Published in final edited form as:

Sex Health. 2016 April ; 13(2): 131–139. doi:10.1071/SH15066.

Does place of service matter? A utilisation and cost analysis of sexually transmissible infection testing from 2012 claims data

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Abstract

Background: In this study, a previous study on the utilisation and cost of sexually transmissible infection (STI) tests was augmented by focusing on outpatient place of service for the most utilised tests.

Methods: Claims for eight STI tests [chlamydia, gonorrhoea, hepatitis B virus (HBV), HIV, human papillomavirus (HPV), herpes simplex virus type 2 (HSV2), syphilis and trichomoniasis] using the most utilised current procedural terminology (CPT) code for each STI from the 2012 MarketScan outpatient table were extracted. The volume and costs by gender and place of service were then summarised. Finally, semi-log regression analyses were used to further examine and compare costs.

Results: Females had a higher number of test claims than males in all places of service for each STI. Together, claims from ‘Independent Laboratories’, ‘Office’ and ‘Outpatient hospital’ accounted for over 93% of all the test claims. The cost of tests were slightly (<5%) different between males and females for most places of service. Except for the estimated average cost for ‘Outpatient hospital’, the estimated average costs for the other categories were significantly lower (15–80%, $P < 0.01$) than the estimated average cost for ‘Emergency Room – Hospital’ for all the STIs. Among the predominant service venues, test costs from ‘Independent Laboratory’ and ‘Office’ were 30% to 69% lower ($P < 0.01$) than those from ‘Outpatient Hospital’.

Conclusions: Even though the results from this study are not generalisable, our study shows that almost all STI tests from outpatient claims data were performed in three service venues with considerable cost variations.

Introduction

Sexually transmissible infections (STIs) continue to cause extensive public health problems in the United States (US). The estimated number of STIs in 2008 was almost 20 million cases in the US,¹ with an estimated annual direct medical cost of well over US\$15 billion.² Due to the prevalence and asymptomatic nature of some STIs, routine testing for some STIs has been recommended for some sexually active individuals.³ For patients with symptoms,

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Conflicts of interest

None declared.

testing is routine for diagnosis.⁴ Thus, testing is a major component of the control and prevention efforts for STIs in the US. Consequently, it is imperative to keep track of the volume of tests performed and the associated cost.⁵

A previous study analysed the utilisation and costs of all diagnostic methods for eight STIs in the US from commercial insurance claims data.⁵ However, that study did not examine the utilisation and costs of tests based on the place of service. Claims data show that STI testing occurs at several venues with potentially different costs for the same tests.

In this study, we augmented the information provided by the previous study⁵ by examining the utilisation and cost of the most commonly used test for each of the eight STIs by service venue (place of service). The information on volume of test by place of service is needed for identifying and monitoring private sector STI testing at the different service venues.

Additionally, information on venue-based cost of STI tests is needed to conduct venue-specific cost-effectiveness analyses. Finally, the results from this study will provide venue-based STI test utilisation and cost benchmarks for future trend analyses.

Methods

The 2012 outpatient claims data on testing from the MarketScan database (MarketScan Database; Truven Health Analytics, Ann Arbor, MI, USA) was used in this study. The MarketScan database contains data on persons who have employment-based health insurance. In 2012, the database listed claims for more than 50 million insured persons.⁶ However, because the data are from companies who volunteered to participate in providing data to the MarketScan database, the population is not representative of the US privately insured population. Thus, data extracted from the database are convenience samples.

