	2.9 (1.4–4.4)	268	0.5 (0.3–0.6)	*	*	*	*
14–17	*	*	*	*	*	*	*	*
18–24	172	0.7 (0.4–1.0)	*	*	*	*	*	*
25–34	*	*	*	*	*	*	*	*
35–44	*	*	*	*	*	*	*	*
45–54	*	*	*	*	*	*	*	*
55–64	*	*	*	*	*	*	*	*
65–74	*	*	*	*	*	*	*	*
75–84	*	*	*	*	*	*	*	*
85+	*	*	*	*	*	*	*	*
Race/ethnicity								
White	411	0.2 (0.2–0.3)	337	0.2 (0.1–0.2)	*	*	*	*
Black	434	1.4 (0.9–1.9)	154	0.5 (0.3–0.6)	*	*	*	*
Asian/Pacific Islander	*	*	*	*	*	*	*	*
Hispanic	*	*	*	*	*	*	*	*
Other	*	*	*	*	*	*	*	*
Gender								
Male	1,052	0.8 (0.4–1.3)	231	0.2 (0.1–0.2)	*	*	*	*
Female	1,226	1.0 (0.6–1.2)	453	0.3 (0.2–0.4)	224	0.2 (0.1–0.2)	164	0.1 (0.1–0.2)
Region								
Midwest	315	0.5 (0.3–0.7)	*	*	*	*	*	*
Northeast	1,364	2.7 (1.0–4.3)	317	0.6 (0.4–0.8)	*	*	*	*
South	430	0.5 (0.3–0.7)	*	*	*	*	*	*
West	169	0.3 (0.2–0.4)	*	*	*	*	*	*
MSA								
Rural	*	*	*	*	*	*	*	*
Urban	2,022	1.1 (0.6–0.5)	566	0.3 (0.2–0.3)	229	0.1 (0.1–0.2)	163	0.1 (0–0.1)

*Figure does not meet standard for reliability or precision.

MSA, metropolitan statistical area.

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US civilian non-institutionalized population.

[b]Persons of other race/ethnicity are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

Table 14. Hospital outpatient visits by Medicare beneficiaries with *Chlamydia* listed as primary diagnosis, count[a], rate[b] (95% CI)

	1995		1998	
	Count	Rate	Count	Rate
Total[c]	980	2.8 (2.6–2.9)	460	1.4 (1.2–1.5)
Total < 65	440	7.2 (6.5–7.8)	240	3.9 (3.4–4.3)
Total 65+	540	1.8 (1.7–2.0)	220	0.8 (0.7–0.9)
Age				
65–74	380	2.3 (2.1–2.6)	120	0.8 (0.7–1.0)
75–84	160	1.7 (1.4–1.9)	100	1.1 (0.8–1.3)
85–94	0	0	0	0
95+	0	0	0	0
Race/ethnicity				
White	540	1.8 (1.6–1.9)	280	1.0 (0.9–1.1)
Black	260	8.1 (7.1–9.1)	100	3.2 (2.6–3.9)
Asian	…	…	…	…
Hispanic	100	25 (20–30)	20	2.8 (1.6–4.1)
N. American Native	…	…	20	37 (20–54)
Gender				
Male	400	2.6 (2.4–2.9)	220	1.5 (1.3–1.7)
Female	580	2.9 (2.6–3.1)	240	1.3 (1.1–1.4)
Region				
Midwest	80	0.9 (0.7–1.1)	60	0.7 (0.5–0.9)
Northeast	460	6.0 (5.4–6.5)	180	2.7 (2.3–3.1)
South	240	1.9 (1.7–2.1)	120	1.0 (0.8–1.1)
West	180	3.5 (3.0–4.0)	80	1.6 (1.3–2.0)

… data not available.

[a]Unweighted counts multiplied by 20 to arrive at values in the table.

[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.

[c]Persons of other races, unknown race and ethnicity, and other region are included in the totals.

NOTES: Counts less than 600 should be interpreted with caution. Coding changes make comparison with data from 1992 impossible.

SOURCE: Centers for Medicare and Medicaid Services, 5% Carrier and Outpatient Files, 1992, 1995, 1998.

Table 15. Frequency of *Chlamydia*[a] listed as any diagnosis in VA patients seeking outpatient care, count[b], rate[c]

	1999		2000		2001	
	Count	Rate	Count	Rate	Count	Rate
Total	636	21	572	17	515	14
Age						
18–24	55	217	44	187	52	226
25–34	202	134	150	106	152	112
35–44	179	54	182	58	120	40
45–54	139	20	140	20	119	16
55–64	29	6	24	4	40	6
65–74	25	3	23	3	22	2
75–84	6	1	9	1	10	1
85+	1	2	0	0	0	0
Race/ethnicity						
White	145	11	122	8	110	7
Black	214	64	226	66	183	52
Hispanic	12	10	18	15	16	12
Other	2	10	0	0	3	14
Unknown	263	22	206	16	203	13
Gender						
Male	519	18	445	14	389	11
Female	117	83	127	84	126	76
Region						
Midwest	131	19	137	18	75	9
Northeast	185	25	134	17	134	15
South	183	18	191	17	197	15
West	137	23	110	17	109	16
Insurance status						
No insurance/self-pay	557	31	488	27	422	22
Medicare/Medicare supplemental	20	3	29	3	27	2
Medicaid	1	20	0	0	4	45
Private insurance/HMO/PPO	49	10	53	10	51	9
Other insurance	9	36	2	7	11	33
Unknown	0	0	0	0	0	0

HMO, health maintenance organization; PPO, preferred provider organization.

[a]Represents diagnosis codes for chlamydia.

[b]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[c]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from observation only; note large number of unknown values.

Source: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 16. Medical visits[a] for chlamydial infection in 1999, count, rate[b] (95% CI)

	Count	Rate
Age		
<10	64	26 (20–33)
10–14	24	14 (8–19)
15–19	165	88 (75–102)
20–24	120	105 (86–123)
25–29	68	69 (53–86)
30–34	80	56 (44–68)
35–39	69	36 (28–45)
40–44	45	21 (15–27)
45–54	80	17 (13–21)
55–64	52	15 (11–19)
65+	0	0
Gender		
Male	209	20 (17–22)
Female	558	49 (44–53)
Region		
Midwest	163	31 (27–36)
Northeast	145	39 (32–45)
South	322	34 (31–38)
West	41	37 (26–48)
Unknown	96	36 (29–44)
Urban/Rural		
MSA	557	38 (35–41)
Non-MSA	114	24 (20–28)
Unknown	96	36 (29–44)

[a]The number of medical visits includes both inpatient visits and outpatient visits; however, most medical visits were outpatient visits.

[b]Rate per 100,000 enrollees who were continuously enrolled in a health plan throughout 1999.

SOURCE: MarketScan, 1999.

of screening in urban areas, not greater incidence of infection.

In the 767 medical visits coded as being for chlamydial infection in the 1999 MarketScan data, 178 drug claims were filed for a recommended or alternate medication regimen from the CDC STD treatment guidelines (36 for amoxicillin, 73 for azithromycin, 46 for doxycycline, 14 for erythromycin, and 9 for ofloxacin) within 7 days before or 20 days after the date of the medical visit. Thus, in only 23% of the cases in which chlamydia was diagnosed was a drug prescribed that was consistent with CDC STD treatment guidelines. In the same dataset, an additional 3,654 medical claims were associated with ICD-9 codes, CPT codes, or NDCs for chlamydial infections. All those claims had at least one of the ICD-9 or CPT codes listed in Table 17 and a drug claim for amoxicillin, azithromycin, doxycycline, erythromycin, or ofloxacin within the 7 days before and 20 days after the date of the medical visit. This analysis indicates that the use of ICD-9 codes alone in the absence of CPT codes for *Chlamydia* testing and NDC codes for *Chlamydia* treatment in claims-based datasets substantially underestimates the numbers of provider visits for chlamydial infections. Because CPT codes for STDs are not available in HCUP or VA data and are presumably uncommon in Medicare data, they were not included in analyses for this chapter.

Gonorrhea

Background

Neisseriae gonorrhoeae is the cause of gonorrhea and its related clinical syndromes. Uncomplicated *N. gonorrhoeae* infection is usually confined to the mucosa of the cervix, urethra, rectum, and throat. The infection is often asymptomatic among females; untreated, it can lead to PID, tubal infertility, ectopic pregnancy, and chronic pelvic pain (24). *N. gonorrhoeae* usually causes symptomatic urethritis among males and occasionally results in epididymitis. Rarely, local infection disseminates to cause an acute dermatitis tenosynovitis syndrome, which can be complicated by arthritis, meningitis, or endocarditis (24).

In symptomatic patients, *N. gonorrhoeae* infection can be diagnosed presumptively using a gram stain of urethral or endocervical exudates if the smear contains typical gram-negative diplococci within polymorphonuclear leukocytes. However, other Neisseria species, including those normally in the flora of the oro- and nasopharynx, have a similar appearance. Culture testing has been the standard against which all other tests for *N. gonorrhoeae* have been compared. However, there are problems in maintaining the viability of organisms during transport and storage in the diverse settings in which culture testing is indicated. Nonculture tests are now available, including EIAs that detect specific gonococcal antigens, nucleic acid hybridization tests (NAATs) that detect *N. gonorrhoeae*-specific deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) sequences, and NAATs that amplify and detect *N. gonorrhoeae*-specific

Table 17. Codes used to identify additional medical visits for chlamydial infection[a] in MarketScan data

ICD-9 Codes	
V73.88	Screening for other specified chlamydial disease
V73.98	Screening, unspecified urethritis
099.40	Other nongonococcal urethritis, unspecified
099.49	Other nongonococcal urethritis, other specified organism
CPT codes	
86631	Chlamydia
86632	Chlamydia, IgM
87110	Chlamydia, culture
97270	*Chlamydia trachomatis*
87320	Infectious agent antigen detection by enzyme immunoassay technique, qualitiative or semiquantitative, multiple-step method; *Chlamydia trachomatis*
87490	Infectious agent detection by nucleic acid (DNA or RNA); *Chlamydia trachomatis*, direct probe technique
87491	Infectious agent detection by nucleic acid (DNA or RNA); *Chlamydia trachomatis*, amplified probe technique
87492	Infectious agent detection by nucleic acid (DNA or RNA); *Chlamydia trachomatis*, quantification
87810	Infectious agent detection by immunoassay with direct optical observation; *Chlamydia trachomatis*

[a]A medical visits was identified as an additional chlamydia visit if the date of a claim for amoxicillin, azithromycin, doxycyline, erythromycin, or ofloxacin was within the interval of 7 days before and 20 days after the date of the medical visit, and if the visit was associated with one of these ICD-9 or CPT codes.

