Measuring the Quality of Performance of a Genitourinary Medicine Primary Care Team

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ABSTRACT

Objectives: *To measure the quality of the clinical Genitourinary (G-U) Medicine and Sexually Transmitted Infection (GUM/STI) management process at a primary care polyclinic and establish a baseline for future monitoring and evaluation.*

Methods: *This was a prospective cohort study on 220 data abstracted clinical notes randomly selected and stratified by gender, age and first point of contact from 2131 GU/STI patients of the GUM/STI clinic seen from 2003–5. Data were also obtained by tele-interview of a subset of 27 individuals. Measurements were incidence (95% CI) as proportions of successful level of activity and outcome indicators for diagnosis, treatment and prognosis.*

Results: *Among 220 patients, the incidence (95% CI) of accurate clinical diagnosis and treatment was 40.5% (33%, 46%) before laboratory results boosted it to 96% (93%, 99%). Successful prognosis at 1st, 2nd and 3rd follow-up was 23.2%, 56.6% and 86.2%. The risk at follow-up for 1, 2 and >2 GU/STI episodes was 28.9%, 45.8% and 25.3%. Follow-up of partners was low, 4.7%. Adequate health promotion and preventive services were reported in 86.5% (78%, 88%) of 220 patients' records and by 84.5% (71%, 98%) of 26 who were tele-interviewed.*

In 88.5% (76%, 100%) of those (27) tele-interviewed, there was satisfaction with the service, but 73.8% (56%, 90%) would have preferred appointments and 29.6% (12%, 47%) preferred extended hours. Per capita ideal cost of medication could have been BB$6.30 (± 1.56) instead of actual BB$13.05 (± 1.84); (BB$2 = US$1).

Conclusions: *GU/STI quality performance improvement in Barbados requires rapid laboratory diagnosis, standardized data formats with prompt expedited partner notification and treatment appointments and use of recommended algorithm that can half the cost of medication. Genitourinary medicine should be strategized instead of STI to better encapsulate the spectrum diversity of presentations and points of service.*

Medición de la Calidad de los Resultados de la Medicina Genitourinaria del Equipo de Atención Primaria

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RESUMEN

Objetivos: *Medir la calidad de la medicina genitourinaria clínica y el proceso del tratamiento de las infecciones de transmisión sexual (MGU/ITS) en un policlínico de atención primaria, y establecer una línea de base para el monitoreo y la evaluación futuros.*

Métodos: *Se trató de un estudio de cohorte prospectivo realizados sobre 220 notas clínicas extraídas de datos, seleccionadas aleatoriamente y estratificadas por género, edad y primer punto de contacto, de 2131 pacientes MGU/ITS de la clínica MGU/ITS atendidos en 2003–2005, y por tele-entrevista de un subconjunto de 27 individuos. Las mediciones fueron incidencias (95% IC) como proporciones del nivel de éxito de la actividad e indicadores de los resultados para el diagnóstico, el tratamiento y la prognosis.*

Resultados: *Entre 220 pacientes, la incidencia (95% IC) del diagnóstico clínico exacto y el tratamiento fue 40.5% (33%, 46%) antes de que los resultados de laboratorio la elevaran a 96% (93%, 99%). La prognosis exitosa en el primer, segundo y tercer seguimiento fue 23.2%, 56.6% y 86.2%. El riesgo en*

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el seguimiento para los episodios GU/ITS 1, 2, y > 2 fue 28.9%, 45.8% y 25.3%. El seguimiento de parejas fue bajo, 4.7%. La promoción adecuada de la salud y los servicios de prevención fueron reportados en 86.5% (78%, 88%) de las historias de 220 pacientes y por 84.5% (71%, 98%) de 26 que fueron tele-entrevistados. En 88.5% (76%, 100%) de los (27) tele-entrevistados, hubo satisfacción con el servicio, pero 73.8% (56%, 90%) hubiera preferido citas y 29.6% (12%, 47%) extensión del horario. El costo ideal per capita de la medicación podría haber sido 6.30 BBD (± 1.56) en lugar de 13.05 BBD (± 1.84); (2 BBD = 1 USD).

Conclusiones: *El mejoramiento en cuanto a resultados de calidad en GU/ITS en Barbados, requiere diagnósticos de laboratorio rápidos, formatos estandarizados de datos con pronta notificación a las parejas, citas para el tratamiento, y uso del algoritmo recomendado que puede reducir a la mitad el costo de la medicación. MUG debe ser estrategizada en lugar del TIS, a fin de encapsular mejor el espectro de la diversidad en las presentaciones y puntos de servicio.*

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INTRODUCTION

Genital urinary complaints (GUC) encompass sexually transmitted infections (STI) and some other genital urinary disorders. Excluding STI screening tests, GUC annually accounts for about 10% of primary care consultation in polyclinics in Barbados (1). Presumed determinants of quality management of GUC/STI in this setting include health services utilization by the community, social values on STI, screening coverage, standardization of screening criteria and laboratory diagnosis, treatment and prevention and contact tracing. To overcome related problems and improve quality of care of GUC/STI, locally relevant guidelines were compiled outlining prevention and health promotion, documented diagnostic criteria, use of rapid diagnostic investigations and short-time treatment strategy, contact tracing and follow-up plans (2).

It became imperative to document a reference point for tracking future progress in GUC/STI management. The research question was, "*What was the quality of GUC/STIs management prior to introduction of guidelines?"* This study set out to probe the quality of the management process of GUC/STI, such as diagnosis, prevention, treatment, prognostic outcomes, follow-up and satisfaction.

METHODS

Study design: The study was a prospective cohort by observation of incidence of GUC/STI events in individuals followed from 2003 to 2005 at the Winston Scot Polyclinic, Barbados' largest polyclinic, with two days a week dedicated to STI sessions.

