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# Demand for and Cost-effectiveness of Integrating RTI/HIV Services with Clinic-based Family Planning Services in Zimbabwe

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## Africa OR/TA Project II

The overall objectives of the Africa OR/TA Project 11 are to broaden understanding of how to improve family planning services in Sub-Saharan Africa, and to apply operations research and technical assistance to improve services by:

- Increasing access to a full range of family planning services and methods;

- Developing service delivery strategies that are client-oriented and acceptable to various population groups;

- Improve the operations of programs to make them more efficient and financially sustainable;

- Improving the quality of services;

- Strengthening the capabilities of family planning program managers to use operations research to diagnose and solve delivery problems.

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# Abbreviations

| | |
|---|---|
| HIV | Human Immune Deficiency Virus |
| AIDS | Acquired Immune Deficiency Syndrome |
| RTIs | Reproductive Tract Infection |
| OR/TA II PROJECT | Operations Research and Technical Assistance II Project |
| ZNFPC | Zimbabwe National Family Planning Council |
| STI | Sexually Transmitted Infection |
| USAID | United States Agency for International Development |
| MCH/FP | Maternal Child Health/Family Planning |
| PPV | Positive Predictive Value |
| LQAS | Lot Quality Assurance Sampling |
| DFID | Department for International Development |
| LCR | Ligase Chain Reaction |
| KOH | Potassium Hydroxide (tests) |
| NASCOP | National AIDS and STDs Control Program |
| VDRL | Veneral Desease Research Laboratory |
| SDTa | Syndromic Treatment Approach (a) |
| STDb | Syndromic Treatment Approach (b) |
| GMS | Government Medical Stores |

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# Summary

## Background

The current spread of HIV/AIDS epidemic poses a major threat to individual lives and national economies in many sub-Saharan African countries, despite many efforts and investments made by governments and international agencies to slow it down. Besides HIV/AIDS, the region also has some of the highest levels of other sexually transmitted infections (RTIs) in the world. Some of these RTIs, especially those associated with genital ulcers (syphilis and chancroid), chlamydia and gonorrhea, have been shown to increase the risk of sexual transmission of HIV infection. Thus the control of RTIs is seen not only as an important reproductive health care strategy to alleviate the immediate symptoms of infection and the long-term gynecological, obstetric and neonatal complications, but also as a key strategy in reducing the spread of HIV/AIDS.

As a result, all national health care programs in the region are actively seeking cost-effective ways of implementing an RTI management program that would reduce and prevent the spread of RTIs and ultimately HIV. Although there are many strong reasons to support an integrated approach to service delivery, there still remains many unanswered questions concerning its implementation, effectiveness and cost-effectiveness.

In 1998, the Africa OR/TA II Project and the Zimbabwe National Family Planning Council (ZNFPC) undertook a study designed to assist the ZNFPC obtain information that would enable it develop the most appropriate and cost-effective approach to managing RTIs in its clinics. The findings from this study are presented in this report.

## Study design

This study used the following methods to collect and synthesize information that the ZNFPC could use in developing an appropriate and cost-effective approach to the integration of RTI/HIV with its clinic-based family planning services.

*1 A baseline survey, using a modification of the Situation Analysis methodology by the Population Council, was undertaken to determine the level of preparedness of the ZNFPC clinic facilities and staff to provide RTI and family planning services using an integrated approach. Using findings from the baseline survey, the following activities were undertaken to strengthen the ZNFPC clinic-based services.*

- Staff training: Clinic staff attended an update course on management of RTIs using the syndromic approach.

- A checklist to facilitate the history taking, clinical examination, STI/HIV risk assessment and counseling was developed and staff were trained on its use before institutionalization.

- Strategies to ensure availability of drugs for treating RTIs were developed and put in place.

2. *Laboratory tests were carried out for all clients consenting to participate in the study for five common reproductive tract infections (gonorrhea, chlamydia, trichomoniasis, candida and bacterial vaginosis).*

3. *The data from the checklist and laboratory tests were used to determine the prevalence of RTI symptoms and clinical signs, the prevalence of STI/ HIV risk factors, sensitivity, specificity and positive predictive values of various algorithms and approaches to the syndromic management of RTIs.*

4. *Multivariate analysis was undertaken to determine the best models for predicting the distribution of infections among the study clients.*

5. *Costs and cost-effectiveness analyses were done for various RTI syndromic management algorithms.*

## Summary of key findings from the study

### a) Baseline survey

The baseline survey found that ZNFPC clinics had the basic physical infrastructure, equipment and the contraceptive supplies required to provide RTI and family planning services in an integrated approach. However, the following problems were identified in the facilities:

i) The clinics did not have the drugs recommended for treating RTIs.

ii) The existing forms did not facilitate the collection, recording and giving of information essential for RTI diagnosis and management.

iii) The clinic staff were not well informed about the national guidelines for treating RTIs and were following algorithms developed elsewhere in the provision of RTI services.

### b) Acceptability of integration and use of a standardized checklist

■ *The study found that provision of RTI and family planning services is acceptable to both clients and service providers.* The vast majority (97%) of clients commended the provision of RTI services in the family planning clinic because infections could be diagnosed and treated early. The clients also said that the approach would make multiple services available to them during a single clinic visit.

■ *Service providers found the integrated checklist useful in the provision of RTIs services to clients attending a family planning clinic.* The majority reported that it improved the quality of services they were providing to clients in the clinics.

■ *Service providers were generally comfortable carrying out clinical procedures including pelvic examinations,* but nearly one-half expressed various levels of discomfort with discussing sexual behavior topics with their clients.

■ *Clients were comfortable with the clinic procedures undertaken during the study period.* The majority of the clients were very comfortable with the pelvic examination and 98% reported that they were comfortable discussing their own and their partner's sexual behavior.

### c) Prevalence of RTIs, associated symptoms and signs

■ *The study found that RTIs are common among clients attending family planning clinics.* One-third of clients were found to have at least one of the five RTIs tested for in the study, with vaginal infections being more common (28.8%) than cervical infections (4.4%).

■ *The majority of RTIs are due to non-sexually transmitted infections (candida, and bacterial vaginosis).* The majority (80%) of clients with a positive laboratory test for any of the five RTIs tested for in this study had a non-sexually transmitted

infection compared with only 25% who had sexually transmitted infections (gonorrhea, trichomoniasis and chlamydia).

■ *Symptoms and signs associated with RTIs are common among family planning clients.* Over one-half (59% and 78%) of the study clients had at least one symptom or sign respectively, suggestive of a RTI. Multiple symptoms and signs were very common.

■ *Most clients with laboratory evidence of a RTIs also had symptoms (61%) or signs (77%) suggestive of a RTI.* However, a large proportion of clients reporting symptoms (66%) and those found to have signs (68%) did not test positive for any of the five RTIs clients were tested for in the study.

### d) Prevalence of STI/HIV risk factors

■ *The study found that behavioral risk factors are relatively uncommon among female family planning clients.* Frequent travel from home, sex with more than one sex partner in the three months preceding the study was reported by 20% and 1.2% of clients respectively. However, few clients reported regular condom use.

■ *Few clients considered themselves at risk for STIs and/or HIV infection, despite the rapidly growing rates of HIV infection in the country.* Fewer than 50% of clients who reasons for visiting the clinic included receiving STI services and those visiting the clinic for other family planning services said that they felt they were at an increased risk for HIV infection.

■ *Many clients had experienced symptoms associated with RTIs in the twelve months preceding the study.* More than half the clients had experienced at least one symptom while 42% had experienced multiple symptoms. Only 25% reported that their partners had experienced symptoms suggestive of STIs and /or had taken medication for STIs in the four weeks preceding this study.

### e) Effectiveness of syndromic management

■ *The study found that service providers did not always follow the national guidelines when managing clients with symptoms and/ or signs suggestive of RTIs.* Although 298 (18.3%) of the study clients had both vaginal discharge symptom and sign, the service providers made a diagnosis of and prescribed treatment for vaginal discharge syndrome in only 194 (65%) of these clients. The rest of clients went untreated despite qualifying for treatment according to the national algorithms.

■ *Using the vaginal discharge and lower abdominal pain symptom and/or sign to identify clients with RTIs in a family planning clinic is associated with poor sensitivity and positive predictive values.* When used to predict the presence of cervical infections, vaginal discharge has a positive predictive value of 11% and lower abdominal pain has a positive predictive value of only 8%.

■ *Combining risk assessment information, history of symptoms and clinical signs in one algorithm improves on the specificity and positive predictive value of the symptom–only algorithm.* Although the sensitivity for predicting cervical infections remains low when risk assessment information is added to the symptom-only-based algorithm, the predictive value is improved to 50% for all family planning clients and 83% for clients seeking RTI services in the family planning clinic.

■ *Using the syndromic approach to screen all women attending a family planning clinic for RTIs identifies more women with RTIs compared to using the approach to respond to only those women coming to the family planning clinic for STI services as well.* However, using the syndromic approach to respond to only those women whose reasons for coming to

the family planning clinic includes receiving STI services is associated with fewer false positives compared to when it is used to screen all women. Therefore, the choice of what approach to use will depend on what measure of effectiveness the program decides to use.

### *f) Cost-effectiveness of various syndromic management algorithms*

■ Although the use of syndromic approach to screen all family planning clients for RTIs was found to be more effective in identifying women with infections, the incremental cost-effectiveness ration of US$ 22.13 is much higher than the per capita expenditure on health by the government of Zimbabwe.

■ Similarly, the incremental cost-effectiveness ratio of US$ 33.95 associated with using laboratory testing for only those clients identified to have RTI syndromes through screening all family planning clients compared with using syndromic approach to respond only to clients seeking RTI services is also unaffordable in Zimbabwe.

■ In the current financial circumstances, using syndromic approach to respond to only those clients seeking RTI services in family planning clinics appears to be the most logical approach. However, it should be realized that even with this approach 73% of RTIs remain undiagnosed (false negatives) and 25% of women are misdiagnosed as having RTIs (false positives). Therefore, the value of syndromic management of RTIs in family planning clinics remains questionable.

## Recommendations

Data from this study and others in the region have shown that syndromic management does not appear to be of great value in the management of RTIs among clients attending family planning clinics. More cost-effective strategies for diagnosing and managing RTIs among family planning clients need to be established.

i) In the absence of cost-effective approaches to the diagnosis and management of RTIs in family planning clinics, we recommend that family planning programs in the region should put more emphasis on the following activities:

■ Behavior change communication to reduce unsafe, unprotected sex

■ Aggressive condom promotion both in clinic and non-clinic settings

■ Counseling services to increase knowledge, perception of personal risk, behavior change and contraceptive method selection.

ii) Secondly, in view of the fact that most programs will continue to use the syndromic approach to manage RTIs until a more cost-effective approach is identified, we recommend that efforts aimed at improving its effectiveness should be continued. These efforts should include:

■ Improvement of skills, attitudes and perceptions of providers to enable them to undertake systemic STI/HIV IEC, risk assessment and counseling for clients in order to improve on clients' knowledge of STI/HIV related symptoms and signs.

■ Development and use of integrated checklists should be encouraged and supported by governments and donors in the region.

■ Reviews of the current STI treatment guidelines to emphasize non-sexually transmitted infections. Many programs in the region still use algorithms that emphasize the treatment of cervical infections at the cost of neglecting the non-sexually transmitted infections.

# Background

**HIV/AIDS is still a threat today to individual lives and national economies of many sub-Saharan African countries, despite many efforts and investments made by governments and international agencies to contain its spread. Besides HIV/AIDS, the region also suffers some of the highest levels of other sexually transmitted infections (RTIs) in the world[1 2 3 4]. Some of these RTIs, especially those associated with genital ulcers (syphilis and chancroid), chlamydia and gonorrhea, have been proven to increase the risk of sexual transmission of HIV infection.**

The control of RTIs is therefore seen not only as an important reproductive health care strategy to alleviate the immediate symptoms of infection and the long-term gynecological, obstetric and neonatal complications, but also as a key strategy in reducing the spread of HIV/AIDS. As a result, most national health care programs in the region are actively seeking cost-effective ways of implementing an RTI management program that would reduce and prevent the spread of RTIs and HIV.

To date, most emphasis has been placed on managing RTI/HIV within the so-called "high-risk" groups, such as commercial sex workers, men and, to a lesser extent, adolescents. Encouraged by the findings of the Mwanza intervention study and by the ICPD Cairo Conference, many programs are now trying to reach a much bigger proportion of the sexually active, and thus potentially at risk, population, that is, women within the reproductive age group. In particular, ways are being tested to reach this population through integrating RTI/HIV management services into existing MCH/FP programs. This approach is being pursued for a variety of reasons.

