Honduran Health Alliance
Reproductive Tract Infection Education & Clinical Management
Program & Evaluation Plan

By
Megan Daw

A Master’s Paper submitted to the faculty of
the University of North Carolina at Chapel Hill
In partial fulfillment of the requirements for
the degree of Master of Public Health in
the Public Health Leadership Program.

Chapel Hill

2005

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Abstract

According to the World Health Organization curable sexually transmitted infections newly infect 340 million people annually\(^1\). These curable infections include gonorrhea, Chlamydia, syphilis, and trichomoniasis and impose the greatest impact on women and children in low-resource nations. For this reason, a mission to address STIs in women has made it to the agendas of nearly every global reproductive health conference since 1994; from the International Conference on Population Development in 1994 to the 57\(^{th}\) World Health Assembly in 2002\(^2,3\).

Latin America carries the third largest burden of these infections, estimated at 38 million in 1999\(^4\). Honduras, in particular, is deficient in the resources and infrastructure necessary to provide sufficient education and services to its communities. Thus, the Honduran Health Alliance (HHA) was established to develop a composite of programs working with communities to improve reproductive health. This paper addresses the program and evaluation plan of one component of this larger program, that is, the clinical management of reproductive tract infections and educational components associated with the exclusion of HIV.
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Introduction

Environmental degradation and worsening poverty, morbidity, and mortality have historically been attributed to population growth beyond available resources and infrastructure. Supporters of this philosophy point out that women in developing countries have had higher fertility rates than in industrialized nations and as a result, attention has been placed on them to slow population growth. During the last ten years, however, it has been suggested that the true source of these growing negative trends in morbidity, mortality, poverty, and environmental degradation are lack of education, economic activities, and compromised women’s rights.

Demographers supporting this reasoning have revealed that when women become educated, empowered, and participants in their society they begin to control their fertility by their own choices and capacity. These women have higher rates of contraception use and smaller families. This pattern was recognized by the world leaders at the third conference on population and development in Cairo Egypt in 1994. Here, 184 governments agreed upon a declaration to move reproductive health from an after-thought in terms of policy, programming, and allocation of funding to the forefront of our social consciousness. The Cairo conference has become the watershed event for the empowerment of women globally and the recognition that reproductive rights are human rights. This event was landmark in that it recognized the role reproductive health and gender equity as a pathway to reducing global morbidity and mortality. Reproductive health programs are since positioned to contribute to meeting the
goals of the Cairo conference and the movements in global reproductive health that followed.

**Background**

**Honduran Health Alliance**

The Honduran Health Alliance is a program developed to address the reproductive health needs of women in rural communities of Honduras. The program was initiated in 2002 as a University of North Carolina at Chapel Hill medical student recognized the need for reproductive health services and education in several rural Honduran communities. The birth of the program then began with UNC medical students working in partnership with women living in these rural communities. Each year, as in the initial year, the program assesses the needs, beliefs, and patterns of behavior of these community members and works with community lay health promoters to provide education about these issues. General topics include family planning, cervical cancer, sexually and non-sexually transmitted diseases, reproductive anatomy, and nutrition. Additionally, medical students work with the district Ministry of Health, and international non-governmental organizations to provide clinical assessment, screening, treatment, and follow-up of a reproductive nature. This paper addresses the program and evaluation plan of one component of this larger program, that is, the clinical management of reproductive tract infections and educational components associated with the exclusion of HIV.
The Reproductive Tract Infection-related (RTI) components as well as the broader program, attempt to approach the communities as partners, sharing and developing the program with them and thus incorporating their cultural belief systems and dynamics. Ideally, this approach will provide a sense of ownership of the program by the communities that will allow it to sustain and grow while empowering the community and its members and building capacity. Additionally, this program seeks to contribute to meeting the goals of the Cairo conference and the movements in global reproductive health that followed.