DNA or RNA sequences. These tests are substantially more sensitive than the first-generation nonculture tests were (17, 24-29).

Of the reportable STDs, gonorrhea is second only to chlamydial infections in the number of cases reported annually to CDC; 361,705 cases were reported in 2001, with an age distribution similar to that for *C. trachomatis* infections (30). The number of reported cases of gonorrhea in the United States increased steadily from 1964 to 1977, fluctuated through the early 1980s, increased until 1987, decreased starting in 1987, and has leveled off since 1998. Antimicrobial resistance in *N. gonorrhoeae* contributed to the increase in cases in the 1970s and 1980s. The decline in prevalence that began in 1987 may be attributable to recommendations by CDC (31) that only highly effective antimicrobial agents be used to treat gonorrhea. Using the LCx assay for *N. gonorrhoeae*, urine specimens were tested on a representative sample of participants 14- to 39-years of age in the 1999 to 2000 NHANES data (32); the prevalence of *N. gonorrhoeae* was 0.25%. The prevlance of gonorrhea among non-Hispanic black (1.3%) was over 25 times that among non-Hispanic white (0.05%). Among those infected with *N. gonorrhoeae*, 57% were also infected with *C. trachomatis*.

The incidence of gonorrhea is highest in high-density urban areas among persons under 24 years of age who have more than one sex partner in a 6-month period and who engage in unprotected sexual intercourse. Increases in gonorrhea prevalence have been noted recently among men who have sex with men (MSM) (33). Up to 50% of infected men and women lack symptoms, and routine screening for gonococcal infection is not common except in public STD clinics. Thus, reported cases of gonorrhea substantially underestimate the true burden of the disease and may not accurately represent the true underlying trends over time or differences in disease rates by demographic characteristics. Because gonorrhea screening is more commonly offered in public STD clinics that are frequented by low-income men, gonorrhea rates may appear higher in these demographic groups merely as a result of the enhanced screening.

Infected women are more likely to be asymptomatic than infected men, and screening for gonococcal infection in asymptomatic women is uncommon; therefore, cases in women are less likely to be identified and reported. Reported gonorrhea rates have leveled off overall. From 1998 through

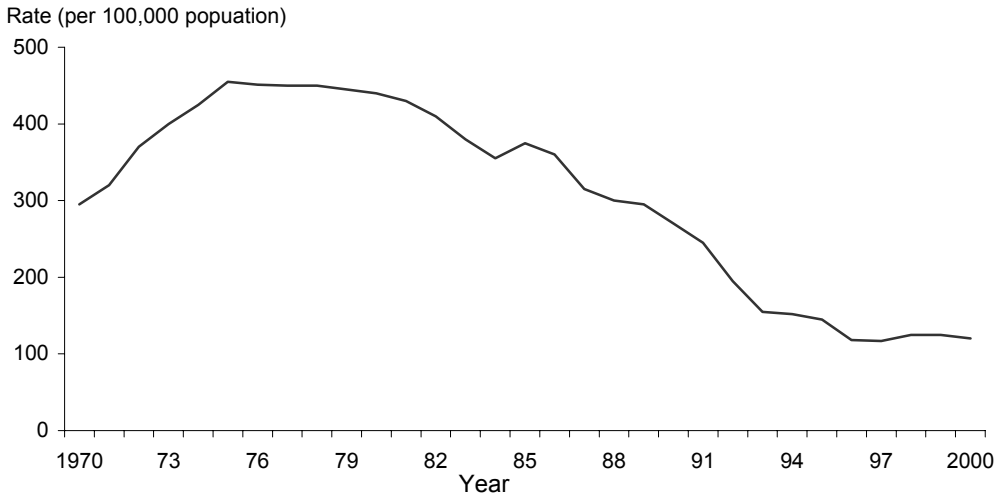

Figure 2. Gonorrhea – Reported rates: United States, 1970–2001.

SOURCE: Centers for Disease Control and Prevention. Adapted from Sexually Transmitted Disease Surveillance 2001 Supplement. Gonococcal Isolate Surveillance Project (GISP) - Annual Report 2001. Available at: http://www.cdc.gov/std/GISP2001/GISP2001Text&Fig.pdf.

2001, the gonorrhea rate in the United States persisted at around 129 cases per 100,000 population (Figure 2) (30). The South continues to have the highest rates of any region. Rates were highest among young women 15 to 19 years of age and men 20 to 24, regardless of race or ethnicity (13). Reported rates of gonorrhea among African Americans are more than 30 times higher than rates among Caucasians and more than 11 times higher than rates among Hispanics (13). As with chlamydia, high reported rates of gonorrhea in certain areas or among certain populations may indicate more effective screening programs and the use of more sensitive tests, rather than higher underlying rates of disease.

The annual economic burden of gonorrhea and related sequelae was estimated to exceed $1 billion in 1994 (18).

The Data

According to HCUP data, hospitalization for a primary diagnosis of gonorrhea is a rare event that decreased from 2,154 hospitalizations in 1994 to 969 in 2000 (Table 18). Although other data indicate that chlamydial infection is more common than gonorrhea (30), infection with *N. gonorrhoeae* is more likely to result in hospitalization because it tends to cause more severe symptoms and may require more sophisticated diagnostic assessment, intravenous antibiotics, or surgical intervention (e.g., abscess drainage).

Medicare data on hospital outpatient and inpatient visits for gonorrhea from 1992 through 1998 are too sparse to permit meaningful interpretation. Hospital outpatient visit rates of approximately 1 per 100,000 Medicare beneficiaries were observed in all three years of data.

In the 2001 VA data, gonorrhea was the third most common pathogen-specific STD clinical presentation, with a total of 17 cases per 100,000 unique outpatients (Table 6). As with chlamydia, the highest rates were seen among women (29 per 100,000), persons under 25 years of age (109 per 100,000), and African Americans (71 per 100,000); this may be due in part to higher rates of screening of younger asymptomatic women in family planning, prenatal, and STD clinics (Table 19). Geographic distribution throughout the country was relatively uniform (15 to 19 per 100,000). A generalized decreasing trend was noted when comparing case counts and rates from 1999 through 2001; this trend was most consistent among persons 25- to 54- years of age, among Caucasians and African Americans, and among persons living in the Northeastern, Southern, and Midwestern regions. In each year examined, the

Table 18. Inpatient hospital stays by individuals with gonorrhea listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total[b]	2,154	0.8 (0.7–1.0)	1,250	0.5 (0.4–0.6)	1,115	0.4 (0.3–0.5)	969	0.4 (0.3–0.4)
Age								
< 14	*	*	*	*	*	*	*	*
14–17	542	3.8 (2.8–4.8)	272	1.8 (1.2–2.3)	221	1.4 (1.0–1.8)	221	1.4 (0.9–1.8)
18–24	739	3.0 (2.3–3.7)	448	1.8 (1.4–2.3)	457	1.8 (1.4–2.2)	403	1.5 (1.2–1.9)
25–34	519	1.3 (1.0–1.6)	321	0.8 (0.6–1.0)	280	0.7 (0.5–0.9)	229	0.6 (0.4–0.8)
35–44	215	0.5 (0.4–0.7)	*	*	*	*	*	*
45–54	*	*	*	*	*	*	*	*
55–64	*	*	*	*	*	*	*	*
65–74	*	*	*	*	*	*	*	*
75–84	*	*	*	*	*	*	*	*
85+	*	*	*	*	*	*	*	*
Race/ethnicity								
White	381	0.2 (0.2–0.3)	258	0.1 (0.1–0.2)	195	0.1 (0.1–0.1)	193	0.1 (0.1–0.1)
Black	1,294	4.1 (3.2–5.0)	794	2.4 (1.9–2.9)	555	1.6 (1.3–2.0)	494	1.4 (1.1–1.8)
Asian/Pacific Islander	*	*	*	*	*	*	*	*
Hispanic	*	*	*	*	*	*	*	*
Gender								
Male	173	0.1 (0.1–0.2)	*	*	*	*	*	*
Female	1,975	1.5 (1.2–1.8)	1,120	0.8 (0.7–1.0)	995	0.7 (0.6–0.9)	920	0.7 (0.5–0.8)
Region								
Midwest	539	0.9 (0.5–1.3)	254	0.4 (0.2–0.6)	279	0.4 (0.3–0.6)	295	0.5 (0.3–0.6)
Northeast	363	0.7 (0.5–1.0)	226	0.4 (0.2–0.6)	172	0.3 (0.2–0.5)	184	0.4 (0.2–0.5)
South	1,082	1.3 (0.9–1.6)	688	0.8 (0.5–1.0)	601	0.6 (0.5–0.8)	408	0.4 (0.3–0.5)
West	170	0.3 (0.1–0.5)	*	*	*	*	*	*
MSA								
Rural	*	*	*	*	*	*	*	*
Urban	1,865	1.0 (0.8–1.2)	1,066	0.5 (0.4–0.6)	978	0.5 (0.4–0.6)	882	0.4 (0.3–0.5)

MSA, metropolitan statistical area.

*Figure does not meet standard for reliability or precision.

