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Implementing the Quality of Care Partnership to Reduce the Cost of Screenings for Sexually Transmitted Infections on a Southeastern College Campus

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Implementing the Quality of Care Partnership to Reduce the Cost of Screenings for Sexually
Transmitted Infections on a Southeastern College Campus

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Abstract

College students are a priority preventative healthcare population that can engage in high risk behaviors which may concurrently increase the potential for unsafe sexual practices, including contracting sexually transmitted infections (STIs). Early education, screening, treatment, and partner notification are important interventions for breaking the chain of transmission and recurrence in relation to preventing poor health outcomes and mitigating college dropout rates. The aim of this quality improvement project was to determine if the reduction in STI screening costs for college students (aged 18-30 years old) would increase the amount of STI screenings conducted at a university health center over the course of an academic semester while evaluating our ability to achieve improved quality of care at a reduced cost, along with improved STI reporting and documentation. This study was conducted through retrospective chart reviews of STI-related visits and utilized the RADAR Matrix to provide a guiding, iterative mechanism to continuously reassess goals and outcomes defined in a memorandum of agreement (MOA) between a university health center and the state department of health (DOH) laboratory. The project failed to increase the amount of STI screenings most likely due to the emergence of COVID-19, but resulted in improved quality of care for students, improved STI-related visit documentation and reporting, and significantly reduced costs for STI screening for collegiate students at a Southeastern private university campus.

Keywords: sexually transmitted infections, college students, young adults, college health, young adult preventive health, college student reproductive health, public health systems

Introduction and Background

Young adulthood encompasses a time characterized by developing behaviors and activities that can promote lifelong independence but can also lead to engagement in high risk behaviors. High risk behaviors may include alcohol consumption, experimental drug use, and multiple sexual partners. These high risk behaviors may concurrently increase the potential for unsafe sexual practices, including contracting sexually transmitted infections (STIs). The Centers for Disease Control (CDC) report that in the United States there are 20 million new cases of STIs each year, and although young adults (aged 15-24 years old) constitute only 25% of the sexually active population, they account for 50% of STIs annually (Fonte et al., 2018; Griner et al., 2017; Montgomery et al., 2008; Whiting et al., 2019).

College students are a priority preventative healthcare population given that they balance a multitude of complex issues and needs during an important time in their lives, which impact for future development and holism. They may participate in risky behaviors stemming from financial hardship, mental health conditions, academic stressors, perceived health status, experimentation with illicit substances, lack of social support and education, peer pressure, and impaired perception of possible consequences (Bersamin et. al., 2017; Lederer & Oswalt, 2017; Luquis & Kensinger, 2017). Sexually transmitted infections can create barriers to overall academic and individual progress by impacting a student's physical, emotional, spiritual, and mental wellbeing. Early education, screening, treatment, and partner notification are important interventions for breaking the chain of transmission and recurrence in relation to preventing poor health outcomes and mitigating college dropout rates.

University health centers are uniquely poised to provide preventative health counseling, cost-effective STI screening, and vital wellness education targeted at young adults in their

campus communities (Bersamin et al., 2017). Many college students remain unaware of evidence-informed, optimal sexual health behaviors and prevention practices that could be significant for awareness and engagement in their long-term wellness habits. University health centers can be integral to identifying factors and removing barriers experienced by collegiate students seeking reproductive health care services.

Problem

A university health center was available to provide care to a recorded 8,440 undergraduate and graduate college students for the 2019-2020 school year and may be the sole source of health care to many of its matriculating students. The university health center at a Southeastern private university carries out an estimated 48 STI related visits per academic semester with an estimated average of 96 STI related visits per academic year (Appendix A). Presently, STI screening costs performed at the university health center in the Southeastern United States average \$110-\$150 per student. Furthermore, if a student requires any genital cultures this overall cost increases to about \$230.

The high cost of secondary health screenings can create a financial burden for college students. In addition to the incurred expense, it can reduce access to care, and highlights a gap in service concerning accurate STI detection rates, STI educational counseling, and optimal STI treatment in the campus community. If a college student cannot afford STI screening at the university health center, the student is referred to the local public health department for an appointment at their STI/HIV clinic. This service will cost the student an estimated \$10 for a complete STI screening and possible treatment if indicated. Continued and regular referrals to an STI clinic within the community health system may also create further patient load burden on public health resources already stretched to provide comprehensive care to their communities.

By partnering with the state department of health (DOH), university health centers may be able to reduce costs, increase reliable reporting surrounding sexually transmitted infection prevalence, remove barriers to quality care and student academic progress, and facilitate timely STI treatment and prevention in a vulnerable population regardless of their ethnic, educational, and socioeconomical backgrounds. There is gap in current literature outlining the process for establishing a quality of care partnership between a university health center at a private institution and a local or state-wide public health entity designed to implement cost-effective STI services and increase the accuracy of STI reporting in collegiate students. Offsetting financial constraints may prove valuable in achieving successful, comprehensive preventative sexual health care and support provision of useful STI transmission information.

Purpose

The aim of this quality improvement project was to determine if the reduction in STI screening costs for college students (aged 18-30 years old) would increase the amount of STI screenings conducted at a university health center over the course of an academic semester while evaluating our ability to achieve improved quality of care at a reduced cost, along with improved STI reporting and documentation. Although the initial aim of increasing the number of STI screenings did not occur, this is highly likely the result of the COVID-19 pandemic. The secondary purposes listed regarding improved quality of care, improved documentation, and improved STI tracking were met in addition to the cost per student visit, which may benefit future students.

