

From Research to Quality Improvement: Adolescent NG/CT Screening and Lessons Learned from a Texas Academic Medical Center

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Introduction

Imperative to the health and well-being of adolescents are health systems that offer quality, equitable health care and are aware of the population they serve. This awareness should entail knowledge of problems faced by the community it serves, barriers to care, and outcomes related to health care delivery. Nationally, issues most noticeable that disproportionately affect youth relate to sexual health. It was hypothesized that the very issues that affect the general American youth likely are the same that impact a local health system.

Methods

The purpose of this study was to conduct a preliminary needs assessment to analyze screening practices and rates of Chlamydia trachomatis and Neisseria gonorrhoeae among adolescents within a local health system. However, data challenges arose, and a research pivot occurred, morphing the study into one of program evaluation and improvement, guided by the Center for Disease Control and Prevention's Program Evaluation Framework.

Results

Data gaps revealed both system and state-level difficulties and health disparities in the assessment of both diseases as well as a health system with minimal, capturable sexual health documentation on its adolescent population.

Conclusion

Through work with key stakeholders, a state Medicaid policy investigation, electronic medical record improvements, and staff training, what was a data challenge resulted in health system change and the beginnings of disruption and dismantling of sexual health disparities for adolescents.

INTRODUCTION

Adolescence is a developmental period synonymous with change, with physical, biological, cognitive, social, and

worldview transformations occurring simultaneously and often abruptly. It is a critical time in development in which facing these changes may lead to positive pathways forward or pathways of increased risk-taking and poor health out-

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comes.¹ Health care clinics that serve adolescents have a vital role in helping navigate these paths, whether through timely health screening or informative health education.²

Since 2013, rates of *Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT) have been climbing in the United States. Fifty percent of new cases are in those 15-24 years old, even though they make up just one-fourth of the sexually active population.³ Stigma, access to healthcare, and lack of sexual health education are leading contributors to the STI epidemic among youth.² As this public health crisis continues, addressing these barriers to care is essential to improving the health of adolescents.

In a close analysis of NG and CT, two-thirds of new chlamydia infections are among 15 to 24-year-olds, and adolescent females account for the greatest rise in gonorrhea cases.⁴ Chlamydia and gonorrhea infections are not only costly, with upwards of \$1 billion annually in healthcare expenditures related to these infections,⁵ but also can have devastating sequela if left undiagnosed or untreated. Pelvic inflammatory disease (PID), a condition in which a lower genital tract infection ascends upward to infect one or more female reproductive organs, is a leading contributor to female infertility, chronic pelvic pain, and ectopic pregnancy.^{6,7}

Unfortunately, challenges abound in diagnosing chlamydia and gonorrhea, with chief concerns being that most infections are asymptomatic.⁸ Given the combination of the prevalence of these diseases, their lack of symptom presentation, and the potential for life-altering consequences, screening has become paramount to stopping the STI epidemic, especially among young people. The US Preventive Services Task Force recommends all sexually active women 24 years or younger, as well as women ages 25 and older who are at risk, be screened for gonorrhea and chlamydia at least annually.⁹ Particular to Texas Health Steps (THSteps), which is healthcare for children in Texas from birth through age 20 with Medicaid, NG and CT screening is recommended starting at age 11 for those at increased risk of infection.¹⁰

STUDY PURPOSE

Given the concerning rise in both STI diagnoses among young people, a research study was designed to obtain a needs assessment and evaluate clinic screening practices of an adolescent population at a large, urban academic medical center in Texas. However, data collection for the needs assessment revealed significant gaps in information. Additionally, internal and external systems-level issues were identified that ultimately changed the course of the study. **The purpose of this paper is to describe the data gap findings and detail how a research challenge turned into that of program evaluation, improvement, and innovation.**

METHODS

CONTEXT

Initial methods for the research study began with a needs assessment, and, therefore, operated in a quantitative data gathering and analysis fashion. However, gaps were recognized after preliminary data was analyzed and interpreted, which led to a subsequent study utilizing different methods to capture data within the Electronic Medical Record (EMR). After evaluating this data set, it was realized that data gaps persist and potentially reflect a more extensive health system-level process that needs evaluation. This initial work led to a qualitative program evaluation, guided by the Center for Disease Control and Prevention's Program Evaluation Framework, to investigate clinic, health system, and state-level sexual health screening and documentation practices.¹¹ The final research product was realized after this mixed-methods data collection and analysis occurred, resulting in health system improvement. Due to the nature of these studies unfolding and ultimate program improvement, methods and results have been organized to reflect each study. This approach articulates data gaps and highlights how a research challenge can evolve into program improvement (**Figure 1**).

