California Gonorrhea Surveillance System: Methodologic Aspects and Key Results of a Sample-Based System

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SYNOPSIS

Objectives. This article describes findings from the California Gonorrhea Surveillance System (CGSS), developed in response to the need for detailed risk behavior data and clinical data required to control increasing gonorrhea (GC) infections in California.

Methods. CGSS is a sample-based surveillance system implemented throughout California in 2007. In 34 of 61 local health jurisdictions (LHJs), 10% of GC cases are sampled for interview; in the other 27 LHJs, all cases are followed. A standardized case investigation record collects case-reported risk data and provider-reported clinical data, and is electronically prepopulated with available contact data. Exclusion criteria include age younger than 14 years, a GC diagnosis within the previous 30 days, and provider request that patient not be contacted. Analyses are weighted to account for sample design.

Results. In 2007, 31,192 cases of GC were reported in California. Of these, 5,388 were sampled for follow-up and 2,715 were interviewed, for a response rate of 54.2%. Of those interviewed, 49.6% were female, 28.8% were heterosexual males, and 21.6% were men who have sex with men (MSM).

CGSS collects a wide range of behavioral and clinical data for targeted programmatic action. Findings from the 2007 CGSS included data on the following areas: incarceration (highest among heterosexual males [22.4%]); methamphetamine use (high overall [12.2%] and lower among African Americans [4.6%]); co-infection with human immunodeficiency virus (high among MSM [31.9%] and very low among heterosexual males and females [<0.5%]); and improper antibiotic use (8.3% overall; 25.6% among patients attending urgent care clinics).

Conclusion. CGSS, an innovative sample-based surveillance system, is effective and flexible. The system provides actionable data on an ongoing basis.

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Gonorrhea (GC) is a sexually transmitted infection caused by *Neisseria gonorrhoeae* and can cause a range of sequelae, including pelvic inflammatory disease, ectopic pregnancy and infertility among women, and epididymitis among men.¹ Further, people infected with GC are more likely to acquire and transmit human immunodeficiency virus (HIV).²

After chlamydia, GC is the most commonly reported communicable disease in the U.S. and California.³ In 2006, 358,336 cases of GC were reported in the U.S., and 33,776 were reported in California.⁴ A key aspect of the epidemiology of GC is significant racial disparity, greater than for any other condition with a *Healthy People 2010* objective.⁵ In California, the overall rate of GC infection in 2006 was 10.2 times higher among African Americans than among non-Hispanic whites, with more extreme disparities in some subpopulations.⁴ For example, among males aged 15 to 19 years, the rate among African Americans was 25.1 times higher than the rate for non-Hispanic whites. Similar disparities have been documented nationally.⁶

After several decades of steadily declining rates of GC in California, rates began increasing in 1999 and continued increasing through at least 2005 in all demographic subgroups (e.g., gender, race/ethnicity, age group, and geographic region).⁷ While the California Department of Public Health's (CDPH's) standard confidential morbidity report (CMR) surveillance system, structured on passive reporting from medical providers and laboratories, does include these demographic characteristics, it does not include risk factor data or detailed clinical data. Therefore, because of the large and increasing burden of GC, the profound racial disparities (a state and national priority target for action), and the need for more detailed risk and clinical data to identify factors associated with transmission, CDPH began work on a pilot system of expanded GC surveillance in one California health jurisdiction. This was a collaborative effort with the Centers for Disease Control and Prevention's (CDC's) Outcome Assessment through Systems of Integrated Surveillance (OASIS) workgroup enhanced GC surveillance project.8

This OASIS project included six other sites engaged in improving GC surveillance and, in particular, in collecting risk factor and clinical data for disease control and prevention. In many of these sites, the absolute number of GC cases was far too large to conduct interviews of all case subjects, given existing funding and staffing levels. Therefore, most OASIS project areas chose to focus on interviewing case subjects sampled from sexually transmitted disease (STD) clinics. In California, only 15% of GC cases are identified in STD clinics. Thus, we wanted to capture a representative sample of all cases, and not limit our enhanced GC surveillance efforts to STD clinics. Other approaches to enhanced GC surveillance, including providerinterview-based systems, have been explored successfully,⁹ but do not provide the level of risk data we felt was required for program development.

