Screening for Chlamydia in Adolescents and Young Women

Rita Mangione-Smith, MD, MPH; Elizabeth A. McGlynn, PhD; Liisa Hiatt, MS

Objective: To measure the proportion of sexually active females aged 15 to 25 years who received a screening test for Chlamydia trachomatis infection during the previous year.

Design: Administrative data were used to identify females in the target age range who were likely to be sexually active. Medical record data were reviewed for a sample to determine whether the administrative algorithm was acceptable. Laboratory claims data and medical record data were used to identify females who had had a screening test for chlamydia.

Setting: Four geographically dispersed US managed health care plans.

Patients: We studied 19214 sexually active females aged 15 to 25 years continuously enrolled for calendar year 1997 in 1 of 4 major US health plans who had a visit to their health care provider during that year. Sexual activity was determined using an algorithm designed for use with administrative data.

Main Outcome Measure: Rates of chlamydia screening among sexually active females aged 15 to 25 years.

Results: The proportion of females aged 15 to 25 years identified as sexually active by the administrative data algorithm in the 4 health plans was similar (43%-54%; \( P = .79 \)). However, substantial variation was found in rates of chlamydia screening for eligible females in these 4 health plans (2%-42%; \( P < .001 \)). Plans varied considerably in the types of visits (eg, sexually transmitted disease screening or pregnancy) that determined eligibility for the measure.

Conclusions: A measure of health plan performance on screening for chlamydia in young females using administrative data is feasible and provides useful results despite some flaws in estimation. There is room for improvement in rates of chlamydia screening in sexually active females aged 15 to 25 years.


Chlamydia trachomatis infection is the most common sexually transmitted disease (STD) in the United States, affecting an estimated 4 million people at an annual cost of $2.2 billion.\(^1\) About 79% of the costs of chlamydial infection in the United States are borne by females.\(^1\) The health consequences of chlamydia for females include increased risk of developing pelvic inflammatory disease, tubal factor infertility, chronic pelvic pain, ectopic pregnancy, death from ectopic pregnancy, and human immunodeficiency virus infection.\(^2,3\)

Although risk factors for chlamydial infection are similar to those for other STDs (eg, having multiple sex partners), chlamydia is much more prevalent (>5%) in adolescent girls than other STDs regardless of race, place of residence, or socioeconomic status.\(^6\) Among females reported to the Centers for Disease Control and Prevention (CDC) as positive for chlamydia in 1995, 4% were aged 14 years or younger, 46% were 15 to 19 years, 33% were 20 to 24 years, and 17% were 25 years or older.\(^7\)

The main goal of chlamydia screening and treatment is to prevent pelvic inflammatory disease and its sequelae. Other goals include preventing perinatal and postpartum complications in pregnant females and preventing infections in infants born to those infected with chlamydia. Among females with evidence of past chlamydial infection, 20% to 40% will experience pelvic inflammatory disease if untreated.\(^2,3\) Among females with positive test results for chlamydia, 50% to 75% will experience tubal factor infertility if untreated\(^6,9\) and 65% will experience an ectopic pregnancy if they become pregnant and are not treated.\(^9\)
PARTICIPANTS AND METHODS

PARTICIPANTS

Six health plans were invited by the NCQA to participate in the testing phase of the HEDIS chlamydia screening measure. The health plans were assured that their results would be confidential to encourage participation. Four health plans agreed to participate in the refinement and ultimate testing of the measure. The participating health plans were geographically diverse, representing the western, eastern, midwestern, and southern United States. Data were collected from visits occurring in these 4 health plans between January 1, 1997, and December 31, 1997.

DEVELOPING THE MEASURE

Specifications for the HEDIS chlamydia screening measure were developed by a team of individuals including quality measurement experts, physician consultants, and representatives from the CDC and several managed care health plans. Because of concerns about costs and confidentiality, the measure was constructed for use with administrative data sets. The denominator of the measure includes females aged 16 to 25 years by December 31 of the reporting year (1997) who were continuously enrolled for the entire 12 months and had a visit code consistent with sexual activity some time during that year (eg, STD screening or pregnancy). This age range was selected because results of published studies in the United States of sexually active females screened during visits to health care providers indicate that the prevalence of chlamydial infection is highest in this group and that age is the sociodemographic risk factor most strongly associated with chlamydial infection. The numerator of the measure includes the number of females in the denominator who were tested for chlamydia during the reporting period.

APPROACH TO IDENTIFYING SEXUALLY ACTIVE FEMALES

We developed a list of 185 International Classification of Diseases, Ninth Revision (ICD-9), and Current Procedural Terminology-4 (CPT-4) codes that identify services, procedures, and medications most likely to be provided to sexually active females. These codes served as an algorithm to identify females for inclusion in the measure using administrative data (Table 1). This was believed to be the most feasible and acceptable approach to identifying the target population. The alternate approaches, medical record review and survey, would be more expensive and potentially invasive. These codes were reviewed by the 4 health plans where the measure was ultimately tested and by the NCQA coding panel. The revised algorithm was tested initially on administrative data from a health plan not involved in the formal testing. This test indicated that the algorithm functioned and identified a reasonable proportion of the target population as being sexually active.