The most recent report released by the CDC suggests STI rates are increasing among the population and in our young adults, who represent an at-risk and potentially vulnerable subgroup (Bersamin et al., 2017; Centers for Disease Control, 2019). Literature suggests preventative

health services offered to young adults may be more beneficial if they are both cost-conscious and comprehensive (American College Health Association, 2016, 2019; Lederer & Oswalt, 2017; Luquis & Kensinger, 2017). Utilizing the state DOH laboratory pricing model reduced on campus average STI screening costs from \$110 to \$45 per screening per student, which is an average cost savings of \$65 per STI screening visit. In previous years, the university health center did not consistently track STI appointment information, the rates of STI screening referrals to the local public health department, did not have access to STI rates in the campus community, and did not participate in any form of STI education or treatment follow up with referred patients. Due to inflated STI screening costs, providers often prioritize which STI tests are performed based on a student's ability to pay, which does not support best evidence-based screening guidelines put forth by the CDC, the U.S. Preventive Services Task Force, and the American College of Obstetricians and Gynecologists (ACOG) (American Academy of Pediatrics, 2020; American Sexual Health Association, 2020; Centers for Disease Control, 2015; Ghanem & Tuddenham, 2020; Lee et al., 2016). Recent changes in operations has permitted additional appointment data collection and tracking of these referrals; however, high cost STI screenings has remained.

College students at the University present in the university health center very frequently for preventative STI testing, treatment, and sexual health care. The vast majority of these appointments result in the student being referred to the local health department for affordable STI services resulting in a preventative care service gap when university care providers are equipped with the necessary skills and training to manage their care. The local health department's STI/HIV clinic visits are by scheduled appointments only which may result in a delay of testing, care, and treatment of a sexually active young adult in the community. Referral

to a community health source may decrease accurate STI detection and treatment as students may face challenges regarding reliable transportation, perceived sexual health social stigma, medical care self-efficacy, and timely STI treatment.

A quality of care partnership between a university health center and state DOH laboratory may be a viable and sensible option to alleviate high costs of preventative health screenings for college students, acquire accurate campus community STI rates, and support timely sexual health education opportunities. This project has the potential to generate pertinent information regarding establishing a public health system partnership and improving cost-effective access to care for college students on campuses of varying demographics.

Review of Evidence

STIs have been referred to as a “hidden epidemic” in the United States and infections can be transferred from one individual to other individuals through any form of sexual contact. It is estimated that one in four Americans will contract one or more STIs at some point during their lifetime, and the infection can lead to personal, physical, and financial consequences that can impact their overall health and wellbeing (Montgomery et al., 2008, p. 268).

In the U.S. there is an average interval of 22 months delay between first sexual contact and young adults presenting for reproductive health care in primary care clinics or school-based settings (Bersamin et al., 2017; Honegger & Harpin, 2016). It is also estimated that up to 70% of young adults do not receive preventative health services (Luquis & Kensinger, 2017). The American College of Preventative Medicine (ACPM) states that reproductive and sexual health is essential to upholding the overall health of public and college students who are members of these communities (Plant et al., 2018). Tracing STI trends and providing prompt treatment is

necessary for promoting improved health outcomes and for developing lifelong, healthy practices in young adulthood.

STI Prevalence in College Students

The estimated population of students matriculating at an institution of higher education is over 20 million students annually, making them a microcosm of young sexually active adults in the United States (Lederer & Oswalt, 2017; Turner & Keller, 2015). The American College Health Association (ACHA) is a professional organization designed to provide guidance and recommendations for optimal health promotion practices in the collegiate group. ACHA released a white paper in January 2020 outlining the importance of robust sexual health education in campus communities. These recommended best practices involve collecting extensive data concerning the rates of STIs, increasing STI screening, and expanding sexual health education efforts in the college community (American College Health Association, 2020).

Young adults are one fourth of the sexually active population and account for half of all new STI cases, with young men and women being equally affected. College students, specifically those among the traditional undergraduate demographic, have the highest rates of STIs (Fonte et al., 2018; Whiting et al., 2019). STIs are an example of a negative preventable health condition that young adults are exposed to that can affect their quality of life and alter future hopes and plans, especially if the STI becomes a chronic condition. STIs are associated with short and long-term consequences such as human papillomavirus (HPV), human immunodeficiency virus (HIV), hepatitis, infertility, increased susceptibility to other STIs, unintended pregnancy, pelvic inflammatory disease (PID), cancer, widespread infections, organ damage, and sometimes death (Allen et al., 2016; Griner et al., 2017; Happa et al., 2018).

College students who have become infected with an STI may be asymptomatic, have more than one STI infection, and may inadvertently continue transmitting the infection among the campus population and local community. Rates of STIs and unintended pregnancy are shown to be the most prevalent in the Southern United States (Griner et al., 2017). The collegiate environment can encourage behaviors that include illicit substance use and risky sexual behavior. These circumstances can result in inadequate sexual health education, STI awareness, and participation in preventative STI screening and treatment for matriculating students (Fonte et al., 2018).

Contributing Intrinsic Factors

The reproductive health of college students can be influenced by a multitude of intrinsic elements such as perceived social sexual health stigma, personal health and wellness beliefs, and health literacy. Early education and health promoting behavioral interventions can expand students' wellbeing improving learning and academic results (Lederer & Oswalt, 2017). Research has linked the importance of health promotion education as a potential social determinant of long-term health concerning young adults' comfort and ability to engage in preventative health care services (Costa et al., 2019; Luquis & Kensinger, 2017). Young adulthood represents a period of growth and maturation. The pre-frontal cortex continues to develop which may influence a college student's decision-making processes and ability to distinguish and acknowledge risky behaviors and future outcomes.

Engagement in reproductive health care can be impacted by a perceived negative social view of utilizing STI screenings and treatment in college students. Anxiety, internal stressors, lack of knowledge, parental reporting, and social disapproval have been positively correlated in determining whether a young adult will seek STI screening and treatment or not (Bersamin et al.,

2016; Lyttle et al., 2018; Marcell et al., 2017). As 40% of college students live on campus, these young adults may delay seeking STI-related care for fear they may run into a member of their peer group when visiting university health centers (Lederer & Oswalt, 2017). Encouraging an environment of social acceptance of reproductive health care could promote young adult compliance utilizing preventative health services on their campus.

Students enter college and are faced with a host of new experiences and arrive with different levels of reproductive health knowledge. College students may have received their STI and reproductive health education from their parents, professional and unprofessional sources from the internet, and their peers. Greater peer influence has been documented as being a contributing factor in lessening condom use and other protection. College students have expressed feelings of shame, embarrassment, and anxiety when discussing healthy sexual practices with their partners or seeking STI treatment (Bersamin et al., 2017; Lyttle et al., 2018). Condom use declines over Freshman and Sophomore years despite 90% of college students reporting sexual activity within the last year (Montgomery et al., 2008; Whiting et al., 2019). Half of these study participants confirm not using a condom. New sexual experiences may also lead to peer relationships labeled “Friends with Benefits” where sexual partners may have repeated encounters with multiple partners, which does not involve long-term commitment, nor open disclosure of this information to all parties involved (Griner et al., 2017).