Definition: A genitourinary complaint was defined as any expression of concern indicating a disorder or need for information on anatomy, physiology or pathology of genitourinary functioning for which the client needed the attention of the GUM/STI team. It included descriptions of complaints and syndromes as in the World Health Organization (WHO) Guidelines (3); listed as syndromes: urethral discharge, genital ulcers, scrotal swelling, vaginal discharge, cervical infection, vaginal infection, lower abdominal pain; as specific infections: gonoccoccal, *chlamydia trachomatis*, Human Immunodeficiency Virus (HIV), syphilis, chancroid, granuloma inguinale, genital herpes, genital warts, trichomoniasis, bacterial vaginosis and candidiosis.

Participants, inclusion and exclusion criteria, and sampling: A participant's notes, (excluding pre-teen children) were included if they indicated a GUC in 2003 to 2005, by participatant's self-referral or discovered by the healthcare provider or by screening, irrespective of point of service: (a) a sampling frame was constructed in SPSS version 11 from clinical registers with an initial set of variables: unique identity number, sex, age, positive GUC/STI, service point and phone number. The contact points of service and patients seen were STI clinic, 903 (42%); family planning, 1130 (53%); antenatal clinic, 198 (9%); total of 2131; (b) the pre-study sample size was determined by stratified random sampling based on the assumption that GUC/STI constituted 10% of all consultations. Furthermore, it was assumed that of the GUC/STI cases, 60 to 70% in the STI clinic, 70 to 80% in the family planning clinic and 69 to 81% in the antenatal clinic would be expected to be managed in a manner equivalent to that of standard guidelines (3). The subsamples were calculated for each service points (STI clinic, family planning and antenatal) at 95% confidence level, and with differences of effects (between the expected and worst care) of ± 5%, ± 5%, ± 6 respectively 10% was added to each subsample size, to account for attrition during follow-up. The determined sub-sample sizes were 253 277 and 110 respectively. Further-more, stratification was by sex and age, or age alone for single sex clinics; (*ie* male/female, young age < 22; adult age 22 – 35 years and > 35 years). It was realized that strata sample sizes would be too small for stratified analysis but would produce a more representative sample; (c) the sampling frame was divided into sex and age-specific subgroups, by the "sort cases" function of SPSS; (d) sex and age ratios were applied to the sampling frame to determine members needed in each sex and age-specific subgroups of the sample; (e) using EpiInfo version 6 random list generator, the numbers of members for each sex and age specific sets were selected and applied to the sorted subgroups.

To investigate clients' perceptions and satisfaction, a tele-interview was necessary as this information was not in the clinical records. A random sample with the same ratios was selected from 277 patients listed with phone numbers in the original sampling frame. On the assumption that 65% and 55% respectively would be the expected and the worst frequency of satisfaction at 95% confidence level, the tele-interview sample size was 73 (with 10% added for rejection rate). A patient who was absent after three or more attempts for the tele-interview, was replaced by a freshly randomly selected individual.

We discovered that the service points listed patients by name and address while in the records office, it was by case file numbers. It therefore required substantial time to locate the patients' files in the records office and about 30 minutes to read and enter the information or fix time with a patient for tele-interview. It was therefore decided to minimize the initial sample sizes by use of actually derived effect measures so far accrued from what was so far processed. After slowly accumulating a size of 220 and 27 tele-interviews in November 2006 to May 2007 by efforts of a public health nurse with experience in GUM, the sample was analysed and its size recalculated.

The *post-hoc* sample size was found adequate and further data extraction ceased. By using the performances obtained in this study as the worst expected, 40.4% accuracy of syndromatic diagnosis obtained; 79.1% being adequate physical examination done; and 66.8% being adequate screening of presenting symptoms found in a stratified random sample drawn from 2131 patients concurred with a similar study (4). Using 70% as the expected level of health-care givers' performance, at 99.9% confidence level, sub-sample sizes would be 26, 243 and 148 for the respective units in the clinic. For the tele-interview, the recalculated sample was 23 at 95% confidence level and at 60% as the expected level of satisfaction which was exceeded by that observed, 88.5%.

Measurements

The primary end outcome was the proportion with successful prognosis. Secondary outcomes were indicators of the GUC/STI consultation process *eg* proportion with adequate history taking, physical assessment, investigations, diagnosis without and with tests, management plan and follow-up inclusive of sexual contacts.

Observations and variables: The data collecting tools, [DCTs] (available on request) consisted of two sections. Part A's 17 items for the tele-inteview was a complement of part B with 89 items. The DCTs included details of the processes that contribute to GUC/STI quality management. The interviewer, after a self-introduction and explaining that monitoring and evaluation was the purpose, sought permission from consenting-age clients and asked questions on personal social details: marital status, socio-economic status, use of substances and number of biological children. The quality of satisfaction by the response was registered on a slide scale: 1 for poor; 2, fair; 3, adequate; 4, good; 5, very good; yes/no or open ended were used as appropriate for answering questions on the process recalled about the visits to the clinic, concerning unprompted information provided by healthcare providers, level of satisfaction, if resorted to other alternative care, how the client identified the GUM/STI among the services at the clinic, duration of the visits, preference for appointment or walk-in and suggestions of changes in the clinic.

Part B was for extracting data from the clients' clinical records about clinical and laboratory diagnostic processes, management plans and prognosis scores as described above. It included description of complaints, episodes of pain, micturition, discharge, impact on life, lesions, relevant GU/STI histories, sexual activity, protected sex, sexual dysfunction, partners at different time periods, partners' relevant health status, sexual orientation, obstetrics and gynaecology history, contraceptives, Pap smears and other health histories. The quality of clinical performance was ascertained from the details of physical examination: general, pregnancy, external and internal genitourinary anatomical components, summary of clinical syndrome, laboratory confirmation, time to report investigations, course of action and prognosis before and after tests. Additionally, there were other factors taken into consideration: comparison of the cost of prescribed treatment to alternative; primary prevention done and tailored to history of contacts, contacts traced, follow-up tests for cure, frequency, causes, management and outcomes of follow-up episodes.