First, the levels of HIV in many sentinel antenatal clinics are already very high among women attending these clinics (in 1995, the range was 4 - 32.5%). Data from the sentinel surveillance in Zimbabwe shows that 30% of antenatal women were infected with HIV in 1995[5]. The prevalence of the common RTIs (gonorrhea, syphilis and trichomoniasis) are also thought to be relatively high among women attending MCH/FP clinics in the region[6 7 8 9 10]. A major problem, however, is the fact that there is little reliable data on these infections and the existing information shows wide variations within similar populations

Second, women attending MCH/FP clinics constitute a larger population than those seeking special services. The vast majority of women (89-95%)[11] in the region attend clinics for antenatal care at least once during pregnancy and quite regularly thereafter for child welfare services. Over 95% of women delivering in the three years preceding the Zimbabwe Demography and Health Survey of 1994 had attended antenatal clinic at least once and 31.1 % of sexually active women were using a modern contraceptive method. The survey also showed that 82 % of women who were currently using a modern family planning method had obtained it from a clinic facility.

"... women attending MCH/FP clinics constitute a larger population than those seeking special services. The vast majority of women (89-95%) in the region attend clinics for antenatal care at least once during pregnancy and quite regularly thereafter for child welfare services..."

These data show that many women utilize MCH/FP clinics and therefore could be reached with other reproductive health services through these facilities. The Zimbabwe National Family Planning Council (ZNFPC) was named as the source of the most recent family planning method by 23% of women who were currently using a modern method in 1994.

Third, the concept of providing comprehensive reproductive health services to women has received global support during the Cairo ICPD and Beijing Women's conferences. Both fora have called on programs to go beyond providing vertical services that meet specific needs to integrated services that address all aspects of human sexuality and reproductive health needs.

In its five-year plan for 1998-2002, the ZNFPC committed itself to improving its ability to provide an integrated range of reproductive health services including RTIs, HIV/AIDS and family planning. Although there are many strong reasons to support an integrated approach, there remain many unanswered questions concerning its implementation, effectiveness and cost-effectiveness. The findings from this study, undertaken by the ZNFPC with technical and financial assistance from the Population Council provide answers to some these questions.

# Study Objectives

**The overall goal of the study was to assist the ZNFPC in obtaining information that would enable it to develop the most appropriate and effective approach to managing RTIs including HIV among its clinic clientele.**

The specific objectives were:

- To describe the preparedness and approach currently used by ZNFPC clinics to manage clients suspected of having an RTI.

- To design interventions using findings from objective 1 above to improve on program preparedness to provide RTI and family planning services using an integrated approach

- To describe the characteristics and the prevalence of RTIs among family planning clients attending ZNFPC clinics.

- To determine the prevalence of RTI/HIV risk factors among family planning clients attending ZNFPC clinics.

- To measure the sensitivity, specificity and positive predictive values (PPV) of the approach and algorithms currently used in the syndromic management of RTIs in a family planning clinic setting.

- To predict the effect of adding risk scoring on the PPV of algorithms currently used for syndromic management of RTIs.

- To determine the cost-effectiveness of different strategies for integrating RTI management services with family planning services at the ZNFPC clinics.

- To determine the acceptability and impact of using a standardized check list in managing RTIs.

The study used a variety of methods to collect and synthesize information that the ZNFPC could use in developing an appropriate and cost-effective approach to the integration of RTI/HIV with its family planning services.

The following sections discuss the methods used to collect information and the study results specific to each of the study objectives.

The overall goal of the study was to assist the ZNFPC in obtaining information that would enable it to develop the most appropriate and effective approach to managing RTIs including HIV among its clinic clientele

# Preparedness of Facilities to Provide RTI Services

To describe the strategy for managing family planning clients presenting with symptoms of RTIs at the ZNFPC clinics prior to the interventions, data were collected using the Africa OR/TA Project's integration case study methodology[12]. Eight clinics were selected from the 19 ZNFPC clinics (Spilhaus, Mpilo, Vengere, Gweru, Bindura, Plumtree, Chiredzi and Chinhoyi) for the baseline survey. Apart from having high client volumes, these clinics were selected to represent the different provinces in Zimbabwe.

The quality and nature of RTI and HIV services that clients received at the ZNFPC clinics was determined through observation of interactions between clients and service providers. For the baseline survey, consultations for 160 new and repeat (due for annual assessment) family planning clients with 19 providers (one doctor, 5 nurses and 13 midwives) at the 8 study clinics were observed over a five day period.

All clients whose interactions with the service provider were observed were interviewed on completion of the consultation. The interviewer collected information on the clients' perspective of the quality of the interaction, including the information communicated on family planning and RTI/HIV/AIDS.

Existing Service Delivery Policies and Standards manuals, client records and other reporting forms were reviewed to identify gaps, conflicting issues and requirements to facilitate the provision of RTI/HIV and MCH/FP services using an integrated approach.

The number of clients that each member of staff was observed interacting with varied from staff to staff. Due to the small sample sizes involved in some cases, percentages or proportions of success are not very meaningful and can be misleading in interpreting the quality of services offered at the clinics. To overcome the problem of small sample size, the principle of Lot Quality Assurance Sampling (LQAS)[13] was used to decide whether the ZNFPC static facilities were well prepared to provide integrated family planning and RTI services and whether the services offered by staff and/or clinic can be considered satisfactory[14]. Findings from the baseline survey are presented below.

### *Physical infrastructure*

The readiness of the physical infrastructure to support the provision of family planning and RTI services in an integrated approach was assessed using the availability of the following five items.

- Working toilets for clients
- Functioning water source on compound
- Functioning sources of energy
- Shelter for waiting clients
- Separate counselling/exam room

All the facilities in the study sample had these basic items required to provide family planning and RTI services except for one clinic that did not have a separate counselling/examination room. Using the LQAS decision rules, it was concluded that the ZNFPC facilities have the basic infrastructure required to provide RTI and family planning services using an integrated approach.

### *Equipment*

Availability of the following basic equipment is a prerequisite for proper delivery of family planning and RTI services.

- Adult weighting scale
- Angle poise/gynaecology
- Blood pressure machines
- Examination couch
- Microscope
- Stethoscopes

The assessment found that three of the eight study clinics did not have a microscope but all eight had the rest of the basic equipment. The current practice in Zimbabwe is to manage RTIs using a syndromic approach that does not require a microscope. Therefore, it was concluded that the ZNFPC clinics are well equipped to provide the basic family planning and RTI services using an integrated approach.

### *Infection Control*

When providing family planning and RTI services, infection control facilities should be readily available to enable the service providers to practice good infection control procedures. In this baseline survey, the availability of dustbins, sharps-disposal container, waste-disposal facilities and antiseptic lotions were used to assess readiness of facilities to practice good infection control procedures. Four of the eight health facilities included in the study did not have an incinerator or waste pit to dispose of their contaminated waste. These data suggest that the ZNFPC clinic facilities were prepared to practice infection control procedures in the clinic but are not well prepared to dispose of the waste generated through the provision of their services.

### *Commodity logistics*

Availability of drugs for treating RTIs and contraceptives is important if ZNFPC clinics are to provide RTI/FP services. During the study, the availability of drugs recommended for the treatment of RTIs in the national guidelines was assessed. Overall, the study found that the ZNFPC facilities did not have in stock the drugs recommended for treating RTIs following the current algorithms. For example, 4 of the 8 study clinics did not have Kanamycin a drug recommended for the first line treatment of gonorrhoea and 7 did not have benzathine penicillin for treating syphilis. Based on these finding it was concluded that the ZNFPC facilities are not prepared to treat RTIs even if they were able to make a diagnosis. However, all the facilities had adequate stocks of contraceptives including condoms.

### *Quality of Services Provided*

During exit interview with 157 of 160 clients whose consultation with clinic staff had been observed the clients were asked about their perception of and satisfaction with the services they had received. The questions covered the following service delivery components.

- Provision of additional services
- Adequacy of consultation time
- Provider listens to client's problems
- Clients freedom to ask questions
- Satisfaction with provider's responses
- Provider's explanation of examination results
- Provider's explanation of clients' health problems
- Adequacy of privacy
- Provider easy to understand

Clients reported high levels of satisfaction with the services received from the facilities, with most clients reporting that they were given enough privacy during the consultations and that the provider was easy to understand and had listened to their problems. Although a few clients indicated dissatisfaction with the explanation of examination results, the clients rated the overall quality of services received high.

The policy guidelines require service providers to carry out medical examinations for all new FP clients. A full medical examination consists of taking a medical history, measuring blood pressure and weight, performing general physical examination, a breast examination and a pelvic examination. These procedures were undertaken for most of the clients whose consultations were observed.

During the observation, service providers' skills in performing pelvic examination were assessed. Service providers' performance on pelvic examination was found to be quite satisfactory with providers passing on five out of eight items used to assess their skills on pelvic examination[15]. Most service providers did not ask clients to pass urine before the exam, did not carry out a bimanual examination and did not take a Pap smear. These are essential components of pelvic examinations and the ZNFPC training program needs to update their staff on pelvic examinations with an emphasis on these components.

RTI/HIV risk assessment has been recommended as one of the strategies for identifying clients with RTIs particularly in cases where the clients are asymptomatic. Therefore, one of the key elements of an integrated approach to providing RTI services in a family planning clinic is for the service providers to undertake RTI/HIV risk assessment for all family planning clients. However, it was observed during the baseline survey that only three of the 19 service providers at the eight clinics included in the survey carried out RTI/HIV risk assessment during the 160 client consultations observed.

It was also observed that only 3 and 4 of the 19 service providers had discussed issues such as breastfeeding and socio-economic status, respectively, in addition to discussing family planning issues with their clients. None of the service providers discussed immunisation, child growth monitoring, infertility, oral rehydration therapy or abortion with their clients.

In summary, the baseline survey showed that ZNFPC static facilities had most of the basic physical infrastructure required to provide RTI and family planning services using an integrated approach. However, the facilities lacked drugs recommended for treating RTIs and the staff were not carrying out RTI/HIV risk assessment for the family planning clients. Although the ZNFPC management thought that their program was integrated, the baselines survey showed that many clients were not being provided with and/or informed about other reproductive health issues.

## Steps Taken to Improve Program Preparedness

Following the baseline survey, the ZNFPC with technical and financial assistance from the Population Council implemented the following interventions to facilitate studying the rest of the specific objectives of the study.

### *Refresher training for clinic staff and supervisors*

During the baseline survey, staff were found to be deficient in the knowledge of the syndromic approach for managing RTIs as recommended by the national RTI program. The clinic staff were following algorithms that were different from the national algorithms. To standardise the quality of RTI services provided at the three study clinics using the national algorithms, staff providing services at the three study clinics, their supervisors, trainers and program managers attended a one week refresher course on the syndromic management of RTIs. The course was conducted using the training curriculum and modules recommended by the National STI Program[16]. The staff were also trained on how to collect specimens for laboratory tests as this was going to be a major component of the intervention study. After the course, clinic staff were now expected to follow the national algorithms for managing RTIs in their clinics.

### *Development of a standardised checklist*

During the baseline, it was found that the clinic cards used to obtain information from clients were lacking components that would facilitate the collection of information essential for the diagnosis and management of RTIs. The forms also did not have any questions to facilitate RTI/HIV risk assessment. In addition the forms did not provide any guidance on information giving and counselling about RTIs and HIV. During interviews with clinic staff lack of an integrated checklist to guide and remind them was cited as one of the reasons why most of them did not undertake RTI/HIV risk assessment and counselling for their clients. With assistance from the Population Council, an integrated checklist (see appendix) was developed and introduced for use in the three study clinics after clinic staff were trained on its use.

### *Negotiations to ensure drug availability*

Another problem that had been identified in the baseline survey was the lack of drugs recommended for the treatment of RTIs at the clinics. The ZNFPC management with assistance from USAID negotiated with the national STI project, World Bank and DFID to include the three study clinics in an ongoing project that supplies RTI drugs to health facilities. The Population Council also provided funds to support the availability of other supplies required to provide family planning and RTI services. This support freed up some funds for the ZNFPC, which were then used to purchase drugs to supplement the supplies from the national STI project. Through this process, the three study clinics had access to the RTI drugs recommended by the national algorithms thorough the study period.

