

A C K N O W L E D G E M E N T S

We take this opportunity to extend our sincere gratitude to UNFPA for its continued support and assistance for the improvement of the overall health status through its valuable input in the improvement of reproductive health. We would like to thank the UNFPA Country Director Mr Som Pudasaini, Ms Dunya Maumoon, the National Program Officer, UNFPA Maldives and the National Programme Assistant, Ms Shadiya Ibrahim for their guidance and facilitation to conduct the survey.

We would like to profoundly thank Dr. Prasanna Gunasekera for the valuable technical assistance he has given to conduct this first study to assess the prevalence of reproductive tract and sexually transmitted infections (RTI/STI) in the country.

The study team would also like to thank all those individuals who had provided their assistance and support to conduct the study. Our sincere appreciation and gratitude are extended to the management of Indira Gandhi Memorial Hospital, for the valuable facilitation of the laboratory analysis as well as the assistance given by the Consultant Gynecologists and the staff nurses in conducting the survey in the IGMH and the regional hospitals.

The Survey Team
Ministry of Health

A B B R E V I A T I O N S

AIDS	Acquired Immunodeficiency Syndrome
CI	Confidence Interval
CST	Country Technical Services Support Team
DPH	Department Of Public Health
ELISA	Enzyme-Linked Immuno-Sorbent Assay
F S W	Female Sex Worker
GUD	Genital Ulcer Disease
GUM	Genitourinary Medicine
HIV	Human Immunodeficiency Virus
HPV	Human Papillomavirus
HSV 2	Herpes simplex type 2
IDU	Injecting Drug User
IEC	Information, Education And Communication
IGMH	Indira Ghandi Memorial Hospital
KOH	Potassium Hydroxide
LCR	Ligase Chain Reaction
MoH	Ministry Of Health
M S M	Men Having Sex With Men
NGO	Nongovernmental Organization
PCR	Polymerase Chain Reaction
PID	Pelvic Inflammatory Disease
RPR	Rapid Plasma Reagin
RTI	Reproductive Tract Infections
SHE	Society for Health Education
STI	Sexually Transmitted Infections
TAG	Technical Advisory Group
TPHA	Treponemal Pallidum Haemagglutination
UNFPA	United Nations Population Fund

E X E C U T I V E S U M M A R Y

Little information exists on the prevalence of RTIs in the Maldives. The present study was undertaken by the Ministry of Health, Republic of Maldives, to fill this lacuna to some extent. The aim of the survey was to determine the prevalence rates of gonorrhoea, chlamydiosis, trichomoniasis, treponemal seroreactivity, herpes simplex type 2 infection and human immunodeficiency virus (HIV) in the Maldives and obtain some information in relation to sexual behaviour. The survey was a laboratory confirmed reproductive tract infection (RTI) prevalence study on women attending antenatal and gynaecological clinics at Indira Gandhi Memorial Hospital (IGMH), Regional Hospitals in Hdh. Kulhudhuffushi, Gdh.Thinadhoo and S.Hithadhoo.

During the period from October 2001 to July 2002, 247 women aged 16-49 years were consecutively recruited from attendees at obstetric and gynaecology outpatient department of Indira Gandhi Memorial Hospital, in Male' and the regional hospitals in Hdh. Kulhudhuffushi, Gdh.Thinadhoo and S.Hithadhoo. Out of all cases recruited 244 were taken as valid cases for the analysis. Recruitment of cases was based on attendees with new presenting complaints and who have not taken any treatment for RTI/SIT problem and not taken any antibiotic 3 weeks prior to consultation. The survey was voluntary, incorporating individual informed consent and laboratory testing was provided free to all study participants. . Of the women sampled, 24.2% were aged 25 years or younger. A high vaginal swab for bacterial vaginosis and *Candida* spp., a posterior fornix swab for *Trichomonas vaginalis*, and an endocervical swab from a cleaned cervix for *Neisseria gonorrhoea*, and *Chlamydia trachomatis* were collected from each of the participating women. A blood sample was drawn to screen for syphilis, hepatitis B surface antigen, herpes simplex and HIV. A diagnosis of *C. trachomatis* was made by a positive antigen detection test (CHLAMYGEN).¹ Gonorrhoea was diagnosed if gonococcal antigen was detected using a commercially available enzyme immunoassay, GONOGEN and CHLAMYGEN were used to test for N gonorrhoea and C trachomatis. Testing for HSV2 IgG antibodies was carried out using a commercially available enzyme-linked immuno-sorbent assay (ELISA), and confirmation was carried out using another ELISA test for IgM antibodies. HIV was assayed with a commercially available enzyme-linked immuno-sorbent assay (ELISA) and a repeat ELISA for confirmation. Syphilis serology was performed using the rapid plasma reagin (RPR) as the screening test. Hepatitis B was

screened for using a commercial test kit (Biotec) which identified Hepatitis B surface antigen. All specimens underwent laboratory testing at the Indira Gandhi Memorial Hospital.

Testing for gonorrhoea, chlamydial infection, *Trichomonas vaginalis* and syphilis was confidential and linked. Testing for HIV was unlinked anonymous testing. Follow-up is to be conducted with study participants who were diagnosed either syndromically and/or by laboratory testing.

Prevalence was zero for HIV infection, 0.9% (95% CI = 0.01 – 1.7) for treponemal antibodies, 4.1% (95% CI = 2.2 – 6.0) for gonorrhoea and 2.9% (95% CI = 1.2 – 4.5) for chlamydial infection. The prevalence of Hepatitis B was 1.3% (95% CI = 0.2 – 2.4) and HSV 2 was 3.4% (95% CI = 1.7– 5.2). The prevalence of *trichomonas vaginalis* was 1.2% (CI = 0.2 – 2.3) and for candida infection 11.5% (95% CI = 8.5 – 14.5). Three women had two RTIs each. One woman had both chlamydia and gonorrhoea; another had gonorrhoea and a positive VDRL treponemal antibody test while one had gonorrhoea and hepatitis B.

The mean age at first intercourse was 17.8 years (range 12 – 31). By 18 years of age 48.8 percent of women had experienced intercourse. The rate of divorce and remarriage are high in the Maldives. While 168 women (69.7%) had only one sexual partner the other women had two or more partners during their lifetime. The mean number of partners was 1.49 (range 1–7). Two women had 7 partners. In women with RTIs the number of sexual partners was found to be significant only in the case of gonorrhoea. Currently 37 percent of the husbands of women in the study worked on islands other than where the wife resided. However, no significant association was found in relation to the place of work of the husband and the wife's RTI. Approximately three quarters of the women were housewives and the majority of RTIs were diagnosed among them. Of the 148 non-pregnant women only 27 were using contraception. Eleven of these women complained of vaginal discharge. One patient with chlamydia and six women with candida infection were using oral contraception. Though the woman using an IUD complained of vaginal discharge no organisms were isolated. There were two women who gave a history of substance abuse. One of the women had also used intravenous drugs. The other woman had used oral heroine. However, neither woman was infected with STIs.

The prevalence of RTIs/STI was low in this study. This confirms the observations of many clinicians in the Maldives. Other studies in South Asia also report low levels of STIs.^{2,3} However, the limitations of the present study also need to be considered as well as the fact that direct

comparison with other studies is not possible due to the different methodologies used in them. The findings of relatively low levels of RTIs and no HIV give health planners in the Maldives the opportunity to ensure RTI/STI does not become a major public health problem. Since there are many social and behavioural factors in the Maldives that could lead to a rapid spread of these diseases it is imperative that health and policy planners not become complacent with the finding of this study.

I N T R O D U C T I O N

Many developing countries are establishing programmes for the control of reproductive tract infections including STIs. The impetus for such programmes has come from several directions. Reproductive tract infections (RTIs) are increasingly recognised as a major cause of reproductive morbidity and mortality in developing countries both directly through their impact on reproductive and child health,¹ and indirectly because of reports that associate STI control with a decrease in HIV incidence.^{2 3} A World Bank report in 1993 showed that the burden of RTI/STIs of urban populations in less developed countries makes up a substantial proportion of the entire disease burden of those populations.⁴ Moreover, the International Conference on Population and Development, recommended that all countries should make reproductive health care, including "treatment of reproductive tract infections and STIs, and other reproductive health conditions" accessible to all individuals.⁵ These infections cause suffering for both women and men around the world, but their consequences are far more devastating and widespread among women than men. In addition to health effects, STIs carry great social and economic consequences for individuals (particularly women), communities and nations. The consequences of RTIs on women include pelvic inflammatory disease (PID), ectopic pregnancy, fetal and perinatal death, postabortal and puerperal sepsis, infertility, cervical cancer, emotional distress and social rejection of women. Many women with self reported morbidity never seek health care for symptoms because of cultural and social constraints, especially personal modesty.^{6 7} Since many RTIs among women may be asymptomatic, this makes their diagnosis and treatment difficult in settings where laboratory diagnosis is unavailable. Moreover, the invisibility and taboos surrounding RTIs and the belief that they should be endured as an inevitable part of being a woman creates a situation that can severely compromise women's health.⁸

The risk of heterosexual HIV acquisition and transmission may be greatly increased in the presence of curable STIs, and symptomatic infections appear to carry greater risks than asymptomatic infections.⁹ The association between STIs and HIV is strongest for those infections that cause genital ulceration,^{1,10} but has also been demonstrated for infections such as gonorrhoea, chlamydia and trichomoniasis.^{11 12} Sexually transmitted diseases that cause genital inflammation have been shown to increase the efficiency of HIV transmission by as much as fivefold.