We first assembled the current procedural terminology (CPT) codes for all the most commonly used testing methods for each of the eight major STIs from the previous study.⁵ The eight STIs and their most utilised CPT codes were: chlamydia [*Chlamydia trachomatis* (CT)] – CPT code 87491 (amplified probe technique), gonorrhoea [*Neisseria gonorrhoeae* (NG)] – CPT code 87591 (amplified probe technique), syphilis [*Treponema pallidum* (TP)] – CPT code 86592 (blood serology; qualitative), trichomoniasis [*Trichomonas vaginalis* (TV)] – CPT code 87070 (culture), hepatitis B virus (HBV) – CPT code 87340 (hepatitis B surface antigen), HIV – CPT code 86703 (antibody; HIV 1 & 2 single assay), human papillomavirus (HPV) – CPT code 88175 (cervical/vaginal cytopathology) and genital herpes simplex virus type 2 (HSV2) – CPT code 86696 (HSV type 2).⁵ Some of these codes are not exclusively for the associated STIs because they can be used for claims for testing for other infections; for instance, 87070 can be used for other bacterial infections such as streptococcus.⁵

We then used the assembled CPT codes to extract claims for each STI test for all ages. Next, we summarised the volume (frequency of claims) available in the outpatient database for 2012 for each STI as the measure of utilisation by gender and place of service. The place of service codes in the outpatient table contained in the MarketScan database represented almost 50 unique service venues that conform to Center for Medicare and Medicaid Services

places of service.^{6,7} See the Appendix for the complete list of service venues. However, less than one-half of these venues were utilised for any of the STI tests that we examined. Additionally, most of the venues had very few claims (<10). Consequently, we ranked the places of service by volume and retained the places of service with at least 100 total claims. Then, the remaining service venues were aggregated into a single category labelled 'The Rest' such that there were nine unique places of service categories for each of the STIs and the proportion of claims that were aggregated into 'The Rest' was as low as possible (0.3%). As a result, the venues composing 'The Rest' were not consistent across all the STIs and are not comparable in terms of costs. For instance, the frequency of tests from 'End-Stage Renal Disease Facility' ranked fourth for HBV, with over 30 000 claims. However, there were only three test claims from the same service venue ('End-Stage Renal Disease Facility') for chlamydia. Thus, for chlamydia, 'The Rest' included tests from 'End-Stage Renal Disease Facility', while 'End-Stage Renal Disease Facility' was a stand-alone service venue category for HBV.

The cost for the tests was the total payment (included payments by both enrollee and insurance plan) associated with each claim record. Following the study by Owusu-Edusei Jr *et al.*,^{8,9} we deleted claims with payments US\$0 and determined the average costs by gender and place of service. Because some encounters contained US\$1 total payments for capitated services that might not represent the correct reimbursements,⁶ we re-estimated the average costs by deleting claims with payments US\$1. Costs were summarized by gender and place of service.

To compare the costs of each STI test between gender and place of service, we used a semi-log regression analysis in which the dependent variable (the natural log of cost) was regressed on the enrollee and claim characteristics [gender, data source, drug benefit (whether enrollee's insurance plan included prescription drug coverage), region and health plan type], as was done in recent studies.^{8,9} Given that the purpose of this study was to examine difference in cost across the different service venues, we included a place of service categorical variable in the model to compare the cost of testing from the different places of service. Based on the findings from several previous studies that cost of services in 'Emergency Room – Hospital' was substantially higher than costs from other service venues,^{10–12} we made 'Emergency Room – Hospital' the referent category. Also, because the dependent variable in the regression analyses was the log of cost and the independent variables were categorical, the resulting coefficients (β) were transformed as $(e^{\beta}-1) \times 100$ and interpreted as the relative difference (in percentages) in the average costs when compared with the referent (or omitted) group (i.e. 'Emergency Room – Hospital').¹³

Finally, preliminary results showed that over 90% of the test claims for each of the eight STIs we examined were performed at three places of service ('Independent Laboratory', 'Office' and 'Outpatient Hospitals'). Consequently, we compared the costs of tests from 'Independent Laboratory' and 'Office' with those from 'Outpatient Hospitals'. To do so, we re-estimated the regression models and omitted 'Outpatient Hospital' from the place of service categorical variable. The results from this part were focussed on the coefficients for 'Independent Laboratory' and 'Office'.