STUDY 1: PRELIMINARY NEEDS ASSESSMENT

Initial institutional review board approval was obtained for a research study designed as a needs assessment, reviewing, and analyzing adolescent health data across six health clinics within an urban, academic medical center. EMR data was requested and compiled into an Excel document. Inclusion criteria were patients aged 12 to 21 who visited any of the six clinics from March 2018 to March 2023. The parameters of the patient data requested are presented in **Table 1**. Frequencies were then conducted on variables of interest, with an initial view of NG and CT screening metrics.

STUDY 2: DATA INVESTIGATION

Discussions occurred with health informatics and quality management team members from the health system. Unfortunately, it appeared most visits did not use the diagnostic code used in Study 1 (Z11.3: encounter for screening for infections with a predominantly sexual mode of transmission) when screening for NG and CT. It was then determined that analyzing lab order data for gonorrhea and chlamydia from the EMR may be a more appropriate metric.

Furthermore, as improvement in attempts to accurately measure gonorrhea and chlamydia screening developed, other potential variables were identified, including the proportion of visits with CT and NG diagnoses, as well as documentation of safe sex practices and sexual activity. The EMR contains a "confidential" area where medical providers may notate any information they deem confidential for a pediatric patient, mainly if the topic is sensitive and not to be shared with others per the patient's preference. A sexual health history is contained in the confidential section. It al-

lows for a yes/no radio button selection for safe sex as well as a yes/no/sometimes button selection for sexual activity.

STUDY 3: PROVIDER BEHAVIOR VERSUS DATA CHALLENGES

With current data abstractions identifying that 3% of all visits from the last five years had NG or CT screening exams performed, continued informal, unstructured interviews were conducted to gain more information about documentation. A new research question was formed, “are screening rates truly this low or is the ability to capture the data the main challenge?”

Stakeholder inquiry and informal, unstructured interviews continued to identify the source of gaps in data collection. These were centered around the new research question and lab ordering processes in general, both internally and externally mandated. As the interviews continued, the initial purpose of a needs assessment transformed into data collection and abstraction investigation and, finally, into a program evaluation and improvement process.

PROGRAM EVALUATION AND IMPROVEMENT

The project’s final phase was developed after many informal, unstructured interviews. Answers to initial research questions revealed that although providers and clinic leadership were adamant that screening rates were high, data was insufficient to support this based on EMR data. Further questions about current program activities and screening practices were answered, showing discrepancies in ordering practices, laboratory processing, lab results, diagnoses entering the EMR, and sexual history documentation. All, however, could be augmented and improved. This evaluation led to a new focus on refining screening practices and improving the EMR to better capture sexual health data. A collaborative meeting occurred in this last phase, involving medical and nurse management, quality, and data control. The goals for this group were to improve program screening processes, diagnosis reporting, and sexual history documentation.

RESULTS

STUDY 1: PRELIMINARY NEEDS ASSESSMENT

Approximately 60,000 visits that meet the inclusion criteria were identified. Study 1 data collection involved the use of a diagnostic code for NG and CT screening: Z11.3: encounter for screening for infections with a predominantly sexual mode of transmission. This code would signal if the visit had an associated STI screening performed, and its absence would count as a visit without screening. Upon data analysis, the proportion of visits with NG and CT screening was 0.1%. However, it was unclear whether this value was due to minimal screening, if the data was collected inefficiently, or if the data should be explored using a different metric from the EMR. This analysis led to a data collection and quality discussion, moving the research into study 2 (**Table 2**).

STUDY 2: DATA INVESTIGATION

Utilizing lab orders emerged as a method for capturing the proportion of visits associated with NG and CT screening, which increased from 0.1% of visits to 3% of visits. Focus on other variables such as NG and CT diagnoses revealed less than 0.2% of visits had associated diagnoses of these diseases. Regarding documentation of safe sex practices, less than 3% of visits utilized the confidential history section to note this, and less than 6% of visits had documentation in the confidential history about whether the teen was sexually active or not.