Ethics, benefits and harm: This study was an inbuilt health service monitoring and evaluation under the Ministry of Health, based on surveillance of patients who had been served at the polyclinic and therefore did not require specific IRB approval. Instead, it was subject to policies operating in the public health services and pertaining to healthcare provider and client; a technical committee reviewed its soundness. Names and records of both participants and clinicians were shielded from the public. Patients that needed to complete appropriate care were contacted as per standard procedure. Patients could agree or refuse to consent *eg* verbally on phone after being informed that they were selected randomly in order to evaluate the service or because it was discovered during records review that it was necessary for them to complete a routine follow-up procedure that they had missed. Both the healthcare providers and health recipients were considered beneficiaries of the findings to upgrade the quality of the service and there was no perceived harm. The Research Grants Subcommittee, The University of West Indies, Cave Hill, offered a humble stipend for data entry but did not play any other role in the study.

Statistical procedures: With one team, it was not possible to use double entry as was planned. The nurse deciphered the

clinical data while the clerk made the entries. The nurse conducted and recorded the tele-interviews. Responses measured on a graded ordinal scale, 1 (poor) to 4 (very good) were regrouped for analysis into inadequate and adequate and/or nominal scale, yes, no and summarized as univariate, proportions, where necessary categorical data in bivariate association, RR_w, OR_w, women compared to men, significant at $p < 0.05$ by chi-square. Linear regression was used for determining predictors of prognosis. The estimation of mean cost separately for actual treatment and preferred alternative treatment per patient ($\tilde{X}$) was made by dividing total costs for individual patients, c_{n1} to c_n^{th}, by N (grand total number of patients): $\tilde{X} = \sum(c_{n1}+c_{n2}+ c_{n3}+ .. c_n^{th})/N$.

We derived the indicator of the accuracy of clinical decision from proportion of laboratory confirmed true positives and true negatives, *ie*, where test results correctly did not alter the course of action. The strength of confirmation (weak to strong) of clinical decision, inversely related to its ordinal scale, and determined the cut off point of probability at which providers decided on a clinical action plan along the decision path; presenting complaints, →test: yes, no or refer, -> management action plan.

Literature review for references: With the exception of 1–3 and 7, that were hand-searched, for the rest the following search words and limits were used in Pubmed: *quality AND (sti OR std). Humans, Adolescent: 13–18 years, Adult: 19–44 years, Middle Aged: 45–64 years, Middle Aged + Aged: 45+ years, Aged: 65+ years* without gender, time, journal and language limitations. From 180, 71 were of interest and of these 13 were relevant references to the study.

RESULTS

The revised stratified random sample drawn from 2131 patients consisted of records of 220 participants; 101 (45.9%) in 2003, 61 (27.7%) in 2004 and 51 (23.2%) in 2005 but for 4 (3.2%) the initial date was not available. Respectively, females were 83, 47 and 39. The mean age (standard deviation) was 30.45 years (12.61), median (interquantile range, IQR), 26 years (20–40), mode, 19, range 15–78 years. The distribution of females (n = 172) and males (n = 48), by age categories < 22, 22–34, 35+ were 20 and 6; 47 and 25; 55 and 17 respectively, $p = 0.27$. Note that by national policy those below age 18 years, 9.5% (95% CI, 6%, 13%, n = 21) could only consent to medical consultation with an accompanying adult relative. Patients came to the GU services through the following healthcare service points and in numbers indicated: fast-track emergency, 3; STI, 120; family planning, 47; prenatal, 45; general practice and others, 6. Females from those units were 1, 77, 47, 45 and 2 respectively.

Fertility: Among 172 women, 42 (24.4%) had never conceived; the status of 10 was unknown. On the extreme, 40 (24.4%) women had had 3 or more pregnancies. The mean, median (IQR) and range and pregnancies in 162 women were, 1.96 (± 0.30), 1(1–3), range 0–12. The median parity (IQR) and range were 1(0–3) and 0–06. In 167, 60 (89.6%) women were nulliparous, 6 (3.6%) unrecorded, 43.7% had 1–2 children and 16.8% had 3–6 children.

GU/STI screening questions: In Table 1A, three categories emerged, most frequent (range, 60% to 98.6%), less (32.7% to 48.6%) and least (2.2% to 24.5%). The ascending order of most frequently asked questions were other significant and relevant history, duration of symptoms, LMP, contraceptive use, presenting problems, protected sex, impact on quality of life, gravida and parity. Less: sexual orientation, menarche and discharge; Least: sexual dysfunction, dyspareunia, duration of relationship, partners in last 6 months, partners' health, lesions, last sexual contact, pain and micturition.

Sexual behaviour: Among the sexually active, 183 (83.2%), only 27 (12.3%) had practised safe sex with condom, 2 males were homosexuals and status was not recorded for 24 (11%); only 16 (6.5%) were asked about sexual partners in the last six months and 10 had such sexual partners, a prevalence of 62.5% (95% CI, 39%, 86%).

Clinical examination: In Table 1B, though female pelvic examination was done for most patients, few, 12 (8.7%, 95% CI, 4%, 13%) had good quality of description of the speculoscopy and bimanual examination.