During the second pilot phase of this enhanced GC surveillance system, conducted from 2004 to 2005, we expanded participation to include seven geographically distributed counties in California. In this article, we report on the final phase, the California Gonorrhea Surveillance System (CGSS), an enhanced surveillance system based on the previous model but developed independently by California in 2006 and fully implemented in all 61 local health jurisdictions (LHJs) by January 2007.

METHODS

Procedures

Under Title 17 of the California Code of Regulations, both medical providers and laboratories in California are required to report GC cases to their LHJs, which include 58 county and three separate city health departments¹⁰ (Figure 1). CMR reports from providers are required to include selected demographic data elements (gender, age, race/ethnicity, and address) and treatment data, although key data elements (e.g., race/ ethnicity and type of treatment given) are frequently missing. As an example, in 2007 34% of GC cases were missing race/ethnicity data, based on the initial case report. Reports from laboratories should include demographic data, test type, and test result; similar to provider case reports, though, demographic elements often are missing. LHJs enter the provider and laboratory data into one electronic surveillance record and forward these reports weekly to CDPH, using one of several electronic data transmission systems. CDPH then organizes the reports into one central, statewide database. These standard CMR surveillance reports formed the basis of the CGSS.

The pilot phases of the GC surveillance system described previously included collection of additional GC data elements, including risk factor data.¹¹ These data suggested the importance of incarceration history and methamphetamine use in the transmission of GC, and yielded important lessons learned. For example, lengthy questionnaires were problematic and may have contributed to low response rates. Interviewing providers to obtain clinical data was labor-intensive. Telephone interviews of patients proved to be more cost-effective compared with in-person interviews, and while there were some differences in reported behaviors between telephone and in-person interviews, overall the data suggested little difference between the two methods. Finally, the restricted geographic scope of the pilot data limited its utility. These findings influenced the design of our current CGSS, which was fully implemented in 2007.

To have sufficient power to analyze these enhanced surveillance data, we performed informal sample-size calculations, based on several key risk factors (e.g., what percent of cases are men who have sex with men [MSM] in each region). When we assumed a response rate of 50%, based on early phases of the project, the sample-size calculations indicated that approximately 3,000 cases, or roughly 10% of cases statewide, were required for selection. However, a number of the smaller LHJs had the resources and desire to interview all of their cases. Therefore, one of two sampling methods was used to initiate the process of selecting cases for follow-up: a 100% sample or a 10% random sample (Figure 1).

Nearly half of all LHJs (27 of 61) chose to interview 100% of their reported cases. These are typically





NOTE: Case numbers may not match published statewide numbers due to differences in date coding. Source: California Department of Public Health, STD Control Branch, February 2009

No. = number

LHJ = local health jurisdiction

ID'ed = identified

Dx = diagnosis

PRF = Provider Report Form

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smaller, more rural jurisdictions (population mean = 161,561; median = 92,592)¹² with few cases, accounting for approximately 5% of cases reported statewide. In these jurisdictions, as soon as their health departments receive a CMR or a lab report, case and provider contact information are transcribed onto the GC Case Investigation Record (CIR), an expanded case report form similar to those used for other communicable diseases to collect data beyond demographics. A public health nurse or disease intervention specialist then initiates the case investigation.

The remaining 34 LHJs, which are generally more urban (population mean = 1,030,066; median = 425,710)¹² and have much higher GC morbidity, follow up on a sample of cases, as resources are not available to interview all cases. The majority of these LHJs (31 of 34) participate in a weekly 10% random sample drawn at CDPH from all case reports received that week from the jurisdictions; a small number of LHJs (n=2) sampled at 40% to 50% for part of 2007 because of their unique characteristics and goals, such as low morbidity coupled with the desire for sufficient power to perform local analysis. San Francisco County has a unique sampling scheme, due to its participation in CDC's national STD Surveillance Network, through which all cases diagnosed in the county's STD clinics are interviewed and separate samples of 100 men and 100 women diagnosed by all other providers are interviewed.

After CDPH runs the weekly sample, a GC CIR is electronically prepopulated with contact information for each case and the reporting provider, and is then sent through secure e-mail or fax to the reporting jurisdiction (Figure 1). Electronic prepopulation of surveillance forms is key to the efficiency of this surveillance activity, as it reduces transcription time, avoids transcription errors, and provides an ideal mechanism to inform the LHJs of which cases to follow. Upon receipt of these forms, LHJ staffs initiate follow-up.