Many young adults are physically healthy which may undermine recognition of their need and subsequently willingness to participate in regular preventative health screenings and counseling that could be beneficial for long-term wellbeing. This perception could also be influenced by their spiritual and religious upbringing and beliefs about sexual activity and STI

treatment. One study found that risky sexual behavior was positively correlated with religiosity and spirituality (Lyttle et al., 2018).

Some studies, including a landmark preventative health study, have also suggested that young adults with lower educational level report higher rates of received STI/HIV screenings and education with only 50% of the young adult population confirming they have received any STI screenings (Luquis & Kensinger, 2017; Lau et al., 2013). Lower condom use has also been associated with lower economic status (Lyttle et al., 2018). It has further been identified that efforts are needed to address racial/ethnic and gender disparities as well (Lau et al., 2013).

Perceived health literacy in college students can perpetuate minimal preventative health visits and decrease the perception that STI screenings are an important health practice. Emerging young adults access much of their health-related information online through internet sources ranging from professional medical organizations, peer blogs, and consumer-driven health sites. It is estimated that half of Americans have limited to low health literacy which can result in decreased adherence to health prevention and wellness guidelines. College students in particular are at an increased risk for STI exposure but have reported a belief that most sexually active adults are at low-risk for contracting HPV and common knowledge of STIs in general was low (Albright & Allen, 2018; Allen et al., 2016).

Contributing Extrinsic Factors

Current literature suggests that external factors, such as financial disposition and health insurance status can influence college students' reproductive health care practices. Many students may have minimal financial resources and may be unable to work regularly or a sufficient amount to create adequate income due to their academic course load, limited access to transportation, and lower socioeconomic status. Financial circumstances could potentially affect

a students' ability to purchase barrier methods or travel to locations to obtain condoms (Griner et al., 2017). Increasing access and condom programs on campus through the university health center or other methods can assist in alleviating this possible barrier. It has also been suggested that improving access to barrier and contraceptive methods can be an effective strategy in helping college students complete their degrees on time for graduation.

Financial barriers may potentially be perpetuated by a students' insurance carrier status. Despite the passage of the Affordable Care Act (ACA) in 2010, it was reported that up to 40% of young adults (aged 19-25) still lacked insurance coverage in 2011 (Luquis & Kensinger, 2017). Furthermore, many insurance carriers dispatch an explanation of benefits (EOB) and record of the healthcare visit to the primary policy holder even though they are not always required to do so by law. In some cases, the primary policy holder is a college student's parent, and this billing record can create unease and a distrust in confidentiality with a student is accessing reproductive health care services. Most university health centers are governed by HIPAA and FERPA and some do not take health care insurance, which removes this confidentiality barrier to care. Cost of service concerns create additional obstacles for young adults accessing care and participating in recommended preventative care screenings. All of these circumstances can further diminish opportunities for reproductive health education and interaction between college students and their university care providers.

Campus Community and Public Health Implications

The American College Health Association (ACHA) recommends college campuses should be labeled as communities. Public health departments are tasked with protecting and promoting overall health in their communities, but many community health systems have been

burdened with budget cuts, decreased staffing, and diminished resources (Bekemeier et al., 2013; Hoornbeek et al., 2019; Ingram et al., 2012).

STI rates are increasing in the population and in our young adults, who represent an at-risk and potentially vulnerable subgroup. Literature suggests preventative health services offered to young adults may be more beneficial if cost-effective and comprehensive (American College Health Association, 2016; Bersamin et al., 2017). Professional resources point out that budget and funding cuts across the board to public health departments since the 1980s have created health department staffing and service delivery challenges and suggest the solution of establishing community partners with possible outsourcing (Bekemeier et al., 2013; Luo et al., 2013). The Council for the Advancement of Standards in Higher Education (CAS Standards) and the American College Health Association (ACHA) also recommend college Clinical Health Services (CHS) should partner with community agencies to promote and offer a comprehensive health program to campus communities, which includes resources facilitating increased access to care and cost-effectiveness. (Appendix B).

To date there have been other STI partnerships between university health centers and public health organizations, but no scholarly articles on partnerships between public health entities and private universities could be located. Offering affordable and convenient STI screening in the university health center may concurrently increase quality of care and reduce challenges revolving around student transportation, campus STI transmission rates, timely STI treatment, and perceived sexual health stigma.

Theoretical Model

The European Foundation Quality Management (EFQM) Excellence Model is a non-prescriptive framework utilized in the business sector to enhance the ability of organizations to

assess and analyze areas of the syndicate against its targets (results) and resources (enablers) (Sokovic et al., 2010). The needs of the Quality of Care Partnership did not require the entire model. Therefore, a more focused portion was selected. That portion is the RADAR (Results, Approach, Deploy, Assess, and Refine) Matrix (Appendix C).

RADAR Matrix

The RADAR Matrix provides a structured approach to the question of performance within an organization through the implementation of the 5 interconnected phases (Sokovic et al., 2010). Using the RADAR Matrix for this quality improvement project provided a guiding, iterative mechanism to continuously reassess goals and outcomes defined by the Quality of Care Partnership. The RADAR Matrix establishes a blueprint for measuring an organization's processes and level of performance improvement. This assessment tool represents a robust PDSA cycle and has synergy with the Demming cycle (Sokovic et al., 2010).

Key Constructs

Results

Results were defined as the outcomes the Quality of Care Partnership aimed to achieve. The results were determined to be decreased costs of STI screenings, improved STI data collection and tracking, increased student access to preventive health services, and improved care delivery at the university health center. Descriptive statistics were utilized to measure scholarly project results and impact.

Approach

This phase was defined as the planned set of approaches to deliver the desired results. The approach began with identifying a public health stakeholder for interprofessional collaboration. A Memorandum of Agreement (MOA) was subsequently created between the state

DOH laboratory and the university health center for an initial three years to adopt the state DOH laboratory's STI screening pricing model within the university health center.

