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Aberration Detection in Sexually Transmitted Diseases (STD) Surveillance ●

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Background
California and Virginia are developing and evaluating the use of automated aberration detection systems in sexually transmitted disease (STD) surveillance. Recent attention on public health aberration detection systems has focused on syndromic surveillance and rare bio-terrorism agents. These systems may also be applicable to detection of aberrations in STD surveillance systems. The parameters of such systems need to be optimized to provide reasonable determination of an unusual occurrence of events.

Objective
To describe general statistical issues, issues specific to systems used for disease surveillance, evaluation issues, and specific statistical algorithms.

Method
In California, three statistical algorithms were evaluated to determine operational parameters, such as detection sensitivity, in a STD surveillance system: Historic Limits, Poisson regression, and CUSUM. In Virginia, PROC MACONTROL in SAS was used with an aberration detection point set at two standard deviations (SD) from the long-term historical weekly mean.

Result
In California, Historic Limits ("MMWR") algorithm with 3 SD cut point and elimination of county periods with < 3 cases still results in 101 flags, but only 5 jurisdictions with more than 5 flags. Too many flags were generated using "standard" parameter values (e.g. 95% CI; inclusion of small case counts) for available resources.

Conclusion
STDs represent a large proportion of reportable diseases, making automated systems essential for rapid detection of outbreaks and aberrations in reporting. Initial analysis of algorithms and parameter choices indicates values need to be set conservatively or too many flags will be generated for the systems to be useful.

Implications
These types of systems may help provide a safety net to detect outbreaks that have been overlooked by other routine activities and/or detect outbreaks at one geographic level that are not detected by systems at another level. They are also critical for the detection and remediation of problems in reporting and surveillance.

Developing an Effective Process for Determining Priority Populations

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Topic Description

The Virginia HIV Community Planning Committee (HCPC) adapted an AED model for population prioritization. This model allowed the HCPC to utilize available data and literature to create an effective process to prioritize target populations in 2006. Additional indicators were incorporated into the model and weighted during the scoring process.

Issues to be Discussed

The Virginia HIV Community Planning Committee (HCPC) adapted an AED model for population prioritization. This model allowed the HCPC to utilize available data and literature to create an effective process to prioritize target populations in 2006. Additional indicators were incorporated into the model and weighted during the scoring process.

Learning Objectives

1. Participants will be able to identify strategies to develop an effective priority setting process.
2. Participants will be able to discuss strengths and limitations in the priority setting process.
3. Participants will be able to discuss pros and cons in the process used by the Virginia HCPC.

Solutions, Methods, Models, or Examples

Target populations were prioritized using eight indicators, including five quantitative and three qualitative sources of data. These indicators included five-year averages of HIV/AIDS prevalence, HIV and AIDS incidence, population size, hazard distribution, available resources, type of risk, and social indicators. Data not routinely collected by VDH was estimated using peer reviewed literature. Each indicator was weighted and scored using a scale created to ensure equal distribution. The total score for each population determined the ranking order.

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The Effect of Mailing Cost Reimbursements on Reporting Timeliness of Sexually Transmitted Diseases

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Background
Timely reporting of STD morbidity improves programmatic response and efficient use of critical resources. For the past six years, the Division of Disease Prevention has tracked STD-related mailings from local health departments. In October 2002, the Division began providing monetary assistance to aid reporting timeliness of STD-related paperwork. To our best knowledge, there are no published reports evaluating STD reporting in this manner.

Objective
To determine whether mailing cost reimbursements have an effect on reporting timeliness.

Method
Reimbursement eligibility was based on 31 health districts and provided between October 2002 and December 2004. Differences in reporting timeliness resulting from this financial incentive were analyzed using baseline data obtained between 1999 – 2002. The outcome variable was based on total mailings received per district per month and used to identify trends. Data was modeled as a generalized linear model for repeated measures using SAS PROC GENMOD.

Result
A total of 7,950 mailings were received between October 2002 and October 2005. The average mailings received per month at the district level was 6.93 (median=6, standard deviation=4.95); reflecting an increase of 2 in median number of monthly mailings from 2002 to 2005. Total monthly mailings statewide increased significantly over time ($p<0.001$), after controlling for numbers of reported cases. Seven districts showed a significant increase ($p<0.001$) in mailings received; two districts showed a significant decrease. Remaining districts showed statistically insignificant variations.