The Republic of Maldives is a small South Asian island nation consisting of about 1,190 islands in the Indian Ocean, of which only 199 islands are inhabited. The population of Maldives is **270,100** (2000 Census), of which 27.4 percent live in the capital island of Male', with a land area of less than 2 sq. kms and a high density of over 38 thousand people per sq. km. About 5 percent of the inhabited islands has a population of less than 200 people. The population growth rate of 1.9% and TFR of 2.8 have both show considerable declines in recent years. Approximately 27.5% of the population are between 10-19 years of age while 24.3% of the population are women aged between 15-49.

In Maldives there is no reliable information available on the prevalence and incidence of RTI/STIs and their complications and hence the burden of these diseases may be substantially under estimated. The Reproductive Health Survey of 1999 indicates that 65% of the population are unaware of any signs and symptoms of STIs and 43% did not know any ways by which they could be contracted.¹³ In order to make STI and HIV policies and programmes more efficient, the Government of Republic of the Maldives, in collaboration with UNFPA, decided to conduct a study to determine the prevalence of various etiologic agents responsible for RTIs within the country.

The first HIV positive case in the Maldives was detected in 1991. It is reported that between 1991 and 2001 new HIV cases grew from 1 to 99 among an expatriate labour force of less than twenty thousand. The latest recorded data shows a cumulative total of 11 HIV positive cases among nationals. All of these cases were in the age group of 25 to 45 years of age and all were sexually transmitted. 10 out of the 11 cases were men.

According to a recent situational assessment¹⁴ there are risk factors that could greatly worsen the STI/HIV/AIDS situation in the future unless action is taken now. These include serial monogamy, with high rates of divorce and remarriage; a growing trend of drug abuse among the young population; and tourism-related factors. A good number of Maldivian men work as seamen and many work on resort islands with long periods of separation from their families. In both these situations, where only a few women are employed, the possibility

for risky behaviour between men is high. Transmission from tourists is also a risk at present. Condoms use for family planning purposes is low. The Reproductive Health Survey indicated that only 6 percent of family planning clients use condoms regularly. Condoms are provided free through the family planning clinics and also by the NGO, SHE. However, the family planning clinics provide condoms only to married couples. Condoms are available at pharmacies. Unfortunately most of the pharmacies are located in Male'.

A large proportion of the population comprises of young people. However, information on sexuality and reproductive health provided through schools is limited. Exposure to external influences due to rapid expansion of internet and satellite television is also a matter of concern. The incidence of thalassaemia in the Maldives is one of the highest in the world, which requires frequent blood transfusion. Hence, many thalassaemics may now live into young adulthood. Another worrying feature is that many of those who receive blood transfusion receive them abroad with very little information about the quality of blood.

Health Services Structure

The health services are organised into a hierarchy made up of central, regional, atoll, and island levels. At the central level, the Ministry of Health (MOH) is responsible for formulating the overall health policy and health development plans, which include RH/FP. The ministry also regulates and coordinates the private sector, the NGOs, and the traditional healers. Although the private and NGO sector is not a part of the hierarchy, it nevertheless provides important health services to the public. The five levels of health services form a referral system with a hierarchy ascending from family health workers at the island level to the specialists at the Indira Gandhi Memorial Hospital (IGMH), supplemented by services from the private and NGO sector.

There are six regional hospitals situated at strategic locations in the archipelago. The hospitals are planned in order to deliver outreach services to 2 to 4 atolls that make up a region. They provide curative services at the secondary level. These hospitals are also responsible for the overall management of health care within the region, including the supervision of health centres and provision of outreach care to the atolls.

The atoll health centres form the next rung down the hierarchy. In addition to the curative services they provide, they are also responsible for services within the atolls including RH services and supervision of family health workers. The services at this level are provided by the health centres, staffed by a team made up of one doctor, CHWs, nurse aids, FHWs and TBAs. There are 26 such centres at present, providing a wide range of curative, preventive,

promotive, and rehabilitative services. Under the ongoing programme, the health centres are being upgraded to provide in-patient and enhanced maternal health services, including delivery rooms.

At the island level, health posts provide services to the island population. They form the lowest rung in the hierarchy and function in collaboration with the island administrative office. At this level, health care is provided by FHWs and TBAs (trained *foolhumas*). They are envisaged as playing a key role as the first contact point for the control of disease and supply of the MCH/FP services.

This document details the findings of the first RTI/STI prevalence survey in Maldives. The survey covered married women aged 16 –49 attending obstetric and gynaecological clinics at the Indira Gandhi Memorial Hospital and the regional Hospitals in Gdh. Kulhudhuffushi, Gdh.Thinadhoo and S.Hithadhoo. It is important to consider that surveys of this type are limited in that they do not represent all major population groups and so will not be a true prevalence survey of STI pathogens in the whole community. However, if used within these limitations, they provide data on the prevalence of selected STIs in the studied population. Such information can be used to refine STI policy and planning and revise disease prevalence estimates in population subgroups.

S t u d y I n v e s t i g a t o r s

The study was coordinated by the Ministry of Health. The principal investigators were Mr. Abdul Bari Abdulla and Ms. Maimoona Aboobakuru. Mr Abdul Bari Abdulla was later succeeded by Mr Ahmed Afaal. The study team was based in Male'.

ii	Mr. Abdul Bari Abdullah	Deputy Director, MoH
i	Mr. Ahmed Afaal	Assistant Undersecretary, MoH
iv	Ms. Maimoona Aboobakuru	Program Manager, MoH
v	Ms. Shareefa Manke	Assistant Director, IGMH
iv	Ms. Waseema Fikuree	Assistant Statistical Officer, MoH
vi	Dr. Nita T. Pant	Consultant Microbiologist, IGMH
vii	Ms. Husna Mohamed	Nursing Supervisor, IGMH

O b j e c t i v e s o f t h e S t u d y

1. To assess the prevalence of RTI/STIs amongst women of reproductive age (16-49 years) attending the Indira Gandhi Memorial Hospital (IGMH) in Male' and the regional hospitals in Hdh. Kulhudhuffushi, Gdh.Thinadhoo and S.Hithadhoo.
2. To obtain baseline information on sexual behaviour of women of reproductive age (16-49 years) attending the Indira Gandhi Memorial Hospital (IGMH) in Male' and the regional hospitals in Hdh. Kulhudhuffushi, Gdh.Thinadhoo and S.Hithadhoo.

M e t h o d s

A clinical and laboratory based cross sectional study was conducted to determine the prevalence of *Neisseria gonorrhoea*, *Chlamydia trachomatis*, *Trichomonas vaginalis*, *Treponema pallidum*, and HIV. A convenient non random sample of 248 consecutive new patients aged 16-49 attending the IGMH in Male' and the regional hospitals in Hdh. Kulhudhuffushi, Gdh.Thinadhoo and S.Hithadhoo was obtained during the 9-month study period from October 2001 to July 2002. Though the expected prevalence of selected RTIs as found in previous surveys in the sub-region^{15, 16, 17} was taken into consideration in determining sample size, other practical factors such as the high cost of test kits and difficulties in undertaking a large study for a long period of time were also matters of concern. Initially all the women were to have been recruited from clients attending the IGMH based on a perusal of client flows over the previous 12 months and the study was to have been completed within two months. Once the study commenced it was found that many patients had visited doctors working at IGMH in their private clinics and came to the hospital only for follow up. Only 46 women were recruited at the end of 2 months. Due to the limited number of clients recruited, the length of study period had to be extended. Moreover, the study also had to be extended to include regional hospitals to complete the study within the required time period.

Women were recruited from those visiting for consultation. They were invited to participate in the study after registration at the clinic before any interview or physical examination was performed. Women who were asked to participate in the study were informed of the objectives and procedures; informed consent was obtained from all participants. Only one of the women approached refused to participate. Three others agreed to the interview but refused clinical examination. Of the clients eligible for inclusion in the study only attendees at the study sites with new presentations were included. Patients attending for follow up and to ascertain the results of investigations were excluded. Patients using any vaginal

preparations (e.g. antiseptics) and those treated with antibiotics within the previous two weeks were also excluded.

A pre-tested questionnaire was administered by a trained nurse to consenting women who were interviewed in a private room and information about socio-demographic characteristics (age, education, current family planning method, place of occupation of the husband and woman), risk factors for RTI/STI related to the partner (current signs of STI) and to the women themselves, (number of partners, sanitary protection, symptoms of RTIs in the past, current symptoms of vaginal discharge and medical history) was obtained. The women were not asked about their marital status or about extramarital relationships because of cultural sensitivity.