Deploy

The state DOH laboratory pricing model achieved by the MOA was enacted in the university health center along with a newly approved STI screening protocol reflective of these new processes. STI lab orders and pricing were systematically entered into the university health center's electronic health record (EHR). STI lab specimen supplies were secured to ensure specimen collection consistency and fluidity of specimen resulting at the state DOH laboratory. Clinical staff were trained in the new STI procedures and processes prior to deployment.

Assess and Refine

Ongoing monitoring and analysis of processes and activities related to the new STI screening procedures was performed to determine whether or not identified results were being met. Biweekly reports were compiled through the Mediat EHR system capturing data on the identified study variables of interest. Clinical staff were approached informally by phone, email, or in-person biweekly and as needed to evaluate the need for process refinement and ascertain the effectiveness of the Quality of Care Partnership. The principal investigator corresponded with the state DOH laboratory director and assistant laboratory director biweekly to assess the need for further clarification, refinement, and improvement regarding the MOA stakeholder processes. Routine updates were provided to clinical staff on a monthly basis regarding the state DOH laboratory and university health center partnership.

Design

The Quality of Care Partnership is classified as a quality improvement project as its goal was to improve access to and quality of care at a reduced cost for college students. To commence

this cost-reduction quality improvement initiative, a Memorandum of Agreement (MOA) was created between the state DOH laboratory and a university health center. The DOH state laboratory may only perform an annual \$10,000 in additional lab work per their state budget and no other MOA between a private university health center and this state lab has existed to date. The project used STI testing supplies from the DOH to screen for STIs on campus with the DOH state laboratory pricing model that reduced previous STI screening costs on average by a total of 60% for a comprehensive STI screening panel. In house university health center fees for Chlamydia and Gonorrhea were reduced from \$50 to \$15, the cost of HIV decreased from \$18 to \$9, and the clinic fee for Syphilis testing lessened from \$42 to \$21. Clinical staff utilized these supplies to collect preventative health screenings and tests for students with STI symptoms or potential/known STI exposure. The university health center ordered STI laboratory tests utilizing the DOH Laboratory Clinical Submission Requisition Form and dispatched STI laboratory specimens to the DOH state laboratory via same day courier service. Clinical staff followed the approved DOH/Health Services Protocol to appropriately label and order specimens according to DOH laboratory policies and procedures prior to being sent to the state laboratory.

STI specimens were tested in the state laboratory and results were dispatched to the university health center via mail initially. In order to provide timely lab results and based on feedback from clinical staff midway through the project implementation period, the principal investigator corresponded with the state laboratory director and the assistant laboratory director to have results faxed directly and securely to the university health center. The results were then entered into the university health center's Mediat EHR by nursing staff after review and signed by the ordering provider. The DOH was also provided with STI results from the university health center and DOH state laboratory to obtain aggregate data for public health tracking purposes and

to ensure any exposed individuals indicated on the STI reporting form were notified. The local health department STI/HIV clinic also offered the university health center free bus passes to cover transportation to and from their local STI/HIV clinic for students if overall costs continued to present a barrier.

This quality improvement project supplied the university health center and the public health department with accurate data on STI screening, transmission, and screening dates that has been previously unavailable. The campus community may continue to benefit from an increased number of STI tests being performed on campus as it will lead to earlier detection and treatment, potentially keeping the college students and the local community healthier. The increase in the number of STI screening encounters may furnish the university health center with greater educational opportunities and preventive counseling for an at-risk population.

Clinical/Practice Setting

The Quality of Care Partnership was initiated in the university health center at a Southeastern private Christian university which had an estimated enrollment of 8,440 students for the 2019-2020 academic year. The university health center is the only provider of health services on campus and is staffed by front desk personnel, registered nurses, nurse practitioners, embedded counselors, and a clinic director. The university health center is an acute-centered clinic utilized by the campus community for episodic urgent care, preventative health needs, uncomplicated mental health management, counseling, triage, and appropriate referral. Students are able to self-schedule, call, or walk-in for an STI appointment at the university health center. Specific student visit office fees are covered by the University's overall student fee. Supplemental services such as laboratory testing, medical supplies, IV fluids, immunizations, in office procedures, and medication for episodic treatment are provided at an additional charge.

The university health center follows HIPAA and FERPA guidelines concerning patient privacy and confidentiality and operates under the Division of Student Affairs with the clinic director reporting to the Dean of Student Life which is governed by the University's Vice Present of Institutional Effectiveness.

Project Population

The target population was undergraduate and graduate college students (aged 18-30 years old) who lived on campus or were commuter students who were actively pursuing their academic interests at the University. The campus population is comprised of young adults who may provide useful data capture and insight about STI prevalence and treatment rates, improving cost-effective access to STI screenings, and the potential benefits and framework for collaborating with a community partner on college campuses. The results of this quality improvement initiative may be applicable to other campus community populations at institutions of higher education across the country.

Project participants were collegiate students who were seeking STI screening, counseling, and treatment at the university health center. To be eligible for the study the participants must matriculate at the institution within the identified age group (aged 18-30 years old) and have made an appointment in the clinic for the visit reasons of "STD Screen," "Personal," "UTI," "GYNProb," "Misc Illness," or any type of visit where an STI screening is recommended by nursing staff or the clinician. The participant would ideally have their physical STI screening performed at the university health center and their results would be included in collective aggregate public health data reported by the department of health. Exclusion criteria was inappropriate age group and/or identifying as a non-university student. Data was compared to

retrospective data from STI-related appointments conducted in the clinic over previous academic semesters and academic years from August 2018 to May 2020 at the university health center.

The Quality of Care Partnership employed purposive sampling following the inclusion/exclusion criteria established by the investigator. The Quality of Care Partnership used nonprobability purposive sampling since there was no finite number of individuals dictated by the researcher. The participants scheduled STI-related visits in the university health center per regular protocol. The participants were not directly engaged for data collection or the intervention.