A Need for a Program and Evaluation Plan

The overall goal of this program and evaluation plan is to create structure for a portion of an existing program, Honduran Health Alliance, in an effort to contribute to its effectiveness and sustainability. The clinical management and education of community members with respect to reproductive tract infections is the specific component of focus for this program and evaluation plan. This document will attempt to provide a greater understanding of the needs and challenges of rural Honduran communities with respect to RTIs and reproductive health in general, provide a review of the literature related to syndromic management of RTIs, and clearly lay out and illustrate how the program is and will be implemented and evaluated.
Honduras

Honduras is a lower-middle income country, according to the World Bank, with a per capita gross national income of $760 in 1999. Sixty-six percent of households were below the poverty line that year with 24% in extreme poverty defined as earning less than one dollar a day. Fifty five percent of Hondurans live in rural areas and typically have poorer reproductive health outcomes than those living in urban areas.

The use of modern contraceptive methods by married women in rural areas was 15% less than the corresponding prevalence in urban areas at 55% and 70% respectively for women 15-49 years of age. The prevalence of using any method of contraception among married women overall was 50%. The total fertility rate was estimated to be 3.72 when averaged across age distribution and region. The maternal mortality rate in Honduras was reportedly 220 per 100,000 live births in 2000. Epidemiologic data related to reproductive tract infections in Honduras are not readily available in the literature. The lack of accessible laboratories and modern “gold standard” diagnostic techniques may contribute to the paucity of this prevalence data.

The United Nations Population Fund (UNFPA) and other international agencies have been working with the Honduran government in, “seeking to harmonize population dynamics with sustainable development; promote reproductive health, including family planning and sexual health, and promote gender equality and equity, including equal socio-economic opportunities and the prevention of gender-based violence.” The UNFPA-sponsored programs are
developed in keeping with the human rights framework illustrated by the Cairo conference mentioned above. This agency, like others, develops program goals and targets that reflect the declarations made at the Cairo conference in an effort to contribute to the global movement of improving reproductive health.

Any progress made in Honduras with respect to reproductive health in the 1990s was undermined by the 1998 Hurricane Mitch disaster. The proportion of poor households increased from 63.1% in March 1998 to 65.9% in March 1999. Households headed by women have an average of 15-30% lower income than the average male-headed household. The UNFPA renewed its commitment to improving reproductive health in Honduras in 2002 as 8 million dollars of the total 12 million the UNFPA used for programming in Honduras was earmarked for reproductive health.

Lack of Modern Diagnostic Methods in Low-Resource Settings

In low-resource settings, such as the rural communities of Honduras, the cost and required resources prohibit the use of current diagnostic techniques for RTIs considered to be the gold standard. The “gold standard” is the most accurate and validated way to diagnose RTIs. For example, laboratory diagnostic techniques used for the detection of gonorrhea and chlamydia in urine and cervical specimens such as polymerase chain reaction, demonstrate sensitivities and specificities of 97-100%. Examples of these limited or unavailable resources include adequately trained staff, laboratory facilities and equipment, and appropriate storage. Additionally, appropriate conditions for transportation are
often unavailable. Where resources are limited but available, diagnosis is often delayed thus requiring multiple trips to the clinic or health outpost. This delay may also become a barrier to follow-up and adequate treatment when compared to management offered at the initial visit or point of care. Diagnosis of these RTIs often requires being sent out from the clinic for more complex diagnostic evaluation. Because these results are not available before the completion of the clinic visit, typically requiring 10-14 days, a return visit to the clinic is required. In rural or low-resource areas, patients are often required to travel long distances that involve transportation or traveling modalities that are often costly, tenuous, and unreliable and requiring further absence from work or from family. As a result of this dynamic patients often do not return for follow-up.

Countries that have the most limited resources for RTI screening, diagnosis, and treatment are often the same countries that have the greatest burden of disease. Approximately 30% of the Honduran population has no access to even basic health services. However, detailed demographic and epidemiologic data of the patterns and burden of reproductive disease in Honduras are limited. As mentioned above, the lack of readily available laboratories and modern “gold standard” diagnostic techniques may contribute to the dearth of this data.