Clinical syndromes: Presentations on first visit (Table 2A) were: voluntary counselling and testing (VCT), 68 (31.2%); transvaginal discharge, 37 (32%), miscellaneous, 13 (6%); male urethral discharge, 11 (5%); genital benign growths/ulcerative diseases, 8 (3.7%), female lower abdominal pain, 6 (2.8%), herpes 5 (2.3%), female urinary, 3 (1.4%) and unspecified, 19 (8.7%).

Pap smears: Out of 172 women, 170 (98.8%, 95% CI, 97%, 100%) had done Pap smear (PS) of which the results were normal in 49 (28.8%); infection with other pathology, 86 (50.6%); inflammation, 21 (12.4%); abnormal squamous cell of undetermined significance ASCUS, 11 (6.5%) and dysplasia, 3 (1.8%). Anecdotal evidence indicated that many women seek PS as a way to "check" for female GUC.

Pap smear review was associated with 123 (71.5%, 95% CI, 65%, 78%) 'female first visits' to the GUM/STI. The findings in 169 PS for which patients reported to GUM were abnormal bacteria, 28 (15.5%); yeast, 16 (8.8%), trichomonas, 5 (2.8%); bacterial activity, 10 (5.5%); Human Papilloma virus (HPV) activity 2 (1.1%). Pap smear detected 5 of 6 (83.3%, 95% CI, 54, 100) of confirmed trichomonas.

Laboratory diagnosis: For the first visit (Table 2B), about 8 (3.6%) laboratory results were not traceable at the GU and 22 (10%) patients did not have investigations. In 8, 3.6% (95% CI, 1%, 6%), the results were normal and for the rest, the descending order of frequency was: candidiasis, PS pathology

Table 1a: Frequency of screening questions in the history of 220 genitourinary patients' seen 2003–2005 at WSPC, Barbados.

Variable	Yes, N = 220 (%)	No, N = 220 (%)	Yes (N for F = 172, M = 48) Female	Male	Female OR (95% CI), p-value, etc
Asked – Presenting problems	147 (66.8)	73 (33.2)	114	33	NS; Female OR 0.89 (0.42, 1.87), *p* 0.74. Fair, 26.3%
Previous Episodes, range mean (SD)					Mean 3.51 (3.14), median 2, mode 2, 0-20, males 1–4, IQR, 1–5,
Asked – Duration	159 (72.3)	61 (26.7)	133	26	OR, 2.89 (1.40, 5.95), $p < 0.002$. Median 10 days, IQR, 4–65.
Asked – Pain	42 (19.1)	178 (80.9)	22	20	OR, 0.21 (0.09, 0.45), $p = 1x10^{-4}$. Fair, 10%
Asked – Micturition	54 (24.5)	166 (75.5)	32	13	NS: OR, 0.57 (0.26, 1.29), $p = 0.14$, Fair 15.5%.
Asked – Discharge	107 (48.6)	113 (51.4)	84	23	NS: OR, 1.04 (0.52, 2.07), $p = 0.91$ Fair, 22.7%
Asked – Impact on life	182 (82.7)	38 (13.3)	155	27	OR, 7.09 (3.11, 16.27), $p < 1 \times 10^{-7}$. Fair, 57.7%
Asked – Lesions	23 (10.5)	197 (89.5)	8	15	NS. OR, 0.11 (0.04, 0.30) $p = 1 \times 10^{-6}$. Fair, 3.2%
Asked Sexual activity	214 (92.3)	6 (7.7)	171	43	OR, 19.88 (2.17, 461.82), $p = 1 \times 10^{-3}$. Abstain 31(14.1)
Asked – sex orientation	72 (32.7)	148 (67.3)	28	42	OR, 0.03 (0.01, 0.08), $p < 1 \times 10^{-7}$. 2 (0.9) homosexual men
Asked Last sexual act	27 (12.3)	193 (87.7)			
Asked – Protected sex	177 (80.5)	41 (19.5)	149	28	OR, 4.16 (1.87, 9.29), $p = 7 \times 10^{-5}$
Prevalence of protected sex in those asked for use of protected sex, n = 177					
Age < 22; n = 76	9 (13.2)	59			CI, 5–21%
Age 22–34; n = 72	12 (20.7)	46			CI, 10–31%
Age 35+; n = 72	6 (11.8)	45			CI, 3–21%
All age groups	27 (15.3)	150 (84.7)			CI, 10–21%, F (12.2%) vs Male (12.5%), NS
Asked – Dyspareunia	7 (4.1)	165 (95.9)	7		CI, 1–7%, in Females
Asked – Sex dysfunction	5 (2.3)	215 (97.7)	1	4	OR, 0(0.00, 0.63), $p = 1 \times 10^{-3}$
Asked – Partners in 6m	16 (7.3)	204 (92.7)	10	6	NS: OR, 0.43 (0.13, 1.43), $p = 0.12$
Asked – Partners' health	21 (9.5)	199 (90.5)	13	8	NS: OR, 0.41(0.15, 1.17), $p = 0.06$
Asked – Duration of relation	9 (4.1)	211 (95.9)	3	6	OR, 0.12, (0.02, 0.59), $p = 9 \times 10^{-4}$
Asked – Menarche	80 (36.4)	92 (63.6)			Mean 12.01(2.06), median, 12, mode, 11, range 11–16, IQR, 11, 13
Asked – Gravida	162 (94.2)	10 (5.8)			42 (24.4) never pregnant
Asked – Parity	166 (96.6)	6 (3.4)			60 (34.9) never given birth
Asked – LMP	126 (73.3)	46 (26.7)			111 (61.0) normal, abnormal 4 (2.2)
Asked contraceptive use	166 (75.5)	6 (24.5)			33 (19.9) using contraceptives
Came for PS results	123 (71.5)	49 (28.5)			10.4% had important abnormality
Pap smear , recent	170 (98.8)	2 (1.2)			Prevalence 98.8%
Asked – Other relevant	133 (60.5)	87 (39.5)	118	15	OR, 4.81 (2.29, 10.18), $p = 3 \times 10^{-6}$
Prevalence of other significant history					**All 23 (10.5), in women 15 (8.7) and men, 8 (16.7)**

In Table 1A and 1B, yes = screened and documented, if not, no. Most frequencies were by intention to screen.

requiring treatment, bacterial vaginosis, latent syphilis, Neisseria gonoccoccal infection, HIV positivity, trichomoniasis and UTI.