Instrumentation and Methods

Data collection occurred by reporting derived from the university health center's Mediat Electronic Health Record (EHR) and commenced in September 2020 and continued through November 2020. Data was tracked in the electronic health record using created referral codes, transaction codes, CPT codes, and appointment visit codes (Appendix A). Data collection reports were compiled biweekly and numbers of STI screenings performed were verified with the DOH state laboratory on a monthly basis. Data was classified by variables of interest and entered into a monthly spreadsheet table by classification.

A retrospective analysis was completed for a data comparison between the project implementation period (September 2020-November 2020) and each previous fall academic semester and academic year (August 2018- May 2020). Mediat EHR charts were reviewed for STI-related visit encounters to record specific STI tests ordered, STI treatments provided in the university health center, cost of STI visit, STIs detected, and if a student was referred to the local health department due to a student's inability to pay the clinic visit costs. Charts were also reviewed to determine if the ordering university care provider was unable to follow evidence-

based STI screening recommendations due to cost constraints instead of performing a full recommended STI screening. Demographic variables of interest collected for each STI-related clinic encounter were the students' age, identified gender, insurance status, campus residency status, and academic designation status (undergraduate or graduate).

Data Procedures

Comparisons of previous and current year episodic visits for STIs were evaluated through descriptive statistical analysis using SPSS Version 27. Frequency distribution tables grouping students by their age, identified gender, residency status, and academic designation were generated and compared to the number of STI-related visits for each academic semester and year from August 2018 through November 2020. Percentages were calculated for the average cost and total saved for a university health center STI visit, the number of students referred to the local health department, STI campus rates, the number of STI-related visits, student age, evidence-based STI screening recommendations upheld, and student identified gender. The percentages of the above mentioned variables were then compared respectively by each academic semester and year from August 2018 through November 2020. Additional frequency tables were also produced to display the total number of students for each academic semester from August 2018-November 2020 and further grouped by their academic designation status, campus residency status, identified gender, and age. Groups were compared to the number of university health center provider visits and STI-related visits for the academic years (2018-2020).

Risks and Benefits to Humans Subjects

There was a relatively low risk to human subjects in this quality improvement study as there was no direct engagement or physical intervention being implemented. These circumstances resulted in an exemption being granted by the Institutional Review Board (IRB),

but a complete IRB application was still submitted for review. The greatest concern was with regard to surrounding ensured confidentiality, privacy, and data reporting. All data collected through the EHR was reported as nonidentifiable, aggregate data only per the agreement between the University and state DOH laboratory. All data captured, including statistical analysis was safeguarded on the investigator's personal password-protected laptop and only shared with the DNP Project Advisor, supervising DNP Faculty, the clinic director, and the state DOH laboratory.

Strengths and Limitations of the Project

Presently, a private Christian university in the Southeastern United States has become increasingly aware of a lack of preventative health education offered to its students. This acknowledgement of an educational gap has increased efforts to glean more assessment data surrounding complex, wellness issues on campus. The University has charged several wellness teams and committees with instituting more complete and comprehensive health promotion initiatives and curricula campus wide. This shift in campus community prioritization and planning has presented a viable opportunity to inspect and improve upon the current reproductive health practices in several departments and areas for the students. The further engagement of administrators and departmental leaders has created a window for preventative quality improvement and increased education for leadership and university students.

A potential strength of this scholarly project is that the university health center already offers STI screening and treatment so there is no change in services, but predominantly in costs and care access expansion. Implementing the Quality of Care Partnership with the state DOH laboratory will continue to provide more precise and complete data regarding STI transmission rates, STI trends and patterns in the college population, and the effectiveness of campus

preventative health services. The DOH could potentially receive additional grant funding for continuing to provide high quality services to the community in which they serve. Regular communication and oversight of this partnership may facilitate the development of future quality of care initiatives and reinforce the advantageous relationship between the University and the DOH. It may pave the way for future collaborations in other important health and wellness areas. Possibly the greatest outcome would be being able to deliver improved reproductive health care services necessary for and requested by the students.

In previous academic years the university health center did not collect, track, or report on sufficient data and trends for STI-related appointments and care processes. Therefore, it may be challenging to perform direct comparisons between newly captured data and previous data. Due to the continued COVID-19 pandemic, the number of overall university health center visits substantially decreased, preventive health visits decreased, and STI-related appointments did not increase as predicted and in fact, decreased. The Quality of Care Partnership could also not be advertised or marketed in any way in relation to the University.

Additional challenges were related to the recent outbreak of the COVID-19 as this pandemic is requiring the majority of the local health department and DOH's resources including personnel, laboratory testing, and public health policy initiatives. The coronavirus outbreak altered the desired project timeline and prospects for eminent execution. The Fall 2020 academic semester was shortened, on campus residences were de-densified, and the requirement for first-year students to live on campus was waived in response to infectious disease recommendations. COVID-19 circumstances are rapidly changing so iterative planning and strategic communication with stakeholders for this quality improvement project was paramount.

Results

Overall student enrollment at a private Southeastern university was 8,260 in 2018 and 8,440 in 2019. There were an average of 3,445 residential collegiate students residing on campus in 2018 and an average total of 3,614 residential students in 2019. A total number of 177 cases were captured for data analysis for this quality improvement project. Retrospective chart reviews of student STI visits were conducted on clinical encounter notes utilizing the electronic health record (EHR) reporting system in a university health center. Student clinic visits for any clinical reason in a university health center decreased from 1,324 appointments to 1,272 appointments from 2018 to 2019 potentially as a result of students returning home during the outbreak of COVID-19 in Spring 2020. University health center appointments also changed to a telehealth format utilized for students only residing in the university health center's state of origin. In the 2018 academic year from August 2018 to May 2019 a total of 97 STI-related visits were documented. STI-related visits comprised 7.3% of the total amount of 1,324 clinic visits in the 2018 academic year. Further retrospective chart reviews in the 2019 academic year from August 2019 to May 2020 yielded 81 STI-related clinical encounters carried out in a university health center, which comprised 6.4% of all 1,272 clinical encounters. Participants were collegiate students visiting a university health center for reproductive health appointments over the course of two academic years.

Demographics

The age of the study participants presenting for STI-related services ranged from 18 to 30 years ($M = 21.8$, $SD = 2.36$). Female participants comprised 68.8% of the study participants with males accounting for 31.2%. Non-residential students constituted 83.5% of all participants visiting the clinic for an STI-related appointment. Seniors were the largest class designation represented in the participants at 43.2% of the entire sample presenting for STI testing (Table 1).