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US civilian non-institutionalized population.

[b]Persons of other race/ethnicity are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

Table 19. Frequency of gonorrhea[a] listed as any diagnosis in VA patients seeking outpatient care, count[b], rate[c]

	1999		2000		2001	
	Count	Rate	Count	Rate	Count	Rate
Total	708	23	660	20	634	17
Age						
18–24	25	99	29	123	25	109
25–34	153	101	138	97	123	91
35–44	216	65	180	58	163	54
45–54	201	29	187	26	189	25
55–64	41	8	59	11	71	11
65–74	46	6	42	5	38	4
75–84	25	5	23	4	24	3
85+	1	2	2	3	1	1
Race/ethnicity						
White	144	11	130	9	127	8
Black	299	90	287	84	251	71
Hispanic	18	16	19	16	32	25
Other	1	5	2	10	2	9
Unknown	246	20	222	17	222	14
Gender						
Male	654	23	599	19	586	17
Female	54	38	61	40	48	29
Region						
Northeast	237	32	159	20	164	19
Midwest	125	18	139	19	128	15
South	250	25	234	21	232	18
West	96	16	128	20	110	16
Insurance status						
No insurance/self-pay	588	32	559	31	507	27
Medicare/Medicare supplemental	46	7	43	5	42	4
Medicaid	1	20	1	13	2	22
Private insurance/HMO/PPO	68	14	54	11	69	12
Other insurance	5	20	3	10	11	33
Unknown	0	0	0	0	3	33

HMO, health maintenance organization; PPO, preferred provider organization.

[a]Represents diagnosis codes for gonorrhea.

[b]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[c]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from observation only; note large number of unknown values.

Source: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 20. Medical visits[a] for gonorrhea in 1999, count, rate[b] (95% CI)

	Count	Rate
Age		
<10	16	7 (3–10)
10–14	6	3 (1–6)
15–19	104	56 (45–66)
20–24	82	71 (56–87)
25–29	70	71 (55–88)
30–34	87	61 (48–74)
35–39	64	34 (25–42)
40–44	57	26 (20–33)
45–54	71	15 (12–18)
55–64	44	12 (9–16)
65+	1	11 (0–32)
Gender		
Male	203	19 (17–22)
Female	399	35 (31–38)
Region		
Midwest	159	31 (26–35)
Northeast	87	23 (18–28)
South	278	30 (26–33)
West	19	17 (9–25)
Unknown	59	22 (17–28)
Urban/rural		
MSA	430	29 (27–32)
Non-MSA	113	24 (19–28)
Unknown	59	22 (17–28)

[a]The number of medical visits includes both inpatient visits and outpatient visits; however, most medical visits were outpatient visits.

[b]Rate per 100,000 enrollees who were continuously enrolled in a health plan throughout 1999.

SOURCE: MarketScan, 1999.

highest rates of gonorrhea occurred among those who had no insurance or were self-paying patients.

The 1999 MarketScan data had 592 outpatient visits and 10 inpatient visits which were accompanied by a claim for services associated with one of the ICD-9 codes listed in Table 1 for gonorrhea (Table 3). There were 399 medical visits for gonococcal infection by women and 203 by men, the rates being 35 and 19 per 100,000, respectively (Table 20). The highest rates were seen equally among those 20 to 24 years of age and those between 25 and 29 (71 per 100,000). Again, the higher rates of gonococcal infection observed among women and those under 25 may be due in part to higher rates of screening of younger asymptomatic women. Rates varied by geographical region, ranging from 17 per 100,000 enrollees in the West to 31 per 100,000 in the Midwest. A difference was also seen between urban (29 per 100,000) and rural (24 per 100,000) residents. The 602 medical visits that were ICD-coded as being for gonococcal infection resulted in 169 (28%) claims for one of the drugs recommended by CDC for treatment of uncomplicated, lower urinary tract gonococcal infection filed within 7 days before or 20 days after the date of the medical visit. However, in the same dataset, 2,530 visits resulted in drug claims for one of these same drugs filed within 7 days before or 20 days after the date of the medical visit and were *either* ICD-coded as being for gonorrhea *or* included a CPT code that referred to a test for gonorrhea. Thus, defining probable and possible visits for gonococcal infection based only on ICD-9 codes would substantially underestimate the number of visits for treatment of gonococcal infection. Clinicians tend not to use gonococcus-specific ICD-9 codes when simply ruling out gonococcal infection with a test; in the case of a test later found to be positive, the original ICD-9 code is not customarily altered to reflect gonococcal infection.

Syphilis

Background

Syphilis is a systemic disease caused by *Treponema pallidum*. Patients with syphilis may seek treatment for signs or symptoms of primary infection (i.e., ulcer or chancre at the infection site), secondary infection (e.g., skin rash, mucocutaneous lesions, or lymphadenopathy), or tertiary infection (e.g., cardiac, ophthalmic, or auditory abnormalities, or gummatous lesions) (31). Signs of primary and secondary syphilis that most commonly would be seen by a urologist include chancre and rash. Latent infections are detected by serologic testing. Latent syphilis acquired within the preceding year is referred to as early latent syphilis; all other cases of latent syphilis are classified as either late latent syphilis or latent syphilis of unknown duration. The latent stages of syphilis begin with disappearance of the secondary symptoms. Unless they have cause to screen patients, urologists rarely see latent syphilis or its manifestations that occur outside the genitourinary system.

The diagnosis of syphilis depends on clinical findings and directly visualizing *T. pallidum* organisms

in secretions or tissue or on serology. Darkfield examinations and direct fluorescent antibody tests of lesion exudate or tissue are the definitive methods for diagnosing early syphilis, but such testing is rarely performed outside STD clinics. A presumptive diagnosis is possible with the use of two types of serologic tests for syphilis: nontreponemal tests (e.g., Venereal Disease Research Laboratory [VDRL] and Rapid Plasma Reagin [RPR]) and treponemal tests (e.g., fluorescent treponemal antibody absorbed [FTA-ABS] and *T. pallidum* particle agglutination [TP-PA]). The use of only one type of serologic test is insufficient for diagnosis because false-positive nontreponemal test results may occur secondary to various medical conditions. Routine serologic screening is done in only a few settings, including blood banks, prenatal care and STD clinics, and some HIV care clinics; it is also required in premarital testing in some states.

Staging of syphilis is based on serology results and relies on knowledge of past titers and treatment history. This can be challenging if no information on past titers or treatment is available, as is often the case when patients pursue care in more than one setting. Treatment with penicillin is often provided based on a single, isolated serologic result because such treatment is generally safe, effective, and inexpensive. If a patient is successfully treated, the titer of the nontreponemal serologic test will fall, usually within the 6 months following treatment. Primary, secondary, and early latent stages are all infectious stages; primary and secondary stages in adults and congenital syphilis are subject to national surveillance because their infectious nature or origin makes them important to public health. Other stages are not under national surveillance but add to the overall burden of disease.

In 1996, 11,400 new cases of primary and secondary syphilis and 53,000 new cases of all stages of syphilis were reported to CDC; if we assume 20% underreporting, approximately 70,000 total syphilis infections were diagnosed in that year (34). However, the rate of primary and secondary syphilis reported in the United States decreased 90% between 1990 and 2000, from 20.34 to 2.12 cases per 100,000 population (Figure 3). In 2001, the overall rate (2.17 per 100,000) represented a 2% increase over the 2000 rate, which was the lowest rate since reporting began in 1941 (35), and the first annual increase since 1990. In 1999, CDC estimated that the annual direct medical costs for adult and congenital syphilis were $213 million, with an additional cost of $752 million for syphilis-attributable HIV infection (36).

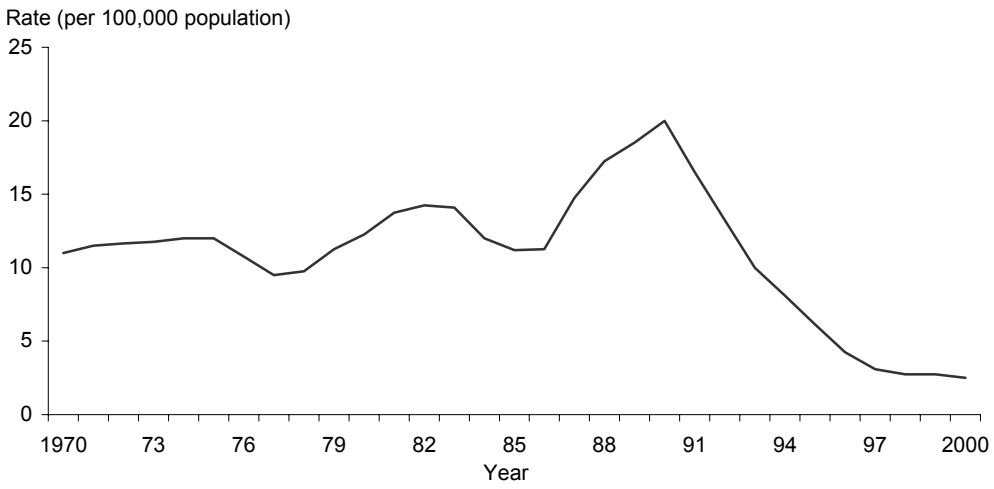

Figure 3. Primary and secondary syphilis – Reported rates: United States, 1970–2001.

SOURCE: Centers for Disease Control and Prevention. Adapted from Sexually Transmitted Disease Surveillance 2001 Supplement. Syphilis Surveillance Report - February 2003. Available at: http://www.cdc.gov/std/Syphilis2001/2001SyphSuppText.pdf.