A comprehensive clinical examination that included speculum examination of the cervix and vagina was conducted by a gynaecologist on the participants. The following specimens were obtained from all the patients at the time of pelvic examination. Samples were taken for laboratory diagnosis of vaginal and cervical infection. A high vaginal swab for bacterial vaginosis and *Candida* spp., a posterior fornix swab for *Trichomonas vaginalis*, and an endocervical swab from a cleaned cervix for *Neisseria gonorrhoea*, and *Chlamydia trachomatis*. A blood sample was drawn to screen for syphilis, hepatitis B surface antigen, herpes simplex and HIV. Testing for HIV was unlinked anonymous testing. The diagnosis of various reproductive tract infections was made based on the following diagnostic criteria: Trichomoniasis was diagnosed by a positive 'wet prep' test.¹⁸ Presence of clinical signs (erythema and curdy white discharge) with a positive culture for *Candida* was taken as indication of Vaginitis due to *Candida* (invasive type of candidiasis).¹⁹ In the absence of clinical signs, presence of pseudohyphae in the KOH mount/Gram stain was also considered as Candidiasis. Bacterial vaginosis was documented by a combination of clinical criteria; i.e. if 2 or more of the following criteria are present^{20, 21} (a) watery vaginal discharge (b) positive amine odor test (c) presence of clue cells in gram-stained vaginal smear. The following tests were carried out at the IGMH laboratory. Specimens taken from other islands were transported to the laboratory in Male'. A diagnosis of *C. trachomatis* was made by a positive antigen detection test (CHLAMYGEN). Gonorrhoea was diagnosed if gonococcal antigen was detected using a commercial enzyme immunoassay (GONORGEN).²² A positive serology by rapid plasma reagin (RPR) test was taken as current infection for syphilis.²³ Hepatitis B was screened for using a commercial test kit (Biotec) which identified Hepatitis B surface antigen. Testing for HSV2 IgG antibodies was carried out using a commercially available enzyme-linked immuno-sorbent assay (ELISA), and confirmation was carried out using another ELISA test for IgM antibodies. [Laboratory methods are appended]

All women with symptoms and signs of reproductive tract infections were treated using the syndromic management flow charts.

S t a t i s t i c a l M e t h o d s

The data were compiled and analysed using the statistical software SPSS (Chicago, IL, United States of America) version 10.0. Estimated prevalence rates were calculated using the confirmed laboratory results. Risk factors for all infections were examined individually using cross tabulations. Socio-demographic, sexual behaviour and hygiene related factors were examined as risk factors for endogenous infection in women.

R e s u l t s

Participation of Clients

A total of 248 women were recruited. Four women who did not proceed to sample collection were classified as non-responders. Of them one woman refused to participate while three refused the clinical examination.

Characteristics of the Study Population

Table 1 shows the age groups of the women. Ages ranged from 19 to 48 years. The mean age was 29.4 years (SD±6.6).

Age group (years) (n= 244)	Number	Percentage
16 - 19	7	2.9
20 - 24	52	21.3
25 - 29	73	29.9
30 - 34	58	23.8
35 - 39	35	14.3
40 - 44	10	4.1
45 - 49	9	3.7
Total	244	100

Of the 244 participants, 96 were pregnant. Table 2 shows the age distribution of the pregnant and non-pregnant women. Five (5.2%) of the pregnant women were aged between 16-19 years while 17 (17.7%) women were over the age of 35 years.

Ninety eight percent (239) used sanitary towels as menstrual protection while only 4 used self made pads. Wells were the main source of water for over 90 % of participants.

The mean age at first intercourse was 17.8 years (range 12 – 31). By 18 years of age 48.8 percent of women had experienced intercourse. While 168 women (69.7%) had only one sexual partner the other women had two or more partners during their lifetime. The mean number of partners was 1.49 (range 1-7). Two women had 7 partners.

Prevalence of RTIs

Fourteen of the patients were not tested for treponemal antibodies, gonorrhoea, Hepatitis B, HIV due to insufficient blood samples and damage during processing. Table 4 shows the prevalence of RTIs. Prevalence was zero for HIV infection, 0.9% (95% CI = 0.01 – 1.7) for treponemal antibodies, 4.1% (95% CI = 2.2 – 6.0) for gonorrhoea and 2.9% (95% CI = 1.2 – 4.5) for chlamydial infection. The prevalence of Hepatitis B was 1.3% (95% CI = 0.2 – 2.4) and HSV 2 was 3.4% (95% CI = 1.7– 5.2). The prevalence of trichomonas vaginalis was 1.2% (CI = 0.2 – 2.3) and for candida infection 11.5% (95% CI = 8.5 – 14.5). Three women had two RTIs each. One woman had both chlamydia and gonorrhoea, another had gonorrhoea and a positive VDRL treponemal antibody test while one had gonorrhoea and hepatitis B. The amine test was negative in all patients, while only 3 wet preparations showed the organism.

Table 4. Baseline prevalence of RTIs and seroprevalence of treponemal antibodies

RTI	Number	Number of women with infection	Prevalance %	95% confidence interval
T. Vaginalis	244	3	1.2	0.2, 2.3
Candida	244	28	11.5	8.5, 14.5
C Trachomatis	244	7	2.9	1.2, 4.5
N Gonorrhoea	231	10	4.3	2.3, 6.2
Treponemal/ antibody seroreactivity	231	2	0.9	0.01, 1.7
HSV 2	231	8	3.1	1.7, 5.2
Hepatitis B	231	3	1.3	0.2, 2.4
HIV	231			

Prevalence of *Trichomonas vaginalis*

Only 3 cases of trichomonas were identified using the criteria for diagnosing the condition. The prevalence rate was 1.2%. Of the 3 women, 2 were pregnant.

Prevalence of Candida

Candida was isolated in 28 women. The prevalence rate was 11.5%. The prevalence of candida infection by five year age group is detailed in Table 5.

Table 5. Prevalence of Candida by 5 year age group and pregnancy status.				
Age group (years)	Study population by age group	Number of positive Candida test results		
		Pregnant (n=96)	Not Pregnant (n=148)	Total
16 - 19	7	2	1	3
20 - 24	72	4	3	7
25 - 29	73	3	2	5
30 - 34	58	3	8	11
35 - 39	35	2		2
40 - 44	10			
45 - 49	9			
Total	244	14	14	28

Prevalence of Chlamydia Trachomatis

Of the survey sample, 7 women were diagnosed with chlamydial infection, three of whom were pregnant. The prevalence of chlamydia infection by five year age group is shown in Table 6. One woman had both chlamydia and gonorrhoea. While 4 of the 7 women who tested positive for chlamydia had only one partner the others had 2 partners during their lifetime. Of the women with chlamydia, 4 were aged 30 or younger.

Table 6. Prevalence of Chlamydia Trachomatis by 5 year age group and pregnancy status.				
Age group (years)	Study population by age group	Number of positive Chlamydia Trachomatis test results		
		Pregnant (n=96)	Not Pregnant (n=148)	Total
16 - 19	7			
20 - 24	72	1		1
25 - 29	73	2	1	3
30 - 34	58		1	1
35 - 39	35		2	2
40 - 44	10			
45 - 49	9			
Total	244	3	4	7

Prevalence of Neisseria Gonorrhoea

Ten cases of gonorrhoea were diagnosed of whom 7 were pregnant. Three women who tested positive for gonorrhoea had one other STD as well. These were chlamydia, hepatitis B and treponemal antibodies. Six of the women were less than 30 years of age. The prevalence of *N. gonorrhoea* infection by five year age group is detailed in Table 7. Seven of the women had only one partner; one woman had 2 partners while two women declined to answer the question. One woman was a widow at the time of the survey.

Age group (years)	Study population by age group	Number of positive Neisseria Gonorrhoea test results		
		Pregnant (n=96)	Not Pregnant (n=135)	Total
16 - 19	7			
20 - 24	72	2		2
25 - 29	73	3	1	4
30 - 34	58	1		1
35 - 39	35	1	1	2
40 - 44	10		1	1
45 - 49	9			
Total	244	7	3	10

Prevalence of Treponemal Antibodies

Treponemal antibodies were detected in 2 of the pregnant women (Table 8). They were both less than 30 years of age. Both these women had only 1 sexual partner. No treponemal antibodies were detected among non-pregnant women. However, the test was not carried out on 13 of the non-pregnant women due to insufficient blood sample and damage during processing.

Prevalence of Hepatitis B

The HbS antigen test was positive in 20 women (Table 9). However, using the confirmatory test only 3 were confirmed as hepatitis B. One of the confirmed cases was pregnant (Table 10). Though 2 of the patients with hepatitis B had received blood transfusions in the past this was not found to be statistically significant.

Age group (years)	Study population by age group	Number of positive Treponemal Antibodies test results		
		Pregnant (n=96)	Not Pregnant (n=135)	Total
16 - 19	7			
20 - 24	72	1		1
25 - 29	73	1		1
30 - 34	58			
35 - 39	35			
40 - 44	10			
45 - 49	9			
Total	244	2		2

Age group (years)	Study population by age group	Number of positive Hbs antigen test results		
		Pregnant (n=96)	Not Pregnant (n=135)	Total
16 - 19	7			
20 - 24	72	2	2	4
25 - 29	73	3	3	6
30 - 34	58	1		1
35 - 39	35		4	4
40 - 44	10		3	3
45 - 49	9	1	1	2
Total	244	7	13	20

Prevalence of Herpes Simplex Type 2

Only 228 patients were tested for HSV 2. There were 12 women with IgG antibodies.