Conclusion
Overall, providing mailing cost reimbursements improved reporting timeliness. Timeliness tracking will continue for the foreseeable future to assess post-cost reimbursement ramifications.

Implications
Financial reimbursement for mailing costs may be an effective tool for addressing delays in reporting timeliness and may encourage localities to improve reporting habits. More well-defined cost-benefit analyses should be conducted to determine long-term benefits and implications.

Health disparities and planning in Virginia: Poverty, HIV/AIDS, and Sexually Transmitted Diseases (STDs)

Authors: ***Carrie Dolan*** and ***Chris Delcher***, Division of Disease Prevention, Virginia Department of Health, 109 Governor St, Richmond, VA

Learning Objectives:

1. The learner will communicate the process a state health department utilized to quantify the association between poverty and HIV/AIDS and STD surveillance data to gain information for prevention planning.
2. The learner will define, explain, and provide examples of the importance of considering poverty as a risk factor for HIV/AIDS and STD incidence in order to assist prevention planning at state health departments.

Background

Because of a lack of socioeconomic indicators collected through routine HIV/AIDS and STD surveillance, states present only descriptive data on poverty in planning tools used to allocate funding to target populations. Rarely is the association between poverty, incidence rates, and characteristics of target populations quantified for state planning.

Methods

Methods developed by the Public Health Disparities Geocoding Project were used to analyze diagnosed cases of HIV/AIDS, total early syphilis (TES), gonorrhea (NG) and chlamydia (CT) from 2000-2005. Cases were geocoded to the census tract level and each tract was stratified into discrete poverty categories (0-4.9%, 5-9.9%, 10-19.9%, 20.0-100%). Age-standardized rates, gamma confidence intervals, and incidence rate ratios (IRRs) were calculated for each outcome and poverty level. The characteristics of target populations, identified by the Virginia HIV Community Planning Group, were proportioned in each poverty level and tested for statistical differences (Tukey-type).

Results

The age-standardized rates were highest in tracts where 20-100% of the population lives below poverty (CT 400/100,000, NG 362/100,000, HIV/AIDS 53/100,000, TES 10/100,000). The IRRs between the least/most impoverished tracts were CT 4, NG 11, HIV/AIDS 5, and TES 10. For HIV/AIDS case reports, target population proportions were significantly different ($p<0.05$) between the least/most impoverished tracts (Men who have sex with Men (42% vs. 27%) and Injection Drug Users (7% vs. 12%)).

Conclusion

There is quantitative evidence of socioeconomic disparity in the diagnosis of HIV/AIDS and STDs at the census tract level in Virginia. Furthermore, poverty levels are sensitive enough to detect differences in populations of interest to HIV/AIDS planners.

High Impact Data Visualization for HIV/AIDS Prevention on a Shoestring Budget:
Easy ways to visualize data to enhance the decision making process

Chris Delcher and ***Carrie Dolan***, Division of Disease Prevention, Virginia Department of Health, 109 Governor St, Richmond, VA

Topic Description
There is growing need for inexpensive, easy-to-use data visualization tools for public health. Clear visualization of data is important for HIV/AIDS surveillance and prevention planning, because it highlights gaps and trends so that limited resources can be targeted where they are needed the most. The Virginia Department of Health (VDH) will present the output of several free or low-cost software packages that provide professional, high-impact data visualization capability for HIV/AIDS prevention programs.

Issues to be Discussed
The implementation of free or low-cost software to visualize a range of HIV/AIDS data.

Learning Objectives
4. Participants will be able to identify emerging methods of data visualization
5. Participants will have an increased capacity to enhance data visualization in standard reports, epidemiology profiles and community presentations.

Solutions, Methods, Models, or Examples
NETDRAW is utilized to represent the change in the county/city assignment of HIV/AIDS cases between two points in time: the initial report and the same report after geocoding. PREFUSE helps illustrate the results of the Interstate Deduplication Project (IDEP). GEOVIZ-CARTOGRAM CREATOR creates attribute scaled maps of national AIDS prevalence data. SPARKMARKER creates SPARKLINES to display changing rates of HIV/AIDS through time. EPIMAP creates GIS maps of cases of HIV/AIDS by cities and counties. GAPMINDER clearly displays AIDS rates in relation to locality, population size and urban/rural status .