The Data

During 2001, 6,103 primary and secondary syphilis cases were reported to state and local health departments in the United States. The highest rate of primary and secondary syphilis among women was seen in those 20 to 24 years of age (3.8 per 100,000 population); the highest rate among men was seen in those 35 to 39 years of age (7.2 per 100,000). The 2001 rate for men was 15.4% higher than the rate in 2000, and the rate for women was 17.7% lower. The male-to-female case ratio of primary and secondary syphilis rose from 1.1:1 in 1996 to 2.1:1 in 2001. Current efforts to eliminate syphilis in the United States are focused on communities in which relatively elevated rates of STDs are being observed among men who have sex with men (MSM) and on heterosexual communities with high prevalence, many of which are in the South. The recent increase in cases in men, the growing disparity in case numbers between men and women observed across all racial and ethnic groups, and reported outbreaks of syphilis among MSM in large urban areas all suggest that increases in syphilis are occurring among MSM. Rates have also remained disproportionately high in the South (3.4 per 100,000) and among non-Hispanic blacks (11 per 100,000) (37, 38). Urologists who care for MSM or work in communities with a high incidence of syphilis may diagnose and treat patients with primary or secondary stages of syphilis, especially when they present with genital ulcers.

Epididymitis/Orchitis

Background

Epididymitis, or inflammation of the epididymis, commonly occurs as a complication of urethral infection with *N. gonorrhoeae*, *C. trachomatis*, or *Pseudomonas aeruginosa*. It may also occur as a complication of systemic infection with *Mycobacterium tuberculosis*, *Brucella spp.*, *Streptococcus pneumoniae*, *Neisseria meningiditis*, *Treponema pallidum*, and various fungi (3). Epididymitis causes considerable morbidity in terms of pain, suffering, and loss of productivity. The condition is common in the United States; in 1977, an estimated 634,000 patients sought treatment for it (39). Changes in the incidence of epididymitis have not been consistently monitored over time because the condition is not subject to national surveillance.

Orchitis is an inflammation of the testicles, which may be caused by any of several bacteria or viruses. Orchitis tends to occur in conjunction with infections of the prostate or epididymis and, like those conditions, may occur as a manifestation of STDs such as gonorrhea or chlamydial infection. The most common viral cause of orchitis is mumps, a non-sexually-transmissible virus (2). The incidence of orchitis is not subject to national surveillance. Because orchitis tends to occur commonly in conjunction with epididymitis, most ICD-9 codes do not distinguish between the two conditions. There are only two unique orchitis codes—one for gonococcal orchitis and one for chronic gonococcal orchitis; there is no unique code for gonococcal epididymitis (Table 1). Summary analyses of cases and visits in national datasets suggest that only about 60% of the cases of epididymitis and orchitis are attributable to STDs (3).

The Data

HCUP data indicate that since 1996 there has been little change over time in hospitalizations for both epididymitis/orchitis using all ICD-9 codes (Table 21) and epididymitis/orchitis not specified as due to Chlamydia or gonococcus (organism unspecified) (Table 22). In 1996, 8,954 hospitalizations had epididymitis/orchitis (all cases) listed as the primary diagnosis; there was a steady increase in rates of stays across all 10-year age categories from 25 to 34 through 85+ (Table 21). In 2000, there were 8,448 hospitalizations for epididymitis/orchitis, with increasing rates of stays across 10-year age categories from <14 through 85+ (Table 21). Over 99% of the cases were for epididymitis/orchitis not designated as due to Chlamydia or gonococcus (Table 22); it appears that clinicians rarely code patients specifically as having acute or chronic gonococcal orchitis (ICD codes 098.13 or 098.33).

Medicare hospital outpatient data indicate that rates of epididymitis/orchitis (organism unspecified) increased from 14 per 100,000 beneficiaries in 1992 to 26 per 100,000 in 1998 (Table 23). An inverse relationship was seen in the Medicare inpatient data, where hospitalizations for epididymitis/orchitis (organism unspecified) decreased from 26 per 100,000 beneficiaries in 1992, to 19 per 100,000 in 1995, to 14 per 100,000 in 1998 (Table 24).

Table 21. Inpatient hospital stays by individuals for epididymitis/orchitis (all cases) listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total[b]	10,235	8.3 (7.8–8.8)	8,954	7.0 (6.5–7.4)	8,954	6.8 (6.4–7.3)	8,448	6.3 (5.9–6.8)
Age								
< 14	657	2.4 (1.8–2.9)	526	1.8 (1.4–2.3)	396	1.4 (1.0–1.7)	435	1.5 (1.1–1.9)
14–17	423	5.8 (4.3–7.3)	277	3.5 (2.4–4.7)	208	2.6 (1.8–3.4)	182	2.2 (1.5–2.9)
18–24	586	4.8 (3.7–5.9)	385	3.1 (2.4–3.9)	428	3.4 (2.6–4.2)	420	3.2 (2.5–3.9)
25–34	1,660	8.3 (7.1–9.4)	1,161	5.8 (5.0–6.7)	1,072	5.6 (4.7–6.5)	872	4.8 (3.9–5.6)
35–44	1,586	8.0 (6.9–9.1)	1,565	7.4 (6.4–8.5)	1,668	7.6 (6.7–8.6)	1,490	6.8 (5.9–7.7)
45–54	1,223	8.7 (7.4–10)	1,251	8.1 (6.9–9.2)	1,336	8.1 (7.0–9.2)	1,354	7.6 (6.6–8.6)
55–64	1,205	12 (11–14)	1,029	10 (8.8–12)	1,159	11 (9.3–13)	1,042	9.3 (8.1–11)
65–74	1,507	19 (16–22)	1,427	18 (15–20)	1,171	15 (12–17)	1,324	16 (14–19)
75–84	1,098	29 (25–33)	1,059	25 (21–29)	1,205	27 (23–30)	1,079	22 (19–26)
85+	291	32 (21–44)	275	32 (22–41)	311	32 (23–40)	252	25 (17–32)
Race/ethnicity								
White	5,370	5.9 (5.4–6.4)	5,118	5.5 (5.1–5.9)	4,892	5.2 (4.8–5.7)	4,374	4.6 (4.2–5.0)
Black	1,568	11 (9.3–12)	1,102	7.2 (6.0–8.4)	1,070	6.8 (5.7–8.0)	1,054	6.6 (5.6–7.7)
Asian/Pacific Islander	*	*	*	*	*	*	*	*
Hispanic	718	5.5 (4.2–6.8)	684	4.8 (3.8–5.7)	670	4.3 (3.2–5.3)	820	5.0 (4.1–6.0)
Region								
Midwest	2,310	7.9 (7.0–8.8)	2,280	7.6 (6.7–8.5)	2,133	7.0 (6.1–7.8)	2,010	6.4 (5.7–7.2)
Northeast	2,789	11 (10–13)	2,161	8.7 (7.5–9.9)	2,029	8.2 (6.9–9.5)	1,684	6.8 (5.8–7.8)
South	3,642	8.8 (7.8–9.8)	3,257	7.3 (6.6–8.1)	3,428	7.5 (6.8–8.3)	3,392	7.3 (6.4–8.1)
West	1,494	5.4 (4.5–6.3)	1,256	4.3 (3.7–4.9)	1,365	4.5 (3.7–5.4)	1,363	4.5 (3.7–5.3)
MSA								
Rural	2,351	7.5 (6.5–8.6)	2,035	7.0 (6.0–8.0)	2,052	7.0 (6.1–7.9)	1,763	6.0 (5.1–6.9)
Urban	7,812	8.5 (7.9–9.1)	6,919	7.0 (6.5–7.4)	6,865	6.8 (6.2–7.3)	6,676	6.4 (5.9–6.9)

MSA, metropolitan statistical area.

*Figure does not meet standard for reliability or precision.

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US civilian non-institutionalized population.

[b]Persons of other race/ethnicity are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

Table 22. Inpatient hospital stays by individuals with epididymitis/orchitis not designated as due to *Chlamydia* or gonococcus listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total[b]	10,082	8.2 (7.7–8.7)	8,894	6.9 (6.5–7.4)	8,882	6.8 (6.3–7.2)	8,387	6.3 (5.9–6.7)
Age								
< 14	650	2.3 (1.8–2.9)	521	1.8 (1.3–2.3)	396	1.4 (1.0–1.7)	435	1.5 (1.1–1.9)
14–17	377	5.2 (3.7–6.7)	256	3.3 (2.1–4.4)	176	2.2 (1.5–2.9)	177	2.1 (1.4–2.9)
18–24	512	4.2 (3.2–5.2)	363	3.0 (2.3–3.7)	422	3.4 (2.6–4.2)	388	3.0 (2.3–3.7)
25–34	1,649	8.2 (7.0–9.4)	1,156	5.8 (5.0–6.7)	1,047	5.4 (4.6–6.3)	852	4.7 (3.8–5.5)
35–44	1,577	8.0 (6.9–9.0)	1,558	7.4 (6.3–8.4)	1,664	7.6 (6.7–8.6)	1,490	6.8 (5.9–7.7)
45–54	1,223	8.7 (7.4–10)	1,251	8.1 (6.9–9.2)	1,336	8.1 (7.0–9.2)	1,354	7.6 (6.6–8.6)
55–64	1,199	12 (10–14)	1,029	10 (8.8–12)	1,154	11 (9.3–12)	1,042	9.3 (8.1–11)
65–74	1,507	19 (16–22)	1,427	18 (15–20)	1,171	15 (12–17)	1,319	16 (14–19)
75–84	1,098	29 (25–33)	1,059	25 (21–29)	1,205	27 (23–30)	1,079	22 (19–26)
85+	291	32 (21–44)	275	32 (22–41)	311	32 (23–40)	252	25 (17–32)
Race/ethnicity								
White	5,323	5.8 (5.3–6.4)	5,099	5.5 (5.0–5.9)	4,887	5.2 (4.8–5.6)	4,374	4.6 (4.2–5.0)
Black	1,471	10 (8.7–11)	1,071	7.0 (5.8–8.2)	1,043	6.7 (5.6–7.8)	1,004	6.3 (5.3–7.3)
Asian/Pacific Islander	*	*	*	*	*	*	*	*
Hispanic	718	5.5 (4.2–6.8)	679	4.7 (3.8–5.7)	654	4.2 (3.1–5.2)	820	5.0 (4.1–6.0)
Region								
Midwest	2,284	7.8 (6.9–8.7)	2,270	7.5 (6.6–8.4)	2,118	6.9 (6.0–7.8)	1,984	6.4 (5.6–7.1)
Northeast	2,743	11 (9.8–12)	2,137	8.6 (7.4–9.8)	2,001	8.1 (6.8–9.4)	1,679	6.8 (5.8–7.8)
South	3,569	8.6 (7.7–9.6)	3,240	7.3 (6.5–8.1)	3,408	7.5 (6.7–8.2)	3,371	7.2 (6.4–8.1)
West	1,485	5.3 (4.4–6.2)	1,247	4.3 (3.7–4.9)	1,355	4.5 (3.7–5.4)	1,354	4.4 (3.6–5.3)
MSA								
Rural	2,300	7.4 (6.3–8.4)	2,028	7.0 (6.0–8.0)	2,046	7.0 (6.1–7.9)	1,752	6.0 (5.1–6.9)
Urban	7,710	8.4 (7.8–9.0)	6,866	6.9 (6.4–7.4)	6,798	6.7 (6.2–7.2)	6,626	6.4 (5.9–6.9)

MSA, metropolitan statistical area.