## Prevalence of Reproductive Tract Infections, Symptoms and Signs

During the 12 months following implementation of interventions to improve program preparedness to provide RTI services using the syndromic approach, all new family planning clients, clients visiting the clinic for resupplies, clients having problems with method, clients seeking RTI services, and repeat clients who came for their annual check-up at the three study clinics were requested to participate in the second phase of the study. Each client was given an explanation of the study objectives, design, benefits and potential disadvantages that may result from their participation.

Those who agreed to participate in the study had a pelvic, breast and general physical examination performed. Using a standardized checklist to conduct clinical examinations (see appendix), staff looked for the presence of abdominal tenderness, rebound tenderness, vaginal or cervical discharge, ulcers in the genital area, changes in the color of the cervix and friability, adenexial masses, adenexial tenderness and uterine size. The staff were required to use the information to make diagnosis and decide treatment, based on the current national algorithms used for the syndromic diagnosis and management of RTIs.

Specimens for RTI testing were collected from all 1634 family planning clients who consented to participate in the study and had been evaluated clinically. During the pelvic examination, clinic staff collected high vaginal and endo-cervical swabs, which were used to test for gonorrhea, chlamydia, candidiasis, trichomoniasis and bacterial vaginosis. All specimens were delivered to the laboratory the same day and results made available within seven days. All the clients, who accepted to have specimens taken for laboratory testing, were requested to return to the clinic after seven days for their results. Follow-up letters were sent to those clients who did not return for their test results within fourteen days. During subsequent visits the women who needed treatment for RTIs or a change in their medication on the basis of laboratory test results were requested to visit the clinic where they were reviewed and treated.

Each client was given an explanation of the study objectives, design, benefits and potential disadvantages that may result from their participation

The following table indicates the reproductive tract infections that were tested for, the specimens that were collected and the tests performed.

**Table 1:**
**Laboratory Test Performed**

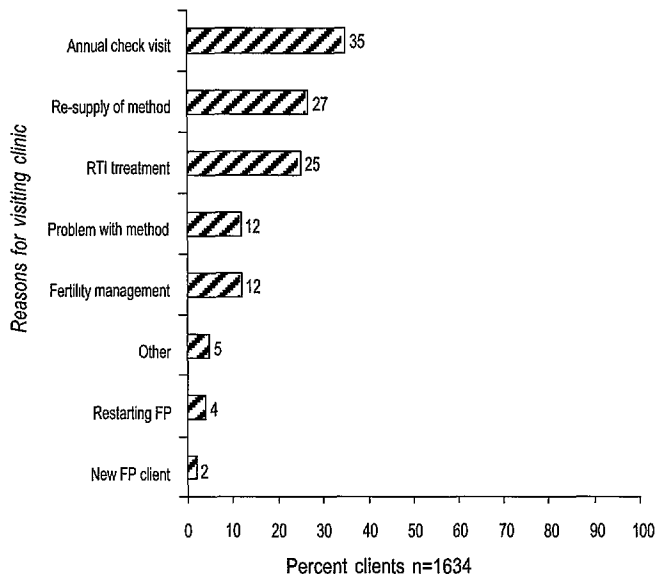
| RTI | TEST |
|---|---|
| Gonorrhea | Culture, Gram stain and LCR |
| Chlamydia | Fluorescent, microscopy and LCR |
| Trichomoniasis | In-pouch media, gram stain |
| Candidiasis | Gram stain and KOH |
| Bacterial vaginosis | Gram stain and KOH |

Data entry was carried out using the EpiInfo 6.02 software with matching-screen formats to the questionnaires. The double entry procedure was used for validation of data entry. Data analysis was carried out using SPSS package Version 8.0 for Windows. Frequency distributions and univariate analysis using two by two tables were done for all the independent variables included in the history, clinical examination and risk assessment. The independent variables were assessed for significance of association with the dependent variables using crude ODDS RATIOs and P-value. The findings are presented below.

### *i) Reasons for visiting the clinic*

*A* total of 1634 women attending three ZNFPC clinics (Mpilo, Lister-Bulawayo and Spilhaus) between January 1998 to December 1998 consented to participate in the study. The most common reasons for visiting the clinics by the study clients were annual check up (35.2%) followed by re-supply of methods (26.7%) and RTI treatment (25.3%) (*figure1*). The distribution of reasons for visiting the clinic was greatly influenced by the criteria for entry into the study[17] and as such may not represent the general pattern of clinic visits to the ZNFPC clinics.

***Figure 1: Reasons for visiting the clinics among women recruited into the study***



Twenty three percent of the study clients visited the clinic for more than one reason. For example 46 (11%) of the women whose primary reason for visiting the clinic was re-supply of method also had another reason for visiting the clinic. The two most common secondary reasons were symptoms suggestive of RTI and problems with the method.

### *ii) Social demographic characteristics of study clients*

The age of the study clients ranged from 15 to 66 years with a mean of 30.9 years and a median of 30.0 years. Only 2.1% of the respondents were less than 20 years while nearly 30% were above 35 years. The majority of the study clients had secondary school level education – this is equivalent to more than 8 years of schooling. The majority (85%) were married and had a mean of 2.7 pregnancies and 2.0 living children. As expected the vast majority (92%) reported a good outcome of their last pregnancy (Table 2).

### *iii) Clinical findings and interpretation*

All women consenting to participate in the study had a detailed medical history obtained from them using a standard checklist (see appendix 1). Women were asked if they currently had any of the symptoms associated with RTIs (Table 3). More than half of the study clients reported at least one symptom suggestive of an RTI. Multiple (more than one) RTI symptoms were reported by 35.4% of the clients.

The most commonly reported symptoms were lower abdominal pain (42.7%) followed by an increase in the amount of vaginal discharge

**Table 2: Socio-demographic characteristics of family planning clients**

| CHARACTERISTICS | PERCENT CLIENTS N= 1634 |
|---|---|
| **Age (in years)** | |
| • 15-24 | 20.2 |
| • 25-34 | 50.5 |
| • 35+ | 29.3 |
| **Highest educational level attained** | |
| • Primary | 30.0 |
| • Secondary | 66.0 |
| • Tertiary | 3.0 |
| **Marital status** | |
| • Single | 9.3 |
| • Married | 85.2 |
| • Widowed/divorced | 5.5 |
| **Outcome of last pregnancy** | |
| • Live birth | 92.0 |
| • Stillbirth | 1.0 |
| • Abortion | 4.8 |
| • Neonatal death | 2.2 |
| **Obstetric history** | |
| • No. of pregnancies | Mean =2.67, Mode =2 |
| • No. of living children | Mean = 2.37, Mode =2 |

(17.1%). The prevalence of symptoms suggestive of an RTI was much higher among clients who indicated that one of the reasons for visiting the clinic was to receive RTI services. The majority of clients seeking RTI services (92%) and 79% of clients seeking services due to problems with a family planning method had at least one symptom suggestive of an RTI compared with fewer than 40% for those clients seeking other family planning services.

**Table 3: Prevalence of RTI related symptoms**

| Symptoms | Percent all study clients N= 1634 | Percent clients seeking RTI services N= 410 |
|---|---|---|
| Lower abdominal pain | 42.7 | 74.9 |
| Yellow vaginal discharge | 14.7 | 30.5 |
| Blood stained discharge | 8.3 | 13.2 |
| Foul smelling discharge | 12 6 | 25.9 |
| Increased discharge | 17 1 | 35.6 |
| Post coital bleeding | 7.5 | 11.2 |
| Pain during sexual intercourse | 18 5 | 33 7 |
| Pain on passing urine | 10 2 | 22.2 |
| Genital ulcers or sores | 2.6 | 5.1 |
| Genital warts | 2.5 | 4.6 |
| Painful swelling in the groin | 0 7 | 1.7 |

During pelvic examination, staff noted the presence of any signs suggestive of RTIs. The majority of the women had at least one sign suggestive of a RTI (77.7%) with 48% of them having more than one sign.

Data on table 4 show that the most commonly encountered signs were tender adenexia, (23.0%), cervical excitation (17.6%), discharge from the cervix (17.1%) and white curdy discharge at the vulva (14.1%). These data show a high prevalence of signs suggestive of RTIs among clients attending ZNFPC clinics.

**Table 4: Prevalence of clinical signs suggestive to RTIs on pelvic examination**

| Signs by clinical procedures | Percent all study clients N=1634 |
|---|---|
| Inspection | |
| • Genital rashes/vesicles | 0.9 |
| • Genital ulcers/sore | 1.9 |
| • Genital warts | 2.0 |
| • Clear discharge at vulva | 26.5 |
| • White curdy discharge | 14.1 |
| • Greenish discharge | 1.1 |
| • Yellow discharge | 6.6 |
| • Swellings in the groin | 1.9 |
| Speculum examination | |
| • Warts on vaginal wall | 1.0 |
| • White curdy discharge in vagina | 10.2 |
| • Cervical warts/polyps | 1.2 |
| • Discharge from cervix | 17.1 |
| • Cervical erosion | 7.8 |
| Digital examination | |
| • Cervical excitation | 17.6 |
| • Tender adenexia | 23.0 |

Clients attending clinics for problems with method (93%), RTI treatment (96%) and infertility (82%) were more likely to have signs suggesting RTIs compared with those attending for annual check up and/or re-supply of methods. However, it should be noted that more than one-half of the clients attending for annual check up and/or re-supply of methods had signs suggestive of RTIs. These finding emphasize the importance of carrying out regular pelvic examination for all clients attending family planning clinics regardless of the primary reason for the visit.

### *iv) Prevalence of RTIs based on syndromic diagnosis*

Following recommendations by the National AIDS and STD Coordination Program (NASCOP)[18] staff in all MOH and other public health facilities use syndromic approach to diagnose and manage RTIs. During the study period, staff were expected to use these national algorithms to diagnose and decide treatment for RTIs. Using these algorithms, 41% of the study clients were diagnosed to have at least one of the RTI syndromes. Lower abdominal pain (27.3%) and vaginal discharge (22.3%) were the most frequently diagnosed syndromes (figure 2).

A syndromic diagnosis was made for 74.9% of clients whose reason for visiting the clinic was to receive RTI services. Even in this category of clients, lower abdominal pain was the most commonly diagnosed syndrome followed by vaginal discharge. These data show that clinic staff were more likely to make a syndromic diagnosis among clients seeking RTI services. Given that more than one-half of the study clients had at least one symptom or sign suggestive of an RTI, these data show that not all women with symptoms and/or signs were syndromically diagnosed to have an infection.

Multiple RTI syndromes were common among the study clients. For example 25% of the 669 clients syndromically diagnosed to have a RTI had both lower abdominal pain and vaginal discharge syndromes. Most algorithms in the region treat each syndrome on its own and do not give clear guidance on what the clinicians should do when faced with multiple syndromes in the same client.

### *v) Prevalence of RTI based on laboratory tests*

A significant proportion of the study clients (31.9) were found to have at least one reproductive tract infection excluding syphilis on laboratory testing. Candida (17.3%) and Clue cells (9.0%) were the most commonly isolated organisms. The presence of these organisms is evidence for Candidiasis and Bacterial Vaginosis infections, respectively. Gonorrhea and Chlamydia considered to be the organisms responsible for cervical infection were less frequently isolated compared with other organisms responsible for RTIs (Table 5). Data on Table 5 also shows that the prevalence of cervical infections was higher among clients seeking RTI services compared with all clients. However, there was no difference in the prevalence of vaginal infections between the two categories of women.