Forms

The GC CIR (available from the authors upon request), was developed for this enhanced surveillance system and includes four parts. The first page captures administrative data (including case and provider contact information), laboratory results, and tracking data (i.e., day/time of contact attempts and final disposition). The second page of the CIR, a Provider Report Form (PRF), collects clinical data from the medical provider, including symptom status and treatment information. The PRF can be completed by telephone, in person, or, most commonly, as a fax-back form sent to the provider to be returned by fax to the LHJ. The third part of the CIR is a two-page Patient Interview Record, which collects detailed demographics and a range of risk factor data from the patient. The fourth part of the form, a one-page Partner Management section, is an optional section for the collection of names and contact information of sex partners.

Interviews

LHJs conduct interviews with case subjects primarily by telephone, but sometimes in person, most commonly when the patient is incarcerated or when in-person follow-up is part of the LHJ's routine case management protocol. As part of the patient interview, public health staff ascertain whether the patient has received appropriate treatment and deliver messages regarding the importance of partner treatment and methods for STD prevention.

After the CIR is initiated but prior to case contact, local staff make a good-faith effort to notify the provider that the health department will be following up with his or her patient. This allows the provider an opportunity to request that the patient not be interviewed, for reasons such as the infection resulting from a sexual assault or for concerns about domestic violence. After the initial provider call, case followup begins and includes a minimum of eight contact attempts, including two attempts between 6 p.m. and 9 p.m. on weekdays, and two weekend attempts. The case interview window ends eight weeks from the date of diagnosis, which is calculated as the earliest of the following: (1) date of clinical visit, (2) date of specimen collection, or (3) date of treatment. In parallel, the provider is asked to complete the PRF; three contact attempts within 30 days of initiation of follow-up are required for this component.

Cases are excluded from interview if the patient is younger than 14 years of age, was diagnosed with GC in the prior 30 days, or was not a resident of the jurisdiction at the time of diagnosis, or if the provider requested that the patient not be contacted. If, during case or provider contact, the interviewer determines that the case is ineligible, follow-up is terminated. However, in the event that a case subject was not a resident of the initial reporting jurisdiction at the time of diagnosis, the true jurisdiction of residence is notified so that the case may be correctly reported and eligible for sampling.

CDPH developed and disseminated a training binder detailing the system protocol, interview instructions, and sample CIRs to all LHJs prior to implementation of the system. Several all-day regional trainings were held for local managers, public health nurses, and disease intervention specialists; local trainings were provided on request, as well. In addition, e-mail updates were sent to all local public health partners to deliver reminders on protocol adherence and to share best practices.

Software

CDPH receives initial case data electronically from LHJs in one of several formats used to report all communicable diseases in California. A range of software is used to organize initial data into one standardized CDPH database. Epi InfoTM is used to select the weekly sample and to generate data elements used to track the cases from that point forward.¹³ Prepopulation of sampled case data into the CIR is conducted with the use of Microsoft[®] Access¹⁴ and Adobe[®] Acrobat Professional¹⁵ software. The Voltage^{®16} secure e-mail system is used to transfer encrypted CIRs to LHJs. Upon completion of each investigation, forms are mailed to CDPH following confidential procedures and are entered into an Epi Info database. Analyses are conducted primarily with SAS[®] software.¹⁷

Data confidentiality

The confidentiality and security of CGSS data are maintained on many levels, from the point of the initial case report through the final dissemination of data tables. Prepopulated forms are sent to LHJs via secure, encrypted e-mail or confidential fax. Data are de-identified prior to analysis and generation of summary data tables for distribution, and tables containing sensitive information and small cells are suppressed to further protect case confidentiality.

Data analysis

CDPH shares data quarterly with LHJ staff and other partners in the form of summary and jurisdictionspecific data tables. Jurisdiction-specific data are also provided upon request for local analysis. CDPH provides feedback on system performance to jurisdictions monthly, including statistics on timeliness of reporting, which is essential to maximize the number of interviews completed within the eight-week interview window.