Utility of laboratory results: Consequent to laboratory results, revision of clinical decision on 203 subjects was as follows, rightly revised, 113 (55.6%); not requiring revision, 82 of the 203, so the accuracy (true positive and true negative) of right decisions was 40.4% (95% CI, 34, 47). Accuracy increased to 96% (40.4+55.6) after applying test results. The relative contribution of the laboratory to the correct diagnosis was 57.9% (95% CI, 48, 68). Errors were 3 (1.5%) from decisions revised wrongly and 5 (2.3%) that were wrong and not corrected. The perceived reasons why the healthcare providers ordered tests were: in 130 (59.6%) to solely screen (those without clinical disease); in 22 (10.1%)

Table 1b: Frequency of examination and treatment process in genitourinary patients during 2003–2005 at WSPC, Barbados.

Outcomes for Variables – Examination and Treatment	Yes	No	Yes Female, n = 172	Males, n = 48	Female OR (95%CI), *p*-value, etc
Did – Physical Examination	174 (79.1)	46 (20.9)	114	30	OR, 3.09 (1.43, 6.66), $p = 1 \times 10^{-3}$
Noted – General condition	16 (7.2)	204 (92.8)	6	10	OR, 0.14 (0.04, 0.44), $p = 4 \times 10^{-5}$
Ruled out pregnancy	97 (56.4)	75 (43.6)			48 (26.8) were pregnant
Examined abdomen	96 (43.6)	124 (65.4)	92	4	OR, 12.65 (4.11, 43.45), $p = 1 \times 10^{-7}$
Examined external genitalia	142 (64.5)	78 (33.5)	115	27	NS: OR, 1.57 (0.78, 3.17), $p = 0.18$
Female, speculoscopy	142 (82.6)*	30 (17.4)			* Includes-Fairly described, 57.3%.
Female pelvic, bimanually	18 (10.5)	154 (89.5)			
Good summary of history & examination	59 (26.8)	161 (73.2)	40	19	OR, 0.46(0.22, 0.96), $p = 0.02$. Fair 54.1%
Adequate clinically based Rx	82 (32.2)	132 (62.8)	57	25	OR, 0.46 (0.23, 0.92), $p = 0.02$, 76.7% if Fair, 96 (44.2) is included.
Good change of Rx after Lab Dx	113 (51.4)	23 (10.5)	107	6	OR, 47.76 (10.65, 69.16), $p < 1 \times 10^{-7}$. Good Rx rises to 83.4% after tests
Sex contacts followed	10 (4.7)	32 (14.9)			4.7% contacts followed.
Used short-term Rx	8 (3.8)	5 (2.3)			Prevalence of short Rx, 61%
Adequate time for Rx	91 (41.3)*	67 (30.5)	75	16	NS: OR, 1.55 (0.75, 3.20), $p = 0.20$. *Includes-Fair, 62 (28.2)
Adequate recovery on Rx	**97 (44.7)**	**123 (63.1)**	**89**	**8**	**OR, 5.36 (2.25, 13.24), $p = 1 \times 10^{-4}$. Fair, 63 (30.6)**

Data ranked by descriptive quality was regrouped and dichotomised into Yes/No, where, Yes = good or adequate (good and very good) and No = none, inadequate, and fair; unless qualified. Rx = treatment

Table 2a: Clinical impression for first attendance in years 2003–2005 at GU clinic, at WSPC, Barbados

	F	M	N (%)
VCT	57	11	68 (31.0)
Rx for Pap S	43		43 (19.5)
V Discharge	37		37 (16.8)
Normal	17		17 (7.7)
Urethritis		11	1 1(5.0)
Ulcer/bumps	2	6	8 (3.6)
LA Pain	6		6 (2.7)
Genit Herpes	3	2	5 (2.3)
UTI	3		(1.3)
Others	3	10	13 (5.9)
DKN	1	8	9 (4.1)
Total (%)	**172**	**48**	**220 (100)**

Table 2b: Lab results for first attendance in years 2003–2005 in GU clinic, at WSPC, Barbados.

	F	M	N (%)
Yeast	55	1	56 (25.5)
Reactive Pap	39		
B.Vaginosis	21		21 (9.5)
N-Gonoccoci	6	7	13 (5.9)
Syphillis	8	5	13 (5.9)
*HIV	1	5	6 (2.7)
Trichimonas	6		6 (2.7)
$^{\gamma}$HPV Warts	2	2	4 (1.8)
UTI	3		3 (1.4)
BH-Strepto	2		2 (0.9)
Chlamydia	1		1 (0.5)
Others, mix	7	13	20 (9.1)
Normal	1	7	8 (3.6)
DKN	2	7	8 (3.6)
None done	21	1	22 (10.0)
Total (%)	**172**	**48**	**220 (100)**

Note: VCT, voluntary counselling and testing, Pap, PS, Papanicolaou smear. DKN, don't know, includes non-traceable results. Time for lab to do simple lab tests in days was mean 4.77 (SEM 0.33), median 3.00, and range 27 days. NB: *HIV, often not as first-time diagnosis. $^{\gamma}$HPV warts, from clinical exam.

to simultaneously confirm and screen (those with clinical disorders and for other possible asymptomatic disorders); 17 (7.8%), not indicated; 18 (8.3%), to rule out other diagnoses; 12 (5.5%), solely to confirm a clinical disorder.