Due to the large number of regression models (six for each STI), we provided the full results from the main chlamydia model showing all the independent variables in which we compared testing cost from ‘Emergency Room – Hospital’ with those from the other service venues. Then, we summarised the regression results focusing on the estimated coefficients for the place of service categorical variables when compared with the cost of tests from ‘Emergency Room – Hospital’ for all eight STIs.

Data extraction was done using MEDSTAT DataProbe version 3.3.15 (Truven Health Analytics, Ann Arbor, MI, USA). Microsoft Excel, version 2010 (Microsoft Corporation, Redmond, WA, USA) was used for summary results and graphic presentations. All regression analysis including result validation and diagnostics were conducted using STATA version 11.1 (StataCorp LP, College Station, TX, USA).

Results

Summaries of the frequency and distribution of testing claims from the non-viral and viral STIs examined in this study are presented in Figs 1 and 2, respectively. Overall, TV had the lowest (Fig. 1), while HPV had the highest frequency (Fig. 2). Also, females had substantially more claims than males for each of the STI tests. In fact, for HPV, almost all of the claims were for females; only 0.04% was for males, which could represent anal cytologies in men or coding errors (Fig. 2).

Utilisation by place of service

For the non-viral STIs (Fig. 1), ‘Independent Laboratory’ (42%) had the highest frequency followed by ‘Office’ (>30%) and then ‘Outpatient Hospital’ (>20%), except for TV where ‘Office’ (32.4%) had the highest followed by ‘Outpatient Hospital’ (31.9%) and then ‘Independent Laboratory’ (31.6%). Among the viral STIs (Fig. 1), ‘Independent Laboratory’ (>42%) had the highest frequency followed by ‘Office’ (>31%) and then ‘Outpatient Hospital’ (12%), except for HBV where ‘Independent Laboratory’ (38.9%) had the highest followed by ‘Outpatient Hospital’ (27.4%) and then ‘Office’ (27.0%). Thus, the three dominant service venues (‘Independent Laboratory’, ‘Office’ and ‘Outpatient Hospitals’) together made up between 93% and 97% of test claims for all the STIs [97% for chlamydia (CT), gonorrhoea (NG), syphilis (TP), HIV and HPV; 96% for trichomoniasis (TV) and HSV2; and 93% for HBV].

Cost by place of service

For all the STIs examined, the average test costs ranged from \$4 from ‘Independent Clinic for syphilis (TP)’ (Fig. 3) to \$77 from ‘End-Stage Renal Disease Facility for HBV’ (Fig. 4). The estimated average cost of tests from ‘Emergency Room – Hospital’ and ‘Outpatient Hospital’ were the two highest-cost settings (except for HBV). ‘Office’ and ‘Independent Laboratory’ were in the middle of the cost distribution for each STI, and ‘Independent Clinic’ was the lowest cost for each STI. The pattern showing the relative magnitude of the estimated average costs was consistent across all the STIs we examined (Figs 3 and 4), with the exception of HBV, which had ‘End-Stage Renal Disease Facility’ as the highest cost

place of service. Other than ‘End-Stage Renal Disease Facility’, the cost pattern for HBV cost versus place of service was similar to the other seven STIs.

To avoid clutter and improve clarity in the charts, we did not show the average costs by gender for each place of service. Summary cost charts by gender and place of service indicated that it was visually difficult to see any substantial differences between males and females, for the most part. When we deleted claims with payments \$1, the total number of claims for each STI was reduced by a negligible amount ($<0.1\%$) and the resulting averages were largely unchanged.

Regression analyses – chlamydia

Table 1 shows the full results for the chlamydia model with all the independent variables and the associated coefficients (β s). Additionally, we transformed the coefficients as discussed earlier for easy interpretation and presented them in the third column (Table 1). The estimated coefficients indicated that on average: the test cost for females was 0.8% ($P < 0.01$) higher than those for males; the test cost from data provided by health plans was 4% ($P < 0.01$) lower than those from the employers. The test cost for those with drug benefits was 2.7% ($P < 0.01$) lower than for those without drug benefits; the test cost for those from the other regions were at least 14% ($P < 0.01$) higher than those from the South; and the test cost for the comprehensive health plan type was significantly different ($P < 0.01$) from those with the other health plan types (Table 1). These results were fairly consistent across the different STIs and all the models that we estimated. Detailed results from all the other regression analyses are available from the corresponding author.