*Figure does not meet standard for reliability or precision.

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US civilian non-institutionalized population.

[b]Persons of other race/ethnicity are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

Table 23. Outpatient hospital visits by Medicare beneficiaries with epididymitis/orchitis not designated as due to *Chlamydia* or gonococcus listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[c]	2,100	14 (14–15)	3,320	22 (21–23)	3,740	26 (25–27)
Total < 65 yrs	320	10 (9.2–12)	1,060	31 (29–33)	1,060	31 (29–33)
Total 65+	1,780	15 (15–16)	2,260	19 (18–20)	2,680	24 (23–25)
Age						
65–74	940	13 (12–14)	1,380	19 (18–20)	1,740	27 (26–28)
75–84	660	19 (17–20)	600	16 (15–18)	820	22 (21–24)
85–94	180	23 (19–26)	240	28 (25–32)	100	12 (9.2–14)
95+	0	0	40	49 (34–63)	20	23 (13–33)
Race/ethnicity						
White	1,480	12 (11–13)	2,300	18 (17–18)	2,900	24 (23–25)
Black	440	35 (31–38)	740	53 (50–57)	460	34 (31–38)
Asian	…	…	…	…	80	58 (45–71)
Hispanic	…	…	140	71 (59–82)	80	24 (18–29)
N. American Native	…	…	…	…	80	286 (222–351)
Region						
Midwest	800	22 (20–23)	1,120	29 (27–31)	1,400	38 (36–40)
Northeast	240	7.6 (6.6–8.5)	640	20 (19–22)	480	17 (16–19)
South	680	13 (12–14)	1,140	21 (20–22)	1,200	22 (21–24)
West	320	14 (13–16)	420	18 (16–20)	660	30 (27–32)

… data not available.
[a]Unweighted counts multiplied by 20 to arrive at values in the table.
[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.
[c]Persons of other races, unknown race and ethnicity, and other region are included in the totals.
NOTE: Counts less than 600 should be interpreted with caution.
SOURCE: Centers for Medicare and Medicaid Services, 5% Carrier and Outpatient Files, 1992, 1995, 1998.

VA data for 2001 report 50 cases of epididymitis/orchitis (organism unspecified) per 100,000 unique outpatients (Table 25). Comparably high rates were seen in all 10-year age categories from 25 to 34 through 55 to 64 (61 per 100,000 to 73 per 100,000). The highest rates were seen among African Americans (87 per 100,000) and persons residing in the West (57 per 100,000). When the definition of epididymitis/orchitis was expanded to include all cases (organism both specified and unspecified), there were 51 cases per 100,000 unique outpatients, similar to the incidence of epididymitis/orchitis (organism unspecified alone).

The 1999 MarketScan data report that 1,580 outpatient visits and 14 inpatient visits were accompanied by a claim for services associated with one of the ICD-9 codes listed in Table 1 for epididymitis and/or orchitis not designated as due to chlamydia or gonococcus (Table 3); among males 16- to 35- years of age, rates of epididymitis/orchitis varied by region, from 556 per 100,000 enrollees in the Midwest to 715 per 100,000 enrollees in the Northeast (Table 26). A small difference was also seen between urban (617 per 100,000) and rural (670 per 100,000) residents. While 1,594 visits were identified as epididymitis/orchitis not designated as due to chlamydia or gonococcus (organism unspecified), only one visit for gonococcal orchitis was identified; as in the HCUP data, it appears that clinicians rarely code patients specifically as having acute or chronic gonococcal orchitis (ICD-9 code 098.13 or 098.33). This may be due to a low underlying prevalence of gonococcal orchitis or to the use of other ICD-9 codes to capture gonococcal orchitis (604, 604.0, 098.1, 098.10, or 098.30).

Table 24. Inpatient stays by Medicare beneficiaries with epididymitis/orchitis not designated as due to *Chlamydia* or gonococcus listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[c]	3,760	26 (25–26)	2,840	19 (18–19)	2,020	14 (13–15)
Total < 65 yrs	540	17 (16–19)	680	20 (18–21)	500	15 (13–16)
Total 65+	3,220	28 (27–29)	2,160	18 (18–19)	1,520	14 (13–14)
Age						
65–74	1,680	23 (22–24)	1,200	17 (16–18)	640	10 (9.2–11)
75–84	1,200	34 (32–36)	780	21 (20–23)	620	17 (16–18)
85–94	320	40 (36–45)	160	19 (16–22)	240	28 (24–31)
95+	20	26 (14–37)	20	24 (13–35)	20	23 (13–33)
Race/ethnicity						
White	3,220	26 (25–27)	2,360	18 (17–19)	1,500	12 (12–13)
Black	320	25 (22–28)	360	26 (23–29)	400	30 (27–33)
Asian	…	…	40	55 (38–71)	0	0
Hispanic	…	…	40	20 (14–26)	40	12 (8.3–16)
N. American Native	…	…	20	99 (55–144)	0	0
Region						
Midwest	1,000	27 (25–29)	800	21 (19–22)	460	12 (11–14)
Northeast	660	21 (19–22)	440	14 (13–15)	460	17 (15–18)
South	1,380	26 (25–28)	1,160	21 (20–22)	780	15 (14–16)
West	580	26 (24–28)	420	18 (16–20)	280	13 (11–14)

… data not available.
[a]Unweighted counts multiplied by 20 to arrive at values in the table.
[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.
[c]Persons of other races, unknown race and ethnicity, and other region are included in the totals.
NOTE: Counts less than 600 should be interpreted with caution.
SOURCE: Centers for Medicare and Medicaid Services, 5% Carrier and Outpatient Files, 1992, 1995, 1998.

Urethritis

Background

Urethritis, or urethral inflammation of any etiology, causes urethral discharge, dysuria, or pruritis at the end of the urethra (40). In heterosexual men, the most common causes of urethritis are gonococcal and chlamydial infections, and infection is limited to the distal urethra (41). In women, urethritis is often observed in association with cystitis and pyelonephritis. *Escherichia coli* remains the predominant uropathogen (80%) isolated in acute community-acquired uncomplicated UTIs, followed by *Staphylococcus saprophyticus* (10% to 15%) (42), but clinicians more commonly code such UTIs as cystitis, rather than as urethritis. Sexually transmitted infections that may result in urethritis include *N. gonorrhoeae* and *C. trachomatis*, but the resulting inflammation creates nonspecific symptoms and signs that cannot be used to identify the etiologic pathogen (2, 40, 41). As with epididymitis and orchitis, there are no systematic national surveillance systems for urethritis, so its incidence cannot be tracked over time. However, because reported cases of gonorrhea in men tend to be cases of urethritis (24, 43), trends in urethritis resemble those in the reporting of gonorrhea.

Urethritis causes considerable morbidity in terms of pain, suffering, and loss of productivity. In the United States, men and women with symptoms of lower UTIs account for an estimated 7 million office visits per year to physicians in office practice (44). In the NDTI, the number of initial visits to physicians' offices per year for nonspecific urethritis in men and women averaged about 250,000 in 1996–1997 and decreased to about 200,000 in 2001.

Table 25. Frequency of epididymitis/orchitis not designated as due to *Chlamydia* or gonococcus[a] listed as any diagnosis in VA patients seeking outpatient care, count[b], rate[c]

	1999		2000		2001	
	Count	Rate	Count	Rate	Count	Rate
Total	1,853	61	1,921	59	1,833	50
Age						
18–24	19	75	17	72	15	65
25–34	122	81	110	77	99	73
35–44	277	84	257	82	198	66
45–54	515	75	568	79	540	72
55–64	330	66	350	63	394	61
65–74	258	34	377	46	357	38
75–84	213	40	216	34	211	26
85+	19	39	26	45	19	24
Race/ethnicity						
White	957	70	1,019	69	956	59
Black	315	94	342	100	309	87
Hispanic	88	77	91	74	100	78
Other	7	36	9	44	8	37
Unknown	486	40	460	35	460	29
Region						
Midwest	370	54	412	55	377	46
Northeast	421	57	415	53	377	43
South	674	66	704	63	681	53
West	388	65	390	61	398	57
Insurance status						
No insurance/self-pay	1,246	68	1,254	69	1,186	62
Medicare/Medicare supplemental	338	49	389	43	414	35
Medicaid	1	20	5	63	3	33
Private insurance/HMO/PPO	247	51	251	49	211	38
Other insurance	20	79	22	76	19	57
Unknown	1	52	0	0	0	0

HMO, health maintenance organization; PPO, preferred provider organization.

[a]Represents diagnosis codes for epididymitis (organism unspecified).