Discrepancies in the best way to capture the data ensued, with informal, unstructured interviews occurring with quality and data management teams. Specifically, health information management recommended capturing the NG and CT screening using a process that would identify the lab even if it was ordered within a series of other diagnostic tests; however, data quality personnel expressed concerns that this would create data that was “not clean” and difficult to precisely identify the NG and CT screenings.

Discussions also arose regarding the low proportion of diagnoses of NG and CT that resulted from using diagnostic codes to capture these variables. Health information management teams noted that they could attempt to capture the diagnoses based on positive lab values. However, it would “take days to script this out” to even identify one positive lab value.

By the end of study 2, goals for needs assessment were placed on hold as it was determined that identifying the appropriate methods to analyze data on screening and diagnoses for gonorrhea and chlamydia was essential. The project then moved into study 3 with attempts to troubleshoot the data challenges (**Table 3**).

STUDY 3: PROVIDER BEHAVIOR VERSUS DATA CHALLENGES

Screening Labs. Interviews revealed the source of limited data was not poor screening behaviors by providers but instead differential administrative and laboratory use practices depending on the patient’s payor source. A specimen from a patient with commercial insurance can be sent to a private lab company for the NG and CT laboratory testing. Lab specimens by privately insured individuals are processed using the standard “lab order” feature within the EMR, thus making the data capturable by the EMR. However, per THSteps and Medicaid guidelines, patients with Texas Medicaid must use the Texas Department of State Health Services (DSHS) laboratory located in Austin, TX, to have no specimen processing fee charged to the patient from the health system. Therefore, instead of ordering the lab through the EMR and risking a charge to the patient, a radio button is selected to alert the medical assistant that this specimen is to be sent to the DSHS lab. These alternative orders and associated results are not captured using standard data collection methods.

Further interviews with clinic leadership revealed that this process also causes a disparity in the timing of specimen arrival at the laboratory and delays specimen process-

ing when comparing commercial to Medicaid payor sources. The private laboratory can collect and process the sample within 24 to 72 hours. However, the specimen journeying to the state laboratory will take that same time to travel via mail to the laboratory. Then, it takes another three to four days to process and result, with the results then mailed back to the clinic. The entire processing period from specimen collection to result to the medical provider is two weeks. Texas Medicaid NG and CT screening labs take, on average, four times longer to result to a provider than commercial insurance specimens, creating a health disparity for low-income patients (**Figure 2**).

Discussion with health system leadership and an email exchange with the DSHS laboratory revealed that sending the NG and CT screening labs to the state laboratory is mandatory. Using a closer laboratory is not a possibility if the clinics are to stay in compliance.

Gonorrhea and Chlamydia Diagnoses. As study 2 revealed, NG and CT diagnoses were small relative to the large sample size of visits. Interviews with medical providers revealed that results are manually entered into the computer, especially with the receipt of paper results from the DSHS laboratory. If the laboratory result is positive, while a patient is notified of the laboratory result and management of the disease ensues, the diagnostic code may or may not be entered into the patient's chart.

Confidential History and Sexual History within EMR. Informal, unstructured interviews also revealed that the confidential section of the EMR, containing data fields such as if the patient is sexually active and practicing safe sex, is not utilized because of the location of the confidential history within the EMR and its nondescript appearance, leaving providers to free text or fail to document the sexual history.

PROGRAM EVALUATION AND IMPROVEMENT

Screening Labs. Recognition of the disparity in NG and CT screening between patients with commercial versus Medicaid coverage led to the need for two changes. One involved how the labs are ordered, and the other focused on improving the timeliness of results notification to medical providers to optimize patient care.

Lab Ordering: The health information management team developed a new way to order labs mandated by THSteps to go to their laboratory. The EMR was improved to reflect this by creating a "state labs" option in the orders module. Furthermore, the radio button used to signal the medical assistant about the screening labs was eliminated. A training appendix to the operational procedures manual was added to support medical staff and faculty about the new lab ordering process.