Timeliness of results: Excluding PS, in 157 patients, the time it took the laboratory to complete the tests was: mean, 3.8 days (± 0.60), median (IQR) 3 (3–6) days. To communicate the results, it took a mean of 0.97 days (± 0.05), median 3 (2–6).

Prevention services: Counselling was done in 183 (86.5%, 95% CI, 78, 88), missed in 24 (11.4%); 147 and 20 being in women and men respectively and OR_w 1.22 (0.36, 4.53), $p = 0.72$. According to the records, 6 (2.9%) were asked the number of lifetime partners. Only 10 of the 42 (23.8%, 95%

CI, 11, 37) had their partners recorded for follow-up, for the rest, 173 (80.5%), this information was not available.

Appropriateness of treatment: In those who underwent clinical interventions, treatment was adequate according to both laboratory and clinical judgement in 85/188 (45.2%), fair in 96 (51%) and inadequate in 7 (3.7%). The proportion of women, 65/160, adequately treated was significantly lower than 28/31 for men, giving a relative risk, RR_w, (95% CI), 0.55 (0.41, 0.72), $p = 0.001$; but would not be significantly differently if 2 women and 11 men whose form of treatment was unknown, were considered as inadequate, corresponding to 65/162 *vs* 23/42, RR_w 0.73 (0.53, 1.02), $p = 0.089$.)

About a quarter of patients, 45 (21.1%) were on treatment for inappropriate periods, while for 91 (42.7%) the period was appropriate and for 62 (29.1%), inappropriate. For 15 (7%), it was difficult to determine. Out of 13 patients suitable for short-period-therapy, 8, 61.5%, (95% CI, 35, 88) received it.

Follow-up and success of treatment (Table 3): The follow-up visits in 3 years per participant were: mean 6.32, (standard error 1.44), median, 1 (1–2), mode 1, range 0–16, (n = 211). After three follow-ups, 86 (39.1%, 95% CI, 33, 46) needed further services. In the first follow-up investigations of 210 patients, in 119 (56.7%) the test results confirmed the management (95% CI, 50, 63). Of those whose management was changed, 39.1%, (27/69, 95% CI, 28, 51), the revised decisions, just fair, were suboptimum. In the second follow-up investigations, laboratory confirmation of the clinical decision was lowest in 30 (13.9%, 95% CI, 9, 19), unequivocal in 10 (4.6%), and strong to fair in 40 (28.5%) to 176 (83.6%), implying a change, could swing either way, with no change in the planned action, respectively. This was equivalent to clinical accuracy of 28.5% – 83.6%, corresponding to strict (strong) and liberal (fair) cut-off points respectively, as above.

The *priori* accuracy (40.4%, 95% CI 34, 47) compared to the range of accuracy of clinical diagnosis from strong to fair cut-off points (28.5 to 83.6%) rates the clinicians as *liberal* in their choice of a diagnosis and management plan.

It was not possible to calculate the accuracy for individual diagnoses, because of lack of clarity in documentation for all diagnoses of individuals and therefore lack of linkage of individual's clinical and test results. Furthermore, tests in clinical setting, unlike research, are done selectively according to expectations or bias; and for some categories, small valid numbers would lead to imprecision and low power.

Prognosis: Laboratory test-based changes improved the outcome in 133, 61.3%, 95% CI, 55, 68) but did not in 46 (23.5%) individuals. Among 63 (30.6%) females, all except one patient achieved fair recovery; 97 (47.1%) did well; 8 (3.9%) had not recovered and 38 (18%) could not be ascer-

Table 3: Follow-up: management action, diagnosis and prognosis in GU clinic at WSPC, 2003–2005

	1st Follow-up				2nd Follow-up				3rd Follow-up		
	F	**M**	**n (%)**		**F**	**M**	**n (%)**		**F**	**M**	**n (%)**
Successful	42	7	49 (23.2)	Successful	108	6	114 (56.6	Success	143	1	144 (86.2)
VCT-Counsel	75	14	89 (42.2)	B Vag	4		4 (2.0)	B Vag	3		3 (1.8)
More tests	22	5	27 (12.8)	BH Strep	2		2(1.0)	BHStrept	1		1 (0.6)
Continue Rx	4	1	5 (2.4)	Yeast	18		18 (9.1)	Yeast	5		5 (3.0)
Change Rx	21	4	25 (11.8)	N-Gonoc	1		1 (0.5)	NGonoc	1		1 (0.6)
Poor response	4	1	5 (2.4)	Trichom	3		3 (1.5)	Trichom	1		1 (0.6)
Refer		3	3 (1.4)	UTI	1	2	3 (1.5)	UTI	2		2 (1.2)
DKN	8		8 (3.8)	Chlamyd	3	1	3 (1.5)	Reactive	6		6 (3.6)
				PID	1		1 (0.5)	Pap			
				Reactive	16		16 (8.1)	Abn Cell	1		1 (0.6)
				Pap							
								Dysplasia	1		1 (0.6)
				AbnCells	4		4 (2.0)	HPV Warts		1	1 (0.6)
				Dysplasia	1		1 (0.5)	Other		1	1 (0.6)
				Syphillis	3	1	4 (2.0)				
				G-Herpes	2	1	3 (1.5)				
				Others	1		1 (0.5)				
				DKN	4	16	20 (10.1)				
Total (%)	**168**	**43**	**211 (100)**		**168**	**30**	**198 (100**		**164**	**3**	**167 (100)**

Successful, patients that adequately recovered at the time of review; 23.2% (95% CI, 18, 29); 56.6% (48%, 61%) and 86.2% (81%, 91%). Poor response, suspected resistance. DKN, indeterminate data. VCT, voluntary counselling and testing. Female outcomes compared male for 1st follow-up, p (df = 5), 0.99.

tained from the records. OR_w for improvement, 0.83 (95% CI, 0.25, 2.92), $p = 0.74$. Multiple linear regression for quality of management plan, number of follow-up and their combination, as independent factors; gender and prognosis as dependent factors; adjusted r^2 were 31% and 25.9% and for all $p < 0.01$, except for treatment follow-up in females, $p = 0.67$, (meaning higher number of episodes in females oversha-dowed appropriate treatment in determining prognosis).