[b]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[c]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from observation only; note large number of unknown values.

Source: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 26. Medical visits[a] for epididymitis/orchitis not designated as due to *Chlamydia* or gonococcus, by males aged 16–35 years, 1999, count, rate[b] (95% CI)

	Count	Rate
Region		
Midwest	382	556 (500–611)
Northeast	291	715 (633–797)
South	691	654 (605–702)
West	84	567 (446–687)
Unknown	146	491 (412–571)
Urban/rural		
MSA	1,092	617 (581–654)
Non-MSA	356	670 (601–739)
Unknown	146	491 (412–571)

[a]The number of medical visits includes both inpatient visits and outpatient visits; however, most medical visits were outpatient visits.
[b]Rate per 100,000 enrollees who were continuously enrolled in a health plan throughout 1999.
SOURCE: MarketScan, 1999.

The Data

The HCUP data report a small decrease in the number of hospitalizations for all urethritis (using all urethritis ICD-9 codes). In 1994, there were 1,313 hospitalizations with a urethritis diagnosis, and a progressive decrease in each year of data to 687 hospitalizations in 2000 (Table 27). Analysis of Medicare hospital outpatient data from 1992 to 1998 yielded counts for cases of urethritis that were too small to calculate meaningful rates.

VA data indicate that in 2001, urethritis (organism unspecified) was diagnosed in 6 cases per 100,000 unique outpatients (Table 28), with the highest rates seen among men (7 per 100,000), those under the age of 25 (39 per 100,000), and African Americans (20 per 100,000). There was a fairly even distribution of case rates across the country (6 to 7 per 100,000 in each region). Urethritis (using all urethritis ICD-9 codes) was diagnosed in 21 per 100,000 unique outpatients, with the highest rates seen among those under the age of 25 (135 per 100,000), women (35 per 100,000), and African Americans (85 per 100,000); there was a fairly even distribution across the country (19 to 24 per 100,000 in each region) (Table 29). Comparing the frequencies in Tables 28 and 29 indicates that in all three years of study approximately 70% of urethritis cases were classified as due to *Chlamydia* or gonococcus.

The 1999 MarketScan data reported 362 outpatient visits and no inpatient visits accompanied by a claim for services associated with one of the ICD-9 codes listed in Table 1 for nonchlamydial or nongonococcal urethritis (Table 3). Women made 74 medical visits for urethritis (organism unspecified), and men made 288, for rates of 6 and 27 per 100,000 enrollees, respectively (Table 30). The highest rate was seen among those 30 to 34 years of age (39 per 100,000). Rates varied greatly by geographical region, with the highest rate seen in the South (21 per 100,000). There was a minimal difference between the rates for urban (16 per 100,000) and rural (18 per 100,000) residents. In addition to the 362 visits for urethritis not due to chlamydia or gonococcus, 45 outpatient visits were reported for chlamydial urethritis, and 504 outpatient and 7 inpatient visits were reported for gonococcal urethritis. Combining these cases with cases of urethritis not specified as due to *Chlamydia* or gonococcus, a total of 425 women and 492 men made medical visits for all urethritis, yielding rates of 37 per 100,000 and 47 per 100,000, respectively (Table 31). The highest rate was seen among those 25 to 29 years of age (104 per 100,000). Rates varied greatly by geographical region, with the highest rate seen in the South (47 per 100,000). Again, there was a minimal difference between the rates for urban (43 per 100,000) and rural (41 per 100,000) populations.

THE BURDEN OF OTHER STDs NOT COMMONLY MANAGED BY UROLOGISTS

Several other presentations account for a large burden of STD (in terms of both morbidity and cost) that is not quantified in these analyses. These include the other manifestations of infection with HPV and infection with HIV / AIDS, hepatitis B virus (HBV), and *Haemophilus ducreyi*. Although we did not perform any new analyses of these diseases using the datasets described above, we provide here a brief overview of the overall burden of each of them from the published literature.

Human Papillomavirus (HPV) Infections Other Than Genital Warts

We discussed HPV infection in conjunction with genital warts (for which HPV types 6 and 11 are the principal causes) above. In addition, multiple types of

Table 27. Inpatient hospital stays by individuals with urethritis (all cases) listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total[b]	1,313	0.5 (0.4–0.6)	778	0.3 (0.2–0.4)	752	0.3 (0.2–0.3)	687	0.2 (0.2–0.3)
Age								
< 14	*	*	*	*	*	*	*	*
14–17	321	2.3 (1.5–3.0)	184	1.2 (0.8–1.6)	*	1 (1–1)	163	1.0 (0.6–1.4)
18–24	352	1.4 (1.0–1.8)	260	1.0 (0.7–1.4)	314	1.2 (0.9–1.6)	286	1.1 (0.8–1.4)
25–34	345	0.8 (0.6–1.1)	220	0.5 (0.4–0.7)	160	0.4 (0.3–0.6)	161	0.4 (0.3–0.6)
35–44	171	0.4 (0.3–0.6)	*	*	*	*	*	*
45–54	*	*	*	*	*	*	*	*
55–64	*	*	*	*	*	*	*	*
65–74	*	*	*	*	*	*	*	*
75–84	*	*	*	*	*	*	*	*
85+	*	*	*	*	*	*	*	*
Race/ethnicity								
White	212	0.1 (0.1–0.2)	*	*	*	*	*	*
Black	788	2.5 (1.9–3.1)	473	1.4 (1.1–1.8)	347	1.0 (0.8–1.3)	365	1.1 (0.8–1.4)
Asian/Pacific Islander	*	*	*	*	*	*	*	*
Hispanic	*	*	*	*	*	*	*	*
Gender								
Male	185	0.2 (0.1–0.2)	*	*	*	*	*	*
Female	1,128	0.9 (0.7–1.1)	651	0.5 (0.4–0.6)	636	0.5 (0.4–0.6)	648	0.5 (0.4–0.6)
Region								
Midwest	341	0.6 (0.3–0.8)	165	0.3 (0.2–0.4)	190	0.3 (0.2–0.4)	189	0.3 (0.2–0.4)
Northeast	189	0.4 (0.2–0.5)	*	*	*	*	159	0.3 (0.1–0.5)
South	635	0.7 (0.5–1.1)	422	0.5 (0.3–0.6)	416	0.4 (0.3–0.6)	283	0.3 (0.2–0.4)
West	148	0.3 (0.1–0.4)	*	*	*	*	*	*
MSA								
Rural	*	*	*	*	*	*	*	*
Urban	1,156	0.6 (0.5–0.8)	664	0.3 (0.3–0.4)	656	0.3(0.2–0.4)	632	0.3 (0.2–0.4)

*Figure does not meet standard for reliability or precision; MSA, metropolitan statistical area.

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US civilian non-institutionalized population.

[b]Persons of other race/ethnicity are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

Table 28. Frequency of urethritis not designated as due to *Chlamydia* or gonococcus[a] listed as any diagnosis in VA patients seeking outpatient care, count[b], rate[c]

	1999		2000		2001	
	Count	Rate	Count	Rate	Count	Rate
Total	275	9	230	7	233	6
Age						
18–24	11	43	8	34	9	39
25–34	52	34	40	28	30	22
35–44	73	22	59	19	62	21
45–54	66	10	74	10	63	8
55–64	29	6	20	4	32	5
65–74	26	3	16	2	19	2
75–84	16	3	12	2	17	2
85+	2	4	1	2	1	1
Race/ethnicity						
White	82	6	74	5	73	5
Black	90	27	74	22	72	20
Hispanic	9	8	5	4	5	4
Other	0	0	1	5	1	5
Unknown	94	8	76	6	82	5
Gender						
Male	268	9	227	7	230	7
Female	7	5	3	2	3	2
Region						
Midwest	85	12	85	11	49	6
Northeast	40	5	39	5	52	6
South	98	10	63	6	84	6
West	52	9	43	7	48	7
Insurance status						
No insurance/self-pay	208	11	176	10	169	9
Medicare/Medicare supplemental	32	5	26	3	27	2
Medicaid	0	0	2	25	1	11
Private insurance/HMO/PPO	35	7	25	5	35	6
Other insurance	0	0	1	3	1	3
Unknown	0	0	0	0	0	0

HMO, health maintenance organization; PPO, preferred provider organization.

[a]Represents diagnosis codes for urethritis (organism unspecified).

[b]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[c]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from observation only; note large number of unknown values.

Source: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 29. Frequency of urethritis (all cases)[a] listed as any diagnosis in VA patients seeking outpatient care, count[b], rate[c]

	1999		2000		2001	
	Count	Rate	Count	Rate	Count	Rate
Total	919	30	835	25	771	21
Age						
18–24	39	154	36	153	31	135
25–34	207	137	169	119	149	110
35–44	273	83	235	75	210	70
45–54	237	34	249	35	225	30
55–64	61	12	67	12	85	13
65–74	62	8	51	6	40	4
75–84	37	7	26	4	29	4
85+	3	6	2	3	2	3
Race/ethnicity						
White	205	15	179	12	167	10
Black	366	110	351	102	301	85
Hispanic	25	22	23	19	25	19
Other	1	5	2	10	3	14
Unknown	322	27	280	21	275	17
Gender						
Male	858	30	769	25	714	20
Female	61	43	66	44	57	35
Region						
Northeast	259	35	188	24	205	24
Midwest	188	27	214	29	159	19
South	323	32	271	24	268	21
West	149	25	162	25	139	20
Insurance status						
No insurance/self-pay	757	41	693	38	612	32
Medicare/Medicare supplemental	68	10	56	6	54	5
Medicaid	1	20	3	38	4	45
Private insurance/HMO/PPO	87	18	79	15	90	16
Other insurance	6	24	4	14	9	27
Unknown	0	0	0	0	2	22

[a]Represents diagnosis codes for urethritis (all urethritis codes).

[b]The term count is used to be consistent with other UDA tables; however, the VA tables represent the population of VA users and thus are not weighted to represent national population estimates.