APPROACH TO IDENTIFYING WHETHER CHLAMYDIA TESTING OCCURRED

Nine CPT-4 codes and laboratory billing data were used to identify whether a chlamydia test had been performed (Table 1). These codes were also reviewed by representatives from the 4 participating health plans, the CDC, and the NCQA. The billing codes for chlamydia tests available during the reporting year did not include specific codes for some of the more recent tests developed for chlamydia screening (eg, urine ligase chain reaction). As a result, these new tests were billed for under existing codes for STD screening tests. The CDC petitioned the CPT coding panel for inclusion of new codes specific to chlamydia testing in 1996. These new codes were implemented in January 1998 but were not available during the test of this measure.

ASSESSING THE VALIDITY OF THE MEASURE

In all the health plans, we abstracted a sample of medical records to examine the validity of the denominator and numerator algorithms used to collect data from the plans’ administrative data sets. We used a stratified sampling design to identify random samples of (1) sexually active and sexually inactive females and (2) females who received and did not receive a chlamydia screening test. We reviewed the medical records of 332 randomly selected females who were “algorithm negative,” ie, not sexually active based on administrative data, and of 253 randomly selected females who were “algorithm positive,” ie, sexually active but did not receive a chlamydia screening test according to the administrative data results. Medical record data were analyzed to determine whether the administrative data algorithm correctly identified (1) females who were sexually active and (2) sexually active females who had not been screened for chlamydia. We calculated screening rates obtained using administrative data alone and using these data in combination with medical records data to determine whether the calculated screening rates were significantly different from each other.
sibility and validity of the proposed HEDIS measure and to examine baseline chlamydia screening rates in 4 managed care health plans.

### RESULTS

#### SEXUAL ACTIVITY RATES

Although the 4 participating health plans were geographically diverse, there was minimal variation in the numbers of young females found to be sexually active by the administrative data algorithm in the 4 plans, ranging from 43% to 54% of those aged 15 to 25 years (Table 2). As expected, the proportion of females found to be sexually active increased with age, from approximately 20% in those aged 15 and 16 years to approximately 70% in those aged 22 to 25 years.

#### VALIDITY OF THE SEXUAL ACTIVITY ALGORITHM

Females would not have been identified as sexually active according to the algorithm if they had no visits to their health care provider in the reporting year; 21% of the sample eligible for the measure based on the age cri-
The results of this study demonstrate a need for improvement in the participating health plans in rates of screening for chlamydia in sexually active females aged 15 to 25 years. Even in the health plan with the best performance on this measure, less than half of the eligible population received a screening test. Two previous studies specifically examined rates of chlamydia screening in sexually active females in this age range. 

RATES OF CHLAMYDIA SCREENING

There was significant variation in the 4 health plans in the rates of screening for chlamydia, ranging from 2% to 42% (P<.001) in all females identified as sexually active by the administrative algorithm (Table 3). The proportion of females screened did not vary significantly by age group. There were also some differences in plans in rates of screening by category of eligibility for the measure (Table 4). The plan with the highest rates of screening (plan B) had the highest rate in all but one category of eligibility (pelvic examination) compared with other plans.

We examined whether females who qualified for the measure based on administrative data but did not have a claim for a chlamydia test had evidence of such a test in the medical record. Only 6 females across all 4 plans (8% of the sample) had evidence of a chlamydia screening test in the medical record. The screening rate results based on administrative data alone were virtually identical to the results obtained using combined data from the medical record and administrative files (Table 5).
advocacy because we developed a method for determining the sexual activity status of health plan members, and thus our denominator more closely reflects the at-risk population for chlamydial infection. Leone et al\textsuperscript{17} surveyed physicians by telephone interview, thus their results are potentially subject to recall bias in the participating physicians. This limitation aside, they found that practices with any patients insured through managed care were significantly less likely to screen for chlamydia than those without managed care patients. One additional study\textsuperscript{16} examined screening rates for STDs in general but did not specifically examine chlamydia screening rates. This study interviewed females aged 15 to 44 years who reported that they had ever had sexual intercourse. The females were asked if they had received an STD screening test in the previous 12 months. They found that females who had had a family planning visit at a public clinic in the previous 12 months were significantly more likely to have received an STD screening test than those who had had family planning visits in a private physician’s office (54\% vs 34\%). However, this study was also limited by self-report and recall bias.