During follow-up of 198 patients (male, n = 30), the following were the subsequent diagnoses: VVC, 18 (9.1%), cervical inflammation (PS), 16 (8.1%), BV, 4 (2%), PID, 4 (2%), syphilis positive serology, 4 (2%), trichomonas, 3 (1.5%), UTI, 3 (1.5%), chlamydia, 3 (1.5%), herpes-2 lesions, 3 (1.5%), beta-haemolytic streptococci, 2 (1%), NGC, 1 (0.5%), cervical dysplasia (PS), 1 (0.5%), NGC and chlamydia, 1 (.05%), undetermined, 20 (10.1%).

Episodes: The frequency of a second episode in the three years was: mean 1.32, (95% CI, 0.97, 1.67), median 0 (0 – 2), range 0–13. About 45.8% experienced a second diagnosis, and 25.3% experienced it more than twice in 3 years under review.

Data entry errors: Dummy variables (where only female should be entered *eg* dyspareunia, menarche, menstrual period, pregnancy contraceptive, PS review) for male gender were used to assess validity of data entry. Gender misclassification error for 1 male in ANC, 2 with menstral period and 1 pregnant, was not significant, 2.1% to 4.2% (95% CI, –2, 10).

Medication costs: The calculated cost to the health system of prescribed medication per GUC/STI patient in BB$ (= 0.5US$) was mean (sd) 13.05 (± 1.84); median (IQR), 10.5 (3.60, 20.8) and range 0-74.8. The ideal cost would have been: mean 6.30 (± 1.56), median (IQR), 3.48 (0.46 – 10.50) and range 0 – 30. Thus, the mean difference, that could be saved per patient was BB$6.75(95% CI, 6.47, 7.03).

For the 27 **tele-interviewed** patients, 59.2%, 29.6% and 11.1% respectively earned BB$/m <1000, 1000–2000, and 3000 or more. Among 25 patients, 36% identified the GU/STI service as "women's or men's clinic", 20% as FP, 12% as ANC and 8% were referred to WSPC from hospital. The range, median and mean (sd) of time spent at the clinic was 1:30 to 9 hrs, 3 and 3.4 (1.7). Consequently, 19/26, 73.8% (95% CI, 56 90) would have preferred to make an appointment. For 25 patients, none of the sexual partners was followed-up. The information given to patients during the consultation was rated as adequate by 22/26, 84.5% (95% CI, 71, 98). Satisfaction was reported as adequate by 23/26, 88.5%, (95% CI, 76, 100); fair in 11.5%, and dissatisfied in 3.8%; and 5/27, 19.2%, (95% CI, 4, 33) sought other care, the rest did not. The patients suggested: extended hours, 29.6%; none, 25.9%; a quicker process 14.8%; more and empathic staff 14.8%; efficient records office, 7.4%. Other minority wishes were: more information, better privacy and special consideration for Moslem patients.

DISCUSSION

Effective medication was achieved in 83.6% for the presenting episode, like in other studies (5, 6). The proportion of successfully managed patients, with resolution of indicators of disease process, was low at first visit, 23.2%, but increased significantly by 144% on the second visit to 56.6%, and by 52.3% on the third visit to 86.2%. Therefore, it is effective and imperative to have a follow-up plan for GU/STI patients. This should include partners for which the follow-up was quite low, 4.7%, and so was protected sex, 15.3%. The high level of satisfaction with the service (85%) despite several dissatisfiers mentioned, may in part, be due to high quality information and counselling (84.5%) given to patients and this was collaborated in 84.5% of those interviewed. Additionally, availability and access to free of charge efficacious medication might explain why few sought other care, 19.2% (95% CI, 4, 33).

Consistently low performance, variation by gender, inadequacy and incompleteness seen in 13 of 25 categories of screening questions and 8 of 13 examination and treatment, scoring ≤ 50% indicated a generic problem, lack of structured information capture tools. Use of client, nurse, and doctor tick-and-fill-in standard form with prompts should replace the subjective free-hand notes, to minimise potential inter and intra-observer errors.

The relative contribution of the laboratory, 58%, to accurate diagnostic decisions was high; only 40% would have been correct without tests. It is therefore important to reduce the time it takes to do the tests (median, 3 days) and also the time to file the test (median, 3 days) by near patient rapid tests. As expected, adequate treatment and follow-up were independently significant and a combination was a synergistic predictor of good prognosis except in recurrent diseases, largely in women. People with recurrent diseases need extra strategies as standard treatment may not be enough to get them well. The evidence favours use of guidelines because in 188 clients, less than half, 45.5% were given adequate treatment; 51%, fair and 3.7% inadequate; only 41.3% were on medication for an acceptable duration. The study indicated that adequate treatment determined good prognosis. Furthermore, use of guidelines could chop off a half, BB$6.75 (US$3.38) from BB$13.05 (US$7.53), the sample's per capita average cost of medication for GU/STI in 2003–5. This would be similar to cost of medication for urethral discharge in Gambia, mean US$3.5 [range, 1.5–9.6] (7).