[c]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from observation only; note large number of unknown values.

Source: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 30. Medical visits[a] for urethritis not designated as due to *Chlamydia* or gonococcus in 1999, count, rate[b] (95% CI)

	Count	Rate
Age		
<10	11	5 (2–7)
10–14	6	3 (1–6)
15–19	23	12 (7–17)
20–24	30	26 (17–35)
25–29	35	36 (24–47)
30–34	55	39 (28–49)
35–39	66	35 (26–43)
40–44	34	16 (10–21)
45–54	66	14 (11–17)
55–64	36	10 (7–13)
65+	0	0
Gender		
Female	74	6 (5–8)
Male	288	27 (24–30)
Region		
Midwest	66	13 (10–16)
Northeast	44	12 (8–15)
South	193	21 (18–24)
West	21	19 (11–27)
Unknown	38	14 (10–19)
Urban/rural		
MSA	235	16 (14–18)
Non-MSA	88	18 (15–22)
Unknown	39	15 (10–19)

[a]The number of medical visits includes both inpatient visits and outpatient visits; however, most medical visits were outpatient visits.
[b]Rate per 100,000 enrollees who were continuously enrolled in a health plan throughout 1999.
SOURCE: MarketScan, 1999.

Table 31. Medical visits[a] for urethritis (all cases), 1999, count, rate[b] (95% CI)

	Count	Rate
Age		
<10	27	11 (7–15)
10–14	10	6 (2–9)
15–19	110	59 (48–70)
20–24	111	97 (79–115)
25–29	102	104 (84–124)
30–34	139	97 (81–114)
35–39	127	67 (55–79)
40–44	88	41 (32–49)
45–54	133	28 (23–33)
55–64	69	19 (15–24)
65+	1	11 (0–32)
Gender		
Female	425	37 (33–40)
Male	492	47 (43–51)
Region		
Midwest	226	44 (38–49)
Northeast	112	30 (24–35)
South	441	47 (43–51)
West	41	37 (26–48)
Unknown	97	37 (29–44)
Urban/rural		
MSA	623	43 (39–46)
Non-MSA	196	41 (35–47)
Unknown	98	37 (30–45)

[a]The number of medical visits includes both inpatient visits and outpatient visits; however, most medical visits were outpatient visits.
[b]Rate per 100,000 enrollees who were continuously enrolled in a health plan throughout 1999.
SOURCE: MarketScan, 1999.

HPV are carcinogenic (high-risk). Using polymerase chain reaction (PCR), investigators report an overall prevalence of HPV-DNA of 42% in penile carcinomas and 50% in vulvar carcinomas (45). HPV is detectable in 80% to 100% of lesions in basaloid and warty penile cancers (of which Bowen's disease, erythroplasia of Queyrat, and bowenoid papulosis are precursor lesions), whereas it is detectable in only 33% of keratinizing and verrucous penile carcinomas (46).

Cervical cancer is the second most common female malignancy worldwide and the principal cause of cancer in women in most developing countries (47). Certain types of HPV have been identified as the principal causes of invasive cervical cancer and cervical intraepithelial neoplasia (48, 49). Despite the widespread implementation of cancer screening, 13,000 new cases of cervical cancer were diagnosed in the United States in 2002, and there were an estimated 4,100 associated deaths (50).

The major known risk factors for acquiring genital HPV infection include having multiple sex partners (51, 52) and having sex partners who have had multiple partners (51). The cumulative 3-year incidence of genital HPV infection of all types among college-age students has been found to be 43%, and the mean duration of new infections is 8 months (53). Extrapolating these data to the US population, we

estimate that there are at least 5.5 million new genital HPV infections each year (34) and that approximately 20 million people have productive genital HPV (that is, active shedding of HPV DNA) (12). In 1994, the economic burden of genital HPV infection and related sequelae, including cervical cancer, in the United States was estimated to exceed $4.5 billion per year (18).

Human Immunodeficiency Virus (HIV)/AIDS

In all US states and territories, data on persons with AIDS are reported to state or local health departments, which forward the data, without personal identifiers, to CDC. Data concerning sex, race/ethnicity, behavioral risk, and state and county of residence are abstracted from medical records of persons who meet either the clinical (opportunistic illness) criteria or the immunologic AIDS-defining criteria that were added to the definition in 1993 (54).

As of the end of December 2001, more than 816,000 cases of AIDS had been reported to CDC. Adult and adolescent AIDS cases totaled 807,000, of which 666,000 were in men and 141,000 were in women. More than 9,000 of the reported AIDS cases were in children under 13 years of age. As of the same date, more than 467,000 persons reported to have AIDS had died—462,000 adults and adolescents and more than 5,000 children under 15 years of age. Current, detailed estimates of the numbers of persons in the United States living with AIDS, by region of residence and year, are available at http://www.cdc.gov/hiv/stats/htm.

The widespread use of highly active antiretroviral therapy (HAART) resulted in substantial decreases in AIDS deaths between 1995 and 1999 in all demographic and risk groups, as well as decreases in new AIDS diagnoses. Further decreases in AIDS diagnoses and deaths in the United States at this point will require better access to therapy, simpler drug regimens, and the continued development of effective drugs. Unfortunately, HIV continues to be transmitted among MSM, among intravenous drug users, and via heterosexual contact. Between 1990 and 1999, the number of living persons diagnosed with AIDS increased fourfold in the United States. The proportions of persons with AIDS are increasing among women, African Americans, Hispanics, intravenous drug users, heterosexuals, and residents of the South, reflecting earlier trends in HIV transmission, differences in testing behaviors, and differential effects of HAART. The poor are disproportionately affected, and HIV incidence rates remain especially high among African Americans with high-risk behaviors.

Hepatitis B

Hepatitis B is caused by infection with hepatitis B virus (HBV). In adults, only 50% of acute HBV infections are symptomatic, and about 1% of cases result in acute liver failure and death. Risk for chronic infection is associated with age at infection. About 90% of infected infants and 60% of infected children under the age of 5 become chronically infected, compared with 2% to 6% of adults. The risk of death from cirrhosis or hepatocellular carcinoma among persons with chronic HBV infection is 15% to 25%.

An estimated 181,000 persons in the United States were infected with HBV during 1998, and about 5,000 deaths occurred from HBV-related cirrhosis or hepatocellular carcinoma. According to NHANES-III data, an estimated 1.25 million people are chronically infected with HBV, serve as a reservoir for infection, and are at increased risk for death from chronic liver disease (31).

HBV is efficiently transmitted by percutaneous or mucous membrane exposure to infectious body fluids. Sexual transmission among adults accounts for about two-thirds of the incident HBV infections in the United States. In the 1990s, transmission among heterosexual partners accounted for about 40% of the infections, and transmission among MSM accounted for another 15%. The most common risk factors for heterosexual transmission include having more than one sex partner in a 6-month period and having a recent history of an STD.

Among MSM, risk factors for HBV infection include having more than one sex partner in a 6-month period, engaging in unprotected receptive anal intercourse, and having a history of other STDs. Changes in sexual practices among MSM to prevent HIV infection have resulted in a lower risk for HBV infection than was observed in the late 1970s, when studies found HBV markers among up to 70% of adult MSM. Recent surveys of young MSM (15 to 22 years of age) indicated that 11% had serologic evidence of past or current HBV infection (anti-HBc or HbsAg) and that 9% had evidence of having been immunized

against HBV (anti-HBs alone among persons reporting having received one or more doses of hepatitis B vaccine) (55).

Up to 70% of persons with acute hepatitis B have previously received care in settings where they could have been vaccinated (e.g., STD clinics, drug treatment programs, and correctional facilities). A 1997 survey of STD clinics demonstrated that hepatitis B vaccine was routinely offered in only 5% of these settings (56).

Chancroid

Chancroid, caused by *Haemophilus ducreyi*, is one of the genital ulcerative STDs, along with syphilis and HSV. Chancroid is prevalent in Africa and Asia and has been shown to be a risk factor in the transmission of HIV. It is a reportable disease in some states and territories but tends to be underreported because laboratory diagnosis of chancroid is difficult, and most laboratories are incapable of culturing H. ducreyi (57). National surveillance data collated by CDC reveal that reported cases of chancroid in the United States rose from about 1,000 per year in 1981–1984 to 5,000 in 1987 but have decreased steadily since then to fewer than 100 cases in 2001 (30).

Trichomoniasis

Trichomonas vaginalis is another common cause of lower urogenital tract infection that urologists may see when evaluating the etiology of urethritis in men or women or urinary symptoms (with or without vaginitis and cervicitis) in women. *T. vaginalis* is a microscopic parasite found worldwide, and trichomoniasis is one of the most common STDs, affecting mainly 16- to 35-year-old women. Signs and symptoms of infection in women range from no symptoms to foul-smelling or frothy green discharge from the vagina, vaginal itching, and redness. Other symptoms can include painful sexual intercourse, lower abdominal discomfort, and the urge to urinate. Most men with this infection do not have symptoms, but those who are symptomatic most commonly have a discharge from the urethra, the urge to urinate, and a burning sensation with urination.

In the NDTI, the number of initial visits to physicians' offices per year for trichomonal vaginitis declined from more than 500,000 in 1966 to fewer than 100,000 in 2001. Vaginal infections caused by *T. vaginalis* are among the most common conditions found in women visiting reproductive health facilities. In 1996, between 3% and 48% of sexually active young women requesting routine care at prenatal, family planning, and college health clinics were diagnosed with trichomoniasis (58). Currently, there are no national surveillance data on this disease (13), but it has been estimated that 5 million persons in the United States become infected with *T. vaginalis* each year, with infection being more common in women who have had more than one sex partner in a 6-month period (1).