Comparing test costs by sex and place of service

We found significant ($P < 0.05$) differences in costs between males and females for most of the places of service. However, the relative differences were comparatively small in all cases ($< 5\%$). Table 2 displays a summary of the regression results showing the relative difference in test cost for the other service venues when compared with those from ‘Emergency Room – Hospital’ for all eight STIs. Except for the cost of tests from ‘Outpatient Hospital’, costs from all the other test venues were significantly lower ($P < 0.01$) than those from ‘Emergency Room – Hospital’ ($16\text{--}80\%$).

When we compared the costs of tests from ‘Independent Laboratory’ and ‘Office’ with those from ‘Outpatient Hospital’, our results indicated that the costs from ‘Independent Laboratory’ and ‘Office’ were $30\text{--}60\%$ lower ($P < 0.01$) than those from ‘Outpatient Hospital’ for all the STIs, and the relative difference was consistently higher for the cost of tests from ‘Independent Laboratory’ than for those from ‘Office’.

Discussion

This study analysed 2012 claims data on the most utilised testing methods by gender and place of service for eight common STIs in the US. Consistent with the previous study,⁵ the utilisation of HPV was the highest, while that for TV was the lowest, and a substantially large proportion of the tests were for female enrollees.⁵ ‘Independent Laboratory’, ‘Office’ and ‘Outpatient Hospitals’ were the predominant STI test service venues. The prominence of

‘Independent Laboratory’ as a place of service reflects testing claims that were submitted directly by the laboratory performing the test; the specimens may have been collected at a variety of places of service. Among the STI test service venues (or categories that we used), cost estimates for ‘Emergency Room – Hospital’ and ‘Outpatient Hospital’ were consistently the highest, while those from ‘Independent Clinic’ were the lowest. Costs from the other test venues were substantially lower than those from ‘Emergency Room – Hospital’, except for those from ‘Outpatient Hospital’. Among the predominant service venues, STI test costs from ‘Independent Laboratory’ and ‘Office’ were considerably lower than those from ‘Outpatient Hospital’.

In terms of the relative utilisation of service venues for STI test claims, we are not aware of any previous studies. Thus, it is not possible to compare our results to any other study. However, in terms of relative cost of services, our results are consistent with findings from previous studies that reported considerably higher costs of health services in ‘Emergency Room – Hospital’ when compared with other service venues, such as retail clinics.^{10–12} Additional analyses of the quality of care from the different service venues showed that quality of care in retail clinics was similar to those provided in the other service venues and slightly better than service from emergency rooms.¹² Thus, from a societal perspective, our results suggest that there is the potential to reduce cost by shifting STI testing and/or treatment services to other low-cost service venues without sacrificing service quality – if the cost of shifting is zero or negligible. In contrast, the high cost variations we found suggest that shifting STI testing and/or treatment services from one venue to the other (such as shifting services from ‘Office’ to ‘Emergency Room – Hospital’/‘Outpatient Hospital’) might have unfavourable cost implications that need to be considered.

We found very similar utilisation and cost patterns for chlamydia and gonorrhoea. This might be due to a combination of reasons. First, the most utilised diagnostic method CPT codes that we focussed on (87491 for chlamydia and 87591 for gonorrhoea) use similar techniques; nucleic acid amplification test. Second, because of the high co-infection rates, the Centers for Disease Control and Prevention recommends testing individuals for both chlamydia and gonorrhoea.^{3,14} Additionally, a recent study found highly correlated contemporaneous correlation between chlamydia and gonorrhoea testing among females aged 15–39 years (who make up the bulk of the enrollees tested) using claims data.¹⁵

Our results show that the estimated costs of STI tests from ‘Independent Clinics’ were consistently the lowest for all the STIs, including those from ‘Independent Laboratory’. Given that most of the providers use the services of laboratories for their laboratory-based tests, it is conceivable that the cost from ‘Independent Laboratory’ will be lower than the costs from other service venues. It is therefore intriguing that the cost from ‘Independent Clinic’ was consistently lower than those from ‘Independent Laboratory’. More data and research are needed to understand these findings.