The proportion of 30% to 50% of patients presenting without physical symptoms but seeking information and screening is likely to rise as the public endorses campaigns for VCT. It is this group that would benefit most if GU/STI offers convenient times of appointments. As noted, however,

the clinical syndrome has low accuracy, 40.4%, and therefore tests are indispensable. The commonest confirmed diagnoses were: yeast, reactive Pap smear, bacterial vaginosis, gonorrhoea, syphilis, HIV, trichomonas and warts. Most trichomonas infection was asymptomatic and from Pap smears. Chlamydia in Kingston (0.5%) *vs* 12.8% (9.1, 16.4) was lower than expected unlike gonorrhoea, 5.9% *vs* 2.2% when compared to this study. Polymerase Chain Reaction (PCR) urine-based test was not available then. Polymerase Chain Reaction and PS appear to be useful in picking up asymptomatic infections; so we expect an increase in detection.

Strengths and weakness: This study had more details of the clinical process and used strict criteria for grading performance. It did not look at the inputs, materials and manpower, because of the favourable socio-economic development attained in Barbados; which in other settings can be major obstacles to service delivery (9–11). Hence, caregiver orientation may uplift performance in the identified weak areas, unlike in a resource-scarce environment (12). The study was dependent on recorded information. Notes by nature are incomplete and vary between and within caregivers. Direct observations of interactions could provide better diagnostic accuracy (13). Self-reporting by the assessed as in some studies could have more errors (13, 14). As survival analysis was not used, variation in case mix and denominator can limit comparison of incidence of episodes at different periods of follow-up. The tele-interview filled in some of the missing quality aspects and its potential negative recall bias was not apparent. Though the information collecting tools were not pilot tested, the content and scales were found to be similar to those used in previous studies (15, 16). The sample was randomly stratified, though the size may appear small, *post-hoc* calculations confirmed its adequacy and the confidence intervals were not overly long. Some effect measures were collaborated *eg* equal incidence of adequate counselling was found in 86.5% (95% CI, 78, 88) of 220 patients' records and reported in 84.5% (71, 98) of 26 tele-interviews.

CONCLUSION: GU/STI quality performance improvement in Barbados requires rapid laboratory diagnosis, standardized data formats with prompts, expedited partner notification and treatment appointments and use of recommended algorithm that can half the cost of medication. It would be better to strategize GUM instead of STI to encapsulate the spectrum diversity of presentations and points of service.

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REFERENCES

1. Ministry of Health, Barbados. Chief Medical Officer – Annual Reports 2000–2001.
2. Ministry of Health. STI Treatment and Control programme, Barbados, National Treatment Guidelines, 2006.
3. WHO Guidelines for the Management of Sexually Transmitted Infections 2003, (ISBN 9241546263).
4. Mehrotra A, Zaslavsky AM, Ayanian JZ. Preventive Health Examinations and Preventive Gynecological Examinations in the United States. Arch Intern Med 2007; **167:** 1876–83.
5. Gully PR, Fisher DC, Pless R, Herbart. How well do family physicians manage sexually transmitted diseases? Can Fam Physician 1995; **41:**1890–6.
6. Buvé A, Changalucha J, Mayaud P, Mugeye K, Todd J et al. How many patients with a sexually transmitted infection are cured by health services? A study from Mwanza region, Tanzania. Trop Med Int Health, 2001; **12:** 971–9.
7. Leiva A, Shaw M, Paine K, Manneh K, McAdam K, Mayaud P. Int J STD AIDS 2001; **12:** 444–52.
8. Adams OP, McIntyre, Prussia P. Risk behaviour, health care access and prevalence of infection with *Chlamydia trachomatis* and *Neisseria gonorrhoea* in a population based sample of adults in Barbados. ***CHRC Abstract***. West Indian Med J, 2004; 53 (**Suppl 2):** 18.
9. Ndulo J, Faxelid E, Krantz I. Quality of care in sexually transmitted diseases in Zambia: patients' perspective. East Afr Med J 1995; **72:** 641–4.
10. Gibney L, Chikukwa P, Seidenberg, Mukherjee S, Mbizvo M. STD treatment for men in rural and urban Zimbabwe: practitioner, perceptions of access and quality of care. Int J STD AIDS 2002; **13:** 201–9.
11. Bitera R, Alary M, Mâsse B, Viens P, Lowndes C, Baganizi E, et al. Quality of disease management of sexually transmitted diseases: investigation of care in six countries in West Africa. Sante 2002; **12:** 233–9.
12. Faxelid E, Ahlberg BM, Freudenthal S, Ndulo J, Krantz I. Quality of STD care in Zambia. Impact of training in STD management. Int J Qual Health Care 1997; **9:** 361–6.
13. Mathews C, va Rensburg A, Schierhout G, Coetzee N, Lombard CJ. An assessment of care provided by a public sector STD clinic in Cape Town. Int J STD AIDS 1998; **9:** 689–94.
14. Green M, Hoffman IF, Brathwaite A, Wedderburn M, Figueroa P, Behets F et al. Improving sexually transmitted disease management in the private sector: the Jamaica experience. AIDS 1998; **12 (Suppl 2):** S67–72.
15. Schneider H, Blaauw D, Dartnall E, Coetzee DJ, Ballard RC. STD care in the South African private health sector. S Afr Med J 2001; **91:** 151–6.
16. Shekelle P, Kosecoff J. Evaluating the treatment of STD at urban public hospital outpatient clinic. Am J Public Health 1992; **82:** 115–17.
17. Bryce J, Vernon A, Brathwaite AR, Perry S, Figueroa JP, Emerson RB. Quality of sexually transmitted disease services in Jamaica: evaluation of clinic-based approach. Collaborative working group on indicators of STD case management. Bull World Health Organ 1994; **729:** 239–47.