Data in reference to ethnicity and race were not available as this was not a required or captured data field in previous clinic visit or student account documentation.

STI Appointments from Retrospective Chart Reviews

A university health center completed a total of 95 STI appointments in the 2018 to 2019 academic year and subsequently a total of 82 STI appointments over the course of the 2019 to 2020 academic year. It should be noted that in-person clinic visits at the university health center were stopped three months prior to the completion of the 2019-2020 academic year due to the restrictions brought on by COVID-19. Retrospective chart reviews over the 2018 and 2019 academic years revealed university care providers were able to conduct a complete, evidence-based STI screening panel 18.9% ($n = 18, N = 95$) of the time in the 2018-2019 and 22.0% ($n = 18, N = 82$) of the time during 2019-2020. Partial STI testing was performed during STI appointments in the university health center 22.1% ($n = 21, N = 95$) in the 2018-2019 academic year and 15.9% ($n = 13, N = 82$) in the 2019-2020 academic year. Furthermore, students requiring STI testing were referred off site to the local health department for lower cost STI services 81.1% ($n = 77, N = 95$) of the time in 2018-2019 and 78% ($n = 64, N = 82$) of the time in 2019-2020 with no additional referral follow up notes (Table 2).

Cost Projections of STI Testing

Retrospective chart reviews over the course of the 2018-2019 and 2019-2020 academic years of STI-related student clinic appointments revealed collegiate students individually paid \$110 on average for a complete STI screening panel, which cost the total 2 year average of 89 students ($n = 95, n = 81$) = 177/2 coming to the university health center for STI testing, \$9,790 over 1 year and \$19,580 over 2 years. Utilizing the Quality of Care Partnership pricing model through the state DOH laboratory, students will individually pay \$45 for a complete STI

screening panel, which is a projected cost savings of \$4,005 over 1 year and \$8,010 over the course of 2 years. The initial plan for this quality improvement project was to compare the number of STI-related visits per academic semester, but due to the limitations generated by the outbreak of COVID-19, clinic visits were limited under the new Quality of Care Partnership STI testing pricing model to 5 total appointments, which is ($n = 5, N = 82$) and ($n = 5, N = 95$) = 5-6%/2 over the one semester project implementation period. The limitations of COVID-19 resulted in clinic flow only being 10-20% of its traditional visit amount for STI-related appointments over the Fall 2020 semester so costs were projected based on a typical year for this project. Under the new Quality of Care Partnership STI testing pricing model for a full STI screening students will individually save \$65, which is an estimated cost savings of \$5,785 over 1 year and an estimated savings of \$11,570 over 2 years (Table 3).

Discussion

The enactment of an MOA between the state DOH laboratory and a university health center resulted in improved quality of care for students, improved STI-related visit documentation and reporting, and reduced costs for STI screening for collegiate students at a Southeastern private university campus. Although it was initially predicted that the decreased STI screening costs would increase the number of STI-related visits during the quality improvement implementation period, this was not the case most likely due to the continued rates of COVID-19. The university health center actually saw a sharp decline in overall preventive health visits as students in the fall of 2020 compared to previous academic semesters and years. Collegiate students and providers alike narrowed their immediate foci to care facets related to COVID-19 infection control practices, testing, isolation and quarantine, daily symptom tracking, and contact tracing. Non-COVID-19 visits decreased overall and collegiate social behaviors and practices may have also

been impacted by public health guidance communicated to mitigate the risk and transmission of COVID-19, and may therefore have contributed to the decline in primary care visits.

Quality of Care

Prior to the implementation of the Quality of Care Partnership between a university health center and the state DOH laboratory, almost 80% of collegiate students were referred to the local health department for reduced-cost STI screening without any further follow up. This practice of referral to the local health department may have potentially placed an additional strain on public health resources accessed by local community members. The introduction of the three year MOA between the university health center and the state DOH laboratory allowed all 5 patients seen for STI-related appointments in the fall of 2020 to have access to STI testing in-house at a lower cost and receive results in a timelier manner as results typically take 2 weeks to receive from the local health department.

Prior to the MOA agreement, university care providers were unable to follow best-practice guidelines for screening for STIs in collegiate students almost 80% of the time. This quality of care improvement project may continue to reduce the burden on the local health department in the years to come and allow university care providers to follow evidence-based practice guidelines for STI screening when caring for young adults who represent 25% of the entire sexually active population in the United States and account for 50% of all STIs (Fonte et al., 2018; Griner et al., 2017; Montgomery et al., 2008; Whiting et al., 2019).

Another benefit may be that earlier detection, prompt partner notification, rapid treatment, and reproductive health educational opportunities in the university health center may prove advantageous in preventing short and long-term health consequences caused by STIs in an at risk population. Furthermore, collegiate students can access convenient high quality preventive

healthcare regardless of their socioeconomic status, personal background, and transportation status on their own campus. Receiving effective preventive healthcare can promote the development of lifelong healthy habits, behaviors, and optimal outcomes. The professional collaboration and partnerships between public health entities and university health centers represents a shared vision and robust efforts to leverage resources to keep communities safe and healthy.

STI Reporting and Documentation

In the academic school years prior to the establishment of the MOA between the state DOH laboratory and a university health center, clinical encounter and referral follow up documentation in the EHR for STI-related visits was inconsistent and hampered accurate and streamlined tracking and reporting. University care providers often utilized different ICD-10 codes or omitted specific STI-related codes limiting data capture on the EHR reporting platform. These inconsistencies made STI-related appointment tracking difficult and time consuming when reviewing clinical encounters for quality improvement purposes and administrative reporting. The addition of procedure codes, including reinforcing the use of the referral code to delineate whether or not the patient was ultimately referred to the local health department for testing, and set transaction codes when applying the newly created MOA pricing model increased the accuracy and expediency of STI-related visit data capture in the EHR reporting system. Laboratory and pathology order result options were also added to allow for STI specimen results to be uniformly documented in the EHR instead of solely relying on free text entry of STI results and only scanning images of lab reports in document folders of each patient's chart.