**Introduction to Syndromic Management of RTIs**

The improvement of RTI control in resource-poor nations requires the development of cheap, reliable, non-invasive, and easy to use tests. Given the absence of these tests, a protocol of syndromic management has been developed.
A combination of symptom report, clinical judgment, algorithms, basic field-based microscopy and biochemical tests may provide adequate sensitivity and specificity to allow for diagnosis and management of RTIs in these resource-poor settings\textsuperscript{10}. Syndromic management follows the patterns of signs and symptoms consistent with the presence of certain RTIs or groups/classes of RTIs identified and illustrated by authorities such as the World Health Organization\textsuperscript{13}. These patterns or syndromes allow the provider to offer treatments that address the most common or most dangerous organisms known to cause this syndrome at the point of care\textsuperscript{11}. Algorithms or flowcharts of the major RTI syndromes for women have been developed by the WHO and others and usually include patterns of vaginal discharge, genital ulcer disease, and lower abdominal pain\textsuperscript{10}. These are often combined with the level of risk assessed using patients' history and in some cases have been fit into a system that provides a risk-score. The use of risk-scores may improve the quality of the syndromic approach\textsuperscript{10}.

The syndromic approach may provide management for symptomatic patients thus shortening the duration of infection and potential transmission time. Examples of the primary syndrome starting points for women include genital ulcers (Fig. 1) which follow patterns predictable for herpes, syphilis, chancroid, or lymphogranuloma venereum (LGV); lower abdominal pain may indicate upper reproductive tract infection or pelvic inflammatory disease; and finally, vaginal discharge (Fig. 2) may provide patterns revealing vaginal infections such as bacterial vaginosis, trichomonas, and candidiasis or cervical infections such as chlamydia and gonorrhea infections\textsuperscript{10}. Vaginal discharge is one of the most
common genital symptoms reported by women worldwide and as described below is the most troublesome symptom to follow by algorithm because it is often a normal phenomenon without disease or infection implications.\textsuperscript{10}

Patient complains of genital sore or ulcer

Examine

Ulcer present?

Yes

- Treat for syphilis and chancre
- Educate
- Counsel if needed
- Promote/provide condoms
- Partner management
- Advise to return in 7 days

Vesicular or recurrent lesion(s)

No

- Educate
- Counsel if needed
- Promote/provide condoms

Figure 1. Genital Ulcer Algorithm by the World Health Organization
Review of the Literature

In 2000, a well-designed systemic review of syndromic management was conducted by Pettifor et al\textsuperscript{10}. These authors evaluated 26 published and 10 unpublished studies primarily focusing on the effectiveness of the syndromic management of sexually transmitted infections\textsuperscript{10}. These authors evaluated the performance of algorithms for urethral discharge, genital ulcer disease, and vaginal discharge of which the latter two are of interest in this setting. This review revealed sensitivities for algorithms of genital ulcer disease, specifically syphilis and chancroid, to range from 72-100\%\textsuperscript{10}. The sensitivities revealed for algorithms of vaginal discharge range from 73-93\% among symptomatic women. In low-risk
populations, however, the positive predictive value (PPV) was estimated at 10% and thus reflects the potential for 90% over-treatment in these populations\textsuperscript{10}.

Additionally, the Pettifor et al. review considered the incorporation of risk score with algorithms for vaginal discharge. This method was assessed for its ability to detect chlamydia and gonorrhea in primarily low-risk populations. The range of sensitivities, specificities, and PPV revealed were 10-98%, 15-95%, and 5-48% respectively\textsuperscript{10}. The risk scores evaluated varied between sites and studies and included: age (<21, <25, 16-20), partner number and change, symptoms (VD, LAP, malodorous discharge, dysuria), partner symptoms, marital status, labs, habitation, contraceptive use, age of coital debut, douching before examination, belief partner is unfaithful, and partner age\textsuperscript{10}. Individual community assessment was emphasized by the authors with respect to tailoring risk appropriately per population.