HIV among African-born Persons in the U.S.: A Hidden Epidemic?

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Background: African-born individuals make up just 0.35% of the U.S. population, but may account for a disproportionate share of U.S. HIV/AIDS cases. Little information is available on HIV patterns among foreign-born populations in the U.S..

Objective: To define the percentage of newly diagnosed cases of HIV among African-born persons in areas of the U.S. with large numbers of African immigrants.

Method: We requested data on African-born persons with HIV from states containing the 16 U.S. metropolitan areas where African-born residents comprise greater than 0.5% of the population. Four states provided data for the following areas: California, Minnesota, King County, Washington (KC), and Virginia's portion of the Washington, DC metropolitan area (VA-DC).

Result: Minnesota, KC, VA-DC and California reported 583, 763, 636, and 8,674 newly diagnosed HIV cases, respectively, in 2003-2004. In Minnesota, African-born cases represented 20% of all new HIV cases, 41% of cases among women, 15% of heterosexual cases, and 56% of cases with no identified risk (NIR). KC African-born cases accounted for 9% of new cases, 42% of female cases, 29% of heterosexual cases, and 46% of cases with NIR. In VA-DC, African-born cases accounted for 13% of new cases, 29% of cases among women, 31% of heterosexual cases, and 20% of NIR cases. African-born cases represented only 1% of new cases in California, including 5% of female cases, 4% of heterosexual cases, and 4% cases with NIR.

Conclusion: In some areas of the U.S., African-born individuals account for a substantial percentage of newly diagnosed HIV cases, especially among heterosexuals and women. This epidemiologic pattern may be obscured if country of origin is not collected and used in routine analyses of surveillance data.

Implications: Country or region of birth should be consistently included in local and national analyses of HIV surveillance data, particularly in conjunction with exposure category, sex, and race.

Accreditation Process for Disease Intervention Specialists and Supervisors

Robert Johnson**,** Division of Disease Prevention, Virginia Department of Health, 109 Governor St., Richmond VA.

Background
To develop, implement, and evaluate a standardized accreditation system which ensures the competencies of DIS and supervisors are maintained at a high degree. To ensure DIS are always prepared, a certification process for DIS and supervisors was developed. Their competencies are examined through a certification process consisting of four components. The process is designed to provide ongoing training and measured achievements so that they remain proficient in 51 different skill areas. Certification is delivered and tracked, via an independent work unit, through an E-learning environment that is both SCORMTM (Shareable Content Object Reference Model) and Section 508 compliant. It is also linked to the performance appraisal and career ladder system. DIS and supervisors go through annual re-certification, which ensures they are constantly exposed to the knowledge and techniques relevant to their work. A method has also been developed to evaluate the success of the project.

Objectives
To describe the four components of the certification process and explain the importance of each;
To show how a standardized system that can be incorporated into the workforce management structure is implemented.

Methods
The posters will demonstrate the 4 components of accreditation, and how it is linked to the job description and career ladder. A continuous running infomercial will also be played on a monitor and will describe the rationale, process, and results.

Results
The performance of DIS who are certified is expected to be consistently higher than non-certified DIS when comparing objective measurements.

Conclusions
Certification of DIS and their supervisors may lead to improved and sustained performance.

Implications for Programs, Policy, and/or Research
Certification can be used by programs to ensure their DIS and supervisors maintain their competencies to a high degree.

Enhancing Gonorrhea Surveillance to Guide Program and Policy

L Newman, K Macomber, M Samuel, M Stenger, ***Jeffrey A. Stover***, T Gerber, C Kent, W Wise, and G Bolan for the Outcomes Assessment through Systems of Integrated Surveillance (OASIS) Project

Background

Although the national gonorrhea rate has decreased in recent years, gonorrhea rates among adolescents and minorities remain disproportionately high, and there are concerning increases among some subpopulations. Routine case report data do not provide adequate demographic, behavioral, or clinical information to explain or describe such trends at the national, state, or local level. Enhanced gonorrhea surveillance is necessary to better define characteristics of individuals with gonorrhea and identify potential areas for gonorrhea control efforts. From 2003 through 2005, CDC funded seven STD programs through the OASIS (Outcomes Assessment through Systems of Integrated Surveillance) Project to pilot enhanced gonorrhea surveillance.