**Figure 2. Sexually Transmited Infection (RTI) syndroms diognosed by clinicians**

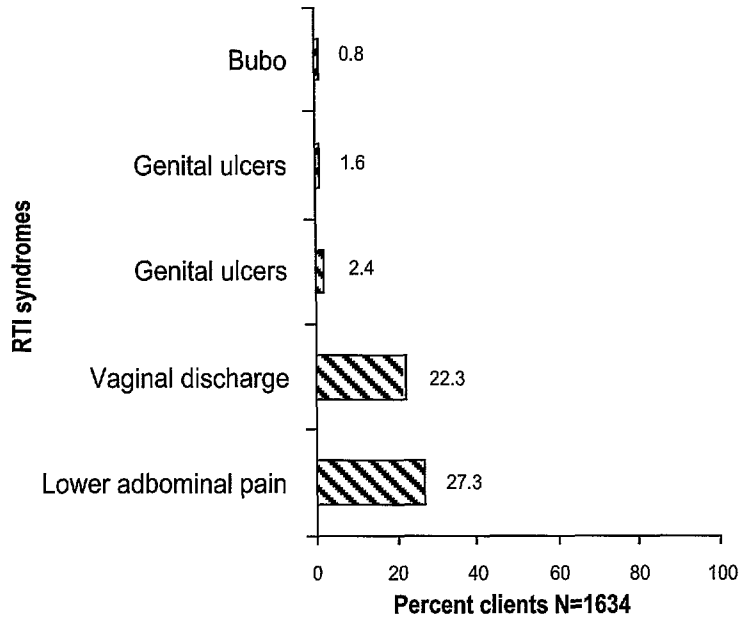


**Table 5. Prevalence of reproductive tract infection detected on laboratory testing**

| REPRODUCTIVE TRACT INFECTION | Percent all clients N = 1634 | Percent all clients seeking RTI N = 410 |
|---|---|---|
| Pus cells | 10.8 | 10.0 |
| Bacterial Vaginosis | 9.0 | 8.3 |
| Gonorrhea | 1.8 | 3.9 |
| Chlmydia | 2.9 | 4.2 |
| Trichomoniasis | 4.1 | 7.1 |
| Candida | 17. | 14.6 |
| Cervicitis[1] | 4.4 | 7.1 |
| Vaginitis[1] | 28.8 | 29.3 |

These data suggest that vaginal infections are much more common among women attending family planning clinics than cervical infection. The data also show that non-sexually transmitted infections are more prevalent than the sexually transmitted infections. In addition, the data show that women attending the clinics specifically for RTI services are more likely to have a sexually transmitted RTI. These findings have major implications for the treatment guidelines outlined in the existing national algorithms.

Currently, the algorithm recommend that all women with vaginal discharge be treated for cervicitis (e.g. gonorrhea and chlamydia) a relatively rare condition as data from this study have shown. These recommendations arose out of fear of the severe complications (especially pelvic inflammatory disease) associated with gonorrhea and chlamydia infections. However given the current knowledge that Bacterial Vaginosis is also associated with pelvic inflammatory disease and increased risk for HIV infection, the same concerns ought to apply to vaginal infections.

"... data reveals a high prevalence rate of syphilis in the MCH/FP population. Screening and treating family planning clients for syphilis needs to be considered as a major intervention in reducing the prevalence and adverse effects on pregnancy outcome..."

### *vi) Prevalence of syphilis infection*

The VDRL and RPR tests were used to identify clients with syphilis infection. According to the VDRL test 7.1% of the clients tested positive for syphilis infection compared with 3.9% on the RPR test. The VDRL is a more specific measure of syphilis infection but stays positive for a long time even after successful treatment while the RPR – a less specific test becomes negative within twelve months following treatment. Therefore, the RPR is a better measure of more recent and untreated infections than the VDRL. In order to have a more reliable estimate of the prevalence of syphilis, only those clients testing positive on both tests (3%) were considered.

The policy implication for these data is the finding of a prevalence rate for syphilis of 3%. This is high, especially considering that interventions in populations with lower prevalence rates result in a major public health impact[21]. Therefore, screening and treating family planning

clients for syphilis needs to be considered as a major intervention in reducing its prevalence and adverse effects on pregnancy outcome.

Intervening during the period before pregnancy occurs may have better impact on reducing adverse effects during pregnancy, given that most of these occur in the first trimester when most women have not started attending antenatal clinics.

### vii) Incidence of Opthalamia neonatorum

*Opthalamia neonatorum* - an infection of the eyes of newborn babies- appears to be common in Zimbabwe. Of the 430 women who had given birth in the 24 months preceding the study, 18.8% reported that their babies had eye infections in the neonatal period suggestive of *Opthalamia neonatorum*.

The high prevalence of eye infections in the neonatal period concurs with reports from the Harare City Health Department[22] of an increase in *Opthalamia neonatorum* cases at their health facilities. Given that most cases of this infection are caused by gonorrhea and/or chlamydia which are found in less than 5% of antenatal /FP clients, there is need to identify what other organisms may be

Data from several Situation Analysis Studies undertaken in the region[23] (two of them in Zimbabwe) have shown that revisit clients (clients visiting the clinics for re-supplies) are rarely assessed. This is based on the assumption that requiring regular check ups introduces medical barriers to family planning clients who are at low risk for RTIs and as such do not need clinical examinations. However, this study found that nearly one-third of revisit and clients attending for their annual check-ups had an RTI on laboratory testing and nearly two-thirds had symptoms and/or signs suggestive of an infection. These data show that there is a need to regularly assess these clients for symptoms and signs related to RTIs.

"... these findings emphasize the importance of carrying out regular pelvic examination for all clients attending family planning clinics regardless of the primary reason for the visit"

# Prevalence of RTI and HIV/AIDS Risk Factors

All the women who accepted to participate in the study were interviewed about the presence/absence of RTI and HIV risk factors by a trained interviewer at the end of the clients' consultation with clinic staff. This information was collected in two stages. First, service providers used a checklist (appendix) to record the client's clinical history including symptoms and signs of RTIs, and the findings of the clinical and pelvic examinations.

Second, all new and revisit clients who agreed to provide a specimen for laboratory testing were interviewed by a trained interviewer after the consultation and specimen collection using a standardized checklist to obtain information on the RTI and HIV/AIDS risk factors. The RTI/HIV risk assessment checklist had a total of 23 risk factors items covering clients' and partners' sexual behavior, history of RTI symptoms in clients, clients perception of their own risk status for RTIs and HIV infection and history of RTI symptoms in partner.

Behavioral risk factors were relatively common among the study population. Forty seven percent of the study clients had at least one of the behavioral risk factors and 22 % had more than one. Frequent travel and staying away from home were the most frequently mentioned behavioral risk factor. Although few women reported frequent change of sex partners, it is important to note that 8.5% said that they had sex with a new partner in the last sexual intercourse encounter. (figure 3).

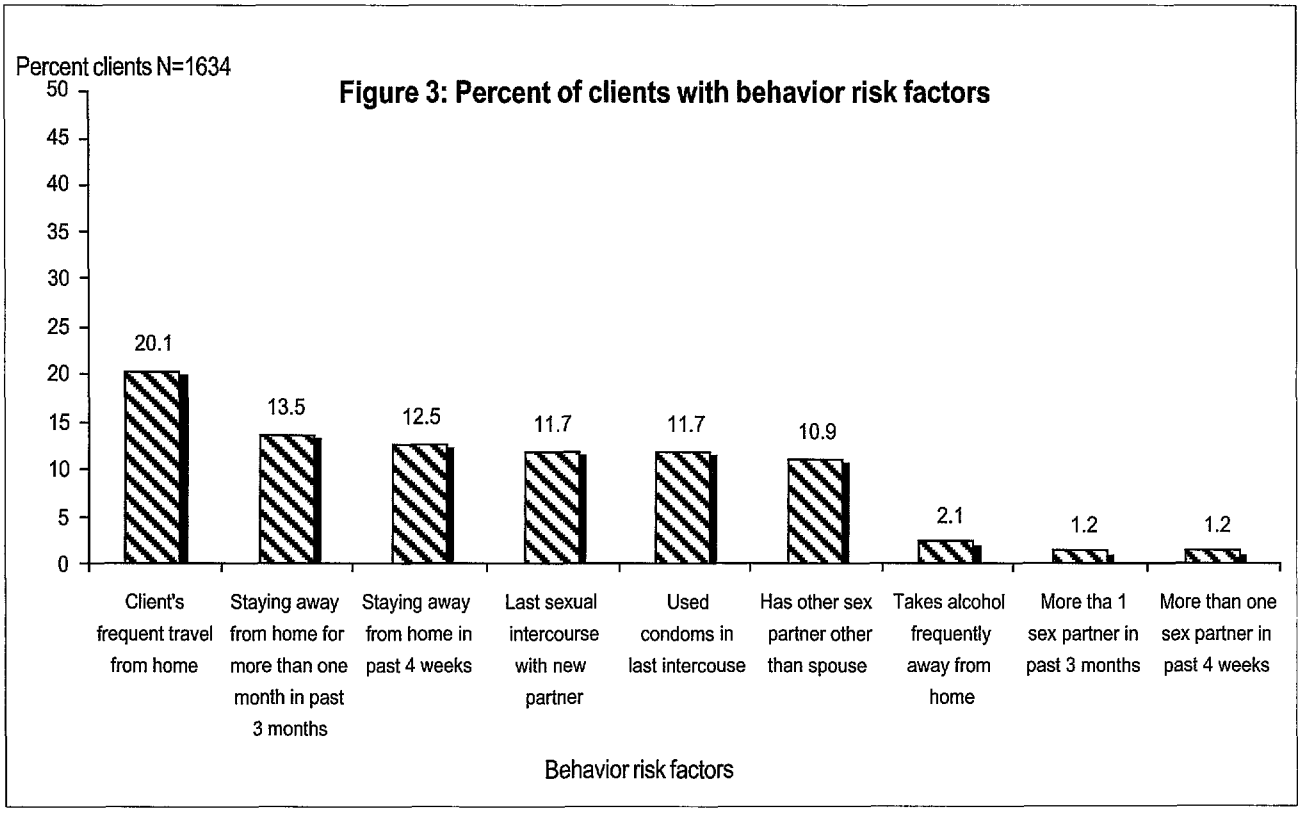


Figure 3: Percent of clients with behavior risk factors

A significant proportion (35% and 30%) of the study clients considered themselves to be at risk for RTI and HIV/AIDS, respectively. Clients seeking RTI services were more likely to perceive themselves to be at increased risk for RTIs and HIV/AIDS (57% and 47%, respectively). In addition it is worth noting that although more than 30% of the clients perceived themselves to be at an increased risk for RTIs and HIV infection, only 12 % had used a condom during the last sexual intercourse. This low use of condoms reported by the study clients may be a reflection of their poor negotiating skills and/or lack of power even when they recognize the risks they are taking.

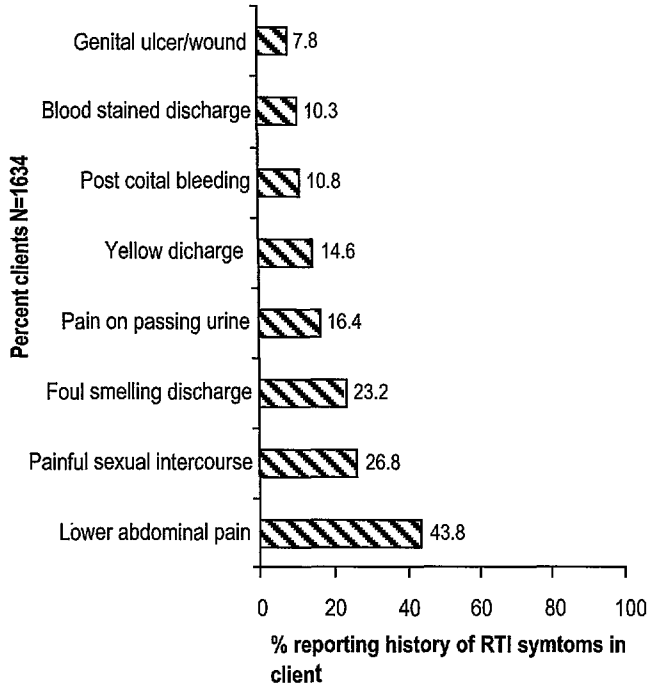
Sixty five percent of the study clients reported having experienced at least one RTI symptom while 42.3 % had experienced more than one symptom in the 12 months preceding the study. The most commonly reported symptom was lower abdominal pain followed by vaginal discharge and pain on passing urine respectively (Figure 4).

Clients seeking RTI services were more likely to report symptoms in the partner than the overall study population. One-quarter of all study clients reported that their partners had experienced at least one RTI symptom in the four weeks preceding the study. However, of the 410 clients seeking RTI services, 149 (36.3%) reported that their partners had experienced at least one RTI symptom over the same period. History of lower abdominal pain was the most commonly mentioned symptom followed by pain on passing urine for both categories of clients (Table 6).