Limitations

These claims data are a convenience sample from large employers and health plans,⁶ so our results cannot necessarily be generalised to the entire privately insured population in the US. Additionally, biases in the volume of claims from certain service venues might be an

inherent reflection of the source of the data — the group of employers and health plans participating in the database — and not the overall representation for the region or the entire US. As an example, if a dominant health plan in a region uses a particular laboratory for most of its laboratory-based tests, then the volume of claims from ‘Independent Laboratory’ from that region will be relatively higher. The potential dominance of ‘Independent Laboratory’ (or the lack thereof) might also be reflected in the associated costs (or payments). This is because the health plans associated with the hospital systems and large physicians groups wield substantial market power and have extensive control over the amount they pay for the health services rendered.¹⁶ However, it is difficult to assess how this limitation might affect our results due to the lack of information on the employers and health plans participating in the database. Additionally, our cost estimate for the tests does not explicitly describe/reflect the associated costs (such as storage and/or transportation), which might vary substantially depending on the volume of tests.

The predominance of ‘Independent Laboratory’ as a place of service may confound our estimated utilisation and cost differences between other places of service (e.g. if some tests conducted in emergency rooms list ‘Independent Laboratory’ as a place of service and others list ‘Emergency Room’ as the place of service, the overall average cost of testing conducted in emergency rooms would be unobtainable using these data). However, claims that show venues other than ‘Independent Laboratory’ as a place of service probably do reflect testing conducted in those venues.

Also, as with most claims data, there may be inaccurate information because of one or a combination of a reasons, including clinician diagnostic and data entry errors.^{17,18} As an example, some of the service venue codes were unknown/missing. Additionally, the Centers for Medicare & Medicaid Services (CMS) raised concerns over physicians incorrectly reporting the place of service where services were rendered.¹⁹ Although there were 50 designated places of service codes, over one-half had no or very low numbers of claims. This precluded us from examining the cost for some of the service venues of interest such as ‘Federally Qualified Health Centers’ and ‘Walk-in Retail Health Clinics’. Also, it was not clear which service venue represented (or included) ‘Sexually Transmitted Disease Clinics’, which plays a very important role in the STI control and prevention efforts in the US,^{20,21} including providing a substantial proportion of the STI surveillance data.¹⁴

Notwithstanding the limitations discussed above, this study has several strengths as well. Although the data are not representative of the privately insured population in the US, the database used in this study is one of the largest private insurance databases in the nation, with data on a substantial proportion of the privately insured population in the US – over 50 million individuals in 2012.⁶ Additionally, the cost information provided in the database are payments (not charges), so our estimate represents actual dollar amounts paid for the tests performed at the various service venues.^{6,22}

Conclusion

Our study showed that STI testing (from claims data) occurred predominantly in three service venues (‘Independent Laboratory’, ‘Office’ and ‘Outpatient Hospital’). Additionally,

although STI tests are rarely performed in ‘Emergency Rooms’, the costs are substantially higher than those performed at the other major testing venues, with the exception of ‘Outpatient Hospital’. Our findings on the utilisation of place of service for STI testing can be used to assist in identifying and monitoring private sector STI testing at the different service venues. Additionally, our venue-based cost estimates of STI tests can be helpful when conducting venue-specific cost-effectiveness analyses. Finally, our results provide venue-based STI test utilisation and cost benchmarks that can be used for future trend analyses. More studies are needed to assess the feasibility of shifting STI testing and/or treatment services to the less costly venues, including determining the magnitude of the potential savings.