Objectives

To review different methodologies, present examples of data analyses, and describe why enhanced gonorrhea surveillance data are useful for STD program planning and implementation.

Content

The first speaker will broadly describe the strengths and weaknesses of different sampling methods, complementing theory with actual OASIS sites' experience. The second speaker will describe a randomized assessment of in-person versus phone interviews and will discuss the relative benefits of each approach, including resources required and patient-reported risk taking. The third speaker will discuss the direct and indirect costs of using incentives for enhanced surveillance. The fourth speaker will share their experience using Tablet PCs and FormDocs software technology to administer a survey in an STD clinic setting. The fifth speaker will present OASIS data and discuss how enhanced data improve demographic and behavioral characterization of patients with gonorrhea. The final speaker will discuss how enhanced surveillance data are disseminated and used to guide policy and program activities.

Implications for Programs, Policy, and/or Research

This symposium will help state and local STD program personnel understand why enhanced gonorrhea surveillance is of value, and provide practical guidance on common issues associated with the implementation of enhanced gonorrhea surveillance.

Use of Tablet PCs in Enhanced Gonorrhea Surveillance

Jeffrey A. Stover, Division of Disease Prevention, Virginia Department of Health, 109 Governor St, Richmond, VA

Measurable Learning Objectives: By the end of this session, participants will be able to describe key reasons for conducting enhanced gonorrhea surveillance and discuss the advantages and disadvantages of different methodological approaches to enhanced gonorrhea surveillance.

The Geocoding Effect: Improving STD Surveillance through Morbidity Reassignment

Jeffrey A. Stover and ***Chris Delcher***, Division of Disease Prevention, Virginia Department of Health, 109 Governor St, Richmond, VA

Background: Postal addresses are the predominant source of sexually transmitted disease (STD) morbidity assignment. Nationally, there are 43 independent cities 39 of which are located in Virginia. This jurisdictional structure can lead to STD case reports where a postal address reflects one city/county while the actual residence, as reaffirmed by geocoding, is located in a different city/county.

Objective: To describe the issues, impact and benefits of using geocoding as a data quality method for assigning STD morbidity.

Method: A retrospective analysis of non-geocoded gonorrhea (GC) and chlamydia (CT) data from 1999 - 2001 was performed to assess the impact of geocoding on morbidity assignment. Cases were geocoded using GeoStan, and SAS was used to identify those cases in which the city/county changed. GC and CT jurisdictional morbidity were adjusted according to the net gain/loss of case distribution.

Result: From 1999-2001, a total of 11,066 GC and CT cases were reassigned representing 14.2% of Virginia's total morbidity (n = 77,701). Statewide, cities lost morbidity by 11.7% and 7.7% for CT and GC, respectively, while counties gained morbidity by 22.7% and 30.6% for CT and GC, respectively. Morbidity reassignment had a significant impact in certain jurisdictions including Albermarle County (+400% gain in GC), and Falls Church (-90% loss in GC). For CY2000, Richmond's national ranking (by rates) would have been #4, instead of #1.

Conclusion: Independent cities predominantly lost morbidity while surrounding counties gained additional cases. These assignment errors impacted local, state and national data.

Implications: Inaccurately assigned morbidity adversely impacts program planning, funding allocations and morbidity reports at all reporting levels. Further research should be conducted to assess the extent of inaccuracies in other large metropolitan cities that are conglomerates of smaller cities/counties. Geocoding should be considered as part of data quality management procedures.

Suppression of Sexually Transmitted Disease (STD) Data to Protect Confidentiality: At What Cost?

KT Edwards, University of Iowa***, Chris Delcher,*** Virginia Department of Health***, Jeffrey A. Stover,*** Virginia Department of Health**,** LM Newman, CDC Division of Disease Prevention, SL Groseclose, CDC Division of Disease Prevention

Background
It is important to balance value of state STD surveillance data dissemination to decision-makers and other interested parties with protection of individual confidentiality. Common methods intended to protect STD data confidentiality involve suppression rules such as "rule of 5" (deleting cells with numerator less than 5) and "Missouri Rule" (deleting cells using numerator-denominator algorithm). The history, effectiveness, rationale for use, and application of suppression rules among states are not well-documented.