**Table 6: Percent clinets reporting RTI symptoms in partner**

| History of RTI symptoms in partner | Percent all clients N=1634 | Percent clients seeking RTI services N=410 |
|---|---|---|
| Lower abdominal pain | 15.4 | 21 |
| Yellow discharge | 7.8 | 9.2 |
| Pain on passing urine | 14.5 | 19.9 |
| Genital ulcer/wound | 8.9 | 13.3 |
| Swelling in the groin | 6.9 | 8.4 |
| Has urethral discharge | 3.8 | 5.9 |

**Figure 4. Percent clients reporting RTI symptoms over 12 months perriod**




Besides asking clients about RTI symptoms in their partners, the clients were asked if they had taken any medication for RTIs in the 12 months preceding the study. Only 14% clients said that they had. Of those clients who attended the clinics for RTI services, 26% had taken RTI medication over the same period. Women were asked whether their partners had taken any medication for RTIs in the four weeks preceding the study. Since some women may not know what medications for RTIs look like, they were given a description of antibiotics and asked if their partners had taken any over the same period.

More than one-half of the women said that their partners had either been on RTI medication or antibiotic treatment over the stated period. Considering all study clients, one-third of the study clients reported use

of RTI medication among their partners. These data suggest that many men had used antibiotics in the four weeks preceding the study.

Data from this study show that risk factors are relatively common among family planning clients. However, some of the more traditional risk factors like rate of change of sex partners are not common and therefore, these risk factors may be playing a role through their partners rather than the women themselves.

### *Return for follow up visits*

The current algorithms used to manage RTI's in Zimbabwe recommend treatment regimens that require clients to return to the clinics for assessment after completion of the initial dose of treatment. In this study all clients consenting to participate in the study for whom specimens for laboratory testing were collected were requested to return to the clinic at specified dates. Findings from this study show that fewer than 20% of clients returned for follow up regardless of whether a syndromic diagnosis was made and the client started on medication (Table 7). These findings suggest that regardless of diagnosis clients do not return for follow-up when requested to do so.

The effectiveness of different algorithms for diagnosing and managing RTI was determined using the sensitivity[24], specificity[25] and positive predictive value[26] for each of the algorithms. The sensitivity, specificity and positive predictive values were calculated using the number of true positives, true negatives, false positives and false negatives associated with each algorithm[27]. Of the 1634 clients who consented to participate in the study, laboratory test results were available for all the five RTIs for 1623 clients. Therefore it is only these clients who are considered in the effectiveness and cost-effectiveness analysis.

This low return for follow up has important implication for policy and service provider guidelines in the management of RTIs. It has led to the recommendation that all clients with vaginal discharge be treated for cervical infections, due to the belief that cervical infections have more severe complications compared with vaginal infections. However, with the emerging knowledge that Bacterial Vaginosis (a more common infection) causes pelvic inflammatory diseases and also increases the risk for HIV infection, there is need to review the recommendations.

**Table 7: Proportion of clients with reprodictive tract infections returning for follow up**

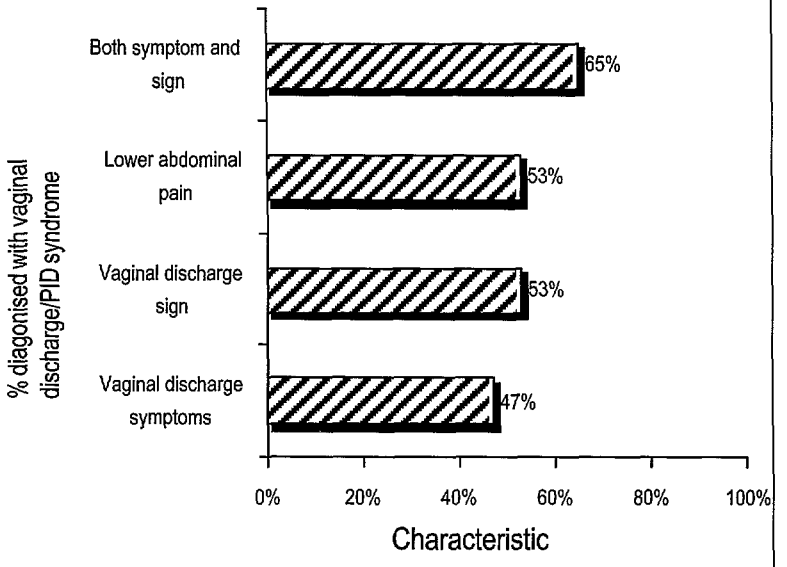
| Type of reproductive tract infection | No. with infection | % returning for follow up |
|---|---|---|
| Any syndromic diagnosis | 669 | 16 |
| Cervicitis | 72 | 19 |
| Vaginitis | 467 | 18 |
| Any RTI | 129 | 18 |
| Non RTIs | 415 | 19 |

Data from this study show that risk factors are relatively common among family planning clients. However, some of the more traditional risk factors like rate of change of sex partners are not common and therefore, these risk factors may be playing a role through their partners rather than the women themselves

## Effectiveness of current national algorithms in Zimbabwe

The national algorithms in Zimbabwe recommend that if a client presents with a symptom of vaginal discharge, she should be examined and if the examination reveals that she has a vaginal discharge then she should be treated for vaginal discharge syndrome[28]. The national algorithms also recommend that when pelvic examination is not possible at a facility, all clients with vaginal discharge symptom should be treated for cervical and vaginal infections. In this study, 535 (33%) of study clients had clinical evidence of vaginal discharge yet only 284 (53%) were diagnosed to have vaginal discharge syndrome and treated according to the national algorithms (Figure 5). The data also show that 298 (18.3%) of the study clients had both symptoms and signs of vaginal discharge. However, a diagnosis of vaginal discharge syndrome was made in 194 (65%) only. It is not clear why a diagnosis was not made in the rest of the clients who had vaginal discharge as is recommended by the national algorithms.

**Figure 5: Proportion of clients with vaginal discharge symptom and/or sign for whom staff made a syndromic diagnosis**




The same algorithms recommend that clients complaining of lower abdominal pain should be treated for pelvic inflammatory disease (PID) syndrome. In this study 698 (43%) of the clients complained of lower abdominal pain but only 53% of those who complained were diagnosed and treated for PID according the national algorithms. These findings suggest that clinical findings do not always guide the clinicians' decision to diagnose and treat RTIs. The data also suggest that clinicians do not always follow the national algorithms even when specific efforts are put in training them and ensuring that the algorithms, supplies, equipment and drugs are available.

Given that clinicians in this study did not make a diagnosis for all clients with symptoms and/or signs of vaginal discharge and lower abdominal pain, further analysis was undertaken to determine the effectiveness of these symptoms in predicting RTIs assuming that the providers would follow the national algorithms and make a diagnosis for all clients reporting these symptoms and/or found to have the signs on examination. In this

analysis, the effectiveness of these symptoms/signs to predict the presence of RTIs among only those clients whose reasons for visiting the clinics included receiving STI services was compared with when the symptoms and/or signs are used to screen all clients attending the clinics for RTIs.

Data on table 8 show the sensitivity for vaginal discharge symptom and/or sign and lower abdominal symptom. The sensitivity for these symptoms and signs when used to screen all women attending family planning clinics for cervical or vaginal infections is low and would therefore, result in a high number of false negatives. However, when used to screen for these infections among clients seeking RTI service within the family planning clinic, the sensitivity is much higher, therefore a lower number of false negatives will be encountered. The data also show that the lower abdominal pain symptom has a better sensitivity compared with the vaginal discharge symptom and/or sign when used to predict the presence of either cervical or vaginal infections in both categories of clients.

**Table 8: Sensitivity of vaginal discharge and/or lower abdominal pain symptoms or signs in predicting RTIs**

| Clinical information | Type of RTI | Sensitivity | |
|---|---|---|---|
| | | All Clients (%) | RTI clients only (%) |
| Vaginal discharge symptom | Cervicitis | 46 | 72 |
| | Vaginitis | 35 | 69 |
| Vaginal discharge sign | Cervicitis | 47 | 62 |
| | Vaginitis | 39 | 60 |
| Vaginal discharge symptom and sign | Cervicitis | 33 | 55 |
| | Vaginitis | 24 | 40 |
| Lower abdominal pain | Cervicitis | 63 | 86 |
| | Vaginitis | 41 | 68 |

Data from this study show that the vaginal discharge and lower/abdominal symptoms and/or signs have poorer specificity when used to identify women with RTIs among those clients seeking RTI services from family planning clinics compared to when they are used to screen all clients attending the clinic for RTIs. Therefore, the number of false positives will be higher among clients. (Table 9)

**Table 9: Specificity of vaginal discharge and/or lower abdominal pain symptoms or signs in predicting RTIs**

| Clinical information | Type of RTI | Specifity | |
|---|---|---|---|
| | | All Clients (%) | RTI clients only (%) |
| Vaginal discharge symptom | Cervicitis | 46 | 72 |
| | Vaginitis | 35 | 69 |
| Vaginal discharge sign | Cervicitis | 47 | 62 |
| | Vaginitis | 39 | 60 |
| Vaginal discharge symptom and sign | Cervicitis | 33 | 55 |
| | Vaginitis | 24 | 40 |
| Lower abdominal pain | Cervicitis | 63 | 86 |
| | Vaginitis | 41 | 68 |

Data on table 10 show that the vaginal discharge and lower abdominal pain symptoms and/or signs have a better PPV when used to identify clients with vaginal infections compared to when they are used to identify clients with cervical infections. However, in both situations the PPV is below 50%. Therefore, using these symptoms or signs leads to a low number of true positives. The data also show that there are no significant differences in the PPV for both categories of clients.

**Table: 10 Positive predictive values of vaginal discharge and/or lower abdominal pains symptoms or signs in predicting RTIs**

| Clinical information | Type of RTI | Positive Predictive Value | |
|---|---|---|---|
| | | All Clients (%) | RTI clients only (%) |
| Vaginal discharge symptom | Cervicitis | 6 | 9 |
| | Vaginitis | 32 | 34 |
| Vaginal discharge sign | Cervicitis | 6 | 10 |
| | Vaginitis | 34 | 38 |
| Vaginal discharge symptom and sign | Cervicitis | 8 | 11 |
| | Vaginitis | 38 | 41 |
| Lower abdominal pain | Cervicitis | 6 | 8 |
| | Vaginitis | 28 | 27 |

In summary, data from this study have shown that the current national algorithms used to syndromically manage clients for RTIs in Zimbabwe are ineffective when used in a family planning clinic. Use of the symptom-only-based algorithms is associated with a high number of false positives and false negatives. The study identified two major reasons why the current algorithms may not be effective. First, the clinicians do not utilize the information obtained during consultations to diagnose and manage clients with symptoms and/or signs suggestive of an RTI. Secondly, the vaginal discharge and lower abdominal symptoms and signs have poor positive predictive values for both cervical and vaginal infections.

### *Algorithm combining clinical and risk assessment information*

The risk factor information from the exit interviews with clients was used in combination with information on symptoms and clinical examination in a multivariate analysis to fit a model whose effectiveness was compared with the symptom-based algorithm.

The independent variables (history, clinical findings and risk factor information) were included in the logistic regression model if they were observed to have an association with the dependent variables (diagnosed RTIs) at the 10% or less significance level in the univariate analysis. Qualifying independent variables were subjected to a stepwise multiple logistic regression procedure using the backwards selection procedure. The model that best explained the distribution of the dependent variable (cervical infection) and also had the best sensitivity, specificity and positive predictive values was selected. To determine the relative importance of each of the variables in the model, we calculated the standardized coefficients for each variable.

The absolute value of the standardized regression coefficients was considered to represent the relative importance of each variable in relation to the other variables in the model[29]. Adjusted OR and p-values resulting from a logistic regression were estimated including the 95% confidence intervals.

The final model fitted using clinical history, examination and risk assessment information is shown on table 11. The relative importance of each information is represented by the absolute value of the standardized coefficients. Symptom of lower abdominal pain, cervical excitation sign, sex with sexual partner in last sexual intercourse who was not a spouse and past history of lower abdominal pain were equally important but more important than the rest of the variables in predicting the distribution of cervical infections among family planning clients.