Lab Resulting. In the collaborative meeting between medical providers, nursing management, health system leadership, and executive quality leadership, a new process was proposed to obtain results faster from the THSteps laboratory. Health system leadership contacted THSteps and discovered that results could be faxed to the clinic, creating a more streamlined re-

sulting system. Instead of paper results, results could now be electronically uploaded and tasked to a medical provider. This would eliminate the mailing of the result to the clinic, helping reduce the time for a provider to receive the result by up to 50%.

Gonorrhea and Chlamydia Diagnoses. At the collaborative meeting, another output occurred in the development of a new process to enter gonorrhea and chlamydia diagnoses, mainly if the labs were from the state laboratory and not electronically delivered by a private lab to the EMR. The new method would allow the medical assistant to send an electronic task to the medical provider to review the lab result, and, if positive, to create an NG or CT ICD-10 code in the chart, allowing for improved data capture of NG/CT diagnoses. A training appendix was developed to teach medical staff and faculty about the new result and diagnosis entering process.

Confidential History and Sexual History within EMR. Health Information Management team members updated the EMR throughout the entire health system, changing the appearance of the "confidential history" from a similar color to a bright red. This change occurred to improve the usage of this section and the documentation of sexual health history among adolescent patients.

Overall, the program evaluation and quality improvement project included changing system-level processes for NG/CT screening, diagnosis capture, and sexual history documentation with expected short-term, intermediate, and long-term outcomes (**Figure 3**).

DISCUSSION

LESSONS LEARNED-1: THE ABSENCE OF INQUIRY LIMITS THE BREADTH OF KNOWLEDGE

As US statistics pointed to the dramatic rise in sexually transmitted infections among youth,^{3,4,9} a need arose to evaluate local patient population STI rates within the health system. A needs assessment, through the use of the EMR, appeared to be the next step. The EMR had been used for many years, yet this was one of the first times a holistic, multi-year review of the entire adolescent population within the health system occurred. As data collection and evaluation unfolded, the overall direction of the research project had to pivot in response. Significant sexual health data gaps were found in these first data sets, and we were unable to conduct a comprehensive, accurate needs assessment using the current data. Our findings that <1% visits had gonorrhea and chlamydia diagnoses did not align with external population research. For example, one study in another large Texas city noted 35% of its adolescent population had chlamydia over a two-year period¹² Formatting...and recent state data revealed young people ages 15-24 comprise the highest reported rate of both gonorrhea and chlamydia.¹⁵Formatting...

From this process, it was identified that there were not only gaps in data, but health disparities in the screening, documentation, and resulting practices for NG and CT, pending the insurance payor source for the patient. As ev-

identified by **Figure 2**, per THSteps Medicaid policy,¹⁴ Formatting...patients who are being tested for NG and CT *must* have the specimen sent to the state laboratory. This led to nearly four times the wait time for results to be delivered to an individual with Medicaid compared to commercial insurance, creating significant health equity concerns. As of August 2023, over five million children in the state of Texas were covered by Medicaid,¹⁵ Formatting...which is designed to meet the medical coverage needs of individuals with low income.¹⁶ Formatting...This is further compounded as a majority of Medicaid recipients in Texas are those from minority populations, particularly of Hispanic, Black, and American Indian/Alaskan native backgrounds,¹⁵ and STIs disproportionately impact low income individuals as well as those from minority populations.¹⁷ Formatting... In theory, Medicaid should be the bridge and disruptor of these connections, allowing for healthcare access that leads to proper testing and treatment of STIs as well as education to prevent future STIs. However, as evidenced by the clinic's current policy and practice for sexual health screening and resulting, disparities in sexual health are added to, instead of helped, by delayed processing and resulting time for gonorrhea and chlamydia. Additional work has been suggested to understand the role Medicaid coverage may have in improving the STI epidemic.¹⁸

LESSON LEARNED-2: COMMUNICATION IS VITAL FOR CHANGING PRACTICE BEHAVIOR

After the discovery of the significant data gaps, it was challenging to identify stakeholder involvement and investigate the reasoning behind the data gaps. It became clear that there were conflicting opinions among health system staff and leadership as to why the gaps existed. As mentioned previously, inquiry is necessary to gain knowledge. Probing others and asking “why” made some uncomfortable or unable to provide clear answers, especially as the health disparities unfolded in the screening and reporting practices per payor source. Responses pointed to historical context (“It has always been this way”) or to challenges with reporting within the EMR itself. Yet, in posing questions, leaders were identified who had the investment and power to enact change within the system. Continuing to engage and convene providers and those in clinic leadership to address STIs may be beneficial in addressing these disparities.¹⁸ Communication, even bringing attention to data gaps and disparities, allowed for momentum to improve the healthcare system.