The confirmatory test using IgM antibodies indicates there were 8 patients with active infection, two of whom were pregnant (Table 11).

Table 10. Number of confirmed Hepatitis B cases.

Age group (years)	Number of positive Hbs antigen test results	Number of positive confirmatory tests		
		Pregnant (n=96)	Not Pregnant (n=135)	Total
16 - 19				
20 - 24	4			
25 - 29	6	1		1
30 - 34	1			
35 - 39	4		1	1
40 - 44	3		1	1
45 - 49	2			
Total	20	1	2	3

Table 11. Herpes Simplex Type 2 IgM positives.

Age group (years)	Number of positive HSV2 test results	Number of positive confirmatory tests		
		Pregnant (n=96)	Not Pregnant (n=132)	Total
16 - 19	1			
20 - 24			1	1
25 - 29	4	1	1	2
30 - 34	5	1	3	4
35 - 39	1			
40 - 44			1	1
45 - 49	1			
Total	12	2	6	8

Place of Work of Husband and RTI

Thirty seven percent of husbands worked on islands other than where the wife lived. Table 12 shows the patients with confirmed STI and the regular place of work of the male partner. Using the c2 test (CI=95%) no significant association between the place of work of the husband and the wife's STI were found.

Table 12. Relationship between island of work of husband and wives

RTI	RTI	Same island	Other island	Total
Candida		19	9	28
Chlamydia		4	3	7
N Gonorrhoea		8	2	10
VDRL		2		2
Herpes Simplex 2		2	5	7
Hepatitis B*		2		2

* Of the three patients with hepatitis B one was a widow and hence, is not included in the table.

Number of Sexual Partners

Table 13 shows the number of sexual partners of women with RTIs during their lifetime. The number of sexual partners was found to be significant only in the case of *N. gonorrhoea* (Table 14).

Table 13. Relationship between number of sexual partners and RTIs

RTI	Number of patients with RTI	Number of partners			
		1	2	3	4
Yeast	28	20	5	1	1
Chlamydia	7	4	3		
Neisseria Gonorrhoea	10	7	1	2	
Treponemal Antibodies	2	2			
HSV2	8	5	2		1
Hepatitis B		3			

Table 14. Univariate association between number of sex partners and

RTI	Pearson chi-square	p- value	Adjusted odds ratio	95% CI
Number of sex partners N Gonorrhoea				
1	0.002	0.03	0.972	0.972
2 or >				

Women's Occupation and RTI

Information was available on the women's occupation in 232 cases. Occupations were classified as housewives, management/professional, teachers and nurses, clerical workers, paramedical workers, labourers and others. The majority of infections were in housewives. However, 4 of the 7 chlamydial infections were among women employed outside the home. One case of *N. gonorrhoea* and HSV2 were among working women. (Table 15)

Table 15. Women's occupation and RTI

Occupation	Number	Candida	Chlamydia	Neisseria Gonorrhoea	Treponemal Antibodies	HSV2	Hepatitis B
Housewife	191	22	3	6	2	7	2
Managerial/Professional							
Teacher/Nurse	14	1	1				
Clerical	12	3	2	1		1	
Paramedical Worker	2						
Other	4	1	1				
Not Known	9	1		3			
Total	232	28	7	10	2	8	2

There was no statistical association between the woman's occupation and any sexually transmitted diseases or with the number of sexual partners.

Previous Pregnancy Outcome

There were 8 women who had experienced stillbirths and one who had an ectopic pregnancy. Sixteen women who had been pregnant before had experienced a spontaneous abortion during the last pregnancy. However, none of the women infected with chlamydia, gonorrhoea, herpes simplex 2 and hepatitis B had experienced unfavourable pregnancy outcomes, such as stillbirths, spontaneous abortions or ectopic pregnancies. There were 6 women who had experienced three or more abortions during previous pregnancies. None of them had confirmed RTIs. Six women had undergone induced abortions. There were two women who had induced abortion twice and one had induced abortions thrice. All the induced abortions were carried out by the women themselves without the assistance of any trained medical personnel.

Substance Abuse and Blood Transfusions

There were two women who gave a history of substance abuse. One of the women had also used intravenous drugs. The other woman had used oral heroine. However, neither woman was infected with STIs. Thirty three women (13.5%) had received blood

transfusions. Though none of the women infected with blood borne pathogens such as syphilis, hepatitis B had received blood transfusions there were two women infected with chlamydia and gonorrhoea who had received blood transfusions in the past.

Vaginal Discharge and RTI

There were 93 women in the study who presented with vaginal discharge. However, only in 31 women were pathogens commonly associated with infections isolated. Of the 96 pregnant women 28 complained of vaginal discharge pathogens were isolated in only 16.

Of the 28 women with candida infection 24 bathed twice or more during the day. There were 2 women who bathed 5 times a day. Twenty two of the women with candida used well water for bathing. The other sources were desalinated water (4 cases) and two used collected rain water. All 28 women with candida used disposable sanitary towels. Twelve of these 28 women had basic literacy, 11 had only primary education and 5 had secondary education.

Contraception and RTIs

Of the 148 non-pregnant women only 27 were using contraception (Table 16). Eleven of these women complained of vaginal discharge. One patient with chlamydia and six women with candida infection were using oral contraception. Though the woman using an IUD complained of vaginal discharge no organisms were isolated.

Table 16. Contraceptive use among non pregnant women and vaginal discharge

	Number using contraception	Vaginal discharge present
O C P	6	3
Injectable	4	2
Condom	6	4
IUD	1	
Rhythm Method	3	
Withdrawal	2	
Female Sterilisation	4	2
Male Sterilisation	1	
Total	27	11

There were 8 patients who had previously used IUD. One of them was pregnant and had gonorrhoea. The IUD had been removed more than 12 months before the survey. Candida was not found in the others.

Genital Ulcers

Of the 27 women who reported genital ulcers or sores only 2 had confirmed herpes simplex type 2 infections.

Pelvic Pain

Of the 199 women who presented with pelvic pain 2 women tested positive for gonorrhoea while five had chlamydial infection.

Infertility and RTIs

There were 56 women presenting with infertility. Of them 10 complained of primary infertility. None of them had RTIs commonly associated with infertility. However two of the women with secondary infertility had chlamydial infection.

Thirteen women reported urethral discharge, genital ulcers, burning sensation on micturition in their husbands. However, none of these women had evidence of a RTI.

D i s c u s s i o n

In this study of symptomatic women attending antenatal and gynaecological clinics in the Maldives a low RTI/STI prevalence and a moderate prevalence of endogenous infections was found. However, it is necessary to interpret the findings with caution given the relatively small number of women tested and the limitations of the study. By the selection of a convenient non-random sample of women attending clinics selection bias may have been introduced into the study. However it was decided that taking a convenient sample would not only be simpler, cheaper and reduce the study period but also reduce the potential for complications in recruitment and specimen collection. In fact, though initially the study was to have been conducted only in Male' due to the difficulty in identifying clients the study had to be extended to other regional hospitals. Though hospitals records indicated a large client flow to the initial planned study site (IGMH), during the study period it was found that many of the clients came for follow up of the presenting complaint. Hence, the option to extend the study to regional hospitals was considered. To ensure the quality of the interviews the trained interviewers from the IGMH visited the regional hospitals for the duration of the study.

Study Limitations

Difficulties were faced having to have undertaken a large study for a long period of time. The study was to have been completed within two months. However, at the end of 2 months, only 46 clients had been recruited. This resulted in a marked decline in enthusiasm of the staff involved in the study.

Due to the limitation in the number of clients obtainable in Male', the survey had to be extended to Hdh, Gdh and Seen regions. Although more clients were recruited, this extension caused further delays.

Socio-cultural factors also played a limiting role. Certain questions that could have further helped in the objectives of the survey could not be asked. For instance, questions regarding extra-marital affairs could not be asked. A comprehensive understanding of sexual behaviour was therefore difficult.

A major limitation with regard to the second objective of the study, namely in relation to eliciting information on the sexual behaviour of Maldivian women is the sensitivity of the subject and the socio-cultural and religious values and beliefs including legal implications arising from certain issues, such as the following:

- Abortion is illegal unless it is to save the life of the mother and in the case of the fetus having thalassaemia.
- Since sexual intercourse is prohibited by law outside marriage it was not possible to directly address questions related to such behaviour.
- Although school going clients are in the target age group, questions regarding sexual behaviour could not be asked because they are not expected by law to be sexually active.

Enumerating only a subset of population i.e. patients visiting hospital was a sampling limitation.

Non-response

Only 1.6% (4/247) of the women approached declined to participate. This was a low refusal rate compared to those reported in other studies in South Asia involving a gynaecological examination for which the range was 15% to 18%.^{15, 17} The low refusal rate is encouraging for future investigators in this area given the sensitivity of the topic in the socio-cultural context of the Maldives.

Prevalence of RTI/STIs

The prevalence of RTIs/STI was low and similar to many studies in South Asia.^{24 25} This confirms the observations of many clinicians in the Maldives. However, the limitations of the study also need to be considered as well as the fact that direct comparison with other studies is not possible due to the different methodologies used. In many societies, younger (unmarried) adolescents and divorced or abandoned women are at higher risk of STIs.²⁶ Although adolescent schoolgirls were eligible for inclusion in the study

they were excluded because of socio-cultural and legal constraints. Law in the Maldives prohibits premarital and extramarital sex. As a result of societal sanctioning, such women may rarely attend publicly funded reproductive health services.