**Table 11: Effectiveness of combined, clinical examination and risk assessment information in predicting cervical infections**

| Information | Prevalence (Percent) | Crude OR | Adjusted OR | Relative importance score |
|---|---|---|---|---|
| Partner in last sexual intercourse not spouse | 8.0 | 2.3 | 3.3 | 2 |
| Sign of cervical excitation | 17.6 | 4.3 | 3.0 | 2 |
| Symptom of lower abdominal pain | 42.7 | 2.3 | 2.0 | 2 |
| Past history of lower abdominal pain | 43.8 | 2.1 | 1.8 | 2 |
| Sign of yellow discharge | 6.6 | 4.1 | 2.2 | 1 |
| Last pregnancy outcome was abortion | 5.0 | 4.5 | 3.1 | 1 |
| Age (less than 24 years) | 20.2 | 3.2 | 1.6 | 1 |
| Partner has genital ulcers | 8.9 | 0.7 | 0.3 | 1 |
| Partner has swelling in the groin | 6.9 | 2.7 | 2.7 | 1 |

Combining information from history, clinical examination and risk assessment leads to some improvement in the ability to predict the presence of cervical infections among family planning clients. The model fitted from combining clinical and risk assessment information had a sensitivity of 3.2%, specificity of 100% and a positive predictive value of 50% when used to screen all clients attending family planning clinics for cervical infections. The model was associated with a sensitivity of 22%, specificity of 99.7% and positive predictive value of 83% when used to screen for RTIs among only those clients whose reasons for visiting the clinics included receiving RTI services, there were great improvements in its effectiveness in predicting cervical infections.

Although the sensitivity of this algorithm was lower than that of the symptom-only-based algorithm for both categories of clients, it has a much higher specificity and positive predictive value. Therefore, if effectiveness is measured by the number of correct diagnoses (true positives + true negatives), then the algorithm that combines risk assessment, clinical history and examination findings is more effective than the symptom-only-based algorithm. However, considering the number of infected women diagnosed as the measure of effectiveness would lead to a conclusion that the symptom-only-based algorithm was more effective than one that includes risk assessment information despite the larger number of false positives and negatives associated with it. These data show that the choice between the symptom-only-based algorithm and an algorithm that includes risk assessment will depend on the effectiveness measure used to judge the two.

### *Comparing the effectiveness of different algorithms for managing RTIs*

There are four possible algorithms that could be used to provide RTI services to women attending family planning clinics. One algorithm is to respond only to those clients who present with symptoms suggestive of an RTI using the syndromic approach (SDTa). The second option is to use the syndromic approach to screen all clients attending the family planning clinic for RTIs (SDTb). A third option would be to first screen all family planning clients using the syndromic approach, followed by laboratory testing for those clients identified to have any of the RTI syndromes (SDTb+LD). The fourth algorithm is one where all women attending the family planning clinic would undergo laboratory testing for the common RTIs (LD).

To compare the effectiveness of these different algorithms, two measures of effectiveness were used. The first measure of effectiveness considered was the number of infections identified. This measure considers only the number of clients correctly diagnosed as having an infection (True positives). The alternative measure of effectiveness considered was the number of diagnoses that were correct. This measure is the sum of the number of clients correctly diagnosed as having an infection and the number correctly diagnosed as not having an infection (True positives + True negatives).

Data on table 12 shows the effectiveness of the various algorithms in identifying women with any RTI. Using the number of correctly diagnosed clients (true positives + true negatives) as the effectiveness measure show that using the syndromic approach to respond to clients seeking RTI services is more effective in identifying women with an RTI compared with using syndromic approach to screen all women attending a family planning clinic for infections. However, if the number of infected women (true positives) is used as the measure of effectiveness, the reverse is true. This highlights the importance of choice of outcome measure when comparing different algorithms for managing RTIs.

Overall, these data show that with syndromic diagnosis, a large number of infections remain undiagnosed. For example, in responding only to clients seeking RTI services at a family planning clinic with the syndromic approach, 73% of infections remain undiagnosed (false negatives). However, the proportion of false negatives drops to 55% when syndromic approach is used to screen all family planning clients for RTIs. Conversely, the number of false positives is higher when syndromic approach is used to screen all clients for RTIs compared to when it is used to respond to only those clients seeking RTI services. Use of laboratory tests to screen those clients syndromically identified to have RTIs (SDTb+LD) eliminates false positives but has no effect on the false negatives. To eliminate both the false positives and false negatives, all clients attending the clinics have to be screened for RTIs using laboratory test (LD).

*Overall, these data show that with syndromic diagnosis, a large number of infections remain undiagnosed.*

**Table 12: Overall case distribution under alternative RTI management algorithms**

| Management Algorithm | # True Positive | # True Negative | # False Positive | # False Negative |
|---|---|---|---|---|
| Responding to Women Seeking RTI Services via SDTa | 140 | 834 | 270 | 379 |
| Screening all Women via SDTb | 234 | 673 | 436 | 285 |
| Screening all Women via SDTb+LD | 234 | 1109 | 0 | 285 |
| Screening all Women via LD | 519 | 1104 | 0 | 0 |

# Costs of Providing RTI Services Using Different Algorithms

The cost analysis undertaken in this study considered only the cost of lab tests to detect infection and the cost of drugs for treatment. Labor costs were not included since a previous study[31] showed that staff had sufficient unallocated time to provide syndromic diagnosis to those clients who would be eligible for this service. In addition, the cost of labor to implement lab diagnosis (collection of sample and dispatching to lab) were not considered since this activity was only being performed during the study period and is not part of the routine clinic procedures.

A previous analysis indicated that training costs were very low when annualized and allocated to visits, therefore were not considered in this analysis. Finally, the costs associated with any later treatment of missed infections were not considered under each algorithm.

## Costs of laboratory tests

For this study, all laboratory tests used to either confirm a syndromic diagnosis or as a screening mechanism, were purchased by the family planning clinic from a local lab. The Zimbabwe public laboratories supplied the charges for RTI tests to the family planning clinic. The cost for the chlamydia test was US$14.90; for gonorrhea, it was US$8.19; for bacterial vaginosis, trichomoniasis and candidiasis, a single slide mount was prepared for all three potential infections and analyzed at a total cost of US$1.49. Therefore, bacterial vaginosis, trichomoniasis and candidiasis were each assigned a lab cost of US$0.50.

## Cost of RTI Pharmaceuticals and Related Supplies

Drug costs for treating any infection were calculated by multiplying the quantities of specific drugs required in treating the specific RTI by their respective prices. The quantities of pharmaceutical and non-pharmaceutical supplies were estimated following the nationally recommended treatment protocols for each RTI syndrome[32]. Two sets of prices could have been applied. Prices charged by the Government Medical Stores (GMS) that are subsidized or the local market prices that are normally higher than the GMS prices. Due to frequent shortages of drugs at the GMS, the ZNFPC often makes drug purchases in the local market. Therefore, the local market prices were used in these calculations, as they are more likely to reflect the true cost of obtaining drugs due the frequent shortages at the GMS. The costs for drugs and other related supplies were obtained from the local market (Geddes Medical Suppliers).

According to the *Flowcharts for the Management of STDs* developed for the Zimbabwe National AIDS Coordination Program, a woman presenting with or found to have the vaginal discharge and/ or lower abdominal pain syndromes would be treated with a broad range of drugs simultaneously[33]. The specific drugs and dosages would depend upon the presence of lower abdominal pain and/or vaginal discharge.

Data on table 13 summarizes the expected program costs under alternative algorithms when the national guidelines are followed in the management of clients diagnosed to have an RTI. A total of 410 clients indicated receiving RTI services as one of the reasons they had visited the clinic; however using the criteria in the national management flow charts 307 qualified for treatment. Therefore, only the 307 women were considered in determining the cost of treatment. Using the syndromic approach to screen all clients identified 669 women with the criteria required to make a syndromic diagnosis by the national flowcharts; therefore, the costs for managing these clients using the SDTb and SDTb+LD are based on this number of clients.

The costs of using the LD algorithm include costs of laboratory tests to screen all 1623 clients and drugs used to treat the 519 clients that tested positive for any of the RTIs.

Data on table 13 also shows that when the laboratory tests are used to screen clients in both the SDTb + LD and LD algorithm, the costs of drugs is drastically reduced. However, the cost of carrying out the laboratory tests more than compensates for the reduction in the drug costs. Therefore, apart from the differences in total costs, the incremental cost of moving from one diagnosis and treatment algorithm to another is dominated by the cost of laboratory tests.

**Table 13: Overall costs if the National Flowcharts for Management for RTIs were followed**

| Management Algorithm | # Women Diagnosed as Infected | # Women with a + Lab Test | Total Cost of Drugs and Supplies (US$) | Total Cost of Laboratory Tests (US$) | Grand Total Cost (Drugs + Lab) (US$) |
|---|---|---|---|---|---|
| Responding to Women Seeking RTI Services via SDTa (N=410) | 307 | N/A | 4,024 | N/A | 4,024 |
| Screening all Women via SDTb (N=1623) | 669 | N/A | 8,605 | N/A | 8,605 |
| Screening all Women via SDTb+LD (N=1623) | 669 | 337 | 733 | 15,989 | 16,722 |
| Screening all Women via LD (N=1623) | 519 | 524 | 951 | 40,867 | 41,819 |

# Cost-Effectiveness of Different RTI Diagnosis and Treatment Algorithms

The costs and alternative effectiveness measures The costs and alternative effectiveness measures associated with each diagnosis and treatment algorithm are presented in table 14. Since the SDTa algorithm does not involve active screening of clients for RTIs, it considered as the 'passive' algorithm and the cost-effectiveness of the other three algorithms are compared to its costs.

**Table 14: Estimated Costs by thetwo alternative measure of effectiveness**

| Management Algorithm | Estimated Cost | Alternative Effectiveness Measures | |
|---|---|---|---|
| | | # of Infections Identified (1) | # of Correct Diagnoses Made (2) |
| Responding to women seeking RTI services via SDTa | 4,024 | 140 | 974 |
| Screening all women via SDTb | 9,066 | 234 | 907 |
| Screening all women via SDTb+LD | 17,354 | 234 | 1,343 |
| Screening all women via LD | 41,809 | 519 | 1,623 |

As discussed in earlier section of this report, when the effectiveness measure is the number of infections identified, using the syndromic approach to screen all women for RTIs, the (SDTb) and the SDTb+LD algorithm yield the same level of effectiveness. Therefore only the less expensive of the two would be considered as a potential cost-effective option. The SDTb+LD algorithm will only be the less expensive if the savings from using fewer drugs were sufficiently large to offset the additional costs of the lab tests. In this study sample this occurs only for Bacterial Vaginosis, Trichomoniasis, and Candidiasis.

When the effectiveness measure is the number of cases correctly diagnosed then the SDTb screening algorithm would not be considered an option even at the individual infection level since it is always less effective than the 'passive' algorithm of responding to requests for treatment. In addition, because the SDTb algorithm is expected to be more costly than the 'passive' algorithm, due to the treatment of a higher number of false positives, it is unlikely to be a cost-effective alternative to the 'passive' algorithm on an overall program basis.

In order to compare the alternative diagnosis and treatment algorithms, the incremental cost effectiveness ratio[34] for moving from a "passive" algorithm towards RTI diagnosis and treatment under the three alternative (active) algorithms are computed for each potential effectiveness measure. The incremental cost-effectiveness ratios for moving from a algorithm that uses the syndromic approach

**Table 15: Incremental cost effectiveness ratios by effectiveness measure**

| | Effectiveness Measure | |
|---|---|---|
| Infection and Management | # of Infections Identified | # of Correct Diagnoses Made |
| Algorithm | (1) | (2) |
| Responding to women seeking RTI services via SDTb | 22.13 | Less Effective[i] |
| Screening all women via SDTb+LD | Less Effective | 33.95 |
| Screening all women via LD | 95.93 | 67.37 |

to respond to only those women seeking RTI services (passive) to the "active" algorithm are presented on Table 15.

Compared to the algorithm that uses syndromic approach for women seeking RTI services only, the other algorithms (SDTb, SDTb+LD, or LD) will always result in more infections being identified, however, the additional cost may not be worth the small gains in effectiveness. For example, considering the identification of clients with any RTI and assuming that providers follow the national guidelines when deciding treatment, the SDTb screening algorithm is associated with an incremental cost-effectiveness ratio of US$22.13. However, adopting this approach may be judged too expensive within the context of per capita spending on health care in Zimbabwe that is well below the costs associated with it.

Under the second measure of effectiveness, the use of SDTb for screening is always "Less Effective". Compared to the use of syndromic approach for providing services to only women requesting RTI services, the algorithm of SDTb+LD, or LD will always result in more cases being correctly diagnosed, however, the additional cost may not be worth the small gains in effectiveness. The incremental cost-effectiveness ratio of US$33.95 associated with the use of SDTb+LD for screening is expensive when considered within the context of per capita spending on health care in Zimbabwe.