In addition, CDPH routinely conducts qualitycontrol analyses to ensure the representativeness of sampled and interviewed cases. These analyses include characteristics of the sampling scheme and selected examples of key descriptive epidemiologic findings. Because of the sampling design, data summaries at the state and regional level must be weighted; for each jurisdiction for each month, a weight is calculated that is the quotient of the number of cases reported in that jurisdiction in that month divided by the number of those cases who were interviewed. The weights for all jurisdictions are then multiplied by a constant so that the total number of cases reflected in the data analysis matches the raw number of interviewed case subjects.

Because of the importance of gender and sexual orientation for STD rates and STD risk, the qualitycontrol analysis stratifies the description of selected risk factor data by sexual orientation, which is generated from each case subject's self-reported gender and gender of sex partners. We used a three-category sexual orientation variable: MSM, heterosexual males, and all females. Females were not further stratified by gender of sex partners, as few GC cases reported female-female sex.

We assessed the representativeness of the CGSS using contingency tables and standard Chi-square tests. For LHJs that sampled cases, demographic characteristics of case subjects selected for follow-up were compared with cases not selected for follow-up. Among LHJs that sampled cases, and separately among LHJs that attempted to interview 100% of cases, demographic characteristics of case subjects successfully interviewed were compared with demographics of case subjects who were not interviewed. Because of the unique sampling scheme in San Francisco County, which oversampled from STD clinics, we excluded San Francisco County from this assessment of representativeness.

RESULTS

Routine case surveillance

In 2007, 31,192 cases of GC were reported in California, with cases reported by 58 of the 61 LHJs. Los Angeles County reported more than 10,000 cases; nine jurisdictions (14.8%) reported 1,000 to 2,500 cases; 14 jurisdictions (23.0%) reported 100 to 999 cases; 24 jurisdictions (39.3%) reported 10 to 99 cases; and 10 jurisdictions (16.4%) reported one to nine cases.

Enhanced surveillance sampling

All 61 LHJs initiated participation in the CGSS beginning in 2007. Thirty-four (55.7%) of the 61 LHJs used the 10% sampling procedure (Figure 1). These 34 LHJs reported a total of 29,440 cases (94.4% of all cases reported) in 2007 (mean = 920, median = 231), of which 3,374 were sampled, had a CIR on file, and were eligible for interview. Of these, 1,678 (49.7%) were interviewed. Local response rates for these jurisdictions ranged from 12.5% to 87.5%.

The other 27 (44.3%) LHJs elected to follow up on 100% of their cases. These jurisdictions reported a total of 1,752 cases (5.6% of all cases reported) (mean = 67, median = 20), of which 1,632 had a CIR on file

and were eligible for interview; of these, 1,037 (63.5%) were interviewed. Local response rates for these jurisdictions ranged from 51.2% to 100.0%. Combining all jurisdictions, 5,006 cases had CIRs on file and were eligible, and 2,715 of these were interviewed, for an overall response rate of 54.2%.

The main reasons for eligible individuals not being interviewed were inability to locate the case subject (32.3%), case subject not responsive within the required eight weeks (30.7%), and refusal to participate (12.5%). Among all 3,001 case subjects whom jurisdictions were able to contact within the eight-week period, 2,715 were interviewed, for a cooperation rate of 90.5%.

No statistically significant differences were found with respect to gender, age, race/ethnicity, or provider type (STD clinic vs. not STD clinic) when we compared cases selected for follow-up with cases not selected for follow-up among LHJs that sampled cases. In the 100%-sampling jurisdictions, we found no statistically significant differences in the demographic characteristics of case subjects interviewed compared with case subjects not interviewed, nor were there significant differences with respect to age and race/ethnicity in the 10%-sampling jurisdictions. However, in the 10%-sampling jurisdictions, interviews were slightly, but significantly, less likely to be completed among men (32.6% completed) compared with women (38.0% completed; p=0.006). Also, the relatively few cases reported by STD clinics (n=257) were significantly less likely to have

completed interviews (27.6% completed) compared with cases not reported by STD clinics (n=2,161; 36.2% completed interviews; p=0.007).