Surprisingly *Trichomonas* was detected only in three patients using 2 or more of the following criteria (a) watery vaginal discharge (b) positive amine odor test (c) presence of clue cells in gram-stained vaginal smear.^{27 20} Though two of the women were found to have a positive RPR result, a specific treponemal test was not carried out as they were living on islands other than Male'.

Though 93 women complained of vaginal discharge only in 31 (33.3%) were pathogens known to cause vaginal discharge isolated. Of the 96 pregnant women 28 complained of vaginal discharge but pathogens known to cause vaginal discharge were isolated in only 16. The aetiology of endogenous infections is poorly understood. Factors such as personal hygiene and sexual behaviour which affect the vaginal environment²⁸ may be important as may hormone level.^{29 30} Endogenous infections are also reported to be common in IUD users.³¹ In the present study 24 women with candida infection bathed twice or more during the day. There were 2 women who bathed 5 times a day. It is possible that frequent washing changes the genital flora especially if antiseptic soaps are used. Since approximately four fifths of women with vaginal discharge in the study do not harbour pathogens the current practice of clinically diagnosing and treating such patients using syndromic management guidelines needs to be seriously reviewed. Not only does over-diagnosis of RTIs have financial consequences for the health system, but it also carries possible social consequences. It is also necessary to educate women about physiological and pathological vaginal discharges.

Currently all pregnant women are screened for syphilis, hepatitis B and HIV. However, the presence of chlamydia and gonorrhoea in 10 of the 96 pregnant women is a cause for concern as these two organisms are known to cause ophthalmic infections in the newborn. Since the sample size is small, generalisations cannot be made. However, review of conditions included in routine antenatal screening needs to be considered. Vigilance of health staff is necessary in the case of newborns with eye discharge. In addition, 2 pregnant women had active HSV2. Vaginal delivery in pregnant women with active genital infection carries a high risk to the newborn. It can cause disseminated visceral infection, encephalitis and death. Caesarean section is advised before membrane rupture when primary or recurrent genital infections occur in late pregnancy because of the risk of neonatal infection.

STIs are associated with adverse foetal outcomes. Only one woman with HSV2 infection had a spontaneous abortion in the previous pregnancy. Investigations for RTIs need to be part of the investigations conducted to ascertain the reason for recurrent abortions and other adverse pregnancy outcomes.

There were 20 patients with HbsAg. None of the three cases of hepatitis B with IgM antibodies had received blood transfusions in the past. One of the 3 patients was pregnant. Perinatal transmission is one of the most serious³² modes of transmitting HBV infection. Infants who are infected during birth are at high risk (up to 90%) of becoming chronic carriers. This significantly increases their risk of developing chronic liver disease which may cause premature death.³³ However, appropriate immunization can prevent the infant developing carrier status in up to 95% of cases.³⁴ Currently most new-borns are provided with immuno-prophylaxis for hepatitis B prior to discharge from hospitals in the Maldives (not all new-borns are vaccinated for Hepatitis B prior to discharge. Some of them have their first Hepatitis B, Polio and BCG vaccines when they are 4-5 months old).

The survey did not elicit whether blood transfusions were received outside the country though many Maldivians seek medical treatment in neighbouring countries. Nevertheless it is necessary to ensure that blood transfusions carried out in the Maldives do not act as a vehicle for blood borne viruses such as HIV, syphilis, and hepatitis by ensuring the quality of the blood. All blood donated in the Maldives is on a voluntary basis. All health personnel who may come into contact with blood or body fluids should be provided with hepatitis B prophylaxis. Infection control procedures need to be vigorous in health care setting.

In many cases of infection with chlamydia women are asymptomatic. Though 10 of the 56 women complained of primary infertility none of them had RTIs commonly associated with infertility. However two of the women with secondary infertility had chlamydial infection. Protocols for investigation of infertility should include investigations for RTIs known to cause infertility.

The rate of divorce and remarriage are high in the Maldives. Frequent partner exchange is usually associated with RTI. We were able to demonstrate a statistically significant difference in relation to the number of partners only in the case of gonorrhoea. The island of regular work of one third of males was different to the island of residence of the wife. This study also failed to establish an association between RTI in the case of such couples. Caution is necessary in interpreting these findings, as the sample size was small. Approximately three quarters of

the women were housewives and the majority of RTIs were diagnosed among them. The Reproductive Health Survey (1999) indicates that both males and females who had a regular occupation were more knowledgeable about STIs. It is necessary to continue to reach the housewives through the visits of the FHW. Women who are employed outside the home also need to be reached with health messages on RTIs.

There is a need for improvement of knowledge, attitude and behaviour of the health personnel in managing RTIs/STIs, especially in infection control, partner notification, and counselling. Health personnel need to be skilled in communicating matters relating to sexuality and reproductive health that are not pregnancy related in a culturally sensitive manner. This requires that such health messages be also communicated to males. Health workers need to be trained to communicate with males about RTIs. They should be mobilised to conduct awareness programmes for males in places such as resort islands where there is a concentration of male employees.

Given the large expatriate workforce in the Maldives it is necessary to conduct programmes for them on safe sex practices to safeguard themselves and any Maldivians who are their sexual partners.

The use of condoms for contraception is only 6%¹⁴. It is necessary to promote their use both for contraception and for prevention of RTIs. For this the support of gatekeepers such as religious leader is necessary. Maldives can draw on lessons learnt from Iran and Bangladesh in mobilising support of religious leader for reproductive health. Condoms also need to be readily available, especially on the islands. People may be reluctant to obtain them from pharmacies or from health workers especially in small communities. Condom boxes can be installed on selected islands on a pilot basis.

There is no active contact tracing. Currently the onus is on the patient to motivate and inform the partner to seek investigation and treatment. There are practical difficulties as a considerable proportion of male partners work on islands other than the island of usual residence. Contact tracing and treatment of infected partners needs to be conducted more vigorously.

STI surveillance is comprised of reporting of general outpatient statistics of suspected or confirmed cases (depending on the laboratory support) from the hospitals and health centres to the Ministry of Health. This includes information from the private sector clinics as well. There is a need for strengthening of the STI surveillance and information system. One strategy to improve STI surveillance is to conduct periodic baseline prevalence studies

of selected STIs. It is necessary in the future to conduct a behavioural and risk factor RTI prevalence survey among males in the Maldives which would better determine community prevalence rates and predictors of infection. With the increasing availability of non invasive methods of testing for RTIs refusal to participation in such surveys will be minimised. It is also necessary to conduct a survey in relation to sexual and other risk taking behaviour among adolescents and youth.

C o n c l u s i o n a n d R e c o m m e n d a t i o n s

Although it was felt at the commencement of the study that in a very conservative society like the Maldives it would be difficult to elicit such intimate personal information this was not the case. The number of women who refused to participate in the study was negligible. This means that information on such a very private and neglected area as RTIs can be scientifically collected in the Maldives.

The majority of RTIs observed were caused by endogenous vaginal infections (i.e. candidiasis and *T. vaginalis*). The observed rate of STIs was low though the presence of cervical infection (i.e. chlamydia and gonorrhoea) in 10 of the 96 pregnant women is a cause for concern as these two organisms are known to cause ophthalmic infections in the newborn. In addition, 2 pregnant women had active HSV2. Currently all pregnant women are screened for syphilis, hepatitis B and HIV. In the light of these findings there is a need for a review of conditions presently included in routine antenatal screening. This requires that integration of RTI/ STI services with current family planning and maternal health services be strengthened. More importantly, women should be educated during their visits to clinics as to how they can protect themselves from STIs. Screening of newborns for ophthalmia neonatorum also needs to be strengthened. Counselling is an important preventive measure and has to be introduced on a priority basis in all MCH/ FP clinics. Investigations for RTIs need to be part of the investigations conducted to ascertain the reason for recurrent abortions and other adverse pregnancy outcomes. Screening for RTIs should be part of the routine investigation of all infertile couples. Behavior change communication and communication (BCC) programmes promoting sexual and family responsibility, and directed to adults and adolescents are another urgent need.

Currently patients are obliged to motivate and inform partners to seek treatment for STIs. There is a need for more vigorous contact tracing in order to prevent spread into the community. Programmes need to be developed to increase male involvement particularly regarding responsible sexual behaviour as husbands and partners. They also need to be informed about the importance of partner screening and management. Programmes on

prevention and treatment of RTI also need to be developed for the large number of migrant workers in order to prevent spread into the host community. Condoms need to be actively promoted for dual protection. They also need to be readily available, especially on the islands. Advocacy with gatekeepers is necessary to destigmatise condoms and to increase acceptance by communities of efforts to prevent RTIs.

There is also a need for further research. For instance, a behavioural and risk factor STI prevalence survey of high-risk males would better determine community prevalence rates and predictors of infection. In addition, the knowledge attitudes and practices of adolescents and youth in relation to sexuality and RTI/STIs including HIV/AIDS is also needed.