Appendix.: Complete list of outpatient service venues (source: MarketScan Data Dictionary6)

NEC, not elsewhere classified.

1. Pharmacy
2. School
3. Homeless Shelter
4. Office
5. Patient Home
6. Assisted Living Facility
7. Group Home
8. Mobile Unit
9. Temporary Lodging
10. Walk-in Retail Health Clinic
11. Place of Employment -Worksite
12. Urgent Care Facility
13. Inpatient Hospital
14. Outpatient Hospital
15. Emergency Room - Hospital
16. Ambulatory Surgical Centre
17. Birthing Centre
18. Military Treatment Facility
19. Inpatient Long-Term Care (NEC)
20. Other Inpatient Care (NEC)
21. Skilled Nursing Facility
22. Nursing Facility
23. Custodial Care Facility
24. Hospice
25. Adult Living Care Facility
26. Ambulance (land)
27. Ambulance (air or water)
28. Independent Clinic

NEC, not elsewhere classified.

29. Federally Qualified Health Centre
 30. Inpatient Psychiatric Facility
 31. Psych Facility Partial Hospital
 32. Community Mental Health Centre
 33. Intermediate Care Facility/Individuals with Intellectual Disabilities
 34. Residential Substance Abuse Facility
 35. Psych Residential Treatment Centre
 36. Non-resident Substance Abuse Facility
 37. Mass Immunisation Centre
 38. Comprehensive Inpatient Rehab Facility
 39. Comprehensive Outpatient Rehab Facility
 40. End-Stage Renal Disease Facility
 41. State/Local Public Health Clinic
 42. Rural Health Clinic
 43. Independent Laboratory
 44. Outpatient (NEC)
 45. Pharmacy (NEC)
 46. Other Unlisted Facility
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Fig. 1.

Frequency and distribution of claims for the most commonly used non-viral sexually transmissible infection tests by place of service, 2012. CT, *Chlamydia trachomatis*; NG, *Neisseria gonorrhoeae* (gonorrhoea); TP, *Treponema pallidum* (syphilis); TV, *Trichomonas vaginalis* (trichomoniasis).

Fig. 2. Frequency and distribution of claims for the most commonly used viral sexually transmissible infection tests by place of service, 2012. HBV, hepatitis B virus; HPV, human papillomavirus; HSV2, herpes simplex virus 2.

Fig. 3.

Average cost of the commonly used non-viral sexually transmissible infection tests by place of service, 2012. CT, *Chlamydia trachomatis*; NG, *Neisseria gonorrhoeae* (gonorrhoea); TP, *Treponema pallidum* (syphilis); TV, *Trichomonas vaginalis* (trichomoniasis).

Fig. 4.

Average cost of the most commonly used viral sexually transmissible infection tests by place of service, 2012. HBV, hepatitis B virus; HPV, human papillomavirus; HSV2, herpes simplex virus 2.

Table 1.
Results of the regression analyses used to compare the cost of the most utilised diagnostic method for chlamydia testing claims from the different places of service

Dependent variable: natural log of cost ($n = 2\,277\,401$). * $P < 0.01$; CI, confidence interval