THE ADDITIONAL BURDEN OF STDs DUE TO SEQUELAE OF ACUTE INFECTIONS AND PERINATAL TRANSMISSION

Several bacterial and viral STDs can cause serious and costly complications if they are not detected and treated promptly. In women, sequelae of acute lower genital tract bacterial STDs that are not promptly treated include PID and its consequences of ectopic pregnancy, infertility, and chronic pelvic pain. Pregnant women can perinatally transmit several STDs, including syphilis resulting in congenital syphilis, gonorrhea resulting in ophthalmia neonatorum, chlamydial infection resulting in pneumonitis and conjunctivitis, HSV resulting in neonatal herpes, HIV resulting in neonatal infection, hepatitis B resulting in neonatal infection, and HPV resulting in respiratory papillomatosis. Bacterial vaginosis in women has been associated with preterm delivery. Infection with certain HPV types can result in dysplasia or cancer of the cervix, penis, vulva, vagina, and anus. Although these complications are far less common than acute cases of bacterial STD and cases of chronic viral STD, they tend to be more complicated and expensive to manage and therefore contribute substantially to the overall clinical and economic burden of STDs. (For details on the burden of these diverse sequelae, see references (59-66)).

MSM: A HIGH-RISK POPULATION FOR STD

Studies demonstrate that MSM with a large number of sexual partners are at higher risk of infection with STDs, including HIV, hepatitis A virus (HAV), and HBV, than are homosexual, bisexual, or

heterosexual men who have fewer sexual partners. Although the frequency of unsafe sexual practices and reported rates of bacterial STDs and incident HIV infection have declined substantially in MSM during the past several decades, recent outbreaks of syphilis and gonorrhea have been observed among MSM in several US cities, contributing to increased rates among men (67). MSM, many of whom have been HIV-infected, accounted for most of the new syphilis cases in many urban areas in 2001. These trends threaten to reverse the marked declines in syphilis morbidity seen over the past decade.

Several factors may explain the recent increases in STD and HIV infection observed among MSM. Increases in unsafe sexual behavior by this population have been seen in several US cities, including those with recent outbreaks. Possible reasons for these relapses in safe behaviors include confidence in the effectiveness of antiretroviral therapy in reducing or eliminating transmission risk, "prevention fatigue," lack of awareness of how STDs increase HIV transmission, and increased use of the Internet to identify new sexual partners.

Inadequate provision of STD services to MSM may also play an important role in the recent increases in STD and HIV infection. Anecdotes suggest that many programs provide syphilis serology to MSM only at the initial patient visit because it can be performed readily using blood collected for HIV viral load tests. However, routine risk assessment of sexual risks, clinical assessment and screening for gonorrhea and chlamydial infection, and provision of hepatitis B vaccine at initial or follow-up visits appears to be less common. Thus, many clinicians are missing opportunities to assess risk, encourage risk reduction, educate patients about the risks of HIV transmission despite antiretroviral therapy, and treat STDs that could promote HIV transmission to others.

Urologists who care for MSM should be aware of common symptoms and signs of STDs, e.g., urethral discharge, dysuria, anorectal symptoms (such as pain, pruritis, discharge, and bleeding), genital or anorectal ulcers, other mucocutaneous lesions, lymphadenopathy, and skin rash. Urologists should consider the unique variations in signs that may be encountered in this population such as oral and perianal chancres in those who practice oral and anal sex. Urologists should also be aware of recent trends in STDs in MSM and recent guidelines for risk assessment, diagnosis, and treatment of HIV-uninfected and HIV-infected patients (31). Clinicians should assess sexual risk for all male patients, including routinely inquiring about the gender of patients' sex partners. MSM, including those with HIV infection, should routinely undergo straightforward, nonjudgmental STD/HIV risk assessment and client-centered prevention counseling to reduce the likelihood of acquisition or transmission of HIV and other STDs (31). In addition, screening for STDs and vaccination for HAV and HBV should be considered for MSM at risk for STDs (31, 68, 69).

ECONOMIC IMPACT

Patient visits, claims for testing, diagnostic procedures, drugs, and other treatment account for the majority of direct medical costs. Most published literature on the economic burden of STDs is based on cost per case, not cost per visit. To calculate the direct medical cost of STDs, one must consider unit costs of medical visits that may involve diagnoses, procedures, drugs, and other treatments. Such unit costs can be estimated from special cost studies or by using claims data (such as MarketScan data). Projections of the economic costs for selected populations could be made using some of the datasets that we examined, but with multiple caveats and assumptions. For example, assuming that Medicare and VA costs are lower than the commercial costs reflected in MarketScan data, one could apply a slightly lower average unit cost when estimating actual "costs" rather than "charges." All the visit/drug costs—weighted across the various datasets—could then be applied to the total number of visits to obtain a national estimate of direct medical costs.

The most recent aggregate estimates of the direct medical costs of STDs were published in 1998 (54). These estimates included the STDs examined in this report, as well as manifestations of STDs rarely managed by urologists (e.g., salpingitis) and other STDs not addressed here. Direct medical costs for STD treatment in the United States were estimated (adjusted to 1997 dollars) to be in excess of $8 billion per year (Tables 32 and 33). This figure does not include lost wages and productivity, out-of-pocket costs, costs related to STD screening programs, or costs resulting

from perinatal transmission. Of all STDs other than HIV, HPV has the highest incidence and accounts for the highest direct medical costs (more than $1.6 billion annually), most or which are associated with treating precancerous and cancerous cervical lesions (34). Estimates of direct medical costs will vary over time as screening, diagnostic, treatment, and prevention practices change.

RECOMMENDATIONS

In the United States, estimates of incidence and prevalence of the more common STDs depend on convenience samples; incomplete national reporting (for chlamydial infection, HBV, syphilis, and gonorrhea); inconsistent, non-representative prevalence data; and rough extrapolations. None of the datasets we examined provides data for accurately estimating the incidence or prevalence of any STD. For example, if we use of only ICD-9 codes to define a case or visit, we substantially underestimate the costs of chronic STDs, such as genital herpes and genital warts, which commonly result in multiple claims for medical visits that may involve diagnoses, procedures, drugs, and surgical treatment. In addition, ICD-9 codes and CPT codes do not readily capture screening for the several STDs that may be asymptomatic and are commonly detected through screening. However, most of the available datasets do provide data that describe basic trends in incidence, populations at highest risk, types of clinicians who provide STD care, and care-seeking behavior for various STDs.

Truly reliable estimates of prevalence based on representative national surveys are limited to HSV-2, C. trachomatis infection, and gonorrhea; similarly reliable estimates of incidence based on fairly complete national surveillance are limited to HIV. Estimates of the burden of HPV have tended to underestimate the oncogenic types of the disease and will change as new guidelines are implemented for Pap smears, with primary testing of women under the age of 30. Population-based serologic surveys, such as NHANES, appear to have the greatest potential for estimating the prevalence of viral STDs in various segments of the population. For estimating the incidence of bacterial STDs, extrapolations from passive surveillance data provide the most reliable data at a population level. Based on our review of the literature and the analyses of numerous datasets, the overall estimate of the STD burden of the early 21st century should approximate that of the late 1990s, with 15 million new cases of STDs occurring annually. The magnitude of this figure underscores the importance of understanding the burden of STDs—by clinicians, public health agencies, persons at risk for STDs, the general public, and persons with STDs (31).

Urologists and other clinicians who see persons at risk for or infected with STDs stand to profit by

Table 32. Estimated annual medical costs of the major curable STDs in the United States adjusted to 1997 dollars

STD	Total Cost[a]
Chlamydia	$374,600,000
Gonorrhea	$56.000,000
Pelvic inflammatory disease	$1,125,200,000
Trichomoniasis	$375,000,000
Syphilis	$43,800,000
Total costs, bacterial STDs	$1,974,600,000

[a]All cost figures are adjusted to 1997 dollars using the Consumer Price Index, from the US Department of Labor's Bureau of Labor Statistics.

SOURCE: Adapted from ASHA Panel to Estimate STD Incidence, Prevalence and Cost. Available at: http://www.kff.org/womenshealth/1445-std_rep2.cfm.

Table 33. Estimated annual medical costs of the major viral STDs in the United States adjusted to 1997 dollars

STD	Total Cost[a]
Genital herpes	$208,000,000
HPV	$1,622,800,000
Hepatitis B	$51,400,000
HIV	$4,540,000,000
Total costs, viral STDs	$6,422.200,000

[a]All cost figures are adjusted to 1997 dollars using the Consumer Price Index, from the US Department of Labor's Bureau of Labor Statistics.

SOURCE: Adapted from ASHA Panel to Estimate STD Incidence, Prevalence and Cost. Available at: http://www.kff.org/womenshealth/1445-std_rep2.cfm.

understanding the incidence, prevalence, subclinical shedding, and transmission modes and risks of STDs. They should also be aware of prevention measures, risk assessment, screening, diagnostic testing, treatment, diagnosis and management of complications, counseling, patient education, sex partner services, and reporting of cases mandated by public health law. As more urologists pursue specialization in gynecological urology, issues of the detection, management, and impact of STDs on upper genitourinary sites may become more central to urologic practice. For all sexually active adolescent and adult patients, urologists and other clinicians should consider STDs as an etiology of genitourinary symptoms and signs and should screen or diagnose and treat according to national guidelines (17, 31). Urologists and other clinicians should also provide appropriate counseling, patient education, follow-up, and medical referral for sex partners and should report cases of notifiable diseases. Fortunately, resources for improving knowledge and skills are available for the clinician through commercial continuing medical education programs and through government-supported training networks (including CDC-sponsored Prevention Training Centers in all regions), on-line training courses, and various clinical decision support tools (such as the STD treatment guidelines that are available online) (31). In addition, continued commitment and advocacy for resources are needed to reduce the burden of STDs and to provide access to high-quality prevention and treatment services in the United States. For additional resources, including recommendations, guidelines, and statistical reports, the reader is referred to the website of the Division of STD Prevention at CDC: http://www.cdc.gov/nchstp/dstd/dstp.html.

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