The findings of relatively low levels of RTIs and no HIV give health planners in the Maldives the opportunity to ensure RTI/STI does not become a major public health problem. Since there are many social and behavioural factors in the Maldives that could lead to a rapid spread of these diseases it is imperative that health and policy planners not become complacent with the finding of this study.

R e c o m m e n d a t i o n s

Review of policy and strategies for STIs and HIV including surveillance, clinical services, laboratory services, health promotion, role of syndrome management and staff training and development.

Review of conditions included in routine antenatal screening (eg. chlamydia and gonorrhoea).

Review of newborn screening practices especially in the case of ophthalmia neonatorum.

Include screening for RTI/STIs in cases of adverse pregnancy outcome such as stillbirths and recurrent abortions and infertile couples.

Increasing the awareness and attention of men to RTI/STI prevention, particularly regarding responsible sexual behaviour as husbands and partners. They also need to be informed about the importance of partner screening and management.

Evaluation of current STI and HIV prevention strategies in health education and promotion for young people.

Consideration of adolescent friendly programmes providing information and services on RTI/STIs and family planning.

Consideration of programmes providing information and services to migrant workers.

Consideration of a community-based strategy to promote condom use.. Advocacy with 'gatekeepers' such as religious scholars and community leaders to obtain their support.

Review of access to condoms to prevent STI transmission and family planning, including their availability and affordability, including female condoms.

Research

- A behavioural and risk factor STI prevalence survey of high-risk males would better determine community prevalence rates and predictors of infection.
- Knowledge attitudes and practices of adolescents and youth in relation to sexuality and RTI/STIs including HIV/AIDS.

A P P E N D I X 1

Laboratory Methods

Vaginal swabs and cervical swabs were collected by the gynaecologists and sent to the laboratory along with the patient for blood collection. Therefore the samples were sent to the laboratory with minimum delay.

Wet smear was prepared and examined as soon as the specimens were received and the other specimens were processed well within four hours of sample collection.

The specimens were registered and tested separately from other laboratory specimens by an identified technologist to ensure standardisation and quality.

1 Vaginal Swabs.

1.1 Saline smear (wet preparation)

Saline smear was prepared by adding few drops of sterile normal saline to the tube and mix the swab in saline and vortexed. Put one drop on to a slide and put a cover slip. The film was examined under microscope with x10 and x40 objectives for Trichomonas and Yeasts.

1.2 Gram stain

The second swab was used for gram staining. Gram stain was done using standard technique and examined for polymorphs, bacteria especially gram negative intra cellular diplococci (N. gonorrhoea)

Quality control

Gram stains were tested by staining smears from standard cultures of gram positive and negative bacteria.

1.3 Chlamygen

Chlamygen test was done on one cervical swab using Chlamygen – Rapid Chlamydia Swab test from Genelabs Diagnostics. The tests were performed with positive and negative controls. Test runs were taken as valid only if positive and negative controls were acceptable.

1.4 Gonorgen

Gonorgen test was done on one cervical swab using Gonorgen – Rapid Gonorrhoea Swab test from Genelabs Diagnostics. Relative sensitivity 100 % and relative specificity 97.6% (Culture method versus Gonorgen). The tests

were performed with positive and negative controls. Test runs were taken as valid only if positive and negative controls were acceptable.

2.0 Blood samples.

2.1 Syphilis

Screening test for Syphilis antibodies was done using Immunotrypt RPR test kits from Omega Diagnostics. The tests were performed with positive and negative controls. Test runs were taken as valid only if positive and negative controls were acceptable. TPHA was not done for the two positive samples because sample was insufficient and the patients lived outside Male'

2.2 HIV

Screening test for HIV 1 & 2 antibodies was done using Serodia HIV 1 & 2 from Fujirebio. Positive and Negative controls were run with all test batches and used to validate the test runs.

2.3 Hepatitis B

Screening test for Hepatitis B surface antigen was done with Hepatitis B latex antigen test from BIOTEC. Positive and Negative controls were done with every batch and used to validate the results. Screening positive samples were tested with confirmatory Elisa test (Murex HbsAg confirmatory version 3)

2.4 Herpes Simplex Virus I & II (IgM)

Samples were tested for HSV IgM with HSV IgM EIA kits from RADIM. Samples with absorbance above the cut off value is considered positive and samples with absorbance lower than the cut off value is considered negative. Samples with absorbance values ranging within +/- 10% of the control are be considered inconclusive and they need to be retested for confirmation.

Herpes Simplex Virus I & II IgG

Samples were tested for HSV I and II IgG separately with EIA kits from RADIM. Samples with absorbance above the cut off value is considered positive and samples with absorbance lower than the cut off value is considered negative. Samples with absorbance values ranging within +/- 10% of the control are be considered inconclusive and they need to be retested for confirmation

The test kits available currently for HSV IgM is a combined kit for both type I & II. However they could be retested to identify type I & II as soon as suitable test kits are available. Serum samples are kept at - 20°C.

A P P E N D I X 2**Study Questionnaires****RTI/STI Survey
Questionnaire (for women)**

Interviewer ID _____

Centre name _____

Client ID _____

Place of residence: 1-Male' 2 - Other island

Nationality _____

Date of visit: _____

Purpose of visit _____

SOCIO-DEMOGRAPHIC PROFILE: (Q1 - Q6)**1** Client's age (Completed years of age)**2** What level of education did you achieve?

1 - Illiterate

2 - Basic literacy

3 - Primary

4 - Secondary

5 - University Diploma

6 - Under graduate

7 - Post graduate

3 What is your occupation? _____**4** Is your usual place of work:

1 In your normal residence island

2 Outside normal residence

5 How many times do you take a bath in a day?

1 Less than 1

2 Once a day

3 More than 1 a day

- 6 What is your main water supply?
- 1 Central (desalinated)
 - 2 Well
 - 3 Rain water
 4. Other (specify) _____

MENSTRUAL HISTORY (Q7 - Q13)

- 7 When did you have your last menstruation?
- 8 In the last 6 months how often did your menstruation come?
Average days
- 9 In the last 6 months how long did your menstruation usually last?
Average days
- 10 How would you describe your usual menstrual flow?
1 - Light 2 - Moderate 3 - Heavy
[Put scales for consistency of responses]
- 11 Are your menstrual periods painful?
1 - Yes 2 - No
- 12 Do you have any bleeding in between your periods?
1 - Yes 2 - No
- 13 What do you use during your menstrual periods?
- | | | |
|--------------------------------|---------|--------|
| 1. Disposable pads | 1 - Yes | 2 - No |
| 2. Home made pads | 1 - Yes | 2 - No |
| 3. One use rag/cloth or cotton | 1 - Yes | 2 - No |
| 4. Reused rag/cloth | 1 - Yes | 2 - No |
| 5. Tampons | 1 - Yes | 2 - No |
| 6. Other (specify) _____ | | |

MEDICAL HISTORY (Q14 - Q27)

- 14 Do you have any abnormal vaginal discharge?
1- Yes 2 - No [If 'no' go to Q.19]

- 15 For how many days have you had the vaginal discharge?
- 16 What is the amount of the vaginal discharge?
1 - Scanty
2 - Moderate
3 - Profuse
[scale necessary here also?]
- 17 Is there any offensive smell in the vaginal discharge?
1 - Yes 2 - No
- 18 What is the colour of the vaginal discharge?
1 - Clear
2 - Whitish
3 - Yellowish or greenish
4 - Blood stained
5 - Other (specify): _____
- 19 Do you have any of the following complaints at present?
- | | |
|--|----------------|
| 1. Itching in the genital area | 1 - Yes 2 - No |
| 2. Genital ulcer or sore | 1 - Yes 2 - No |
| 3. Lower abdominal (pelvic) pain | 1 - Yes 2 - No |
| 4. Pain or burning on passing urine | 1 - Yes 2 - No |
| 5. Frequent passing of urine | 1 - Yes 2 - No |
| 6. Painful sexual intercourse | 1 - Yes 2 - No |
| 7. Bleeding during or after sexual intercourse | 1 - Yes 2 - No |
| 8. Infertility | 1 - Yes 2 - No |
| 9. Other (specify): _____ | |
- 20 Have you ever had any of the following genital problems before?
- | | |
|---------------------------|----------------|
| 1. Vaginal discharge | 1 - Yes 2 - No |
| 2. Genital ulcer | 1 - Yes 2 - No |
| 3. Pelvic pain | 1 - Yes 2 - No |
| 4. Other (specify): _____ | |

[If response is 'no' for every option, go to Q.25]

- 21** When did you have the problem?
 1- last week
 2- 2 weeks ago
 3- more than 3 weeks
- 22** Did you get any treatment?
 1 - Yes 2 - No [If 'no' go to Q25]
- 23** What kind of treatment did you get?
 1 - Oral medication (Name of medicine: _____)
 2 - Injections (Name of the injection: _____)
 3 - Other (specify): _____
- 24** What was the response to the treatment?
 1 - Recovered
 2 - Improved
 3 - No improvement
 4 - Worsened
 5 - Don't know
- 25** Have you ever been to Drug Rehabilitation Centre?
 1 - Yes 2 - No [If 'no' go to Q.28]
- 26** Have you ever used any drugs?
 1 - Yes 2 - No [If 'no' go to Q.28]
- 27** What type of drugs have you used?
 1. Chewing 1 - Yes 2 - No
 2. Sniffing 1 - Yes 2 - No
 3. Intra venous 1 - Yes 2 - No
 4. others (specify): _____

OBSTETRIC HISTORY (Q28 - Q41)

- 28** Have you ever had sexual intercourse?
 1 - Yes 2 - No [If 'no' go to end]

clinical examination not required?