Variable	Coefficient (β) [95% CI]	Relative difference as percentages ($e^{\beta} - 1 \times 100$ [95% CI])
Gender		
Male	Referent	Referent
Female	0.0083* [0.0062 to 0.0105]	0.8% [0.6 to 1.1]
Data source		
Employer	Referent	Referent
Health plan	-0.0403* [-0.042 to -0.0386]	-4.0% [-4.1 to -3.8]
Drug benefits?		
No	Referent	Referent
Yes	-0.0270* [-0.0289 to -0.0250]	-2.7% [-2.9 to -2.5]
Region		
South	Referent	Referent
North-west	0.2319* [0.2298 to 0.2334]	26.1% [25.8 to 26.4]
North Central	0.1312* [0.1293 to 0.1332]	14.0% [13.8 to 14.3]
West	0.3200* [0.3179 to 0.3220]	37.7% [37.4 to 38.0]
Unknown	0.2986* [0.2934 to 0.3037]	34.8% [34.1 to 35.5]
Health plan type		
Comprehensive	Referent	Referent
Exclusive Provider Organisation (EPO)	0.0665* [0.0575 to 0.0755]	6.9% [5.9 to 7.8]
Health Maintenance Organisation (HMO)	-0.0316* [-0.0400 to -0.0233]	-3.1% [-3.9 to -2.3]
Point of Service (POS)	-0.0847* [-0.0932 to -0.0762]	-8.1% [-8.9 to -7.3]
Preferred Provider Organisation (PPO)	-0.0156* [-0.0237 to -0.0075]	-1.5% [-2.3 to -0.7]
POS with Capitation	0.0957* [0.0812 to 0.1102]	10.0% [8.5 to 11.6]
Consumer Driven Health Plan (CDHP)	-0.0624* [-0.0712 to -0.0536]	-6.0% [-6.9 to -5.2]
High Deductible Health Plan (HDHP)	-0.0199* [-0.0287 to -0.011]	-2.0% [-2.8 to -1.1]
Place of service		
Emergency Room - Hospital	Referent	Referent

Variable	Coefficient (β) [95% CI]	Relative difference as percentages ($e^{\beta} - 1$) $\times 100$ [95% CI]
The Rest	-0.2447* [-0.263 to -0.2264]	-21.7% [-23.1 to -20.3]
Independent Laboratory	-0.4585* [-0.4697 to -0.4473]	-36.8% [-37.5 to -36.1]
Office	-0.1992* [-0.2104 to -0.188]	-18.1% [-19.0 to -17.1]
Outpatient Hospital	0.1641* [0.1528 to 0.1754]	17.8% [16.5 to 19.2]
Other Unlisted Facility	-0.3898* [-0.4023 to -0.3772]	-32.3% [-33.1% to -31.4]
Independent Clinic	-0.8827* [-0.8958 to -0.8695]	-58.6% [-59.2 to -58.1]

Table 2.

Summary results from regression analyses showing the relative difference in test cost at various service venues compared with test costs in Emergency Room – Hospital^A for the most commonly used sexually transmissible infection tests^A

CT, *Chlamydia trachomatis*; NG, *Neisseria gonorrhoeae* (gonorrhoea); TP, *Treponema pallidum* (syphilis); TV, *Trichomonas vaginalis* (trichomoniasis); HBV, hepatitis B virus; HIV, human immunodeficiency virus; HPV, human papillomavirus; HSV2, herpes simplex virus 2. NS, not significant. Results are presented as percentages

Place of service	CT	NG	TP	TV	HBV	HIV	HPV	HSV2
Independent Clinic	-59	-58	-71	-80	-48	-55	-56	-51
Independent Laboratory	-37	-34	-64	-71	-41	-50	-37	-40
Other Unlisted Facility	-32	-29	-64	-76	-39	-51	-40	-39
The Rest	-22	-19	-51	-15	NS	-36	-29	-16
Office	-18	-16	-56	-67	-28	-39	-30	-29
Outpatient Hospital	18	21	10	-5	61	16	NS	NS
Inpatient Hospital	<i>B</i>	<i>B</i>	-42	-59	-48	-56	<i>B</i>	<i>B</i>
End-Stage Renal Disease Facility	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	68	<i>B</i>	<i>B</i>	<i>B</i>
Residential Substance Abuse Facility	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	-51	<i>B</i>	<i>B</i>
Hospice	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	-53	<i>B</i>
Urgent Care Facility	<i>B</i>	<i>B</i>	<i>B</i>	-51	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>

^A All the transformed numbers were rounded to the nearest whole percentage and the associated *P*-values were <0.01.

^B No claims or included in 'The Rest'.