Objectives
To describe state data suppression rules used and model relative impact of commonly used rules.

Methods
State data suppression rule usage was obtained from a national survey of STD incidence by county, race, and gender conducted by CDC's Office of Women's Health (OWH) . We modeled selected suppression rules using data supplied by Virginia to OWH for women with gonorrhea and described potential loss of useful information, complexity of application, and protection of confidentiality.

Results
Twenty-one (43%) of 49 states did not suppress data, 4 (8%) applied "rule of 3", 5 (10%) "rule of 5", and 19 (39%), one of 10 different suppression rules. Applying "rule of 3", "rule of 5", and "Missouri rule" to Virginia data resulted in 20%, 30% and 0.01% data loss, respectively. Complexity of application was greatest using numerator-denominator rules and moderate for numerator-only rules. Plausible scenarios for breach of confidentiality were identified for all rules examined.

Conclusions
There is no uniform application of suppression rules among state STD programs. Application of suppression rules can be time-consuming and complex, may result in significant data loss, and may still allow breach of confidentiality.

Implications
Improved national guidelines for state release of STD data are needed to maximize public health data dissemination, minimize data re-release burden, and more uniformly protect individual confidentiality.

Measurable learning objectives

By the end of the presentation participants will be able to:

Describe common methods for protecting confidentiality of state STD surveillance data dissemination.

Explain data suppression issues regarding potential loss of useful information, complexity of suppression rule application, and confidentiality protection.

Accreditation Process for Disease Intervention Specialists and Supervisors

Robert Johnson, ***Debbie Roddenberry***, ***Caroline Campbell***, and ***Anita Johnston***, Division of Disease Prevention, Virginia Department of Health, 109 Governor St., Richmond VA

Background

Disease Intervention Specialists (DIS) are trained to use medical and epidemiological techniques that are very comprehensive and technical in nature. When this knowledge is not used for a period of time, DIS skills tend to deteriorate. For example, in periods of declining syphilis, there may not be enough cases for DIS to manage to keep their skills sharp. Techniques such as visual case analysis go by the wayside when not used on a routine basis. To ensure they are always prepared, a certification process for DIS and supervisors was developed. Their competencies are examined through a certification process consisting of four components. The process is designed to provide ongoing training and measured achievements so that they remain proficient in 51 different skill areas. Certification is delivered and tracked, via an independent work unit, through an E-learning environment that is both **SCORM**TM (Shareable Content Object Reference Model) and Section 508 compliant. It is also linked to the performance appraisal and career ladder system. DIS and supervisors go through annual re-certification, which ensures they are constantly exposed to the knowledge and techniques relevant to their work. A method has also been developed to evaluate the success of the project.

Purpose

To develop, implement, and evaluate a standardized accreditation system which ensures the competencies of DIS and supervisors are maintained at a high degree.

Methods

Faculty members will present from their perspective (i.e., administration/HR, training/CEU, oversight) the rationale and methodology employed to develop and deliver the process. A DIS will also discuss what it was like to go through certification. Interactive components of the workshop will allow the audience to sample firsthand what it is like to go through the process.

Learning Objectives

By the end of this workshop, participants will be able to:

Describe the four components of the certification process and explain the importance of each;

Develop and implement a standardized system that can be incorporated into the workforce management structure.

Geographic and Spatial Regression Analysis of Sexually Transmitted Diseases in Richmond, VA

Chris Delcher and ***Jeffrey A. Stover***, Division of Disease Prevention, Virginia Department of Health, 109 Governor St, Richmond, VA

Background
Richmond, Virginia is consistently ranked among the highest cities in the country for gonorrhea and chlamydia rates.

Objective
The objective of this research was to examine the geographic epidemiology of sexually transmitted diseases (STD) in Richmond, Virginia and to employ an ecological regression study design to assess the correlation between STD rates and census-block-aggregated per capita income levels, drug arrest rates, and percent African-American population.

Method
The study population included pooled geocodable cases (N= 8159) of gonorrhea and chlamydia diagnosed for three years (2000-2002) in Richmond. First, a geographic analysis, using the spatial scan statistic, identified highly probable ($p<.0001$) clusters of high STD rates at the block group level. Second, a spatial linear regression technique was applied to the data (Y2000) after diagnostics of the ordinary least squares (OLS) model confirmed significant spatial autocorrelation.