Risk factor findings

Table 1 shows the raw numbers, weighted numbers, and weighted percents of cases by sexual orientation and region in California. The differences between the raw and weighted numbers highlight the impact of different local sampling schemes and interview rates on how cases are counted. For example, the San Francisco Region, which consists solely of San Francisco County, contributed interview data from 772 cases in 2007. Because of the unique sampling scheme through which they sampled approximately 30.0% of their cases and achieved a very high interview rate, each of those 772 cases is down-weighted, resulting in a lower weighted number of cases (183.5) and a weighted proportion of 7.0% of the total number of cases interviewed statewide. This weighted proportion corresponds closely to the absolute proportion of cases reported annually by San Francisco. Conversely, in the Los Angeles Regionwhich also consists solely of one county, sampled 10% of cases, and experienced a lower-than-average interview rate-cases are up-weighted, thus resulting in a higher weighted number of cases than the raw numbers. In all other regions, which are composed of a mixture of 100%-sampling and 10%-sampling jurisdictions, the weighted and raw numbers correspond more closely.

Table 1 indicates that 49.6% of interviewed GC case

Table 1. Distribution of sexual orientation of California gonorrhea cases by geographic region,and weighted and unweighted totals, California Gonorrhea Surveillance System, 2007

	Ferr	nale (all)	I	MSM	Hetero	sexual male		Total ^b	
Regionª	N	Percent	N	Percent	N	Percent	Weighted percent	Weighted N	Unweighted N
Northern CA	187	60.3	18	5.8	105	33.9	11.8	311	405
Bay Area	237	54.3	62	14.1	138	31.5	16.6	436	431
San Francisco	25	13.8	148	80.5	11	5.7	7.0	184	772
Central CA	112	57.9	14	7.2	68	34.9	7.4	194	347
Southern CA	280	44.7	127	20.2	221	35.2	23.9	627	411
Los Angeles	459	52.6	198	22.7	216	24.7	33.3	873	259
Total	1,302	49.6	566	21.6	757	28.8	100.0	2,625	2,625

^aRegions are defined as follows: Northern California—Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Yolo, Yuba; Bay Area (excluding San Francisco)—Alameda, Berkeley, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano, Sonoma; San Francisco County; Central California—Fresno, Inyo, Kings, Madera, Mariposa, Merced, Mono, Monterey, San Benito, Santa Cruz, Stanislaus, Tulare, Tuolumne; Southern California (excluding Los Angeles)—Imperial, Kern, Long Beach, Orange, Pasadena, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura; Los Angeles County.

^bIndividuals with unknown sexual orientation (n=90) were excluded from calculations and from future analyses.

MSM = men who have sex with men

CA = California

subjects in California were female, 28.8% were male heterosexual, and 21.6% were MSM. These percentages vary by region, with 80.5% of cases in San Francisco County being MSM, compared with about 20.0% in the other more urban regions, and less than 10.0% in the more rural northern and central regions.

Table 2 shows the distribution of a range of selected risk factors stratified by sexual orientation, all based on weighted data. The distribution of numbers of sex partners varied substantially, with the largest proportion of females having reported one partner (41.1%) and few having reported 10 or more partners (2.6%). In contrast, among MSM the smallest proportion reported one partner (14.3%), and many reported five to nine partners (24.1%) or 10 or more partners (23.4%). The distribution of partners for heterosexual males fell between these two groups.

Prior-year methamphetamine use was reported by 19.0% of MSM, 10.1% of females, and 10.7% of heterosexual males (Table 2). In all three groups, case subjects reported more methamphetamine use by their partners than by themselves, including partner methamphetamine use of 31.8% among MSM. Data not shown also indicated variability in methamphetamine use by race/ethnicity, with generally lower methamphetamine use among African Americans, particularly heterosexuals.

Another key risk variable of interest, incarceration history, was reported by almost one-fourth of heterosexual males; congruently, partner incarceration history was reported by roughly one-third of females (Table 2). Few MSM reported that they or their partners had been incarcerated in the previous 12 months.

Another important risk variable, venues where case subjects met new or anonymous sex partners, showed high variability across sexual orientation categories. MSM commonly reported meeting their new or anonymous partners on the Internet (41.8%) and in bathhouses or sex clubs (19.0%), but females or heterosexual males very rarely reported using these venues (Table 2). Females (15.1%) and heterosexual males (19.9%) reported meeting sex partners at private parties, but these too were more frequently used by MSM (26.6%). Other venues where females and heterosexual males reported meeting their partners included through friends and in bars/clubs (data not shown).