The sexual activity rates obtained in the present study using the administrative data algorithm suggest that, although far from perfect, this method offers a reasonable approach for identifying the eligible population (the denominator) for chlamydia screening within a health plan for quality measurement purposes. The average sexual activity rate in females in the 4 health plans (approximately 48\%) is similar to the rate reported for females aged 15 to 18 years by the 1993 Youth Risk Behavior Survey (50.2\%).\textsuperscript{35} The algorithm’s false-negative rate varied by health plan from 2\% to 11\%. There are several possible reasons why sexually active females were underrepresented in the measure’s denominator. First, this proxy measure of sexual activity required that a billable event occur during the study period for a female to be eligible for the measure. We expect that the rate of sexual activity in females in a health plan will be underestimated by the algorithm because not all sexually active females will have a visit during the study period. Among females in our study who were sexually active according to the medical record and not detected to be so by the administrative data algorithm, 15\% had no visits during the study period. Second, even among females who had visits during the study, it is possible that they received reproductive health services outside their regular source of care. The population of young females eligible for this measure (primarily adolescents) is much more likely to obtain out-of-plan care for reproductive health services to maintain confidentiality. This again would result in having no relevant administrative data about them. Third, not all sexually active females will have care that results in a billable code associated with sexual activity. Finally, this measure was constructed to be consistent with other quality performance measures that aim to minimize the number of false positives identified as part of the denominator population. If a measure has a high false-positive rate in the denominator, health plan performance scores on the measure will be biased downward. In health plan D, the algorithm resulted in a relatively high false-positive rate (26\%) for sexual activity. This might be explained by the small number of females in plan D who were eligible (n=229) and tested (n=8) compared with the samples in the other 3 plans (Tables 2 and 5). This reduced sample size calls into question the robustness of the results from plan D. Another possible explanation is that the most common ICD-9 code for identifying females in plan D as sexually active was presenting for a general pelvic examination (70\% of eligible females from this plan, data not shown). Presenting for a pelvic examination, particularly in younger adolescents, might not be the best proxy for determining whether they are sexually active. One other possibility is that medical record documentation of sexual activity in this particular health plan was markedly worse than in the other plans. Bowman et al\textsuperscript{36} found that less than 46\% of physicians surveyed asked new patients about their sexual practices. Thus, the medical record might not be the best gold standard for determining a patient’s true sexual activity status.

The chlamydia screening rates obtained using the administrative data algorithm to determine sexual activity may either overestimate or underestimate the true rate of screening in the population. If the rate of chlamydia screening in females known to a health plan to be sexually active is higher than the rate of screening in those not known to be sexually active but who actually are, this method will overestimate rates of screening. If the rate of chlamydia screening in females known to a health plan to be sexually active is lower than the rate of screening in those not known to be sexually active but who actually are, this method will underestimate rates of screening. Underestimates of screening are also particularly likely with populations of adolescent girls, who may opt to obtain reproductive health care in family planning or school-based clinics for confidentiality reasons. One study\textsuperscript{37} found that adolescents were significantly less likely to go to their regular source of care for questions about pregnancy, STDs, or other topics they wished to keep private from their parents. For plans to avoid underrepresentation of their screening rates resulting from eligible girls obtaining these services from public health clinics, they will need to focus on ways to improve the confidentiality afforded to adolescents. This might require restructuring the way they schedule appointments, ie, not requiring parental consent for care, how they bill for visits, and how they keep medical records.

The screening rates obtained in this study might not represent true screening rates, which by definition should be the rates of testing performed in asymptomatic, at-risk members of the population. In the administrative data algorithm, we included ICD-9 and CPT-4 codes for the treatment of other STDs to identify the eligible population of females. Patients receiving treatment for other STDs are unlikely to be in the asymptomatic category. However, females qualifying for the measure based on these types of codes represented only 8\% of the entire sample of eligible females (data not shown). The group eligible on the basis of pregnancy, although not meeting the conditions of asymptomatic screening, received screening at a very low rate, despite clinical guidelines suggesting the importance of this prenatal care intervention for high-risk females (which includes those aged <25 years).\textsuperscript{38}
As with many HEDIS measures, the specifications for the measure will require updating as new information and technology become available. For example, although not widely used in managed care settings at present, the availability and use of urine-based chlamydia testing will likely increase in the future. The administrative data algorithm will need to be updated to include CPT codes for such tests to reflect these technological advances.

Although the algorithm likely underrepresents the true eligible population because adolescent girls frequently have confidentiality concerns, it is preferable to other more costly and less logistically feasible alternatives such as medical record review or patient surveys. Among the 4 participating health plans, there was considerable variation and low rates of performance. Variability among plans is one of the conditions that makes a measure useful for plan-to-plan comparisons, so results from this measure can be expected to provide useful information for consumers and purchasers. The overall low rates of performance should motivate quality improvement activities despite some questions about the high rate of false positives in the denominator in one plan. Highlighting the relation between age and risk of chlamydial infection is important clinically and should be facilitated by widespread implementation of the measure. This measure will be included for the first time in HEDIS 2000. Consistent with current NCQA policy, health plans will be asked to collect data on this measure but not required to port the results publicly. This affords an opportunity to the first release of results for this measure will be in HEDIS 2001.

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Reprints: Elizabeth A. McGlynn, PhD, RAND Health Program, 1700 Main St, PO Box 2138, Santa Monica, CA 90407-2138.

REFERENCES