LESSON LEARNED-3: DATA CHALLENGES CAN BRING OPPORTUNITIES FOR CHANGE

As stakeholders were identified and health system leadership became more invested, it was evident that another pivot was needed. Instead of program evaluation, the question became “how can improvements be made?”. The use of a logic model, which provides a systematic way to evaluate programs, allowed for addressing activities and key participants around sexual health and identifying outcomes that

can improve health. This enabled the pivot from evaluating to improving sexual health programming.

The recommendations we identified here may be applicable across the state and potentially across the nation. Program improvements include faster receipt of NG and CT laboratory results with the use of a new fax line as compared to mail receipt of results, a new feature in the EMR to allow for “state labs” to be entered and monitored more efficiently, and a guide to train individuals and instruct medical providers how to enter the diagnosis code in the EMR so that CT and NG diagnoses can be more easily detected and monitored. Furthermore, the updated appearance of the confidential section in the medical record may lead to providers more readily documenting the sexual health history of adolescent patients. On the broader scale related to payor source, one recommendation to improve screening may be linked with performance measures and incentives – developing programming in collaboration with healthcare providers can inform service delivery within the clinic and improve adolescent health across the state.¹⁸

LIMITATIONS

There are several limitations to this research. Firstly, it is argued that the main learned themes are universally applicable; however, one may not be able to apply these specific health system findings to other health systems. Differences in EMRs, sexual health documentation and reporting practices, state Medicaid guidelines, and health system operations all can impact the translation of this research to other settings.

Many stakeholders were very invested in the health outcomes of the adolescent population. This may be attributable, in part, to the academic medical setting of the health system. Results may differ if the research was translated to a private medical setting. In trying to make program improvements, another limitation is the heterogeneous provider group and large health system setting. Dozens of medical providers, each with different backgrounds and experiences, make up this particular health care system. It is challenging to identify individual providers' motivations and limitations in data entry and sexual health history documentation. Within the research itself, another limitation was that free text entry was not analyzed. Free text fields may yield more information regarding sexual health documentation and NG/CT screening motivations.

CONCLUSION

Investment in youth is key to the health and well-being of society. Health care systems must mitigate pressures and serve adolescents to achieve the “highest attainable standard of physical and mental health.”¹⁹ Formatting...With the rise in STIs and the disproportionate impact on youth, health clinics can have policies and procedures that change these statistics. However, if a health system does not routinely evaluate the needs of its population, how can it know the problems and if its policies are making a difference? This research and quality improvement journey shows the value of routine data analysis of a population and how

the results can be interpreted to impact the health system and public health practice. Discovering disparities in communicable disease identification based on payer source, a process that had existed for years, would not have been possible without data investigation. Stakeholders can be identified and motivated to work together to influence public health outcomes. Data challenges can aid program improvement. This project allowed for system-level change in health delivery that ultimately promotes adolescent health and will seek to improve health outcomes for the community.

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DISCLOSURE STATEMENT

The author(s) have no relevant financial disclosures or conflicts of interest.

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POSITIONALITY STATEMENTS

AMANDA BROSNAN, MPAS, MPH, PA-C

I am a Physician Assistant with clinical experience in adolescent health as well as sexual and reproductive health. I bring clinical expertise to this work. However, I acknowledge my identity as a white woman in the United States and understand this shapes my perspective. I bring clinical expertise as well as performed the research as a capstone project through my training in public health. I consulted Stacey and Maria as public health experts and mentors to ensure the validity, acceptability, and appropriateness of my research and findings.

STACEY B. GRINER, PHD, MPH, CPH

I am a public health professional with experience in sexual and reproductive health and sexually transmitted infections, and I bring academic expertise to this work. However, I recognize that my perspective is shaped by my identity as a white woman from the United States. My contribution to this article was conducted in partnership with Amanda to ensure a contextually grounded approach to the methods and quality improvement approach.

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SUPPLEMENTARY MATERIALS

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