Clinical/care findings

Among heterosexual males, 84.6% reported having symptoms at the time of their diagnosis, compared with 82.2% of MSM and 47.2% of females (data not shown). This undoubtedly reflects, in part, the greater

likelihood of an asymptomatic female being screened, followed by MSM. Among symptomatic men, the most commonly reported symptoms were penile discharge (76.4%), burning or pain on urination (45.7%), and testicular pain/discomfort (4.3%). Among symptomatic females, the most common symptoms were abnormal vaginal discharge (67.6%), pelvic or abdominal pain (27.9%), burning or pain on urination (13.3%), and abnormal vaginal bleeding (9.1%).

A prior GC infection in the previous year was reported by 7.7% of MSM, 3.8% of females, and 4.4% of heterosexual males. Self-reported HIV infection was common among MSM (31.9%) and virtually absent among females and heterosexual males.

As Figure 2 shows, the majority of case subjects were seen by a private physician/health maintenance organization (32.9%), followed by 17.7% at a family planning facility, 15.1% at an STD clinic, 12.6% at another community/public health clinic, and less than 10.0% at any other specific type of facility. Females were more often seen by a private physician or in a family planning setting (37.8% and 24.6%, respectively; data not shown) compared with heterosexual males and MSM, who sought care primarily from a private physician (27.8% and 26.8%, respectively) or an STD clinic (22.3% and 31.7%, respectively). In addition, emergency rooms were a significant setting of diagnosis for heterosexuals, with 7.5% of women and 8.6% of heterosexual men seeking care at this type of facility.

A focus of our clinical data analysis was GC antibiotic treatment, given the increases in fluoroquinolone resistance in California¹⁸ and the U.S., and the concomitant modifications of treatment guidelines.¹⁹ Overall, 7.4% of case subjects were treated with a nonrecommended therapy, and 4.6% were not treated by the time of the surveillance report (Figure 3). Also, substantial variability in treatment was noted across provider types, with urgent care facilities being by far the most likely to use a nonrecommended regimen, and STD clinics most likely to provide a CDC-recommended therapy (Figure 3).

DISCUSSION

More than 30,000 cases of GC were reported in California in 2007. CDPH established a successful sample-based enhanced surveillance system, the CGSS, whereby public health staff were able to interview more than 2,700 of these case subjects and collect data needed for effective program development and resource allocation. In addition to the primary benefit of acquiring detailed surveillance data to better identify factors associated with transmission, the development

		Female (a	(1)		MSM		He	terosexua	l male	Total
	۳	٩ L	Percent	Š	٩u	Percent	Z	۹u	Percent	Percent
Number of sex partners ^c										
-	1,286	529	41.1	552	79	14.3	736	145	19.5	29.2
2	1,286	403	31.3	552	94	17.0	736	198	26.1	27.0
3-4	1,286	232	18.0	552	117	21.2	736	185	25.7	20.7
5-9	1,286	89	6.9	552	133	24.1	736	131	18.4	13.7
≥10	1,286	33	2.6	552	129	23.4	736	77	10.1	9.3
Methamphetamine use	1,230	124	10.1	539	103	19.0	702	75	10.7	12.2
Sex partner methamphetamine use	1,110	153	13.8	316	100	31.8	909	91	15.1	17.0
Case incarceration history	1,267	148	11.7	497	25	5.0	733	164	22.4	13.5
Sex partner incarceration history	1,203	380	31.6	410	27	6.6	645	69	10.8	21.1
Venues used to meet sexual partners d										
Internet	682	23	3.4	443	185	41.8	577	39	6.8	14.6
Bathhouses/spas/sex clubs	657	16	2.5	312	59	19.0	564	0	0.0	4.9
Private parties	657	66	15.1	312	83	26.6	568	113	19.9	19.2
^a Total number of respondents to the item										
^b Number of respondents with the characteris	istic									
$^\circ\text{All}$ risk behavior variables asked of the 12 π	nonths prece	ding gonori	hea infection							

Table 2. Distribution of selected risk factors of California gonorrhea cases by sexual orientation, California Gonorrhea Surveillance System, 2007

 ^dNew or anonymous sexual partners MSM = men who have sex with men



Figure 2. Provider type among interviewed cases, California Gonorrhea Surveillance System, 2007

^a"Other" includes military/Veterans Administration, HIV clinic, hospital inpatient, school-based clinic, and other providers.