Reducing the cost of STI screening for collegiate students by over 50% should allow for increased STI testing to be performed in the university health center resulting in prompt STI

result and partner notification and STI rate tracking within the campus community. An increase in the amount of STI screening performed in the campus community may further enhance accurate STI rates and expand the reporting of communicable disease cases detected to the state DOH which could potentially increase public health preventive grant funding and resource allocation for the greater local community. This increase in in-house STI screening will also remove the challenges associated with patient follow up as it may lead to decreased overall referral for STI testing off campus. Patient STI-related case studies and quality improvement analyses could assist in the continued education of university care providers.

Cost-Conscious Campus Care

By adopting the state DOH laboratory's pricing model to reduce STI screening costs by greater than 50%, collegiate students may be more apt to visit their university health center for STI screening. The overall volume of STI testing performed within the campus community may generate an expanded amount of STI-related data and allow for targeted collegiate student reproductive health education interventions and education. Removing the financial barriers previously associated with the previous STI screening pricing model will allow the university health center to align more closely with CAS Standards in offering students a comprehensive health program (Appendix B).

Collegiate students may present more frequently to the university health center as it often functions as the sole source of primary care. It has been documented that young adults may present for reproductive health services at the university health center for convenience. The university health center does not accept health insurance which upholds confidentiality as many college students remain on their parent or guardian's insurance policy. The reduced costs of STI screening in tandem with the current evidence-based STI screening guidelines will allow

sexually active collegiate students to pay a reasonable amount for recommended STI testing during their appointments while continuing to pay lower costs for future recommended screenings at the designated intervals.

RADAR Matrix

Employing the RADAR Matrix during this quality improvement project allowed for the continued assessment and reassessment of goals and outcomes identified in the development phases of the Quality of Care Partnership. The RADAR Matrix supported the problem-focused application of a PDSA cycle and allowed it to be performed as an iterative evaluation method for the relationship between the university health center and the state DOH as well as the deployment of this intervention and acquisition of laboratory supplies. Although in the initial identified results there was a prediction that the reduced cost of STI screening on campus would increase the amount of STI testing performed by the university health center, this outcome was not met. It is believed that this was primarily the result of COVID-19 and the impact on all health services. However, cost-conscious STI screening on campus supports improved quality of care, access to preventive health services, and STI data collection and overall tracking.

Biweekly reports were produced in the EHR system and clinical staff were informally approached through a variety of communication methods to ascertain the effectiveness and evaluate the project processes between the university health center, the laboratory couriers, and the state DOH laboratory services. The state DOH laboratory director, assistant director, and the principal investigator corresponded by phone or email in order to assess and refine MOA processes and procedures. Clinical staff in the university health center were provided with process clarification updates, communications, and responses to any identified questions or concerns clinical staff alerted the principal investigator to. STI results received by mail were

being held in the campus mail room causing some delays in result delivery to clinical staff so this procedure was altered so STI results were faxed from the state DOH laboratory directly to the university health center secure fax line. This refinement increased result notification turnaround time to an average of 3-5 business days.

Implications for Practice

STIs continue to be an important concern for the young adult population which is a priority preventive health population in the United States. Many university health centers operate as the sole source of primary care for collegiate students. College students themselves are balancing a multitude of complex social, financial, emotional, and physical issues during an important time of future and holistic development in their lives. STI rates are continuing to increase globally and within the United States and can have lasting short and long-term health impacts on the young adult population (Allen et al., 2016; Griner et al., 2017; Happa et al., 2018). Increasing efforts to provide affordable, confidential, and comprehensive reproductive health services can assist in timely identification, tracking, reporting, and treatment of STIs which will help prioritize the overall health and wellness of not only a campus community but benefit the greater community at large as young adults are members of both groups. Providing increased opportunities for healthcare providers to practice and implement evidence-based STI-related care and preventive care is beneficial.

Further development of mutually beneficial partnerships and frameworks for achieving agreements between institutions of higher education and public health systems may maximize the engagement of stakeholders and expand care delivery in all communities. Accurate preventive health data capture and reporting may pave the way for more targeted preventive health care educational opportunities and interventions. Community health organizations and

institutions of higher education participating in interprofessional collaboration assists in creating preventive health networks which may minimize care barriers for younger adults and future older adults from experiencing a gaps to their overall success and access to holistic health services.

Public health resources are strained in many areas of the United States so opportunities for stakeholders to partner and develop additional pathways to health that can alleviate any of these burdens are paramount.

Strengths, Limitations, and Future Directions

The Quality of Care Partnership benefited from several strengths over the course of this study. The principal investigator was employed as a healthcare provider at the university health center and encountered the identified clinical problem regularly in daily practice. The principal investigator also had familiarity and access to the university health center's EHR and reporting software. As a practicing healthcare provider previously in the larger community surrounding the campus, the principal investigator possessed knowledge of and was able to identify potential public health stakeholders and campus community stakeholders utilizing existing and establishing further professional relationships during the quality improvement project development and implementation. Despite the outbreak and continued transmission of COVID-19, the project stakeholders the principal investigator had previously identified and communicated with remained supportive, flexible, and responsive to the project even if the allocation of many resources had to be redistributed to the COVID-19 pandemic response effort. The institution of higher education where the Quality of Care Partnership was enacted had recently upgraded the EHR reporting software in response to the outbreak and management of COVID-19. Although in-person research activities were placed on hold during the 2020-2021

academic year at the University, this quality improvement project could be implemented without a direct in-person research intervention and relied on retrospective chart reviews.

There were several limitations to the Quality of Care Partnership. During COVID-19 the university health center policy discontinued online self-scheduling of STI appointments by students. Rather, they were required to call to schedule an appointment. It is felt that this change may have led to increased embarrassment of sense of judgement among students who could no longer schedule with the same degree of anonymity. This may have decreased the number of students that could have been cared for. All university care providers at the university health center are also female which may have resulted in some reluctance for male students wishing to access sexual healthcare. This low turnout resulted in a lack of new data captured during the project implementation period and the inability to forecast post-COVID-19 consumption of STI-related services in the university health center. A final limitation identified was there were not any potential strategies approved for reproductive healthcare education or communication of the new MOA pricing model for STI-related services campus-wide to the students.