- 29 Are you pregnant now?
1- Yes 2- No
- 30 Have you been pregnant before?
1 - Yes 2 - No 3 - Don't know
[If 'No' or 'Don't know' go to Q.41]
- 31 How many times have you been pregnant before?
- 32 How many children were born to you?
- 33 What was the outcome of your last pregnancy?
1 - Live birth
2 - Still birth
3 - Spontaneous abortion
4 - Induced abortion/miscarriage
5 - Ectopic pregnancy
6 - Other (specify): _____
- 34 When did this happen?
1 - Less than one month ago
2 - One to within six months ago
3 - Six to within 12 months ago
4 - Twelve months and over
- 35 Where did this happen?
1 - Home
2 - Government hospital
3 - Private hospital
4 - Regional hospital
5 - Atoll Hospital
6 - Health Centre
7 - Private clinic
4 - Other (specify): _____
- 36 Did you have any of the following complications post delivery/
Abortion/miscarriage? [Ask as appropriate]

- | | | |
|-------------------------|---------|--------|
| 1 - Hemorrhage | 1 - Yes | 2 - No |
| 2 - Infection | 1 - Yes | 2 - No |
| 3 - Infected episiotomy | 1 - Yes | 2 - No |

37 Have you had any abortion (or alternatively)

Have you had any miscarriage?

1 = Yes 2 = No [Go to Q.41]

38 How many abortions (or miscarriages) have you had?

Number of miscarriages

Number of spontaneous abortions

Number of induced abortions

39 How long ago did you have the last abortion or miscarriage?

1 - Less than one month

2 - One to within 6 months

3 - Six to within 12 months

4 - Twelve months and over

40 Post abortion/miscarriage, did you have any of the following problems?

1 - Fever 1 - Yes 2 - No

2 - Prolonged vaginal bleeding 1 - Yes 2 - No

3 - Vaginal discharge with foul smell 1 - Yes 2 - No

4 - Other (specify): _____

41 Have you ever had blood transfusion for any reason?

1 - Yes 2 - No

CONTRACEPTIVE HISTORY (Q42 - Q43)

42 Have you ever used a contraceptive method?

1 - Yes 2 - No [If No go to Q.47]

43 Which of the following contraceptive method did you use?

1. Pills 1 - Yes 2 - No

2. Injectables 1 - Yes 2 - No

3. Spermicide 1 - Yes 2 - No

4. Condom 1 – Yes 2 – No
5. IUD 1 – Yes 2 – No
6. Rhythm 1 – Yes 2 – No
7. Withdrawal 1 – Yes 2 – No
8. Exclusive Breastfeeding 1 – Yes 2 – No
9. Sterilization 1 – Yes 2 – No
10. Other (specify): _____

44 (If 'Yes' for IUD in Q43) How long ago did you stop using the IUD?

- 1 – Less than one month
- 2 – One to within six months
- 3 – Six to within 12 months
- 4 – Twelve months and over

45 Are you currently using a contraceptive method?

- 1 – Yes 2 – No [If 'No' go to Q.47]

46 Which method are you using currently?

1. Pills 1 – Yes 2 – No
2. Injectables 1 – Yes 2 – No
3. Spermicide 1 – Yes 2 – No
4. Condom 1 – Yes 2 – No
5. IUD 1 – Yes 2 – No
6. Rhythm 1 – Yes 2 – No
7. Withdrawal 1 – Yes 2 – No
8. Breastfeeding 1 – Yes 2 – No
9. Sterilization 1 – Yes 2 – No
10. Other (specify): _____

SEXUAL HISTORY (Q47 – Q55)

47 At what age did you have your first sexual intercourse?

48 Have you had sexual intercourse with more than one person during the last 6 months?

- 1 – Yes 2 – No

49 How often do you use condoms with your sexual partner?

- 1 - Regularly
- 2 - Occasionally
- 3 - Never use

50 Does your partner have any genital problems now?

- 1 - Yes
- 2 - No
- 3 - Don't know

[If 'no' or 'don't know' go to Q.52]

51 What kind of problems has he now?

- 1. Urethral discharge 1 - Yes 2 - No
- 2. Ulcers and sores 1 - Yes 2 - No
- 3. Burning/pain on urination 1 - Yes 2 - No
- 4. Scrotal swelling 1 - Yes 2 - No
- 5. Other (specify): _____

52 Has your partner had any genital problems before?

- 1 - Yes
- 2 - No
- 3 - Don't know

(If 'No' or 'don't know', go to Q.54)

53 What kind of problems did he have?

- 1. Urethral discharge 1 - Yes 2 - No
- 2. Ulcers and sores 1 - Yes 2 - No
- 3. Burning/pain on urination 1 - Yes 2 - No
- 4. Scrotal swelling 1 - Yes 2 - No
- 5. Other (specify): _____

54 Is your husband's usual place of work:

- 1. Inside your residence island
- 2. Outside residence island
- 3. Not applicable

55 What is your family monthly income?

- 1. Less than 2000 Rf
- 2. 2000 - 5000 Rf
- 5000 Rf and above

Clinical Examination**I. GYNAECOLOGICAL EXAMINATION:**

Note: No antiseptic to be used.

1 Any pelvic mass or tenderness in the abdomen?

1 - Yes 2 - No 9 - Not applicable

(If 'Yes' to 1) Is the tenderness:

1 - Left sided 2 - Right sided 3 - rebound

2 Any enlarged glands palpable in the inguinal region?

1 - Yes 2 - No

3 (If 'Yes' to 2) Are the enlarged glands painful?

1 - Yes 2 - No

4 Vulva examination:

Inflammation? 1 - Yes 2 - No

Ulcer or sore? 1 - Yes 2 - No

Other (specify): _____

(If response code 1, else code 2 in this box)

5 Speculum examination:

Note: Take 1 high vaginal swab and 1 cervical swab.

5.1 Vagina:

Any discharge 1 - Yes 2 - No

If 'Yes':

Volume: 1 - Scanty 2 - Moderate 3 - Profuse 9 - Not applicable

Odour: 1 - Foul 2 - Fishy 3 - None 9 - Not applicable

Colour: 1 - Clear 2 - White 3 - Yellowish or greenish

4 - Blood stained 9 - Not applicable

Consistency: 1 - Homogenous 2 - Curd like 3 - Frothy 9 - Not applicable

5.2 Vaginal wall normal?

1 - Yes 2 - No

If 'No'

1 - Diffuse inflammation

2 - Patchy inflammation

3 - Other (specify): _____

9 - Not applicable

6 Ectocervix: Normal? 1 - Yes 2 - No

If 'No', specify: _____

Cervical erosion (ectopy): 1 - Yes 2 - No

Discharge from endocervix: 1 - Yes 2 - No

If 'Yes' specify:

1 - Mucopus

2 - Clear cervical mucus

3 - Other (specify): _____

9 - Not applicable

Quantity:

1 - Scanty

2 - Moderate

3 - Profuse

9 - Not applicable

Bleeding of the cervix on touch: 1 - Yes 2 - No

II. BIMANUAL EXAMINATION:

Cervical motion - tenderness? 1 - Yes 2 - No

Uterus size - normal? 1 - Yes 2 - No

Uterine tenderness? 1 - Yes 2 - No

Right adnexal tenderness? 1 - Yes 2 - No

Left adnexal tenderness? 1 - Yes 2 - No

Right adnexal fullness or mass? 1 - Yes 2 - No

Left adnexal fullness or mass? 1 - Yes 2 - No

Other (specify): _____

Comments on other important findings:

III. CLINICAL DIAGNOSIS:

Comments:

Signature Doctor: _____

References

- ¹ CHLAMYGEN - Genelabs Diagnostics Pte Ltd, 85 Science Park Drive # 04-01, the Cavendish, Singapore Science Park, Singapore 118259.
- ² Hawkes S, Morison L, Foster S, Gausia K, Chakraborty J, Peeling RW, Mabey D. Reproductive-tract infections in women in low-income, low-prevalence situations: assessment of syndromic management in Matlab, Bangladesh. *Lancet* 1999; 354: 1776-81.
- ³ Brabin, L; Gogate, S; Karde A. : Reproductive tract infections, gynaecological morbidity and HIV. Seroprevalence among women in Mumbai, India. *Bulletin of the World Health organization*, 1998. 76;277-287.
- ⁴ Wasserheit JN. The significance and scope of reproductive tract infections among third world women. *International Journal of Gynecology and Obstetrics*, 1989; Suppl 3:145-168.
- ⁵ Grosskurth H, Mosha F, Todd J, et al. Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: randomised control trial. *Lancet* 1995; 346: 530-36.
- ⁶ Cohen MS, Hoffman IF, Royce RA, et al. Reduction of concentration of HIV-1 in semen after treatment of urethritis: implications for prevention of sexual transmission of HIV-1. *Lancet* 1997; 349:1868-73.
- ⁷ World Bank. *World Development Report: investing in health*. New York: Oxford University Press, 1993.
- ⁸ United Nations. *Programme of action of the UN International Conference on Population and Development*. New York: United Nations, 1994.
- ⁹ Bang R A, Baitule M, Samukaddam S, Bang A T, Choudhary Y, Tale O. High prevalence of gynaecological diseases in rural Indian women. *Lancet* 1989; I:85-88.
- ¹⁰ Bhatia J C, Cleland J. Self reported symptoms of gynaecological morbidity and their treatment in South India. *Studies in Family Planning*. 1995; 26:203-216.
- ¹¹ Dixon-Mueller R, Wasserheit J. *The culture of silence: Reproductive tract infection among women in the Third World*. International Women's Health Coalition, New York, USA. 1991.
- ¹² Parker KA, Koumans EH, Hawkins RV, Massanga M, Sonse P, Barker K, Moran J. Providing low-cost sexually transmitted diseases services in two semi-urban health centres in the Central African Republic (CAR): characteristics of patients and patterns of health care-seeking behavior. *Sexually Transmitted Diseases*, 1999;26(9):508-16.
- ¹³ Plummer FA, Simonsen JN, Cameron DW, et al. Cofactors in male-female sexual transmission of human immunodeficiency virus type 1. *Journal of Infectious Diseases*
- ¹⁴ Weir SW, Feldum BJ, Roddy RE, et al. Gonorrhoea as a risk factor for HIV acquisition. *AIDS*, 1994;8:1605-8.
- ¹⁵ Laga M, Manoka A, Kivuvu M, et al. Non-ulcerative sexually transmitted diseases as risk factors for HIV-1 transmission in women: results from a cohort study. *AIDS*, 1993;7:95-102. ,1991;163:233-9.
- ¹⁶ Republic of Maldives reproductive Health Baseline Survey. Ministry of Health, republic of Maldives. CIET International. August 1999.
- ¹⁷ Jenkins C. A situational assessment of HIV/AIDS in the Maldives for the year 2000. UNAIDS
- ¹⁸ Hawkes S, Morison L, Chakraborty J, Gausia K, Ahamed F, Islam S S, Alam N, Brown D, Mabey D. Reproductive tract infections: prevalence and risk factors in rural Bangladesh. *Bulletin of the World Health Organisation* 2002; 80:160-188.
- ¹⁹ Bogaerts J, Ahamed J, Akter N, Begum N, Rahman M, Nahar S, Van Ranst M, Verhaegen J. Sexually transmitted infections among married women in Dhaka, Bangladesh: unexpected high prevalence of herpes simplex type 2 infection. *Sexually Transmitted Infections*. 2001;77:114-119.
- ²⁰ Gary S, Sharma N, Bhalla P, Sahay R saha R, Raina U, Das B C, Sharma S, Murthy NS. Reproductive morbidity in an Indian urban slum: need for health action. *sexually transmitted infections*. 2002;78:68-69.
- ²¹ Heine P, McGregor JA. *Trichomonas vaginalis*: A reemerging pathogen. *Clinical obstet Gynaecol* 1993; 36(1) 137-143.
- ²² Sobar JD. *Candidal vulvovaginitis*. *Clinical obstet Gynaecol* 1993; 36(1) 153-165.
- ²³ Amsel R, Totten PA, Spigel CA, Chen KCS, Eschenbach D, Holmes KK. Non specific vaginitis: Diagnostic criteria and microbial and epidemiologic association. *American Journal of Medicine*; 74:14-22.
- ²⁴ . Nugent RP, Krohn MA, Hillier SL. Reliability of diagnosing bacterial vaginosis is improved by a standardised method of gram staining interpretation. *Journal of Clinical Microbiology* 1991; 29(2):297-301.
- ²⁵ GONORGEN - Genelabs Diagnostics Pte Ltd, 85 Science Park Drive # 04-01, the Cavendish, Singapore Science Park, Singapore 118259.
- ²⁶ IMMUIREP RPR. Omega Diagnostic Ltd. Omega House, Carsebridge Court, Whins Road, Alloa, FK10 3LQ, Scotland, United Kingdom.
- ²⁷ Heine P, McGregor JA. *Trichomonas vaginalis*: A reemerging pathogen. *Clinical obstet Gynaecol* 1993; 36(1) 137-143.
- ²⁸ Sobar JD. *Candidal vulvovaginitis*. *Clinical obstet Gynaecol* 1993; 36(1) 153-165.
- ²⁹ Amsel R, Totten PA, Spigel CA, Chen KCS, Eschenbach D, Holmes KK. Non specific vaginitis: Diagnostic criteria and microbial and epidemiologic association. *American Journal of Medicine*;

74:14-22.

³⁰ . Nugent RP, Krohn MA, Hillier SL. Reliability of diagnosing bacterial vaginosis is improved by a standardised method of gram staining interpretation. *Journal of Clinical Microbiology* 1991; 29(2):297-301.

³¹ CHLAMYGEN – Genelabs Diagnostics Pte Ltd, 85 Science Park Drive # 04-01, the Cavendish, Singapore Science Park, Singapore 118259.

³² GONORGEN – Genelabs Diagnostics Pte Ltd, 85 Science Park Drive # 04-01, the Cavendish, Singapore Science Park, Singapore 118259.

³³ IMMUTREP RPR. Omega Diagnostic Ltd. Omega House, Carsebridge Court, Whins Road, Alloa, FK10 3LQ, Scotland, United Kingdom.

³⁴ Heine P, McGregor JA. *Trichomonas vaginalis*: A reemerging pathogen. *Clinical Obstet Gynaecol* 1993; 36(1) 137-143.

³⁵ Sobar JD. Candidal vulvovaginitis. *Clinical Obstet Gynaecol* 1993; 36(1) 153-165.

³⁶ Ansel R, Totten PA, Spiegel CA, Chen KCS, Eschenbach D, Holmes KK. Non specific vaginitis: Diagnostic criteria and microbial and epidemiologic association. *American Journal of Medicine*; 74:14-22.

³⁷ Nugent RP, Krohn MA, Hillier SL. Reliability of diagnosing bacterial vaginosis is improved by a standardised method of gram staining interpretation. *Journal of Clinical Microbiology* 1991; 29(2):297-301.

³⁸ GONORGEN – Genelabs Diagnostics Pte Ltd, 85 Science Park Drive # 04-01, the Cavendish, Singapore Science Park, Singapore 118259.

³⁹ IMMUTREP RPR. Omega Diagnostic Ltd. Omega House, Carsebridge Court, Whins Road, Alloa, FK10 3LQ, Scotland, United Kingdom.

⁴⁰ Hawkes S, Morison L, Foster S, Gausia K, Chakraborty J, Peeling RW, Mabey D. Reproductive-tract infections in women in low-income, low prevalence situations: assessment of syndromic management in Matlab, Bangladesh. *Lancet* 1999; 354: 1776-81.

⁴¹ Brabin L, Gogate, S; Karde A. : Reproductive tract infections, gynaecological morbidity and HIV. Seroprevalence among women in Mumbai, India. *Bulletin of the World Health organization*, 1998. 76;277-287.

⁴² Brabin L, Kemp J, Oluje OK, et al. Reproductive tract infections and abortion among adolescent girls in rural Nigeria. *Lancet* 1995; 345: 300-04.

⁴³ . Nugent RP, Krohn MA, Hillier SL. Reliability of diagnosing bacterial vaginosis is improved by a standardised method of gram staining interpretation. *Journal of Clinical Microbiology* 1991; 29(2):297-301.

⁴⁴ Hay P E, Ugwumadu A, Shows J. Sex, thrush and bacterial vaginosis. *International Journal of Sexually Transmitted Diseases and AIDS*. 1998;9(1):45-47.

⁴⁵ Sonnex C. The influence of ovarian hormones on urogenital infection. *Sexually Transmitted Infections*. 1998;74:11-19.

⁴⁶ Taylor-Robinson D, Hay P E The pathogenesis of the clinical signs of bacterial vaginosis and possible reasons for its occurrence. *International Journal of Sexually Transmitted Diseases and AIDS*. 1997;85 Suppl:1.

⁴⁷ Ansel R, Totten P A, Spiefel C A, Chen K C, Eschenbach D, Holmes K K. Non-specific vaginitis: diagnostic criteria and microbial and epidemiological associations. *American Journal of Medicine* 1983;74:14-22.

⁴⁸ Bhatia S, Mosley WH, Faruque ASG, Chakraborty J. The Matlab family planning health services project. *Stud Fam Plann* 1980; 11: 202-12.

⁴⁹ Grosheide PM, Van Damme P. Prevention and control of hepatitis B in the community. *Communicable Disease Series*. No 1. Antwerp, Belgium: Viral Hepatitis Prevention Board Secretariat. 1996;1:60.

⁵⁰ Shapiro C. Epidemiology of hepatitis B. *Pediatric Infectious Disease Journal*. 1993;12:433-437.

⁵¹ Hadler S, Margolis H. Hepatitis B immunization: vaccine types, efficacy and indications for immunization. In Remington J, Swart Med, *Current Clinical Disease*. Boston, Mass: Blackwell Scientific. 1992.