HMO = health maintenance organization

STD = sexually transmitted disease

HIV = human immunodeficiency virus

and implementation of the CGSS has been valuable for building sustained partnerships with epidemiology and field staff in many LHJs. Additional benefits have included identifying and correcting structural deficiencies in our CMR surveillance system, including reporting delays and data entry problems, which benefits not only our STD surveillance system, but also the system for the surveillance of other communicable diseases.

While data analysis and dissemination are ongoing and are being refined, the preliminary results, such as those presented in this article, are already proving useful. The data showing the distribution of cases by sexual orientation are important, indicating the wide variability across the state in the proportion of GC cases that are MSM and the much larger proportion of cases that are female vs. heterosexual male. This suggests the need for sustained focus on STD prevention efforts among MSM in selected areas, a greater focus on heterosexuals in others, and perhaps a particular need to identify undiagnosed heterosexual male cases.

The high rates of incarceration history among heterosexual males and partners of females highlight the need to further understand how incarceration increases population GC rates and the need for effective interventions, including screening for GC and other STDs in jails and prisons.^{20,21} Other key observations, consistent with previous data and already the focus of prevention efforts, include the high rates of methamphetamine use among MSM and the use of the Internet and bathhouses/sex clubs by MSM to meet sex partners. The granularity of these data and the ability to stratify analyses by race/ethnicity allow us to further refine targeted interventions.

The observation of high rates of nonrecommended antibiotic treatment, particularly among certain provider types, has led us to develop interventions specifically focusing on this issue. We have provided these data to colleagues in our HIV/STD Prevention Training Center and elsewhere, who are using them in clinical trainings and in outreach to the specified provider types. In addition, we are providing LHJs with the names of providers who used nonrecommended therapies in 2007, so that local public health staff may conduct educational efforts. We are also currently developing a system to notify individual providers, on a more real-time basis, of nonrecommended treatment.

After this first year of CGSS data collection, we

informally reviewed the system and have determined that it is performing well in a number of key areas.²² The data collection forms are flexible enough to implement changes annually or biannually, if so indicated. The protocol requirement that a case interview must occur within eight weeks of the date of diagnosis ensures timely collection of data. We conduct monthly reviews of the proportion of forms received and local response rates, and provide feedback to LHJs, allowing for rapid improvement of local performance. Finally, we are distributing summary and local data tables quarterly to ensure timely use of system data for local action.

Limitations

The CGSS, still in development, has a number of limitations. The overall response rate in 2007 was 54.2%, less than our ultimate goal of 80.0% but slightly higher than the 50.0% response rate we used for our initial sample-size calculation to arrive at the 10%-sampling frame. Reporting delays and other logistical problems resulted in 3.4% of eligible, sampled cases being timed out before they could be contacted within the eightweek interview window.

Analysis of the demographic characteristics of cases selected for interview vs. those not selected revealed no differences. Among cases selected, interviewed case subjects were similar to noninterviewed cases,

with some minor differences: interviewed case subjects were somewhat more likely than noninterviewed ones to be female and to have been reported from a facility other than an STD clinic. These differences could have introduced small biases into our findings and are under further investigation; efforts to increase response rates will be implemented to help mitigate this issue. Also, use of telephone rather than in-person interviews may adversely affect this surveillance, as field staff are less accustomed to this approach, and case subjects may not be as honest or complete with their responses. Analysis of our pilot data did indicate that phone interviews are largely reliable, but there were some differences of concern.²³ Other research has found that respondents are equally likely to report sensitive behaviors via telephone compared with in-person interviews.24

CONCLUSION

While not without challenges, the overall design of the CGSS, including the initial training activities, sampling procedures, prepopulation of forms, focus on telephone interviews, quality-control systems, and other procedural components, has led to the development of an effective, flexible, and sustainable system that has already provided actionable data and appears well-positioned to continue to do so.

Figure 3. Nonrecommended gonorrhea treatment by provider type, California Gonorrhea Surveillance System, 2007



^a"Other" includes military/Veterans Administration, HIV clinic, hospital inpatient, school-based clinic, and other providers.

HMO = health maintenance organization

STD = sexually transmitted disease

FQ = fluoroquinolone

HIV = human immunodeficiency virus

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