# Client and Service Provider Perceptions on the Integration of Sexually Transmitted Infection Services into Family Planning Services

A questionnaire was administered to all fourteen 14 service providers who participated in the study to assess how they felt about using the checklist and participation in the study. Another questionnaire was administered to 154 clients who participated in the study at the three ZNFPC clinics (i.e. Spilhaus (67%), Lister-Bulawayo (11%) and Mpilo (22%)).

## Perceptions of the service providers

When asked about how they felt about the checklist when it was first introduced, 43% of providers thought it was rather too long, 29% thought it was fine and the rest thought it was either cumbersome (7%) complicated (7%) or were not sure of its usefulness (7%). After using the checklist for several months, their feelings had changed with the majority (86%) saying that it was easy to use and had greatly improved their quality of work.

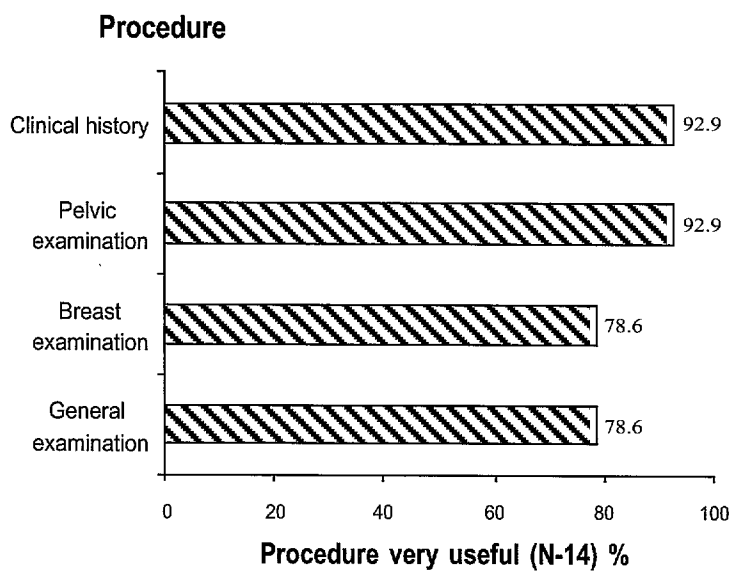
The two specific difficulties mentioned by the two providers who still had some concerns with the checklist were the time it took to go through the checklist and the inclusion of some "irrelevant" questions. The majority of the providers, (71%) said that they would like to continue using the checklist routinely.

All the service providers were completely comfortable in performing pelvic examinations for their clients and the vast majority (93%) said that these examinations were useful ( Figure 6).

Although the majority (86%) of the providers said that the STI/HIV risk assessment questions were useful, fewer than half indicated that they were comfortable asking clients about their sexual behavior and that of their partners.

In general, the majority felt that research studies are very useful as they highlight aspects of service provision, which require improvement. They also educate service providers on new approaches to managing clients. Specifically, the service providers reported that their participation in this study had influenced the way they do their work and how they relate to clients. They reported that their participation in the STI project had improved their skills on counseling of STIs/HIV and the way they interact with their clients.

**Figure 6: Percentage of service providers who were comfortable in performing procedures and those who found them useful**



# Concluding Observations and Recommendations

This study showed that a significant proportion of clients attending family planning clinics has RTIs and that the majority of these infections are not sexually transmitted. A large proportion of the clients with RTIs are asymptomatic and many women reporting the presence of symptoms do not have any infection based on laboratory testing.

The study also showed that using algorithms that rely on clinic-based information is associated with a large number of false positives and false negatives leading to many management and social difficulties. Using syndromic approach to respond to only those clients seeking RTI services was found to be more effective than using it to screen all clients attending family planning clinics for RTIs. However, it was still associated with a large number of false positives and false negatives.

The study also found that using laboratory testing was effective in reducing the number of false positives associated with the syndromic approach but implementing this approach was not feasible given the per capita expenditure on health in Zimbabwe and the costs of the laboratory tests.

## *Summary of Recommendations*

i) In the absence of cost-effective approaches to the diagnosis and management of RTIs in family planning clinics, we recommend that family planning programs in the region should put more emphasis on the following activities:

- Behavior change communication to reduce unsafe, unprotected sex
- Aggressive condom promotion both in clinics and non-clinical settings
- Counseling services to increase knowledge, perception of personal risk, behavior change and contraceptive method selection.

ii) Secondly, in view of the fact that most programs will continue to use the syndromic approach to manage RTIs until a more cost-effective approach is identified, we recommend that efforts aimed at improving its effectiveness should be continued. These efforts should include:

- Improvement of skills, attitudes and perceptions of providers to enable them to undertake systemic STI/HIV IEC, risk assessment and counseling for clients in order to improve on clients' knowledge of STI/HIV related symptoms and signs.

- Development and use of integrated checklists should be encouraged and supported by governments and donors in the region.

- Reviews of the current STI treatment guidelines to emphasize non-sexually transmitted infections. Many programs in the region still use algorithms that emphasize the treatment of cervical infections at the cost of neglecting the non-sexually transmitted infections.

The findings from this study support some of the guidelines put forth in a recent document from USAID, *Integration of Family Planning/MCH with HIV/STD Prevention, Programmatic Technical Guidance: Priority for Primary Prevention with a Focus on High Transmitters* (December 1998). The document summarizes a number of weaknesses of integrated programs, including an overemphasis on the clinical management of STDs, the ineffectiveness of the syndromic algorithm for vaginal discharge, and inadequate support for primary prevention of sexual transmission of HIV and other STDs, especially for condom promotion and behavior change intervention.

In agreement with the USAID guidance document, we recommend that as the search for more cost-effective strategies for diagnosing and managing RTIs among family planning clients continues, family planning programs in the region should put more emphasis on the following activities:

- Behavior change communication to reduce unsafe, unprotected sex
- Aggressive condom promotion both in clinics and non-clinical settings
- Counseling services to increase knowledge, perception of personal risk, behavior change and contraceptive method selection.

This study also found that clients attending family planning clinics are comfortable discussing matters relating to their sexual behavior and that of their partners. The study also showed that it is feasible to use an integrated checklist to collect STI/HIV risk factor information and provide STI/HIV information and counseling in a standardized manner to many clients attending family planning clinics. Therefore, it should be possible to implement the recommended activities within the family planning clinic setting.

Secondly, we recommend that efforts aimed at improving the effectiveness of the syndromic approach be continued given that most programs will continue to use the syndromic approach to manage RTIs until a more cost-effective approach is identified. For example, the large discrepancy between reported symptoms and signs found during clinical examination might be a reflection of poor clients' knowledge of the symptoms associated with these infections. The study also showed that combining information on STI/HIV risk assessment, history of STI symptoms and clinical examination improves on the performance of the clinic-based algorithms. However, the study also found that more than 50% of service providers were not comfortable discussing sexual behavior issues with their clients. Therefore there is a need to improve skills of providers and to encourage them to undertake systemic STI/HIV IEC for clients in order to improve on clients' knowledge of STI/HIV related symptoms and signs.

Thirdly, the study found that using syndromic approach to respond to women requesting RTI services at the family planning clinic was a more cost effective strategy compared with using syndromic approach to screen all family planning clients for RTIs.

However, both strategies were associated with large numbers of false negatives and positives. Therefore, we recommend that should programs choose to continue using the syndromic approach, they strategy that responds to only those clients requesting for RTI services be adopted.

In addition, data from the study showed that the checklist enabled more clients with symptoms and signs suggestive of STIs to be identified and the vast majority of clients received STI/HIV counseling. Therefore, development and use of integrated checklists should be encouraged and

supported by governments and donors in the region. Also many programs, in the region use algorithms that emphasize the treatment of cervical infections at the cost of neglecting the non-sexually transmitted infections. However, data from this study shows that the non-sexually transmitted infection are much more common and given recent evidence indicating that bacterial vaginosis may be associated with increased transmission of HIV infection and pelvic inflammatory disease, there is need to review the treatment guidelines to focus on these infections.

In summary, the study provides information that would be useful in reviewing and redirecting many programs in the region that have adapted or are planning to adapt the integrated approach for providing RTI and family planning services.

# References and Notes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[12]National DHS surveys, Botswana (1988), Kenya (1993), Uganda (1995), Tanzania (1996) Zambia (1996) and Zimbabwe (1994).

[13] This methodology is based on the Population Council's Situation Analysis approach and requires a team of two researchers spending one week at a sample of clinics collecting data through a number of data collection instruments, including observations of client-provider interactions, exit interviews with clients and in-depth interviews with service providers, and a clinic inventory. It also requires in-depth interviews with senior program managers and policy makers and a review of policy and service delivery guideline documents

[14] Valdez J., et al, (1997) "Assessing family planning service delivery skills in Kenya". Studies in family Planning, 28,2:143-150, 1997.

[15]For staff, clinics and clients, the performance, readiness and satisfaction were considered satisfactory or to be of an acceptable quality if the number of failures on each indicator did not exceed an appropriate number called the Lot Tolerance Number of Failures (LTNF), or equivalent if the number of passes equals or exceeds an appropriate threshold value. The LTNF varies with the sample size being considered. For example, a provider examining say ten clients, on a given indicator such as whether or not a provider undertakes pelvic examination, would pass

on this indicator if she performed the examination to at least eight clients or equivalently if she did not do so in at most two cases. In all cases a consumer or client's risk of $\beta = 0.10$ was used to determine the critical values upon which a decision about the quality of service may be based (See appendix for the LTNF critical values used).

[16] According to the service provider guidelines, a complete pelvic exam should include; explaining to the clients the procedure in advance, asking the clients to pass urine before the exam, putting the client in the lithotomy position for the exam, inspecting the thighs, pubic and external genitalia for ulcers, separating the labia for proper inspection, speculum examination, bimanual examination and collection of a specimen for papsmear from all new, restarting and clients attending for annual check-up.

[17] Latif A.S. (1997). " Syndromic Management of Sexually Transmitted Diseases: Training Manual for STD Case Management". National AIDS Coordination Program, Ministry of Health and Child Welfare, Harare, Zimbabwe.

[18] Clients were recruited into the study if they were above 16 years of age and had visited the clinic for any of the services in Table 2 and consented to participate in the study. All new family planning clients, clients attending for annual check-up, clients with problems with a current method, those with symptoms of RTIs and clients attending for infertility services were approached and requested to participate in the study. A random sample of clients attending for re-supply of methods were also recruited into the study.

[19] Latif A.S (1997) op.cit.

[20] Cervicitis was defined as the presence of gonorrhea and/ or Chlamydia infection confirmed by lab test

[21] Vaginitis was defined as the presence of Trichomoniais and/or Candida and/or Bacterial Vaginosis on lab test

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[25] ***Sensitivity:*** The sensitivity is defined as the probability of clients having the symptoms and/or signs when they have a positive laboratory test for RTIs. For this study two major groups of RTIs are considered. Clients who have a positive laboratory test for Gonorrhea and/or Chlamydia are said to have cervical infections while those with Trichomoniasis, Candida and/or Bacterial Vaginosis are said to have vaginal infections.

[26] ***Specificity***: Specificity is defined as the probability of clients not having symptoms and/or signs when they test negative for RTIs on laboratory testing. This was measured by the proportion of clients who did not have symptoms and/ or signs when only those clients with a negative laboratory test are considered.

[27] ***Positive predictive value (PPV)***: The PPV is defined as the probability of clients having a positive laboratory test when they have symptoms and/or signs. This probability is measured by the proportion of clients who have both a positive laboratory test and symptoms/ or signs considering only those clients with symptoms and/or signs

[28]

**True Positive**: This is a case that is diagnosed as infected when in fact the woman is infected.

**False Positive**: This is a case that is diagnosed as infected when in fact the woman is not infected. (These are the "over-treated" cases).
**False Negative**: This is a case that is diagnosed as uninfected when in fact the woman is infected. (These are the missed cases)
**True Negative**: This is a case that is diagnosed as uninfected when in fact the woman is uninfected.

[29] Latif A.S. (1997) op. Cit.

[30] The standardized regression coefficient is a useful measure for comparing the predictive values of several independent variables in one model. The standard regression coefficient represents the predicted increase in the standard deviation units of the dependant variable that would be expected per standard deviation increase in the independent variable. By expressing changes in standard deviation units for the different independent variables it is possible to control for differences in the units of measurements for the independent variables and therefore make direct comparisons of their ability to predict the dependent variable. Rosner B. in Fundamentals in Biostatics, Third

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[32] Latif AS (1997) op.cit

[33] Latif AS (1997) op.cit

[34] The incremental cost effectiveness ratio is given by:

$$\frac{\text{(Estimated Cost of Active Diagnosis \& Treatment Strategy - Estimated Cost of Passive Strategy)}}{\text{(Effectiveness of Active Diagnosis \& Treatment Strategy - Effectiveness of Passive Strategy)}}$$

A negative value indicates a strategy that is less effective than the passive strategy and one that should not be considered as a viable alternative to the passive approach. Among the incremental cost-effectiveness ratios which are greater than zero, the most cost-effective algorithm would be the one with the lowest incremental cost-effectiveness ratio. However, it may be decided that the cost for obtaining this outcome is too expensive relative to a passive approach to RTI management. This judgment rests with the decision-maker.