Future areas of investigation and research could be creating healthcare practice organization guidelines and a checklist of tasks and variables necessary to implement a successful preventive health partnerships between college campuses of different demographics and sizes and public health organizations. Continuing to collect future data related to STI visits at the university health center including the number of clinical encounters under the new MOA pricing model in subsequent semesters depending on the status of COVID-19 and preventive healthcare visits may prove insightful. Dispatching collegiate student surveys at the University related to their identified reproductive healthcare needs and evaluation of services may also lead to the development of more targeted preventive healthcare education and interventions. Studying

trends and access to preventive healthcare during and in the time following mass COVID-19 vaccination could lead to improved preventive health appointment capture in vulnerable and at-risk populations.

Conclusion

After the implementation of the Quality of Care Partnership between the University and the state DOH students were able to receive reduced-cost STI screenings in the university health center which did improve access to quality care. Collegiate students are not only members of their campus communities but members of greater communities at large. Increased efforts advancing collaborative networks among institutions of higher education and community health organizations to prevent short and long-term negative health outcomes may assist in removing barriers to young adults' overall academic and personal success. These collaborative efforts may also help future generations establish valuable, healthy holistic practices over the course of their entire lifetime.

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Table 1***Demographics of Collegiate Students Presenting for STI Testing***

Characteristics	Class Designation				
	Freshman (n=21)	Sophomore (n=30)	Junior (n=25)	Senior (n=76)	Graduate (n=24)
	Percentages				
Number of Students	11.9%	17.0%	14.2%	43.2%	13.6%
	Gender				
Female	90.5%	70.0%	76.0%	64.5%	54.2%
Male	9.5%	30.0%	24.0%	35.5%	45.8%
	Residency				
Residential	66.7%	13.3%	16.0%	9.2%	0.0%
Non-residential	33.3%	86.7%	84.0%	90.8%	100%

Table 2***Characteristics of STI Appointments from Retrospective Chart Reviews***

Variable	2018-2019 Academic Year (n=95)		2019-2020 Academic Year (n=82)	
	n	%	n	%
Number of STI Screenings ^a	18	18.9%	18	22.0%
Number of Partial STI Screenings ^b	21	22.1%	13	15.9%
Evidence-based Practice ^c	18	18.9%	18	22.0%
Referral to Health Department	77	81.1%	64	78.0%

Note. The measured academic years examined STI appointments from August to May except the 2019 to 2020 academic year ceased in-person appointments three months early due to COVID-19.

^aNumber of STI Screenings refers to complete STI Testing performed in the university health center.

^bNumber of Partial STI Screenings refers to only some tests of the total STI Screening were performed.

^cEvidence-based Practice refers to if the university care provider was able to follow current STI screening recommendations.

Table 3***Cost Projections of STI Screening***

Pricing Model (n=89)	Cost of STI Screening		Cost Projections
	Individual Student Cost	Total Cost 1 Year	Total Cost 2 Years
Former Pricing Model			
STI Screening	\$110	\$9,790	\$19,580
Quality of Care Partnership Pricing Model			
STI Screening	\$45	\$4,005	\$8,010
Total Savings	\$65	\$5,785	\$11,570

Appendix A

Test:	CPT Code:	Specimen Numbers (2019-2020 academic year):
Urine Gonorrhoeae/Chlamydia	87591/87491	42
Trichomonas	87661	0
HIV	86703	29
Syphilis (Treponemal Antibody IgG)	86780	23
HSV 1 & 2 Antibody (HGG)	86694	2
Herpes Culture	87252	2
Total Specimens:		98

These are the number of specimens recorded for each of these CPT Codes over the 2018-2019 academic school year.

The university health center had 76 appointments for “STD Screen” and 20 appointments for “Personal” which was often used for STI screening appointments previously.

Appendix B

The Council for the Advancement of Standards in Higher Education (CAS Standards) directs Clinical Health Services to:

The mission of Clinical Health Services (CHS) must be to teach, provide, promote, and support clinical health care, preventive services, treatment of illness/injury, patient education, and general public health responsibilities.

CHS must serve as a method for the education of health issues for all students, thereby enhancing the learning environment of the institution of higher education it serves.

CHS must serve as leaders for advocating for a healthy campus community.

CHS must take into consideration the health status of the student population along with the safety and emergency preparedness of the learning environment.

CHS must advocate for inclusive and equal access to resources and services, eliminate health disparities, and achieve health equity.

1. In determining the quality of services provided, the following guidelines should apply:
 - access to primary healthcare for all students
 - provision of services in accordance with standards of professional practice and ethical conduct and consideration of cost-benefit analyses regarding the health status of the population
 - cost-effective and relevant services designed to address unique campus configurations
 - coordination of services to ensure coverage with little to no duplication
 - identification of less expensive alternative resources for individual health care when appropriate
 - provision of appropriate referrals for additional or alternative treatments and assessments
 - timely, fiscally, and efficient in meeting the needs of students

CHS should provide service that is competent, considerate, and compassionate; recognizes basic human rights; safeguards personal dignity; and respects identities, values, and preferences.

CHS personnel should participate actively with their institution in designing policies and practices and developing further resources and services that have direct effect on the health status of the campus population.

CHS must develop and implement strategies for outreach and promotion.

1. The CHS director or coordinator must be placed within the institution's organizational structure to be able to promote cooperative interactions with appropriate campus and community entities.
2. CHS should identify and utilize community services, whenever appropriate, to build resource and service networks and to create awareness within the community about special needs populations.

The American College Health Association (ACHA) published Standards for Health Promotion in Higher Education identifies the importance of Standard 3: Collaboration

Effective practice of health promotion in higher education requires a shared responsibility of all campus and community members to enhance health and well-being.

1. 3.1 Identify and collaborate with interdisciplinary partners, including students, faculty, staff, administrators, and community partners.
2. 3.2 Utilize campus and community assets to create health promoting environments.
3. 3.3 Engage with campus and community coalitions to maximize the reach and effectiveness of health promotion initiatives.
4. 3.4 Utilize purposeful collaboration as a tool to achieve health and well-being goals and objectives.

Appendix C

RADAR