Result
Before and after adjusting for spatial effects, high incidence rates of STDs were strongly correlated ($p<0.0001$) with all the independent variables tested.

Conclusion
Tight clustering indicates core theory operational in Richmond, Virginia. The core is characterized by high degrees of poverty, certain types of crime, and racial uniformity.

Implications
From a surveillance perspective, this analysis illustrates that the spatial scan statistic can be a useful tool for identifying neighborhoods of core STD transmission in an urban area.

Syphilis Eliminated…..Not Once, but Twice

***Robert Johnson*,** Division of Disease Prevention, Virginia Department of Health, 109 Governor St., Richmond VA.

Background
Two outbreaks, two cities, two different time periods. Danville was one of the original 25 high morbidity areas in 1999. Virginia's outbreak response team spent a year there in 2000 using newly acquired syphilis elimination funds. The last case was reported in 2001. The outbreak in Suffolk was first detected in August 2005. Using lessons learned from the Danville experience, the outbreak response team worked with the local health department in Suffolk to eliminate syphilis in only 4 months.

Objectives
To eliminate syphilis using the most rapid means and ensure domestic transmission of syphilis did not re-occur.

Methods
Strategies outlined in the national syphilis elimination plan were implemented. Unique, however, was a technique discovered during the Danville outbreak. Social networking was used to target core transmitters, who, according to the literature, represent about 5% of the affected population. When the response effort concluded, the infrastructure remained in place to sustain low incidence levels.

Results
Social networking had the greatest impact on case management. In both outbreaks, there were countless sex partners who could not be found through traditional partner notification efforts. When these partners were named again in social networking interviews, they were easily located and examined. In Danville, about 40% of cases identified during the outbreak response effort were the result of case finding techniques. This improved to over 80% during the Suffolk outbreak.

Conclusions
Lessons learned 5 years ago resulted in syphilis being eliminated in Suffolk in less than half the time it took for Danville.

Implications for Programs, Policy, and/or Research
Countless studies have shown that when core transmitters (i.e., sex workers) are named in the partner elicitation process, they account for a high number of unlocatable contacts. However, when they are named by disinterested third parties in the social networking process, most can be found and examined.

Learning Objectives
By the end of this session, participants will be able to: describe how social networking can be used to expedite case finding and prevention efforts, and implement steps to ensure syphilis remains at bay after the outbreak response effort is concluded.

Who's Using Geographic Information Systems (GIS): A Survey of STD Programs

Jennifer M. Bissette, ***Jeffrey A. Stover***, and ***Chris Delcher***, Division of Disease Prevention, Virginia Department of Health, 109 Governor St, Richmond, VA.

Background
An increasing number of sexually transmitted disease (STD) programs are using Geographic Information Systems (GIS) to enhance data analyses and enable better data visualization on multiple geographic scales. Several STD project areas implemented GIS activities through OASIS, a CDC funded project, and created an informal GIS workgroup to discuss the unique security/confidentiality issues associated with mapped data.

Objective
To assess STD project areas' capacity to map data, to understand how the data is used and to learn how patient confidentiality is protected.

Method
The GIS workgroup created a web-based survey that was distributed by Email to all STD project areas by the National Coalition of STD Directors (NCSD) on the workgroup's behalf. Follow-up calls were made to non-responders to encourage participation.

Result
Fifty-three (82%) of the project areas (n=65) completed the survey. Over half of the project areas use GIS and geocode STD patient-level data, and have done so for over four years. Just over half of the project areas use the rule of five numerator rule for confidentiality with mapped data; however, the operational definition of this rule varied widely. There was variation in the confidentiality rules applied by the remaining sites and some sites stated that no rule was applied to the data. Eighty-five percent of all project areas that currently use GIS do not have written confidentiality guidelines to address GIS activities.

Conclusion
STD programs have employed various methods to protect mapped data. However, the inconsistency between programs and the lack of written guidelines to address these activities emphasize the growing need to develop formal guidelines to help STD programs make well-informed decisions.

Implications
GIS affords STD programs the ability to enhance surveillance through analysis, visualization and reporting activities; however, STD programs need to ensure potential risks are known and patient confidentiality is maintained.