[35] Note: "Less Effective" indicates that either (1) the screening algorithm results in an outcome that is less effective than responding to requests for RTI services through Syndromic approach or (2) the screening algorithm is more costly and no more effective than an alternative screening algorithm. The numbers in this table represent the cost necessary to increase the effectiveness measure by one unit through a screening approach to RTI management compared to using the Syndromic approach for only those women who come seeking RTI services. The numbers in bold represent the most cost-effective screening algorithm compared to responding to requests for RTI services through Syndromic approach.

# Appendix

## REPRODUCTIVE HEALTH ASSESMENT AND MANAGEMENT FORM FOR THE ZIMBABWE NATIONAL FAMILY PLANNING COUNCIL STI STUDY/ FP FORM

****Informed Consent obtained (circle one): yes no**

**Attach sticker**

### 1. Clinic and Personal Information

| **Health Facility name** | | **Marital status** | **YES** | **NO** |
|---|---|---|---|---|
| **Client No.** | | Cohabiting | | |
| **Study No.** | | Married (Polygamous) | | |
| **Time consultation began:** | | Married (Monogamous) | | |
| **Date:** Day Month Year | | Divorced/Separated | | |
| **Client's Name** | | Widowed | | |
| **Date of birth** Day Month Year | | Single (never married) | | |

| **Education (Grade completed )** | Grade | **Age at first marriage:** |
|---|---|---|
| Primary | | **Contact address (Ask for physical address: "how do I find you?")** |
| Secondary | | box: |
| Tertiary | | village/estate: |
| **Occupation of client** | | sublocation: |
| **Occupation of spouse/partner** | | other info: |
| **Husband/Father's name** | | **Religion:** |

### 2. Reason for clinic visit, Obstetric and Gynaecologic History

| **Reasons for visiting the clinic today** | **YES** | **NO** | **Gynaecologic History (Does client currently have ----- ?** | **YES** | **NO** |
|---|---|---|---|---|---|
| New family planning client | | | Lower abdominal pain (PID) | | |
| Restarting Family Planning | | | Yellow discharge | | |
| Annual examination | | | Blood stained discharge | | |
| Re-supply / revisit | | | Foul smelling discharge | | |
| Problem with method | | | Increased amount of discharge | | |
| STD treatment | | | Post coital bleeding | | |
| Infertility | | | Pain during sexual intercourse | | |
| **Date of last visit:** | | | Pain on passing urine | | |

| **Obstetric History** | | | Genital ulcers/wounds/sores | | |
|---|---|---|---|---|---|
| No. of total pregnancies | | | Painful swellings in the groin | | |
| No. of living children | | | Warts in the genital area | | |
| Ages of children | | | Bleeding between periods | | |
| No. of stillbirths | | | Dysmenorrhoea | | |
| No. of neonatal deaths | | | | | |
| **Date last pregnancy ended:** Day Month Yr. | | | **LMP**: Day Month Year | | |
| **Out come of last pregnancy** | **YES** | **NO** | **Age at menarche:** | | |
| Live birth | | | | | |
| Stillbirth | | | **Reproductive Intentions** | | |
| Abortion | | | No. of desired children: | | |
| Neonatal death | | | Timing of next child: | | |
| **Is client on menses?** | | | | | |
| Cycle length (No. of days): | | | | | |
| No. of bleeding days: | | | | | |
| Flow: regular/irregular: | | | **Is client currently breast-feeding?** | | |

**3. General Medical and Contraceptive History**

| **Medical history (Has client ever had or currently have ------ ?)** | **YES** | **NO** | **Contraceptive use history** | **Ever Use** | **Current Use** |
|---|---|---|---|---|---|
| Varicosis | | | Combined pill | | |
| Jaundice | | | Progesterone only pill | | |
| Renal disease | | | Male condom | | |
| Hypertension | | | Spermicide | | |
| STD | | | IUD/Loop | | |
| Diabetes | | | Injectables | | |
| Epilepsy | | | Implants | | |
| Tuberculosis | | | Female Sterilisation | | |
| Goitre | | | Male Sterilisation | | |
| Severe weight loss | | | Traditional Methods | | |
| Severe weight gain | | | LAM | | |
| Headaches | | | Natural FP | | |
| Thrombosis | | | Female Condom | | |
| Allergy to medicines (e.g., Penicillin) | | | | **YES** | **NO** |
| Toxaemia of pregnancy | | | Are you on any medication? | | |
| Asthma | | | Does client smoke? | | |

**4. Clinical examinations, Diagnosis and Treatment**

| **General examination.** | | ***Speculum examination [TAKE SPECIMENS AT THIS TIME]*** | **YES** | **NO** |
|---|---|---|---|---|
| Blood Pressure | | Warts on vagina wall | | |
| Weight | | Curdy discharge in vagina | | |

| **Does the Client Have --------- ?** | **YES** | **NO** | Cervical warts/polyps | | |
|---|---|---|---|---|---|
| Hair loss or colour change | | | Discharge from cervix Os | | |
| Jaundice | | | Cervical erosion/ulcers | | |
| Anaemia | | | ***Digital examination/ Bimanual*** | | |
| Ulcers/sores in mouth | | | Cervical excitation | | |
| Enlarged thyroid gland | | | Retroverted uterus | | |
| Skin rashes | | | Anteverted uterus | | |
| Enlarged lymph-nodes | | | Enlarged uterine size | | |
| Enlarged liver | | | Tenderness in adenexia | | |
| **Breast Exam. Does client have -?** | **YES** | **NO** | Ovarian masses | | |
| Dimples in the skin | | | **Syndromic Diagnosis** | | |
| Breast masses/lumps | | | Vaginal Discharge | | |
| Discharge from the nipple | | | Genital ulcer | | |
| Ulcers/sores on breast | | | Lower abdominal pain | | |
| Enlarged axilla nodes | | | Bubo (swelling in the groin) | | |
| **Pelvic exam. Does client have -?** | **YES** | **NO** | Warts | | |
| ***Inspection (vulva/ buttocks/ groin)*** | | | **Treatment given for syndrome** | | |
| Rashes/Vesicles | | | 1. | | |
| Ulcers/wounds/sores | | | 2. | | |
| Warts | | | 3. | | |
| Swellings in the groin | | | 4. | | |
| Clear discharge | | | **Family Planning method given (for pill, note # of cycles given; for condom, # of condoms)** | | |
| White/curdy discharge | | | 1. | | |
| Greenish discharge | | | 2. | | |
| Yellow discharge | | | **If none, reason:** | | |
| | | | **Return Date:** Day Month Year | | |

**5. Counselling**

| **Counselling for STIs and HIV/AIDS (NOTE: for all clients)** | **YES** | **NO** | **Information given to Clients with STIs (NOTE: only for clients who are given treatment)** | **YES** | **NO** |
|---|---|---|---|---|---|
| STI/HIV risk factors | | | Importance of completing therapy | | |
| Modes of transmission | | | Importance of protecting partners during therapy | | |
| Symptoms of STD and HIV/AIDS | | | How to protect partners from infection | | |
| Complications of STDs | | | Condom use | | |
| Dual Contraception | | | Need to refer partner for therapy | | |
| Condom use | | | Need to return for check up | | |

**6. Laboratory tests**

| Specimens taken for lab tests (check if taken) | YES | NO | Laboratory Test Results (to be completed later) | Positive | Negative |
|---|---|---|---|---|---|
| HVS for Gonorrhea/ Chlamydia | | | Gonorrhea | | |
| | | | Chlamydia | | |
| HVS for Candidiasis | | | Candida | | |
| HVS for Bacterial Vaginosis | | | Bacterial Vaginosis | | |
| HVS for Trichomonas (in-pouch) | | | in pouch test | | |
| Urine for pregnancy test | | | Pregnancy test | | |

## 7. Follow-up

**[NOTE: Follow-up information to be completed when client returns for follow up appointment]**

| Follow-up Visit | YES | NO | Contact tracing | YES | NO |
|---|---|---|---|---|---|
| Date returned: Day Month Year | | | Contact treated | | |
| Returned on scheduled date | | | | | |
| Returned after due date | | | | | |
| Returned following home visit | | | | | |
| Clinically cured if had STI | | | | | |
| Treatment changed to if not cured | | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| Clientreferredelsewhere | | | | | |

**STD/HIV RISK ASSESSMENT CHECK LIST** **attachsticker**

| Questions | YES | NO | DK |
|---|---|---|---|
| **1.** Does your employment /major source of income activity involve travelling and staying away from home frequently? | | | |
| **2.** Have you stayed away from home for a month or more in the past three months? | | | |
| **3.** Have you stayed away from home in the past four weeks? | | | |
| **4.** Do you have a regular sex partner? By regular sex partner I mean someone you had a relationship for at least one year **[for married women, other than spouse]** | | | |
| **5.** For how long have you known your spouse (regular partner)? | Years: _____ | | |
| **6.** Does your spouse's (regular partner's) employment /major source of income activity involve travelling and staying away from home frequently? | | | |
| **7.** Has your spouse (regular sex partner) stayed away from home for more than a month in the past three months? | | | |

| | | | |
|---|---|---|---|
| **8.** Has your spouse (regular partner) stayed away from your home in the past four weeks? | | | |
| **9.** Does your spouse (regular partner) go out to drink alcohol at least once a week? | | | |
| **10.** Do you go out to drink alcohol at least once a week? | | | |
| **11.** Some men have sex with more than one woman. Do you think that your spouse (partner) has sex with other women? | | | |
| **12.** Do you think that you are at an increased risk of getting an STD infection? | | | |

| |
|---|
| **12a.If yes to Q12.**Why do you think that you are at increased risk? |
| |

| | | | |
|---|---|---|---|
| **13.** Do you think that you are at increased risk of getting HIV infection? | | | |
| **13a.If yes to Q.13.** Why do you think that you are at increased risk? | | | |
| **14.** Do you think that you might be having an STD infection currently? | | | |
| **14a.** Have you been treated/or sought treatment for an STD in the past 12 months? | | | |

| **15.** Have you experienced ( Read from list below---------) the past 12 months before coming to the clinic today? | | | | |
|---|---|---|---|---|
| | Lower abdominal pain | | | |
| | Foul smelling vaginal discharge | | | |
| | Purulent vaginal discharge | | | |
| | Blood stained vaginal discharge | | | |
| | Post coital bleeding | | | |
| | Painful sexual intercourse | | | |
| | Pain on passing urine | | | |
| | Genital ulcers/wounds | | | |
| | Swellings in groin | | | |
| | Sores/wounds in the mouth | | | |
| | Skin rashes | | | |

| **16.** Does your partner currently have or has had any of the following … in the past four weeks? | | | | |
|---|---|---|---|---|
| | Lower abdominal pain | | | |
| | Purulent urethral discharge | | | |
| | Pain on passing urine | | | |
| | Wound/sores in the genital area | | | |
| | Swellings in the groin | | | |
| | Wounds/sore in the mouth | | | |
| | Skin rash | | | |
| | Treatment for STIs | | | |
| | Antibiotic treatment (Capsules or injection) | | | |

| | | | |
|---|---|---|---|
| **17.**When was the last time you had sexual intercourse? | Day | Month | Year |

| | | | |
|---|---|---|---|
| **18**. Have you had more than one sexual partner in the past three months? | | | |
| **19**. Have you had more than one sexual partner in the past four weeks? | | | |
| **20**. With whom did you have sex the last time? | | | |
| | Spouse | | |
| | Regular Partner | | |
| | New Partner | | |
| | Other | | |
| **21**. Did your partner use a male condom the last time you had sexual intercourse? | | | |
| **22.(If last partner not spouse)** Did you receive or give money or other types of gifts the last time you had sex? | | | |
| **23**. Have you used any intra-vaginal preparations for the purpose of constricting and/ or drying the vagina to prepare yourself for sexual intercourse in the past three months? | | | |

**Time consultation ended:**