The greatest observed validity and feasibility of identifying syndromes in women revealed by this review were those of genital ulcers\textsuperscript{10}. Syndromic management of vaginal discharge, in contrast, was problematic in low prevalence settings and in adolescent females in particular. Under these circumstances vaginal discharge may be much more likely to result from endogenous vaginitis rather than from communicable disease. Furthermore, vaginal discharge appeared to be a poor indicator of cervical infection. This approach, however flawed, was nevertheless considered by the authors to be the most cost-effective approach to vaginal discharge and cervical infections in settings without access to gold standard laboratory diagnostic techniques.
As mentioned above, the quality of syndromic management may improve by incorporating risk determinants and risk scores. The set of characteristics that indicate risk in one community, however, may be different from those in another community and thus illustrate the importance of needs assessment and community partnership. Key informants and focus groups have and may continue to be used to provide understanding of local terminology for symptoms, about beliefs concerning their causes, and about how they are approached. This inquiry, ideally, reveals the characteristics that indicate risk in rural communities of Honduras as it applies to this project.

Search Strategy

This review consisted of 6 articles identified through electronic searches of Medline. The search was limited to studies published during or after 1999 given the substantial information gleaned from the Pettifor et al. review. Searches were conducted using the following key phrase search terms: “Syndromic management sexually transmitted infections,” “Sexually transmitted infections low-resource settings,” “Sexually transmitted infections resource poor settings,” “Sexually transmitted infections developing countries,” “Sexually transmitted infections point of care,” “Syndromic management STI low-resource setting,” “Syndromic management STI resource poor setting,” and “Syndromic management STI developing countries” the bibliographies that were obtained provided additional references. Articles primarily concerned with HIV or AIDS or the study of male patients were eliminated for the purpose of this review as were
Effectiveness of Syndromic Management

George et al. assessed vaginal discharge as a marker for STIs in Tamilnadu, India\(^{14}\). The prevalence of RTIs in Tamilnadu estimated prior to the study was approximately 5%. The study was population-based with a total of 1,157 participants. The investigators used the "probability proportional to size" (PPS) method to select households in which the quality of the syndromic management of vaginal discharge would be assessed. As already mentioned, the performance of vaginal discharge syndromes in low prevalence settings has been reported to be low and is ultimately supported by the findings of this study. Compared to the microbiological methods used as the gold standard, sensitivity, specificity, positive predictive value, and negative predictive value for vaginal discharge syndromes as an indicator of RTI were found to be 43.3%, 61.6%, 10.7%, and 91.1% respectively\(^{14}\). The PPV indicates that approximately 90% of participants in this study would have been over treated if determined by syndromic algorithms alone. Additionally, 57% of women with an RTI had no symptoms or signs of infection and would have gone untreated by the sole use of syndromic management. The demographic data of the study participants provided by the authors was sparse thus limiting the external validity of the study. Furthermore, the authors do not report any indicators of the precision of their
point estimate, confidence intervals or P-values, thus preventing the reader from investing full confidence into the findings of their study.

A study by Hawkes et al. in Matlab, Bangladesh further supports the poor performance of vaginal discharge syndromes as an indicator of STI in low prevalence settings\textsuperscript{15}. The setting of this study was a maternal child health/family planning clinic in a rural area of Matlab providing free care for married women of which 320 participated. Here, vaginal discharge was one of the most common complaints of reproductive age women. This study, like the previous study described, compared the performance of syndromic management to gold standard laboratory diagnosis of RTIs. In this setting the sensitivity for syndromic detection of cervical infection, in particular, was approximately 100\% while the specificity was approximately 56\% thus resulting in a large population of women who would have been over-treated\textsuperscript{15}. The use of the syndromic algorithm in this study would “waste” one U.S. dollar on each symptomatic woman according to the authors. These financial dynamics are particularly concerning in this setting because the Bangladesh government at the time of the study only spent four U.S. dollars per person annually on health care\textsuperscript{15}.

The WHO recommends the incorporation of risk assessment to increase the sensitivity and specificity of algorithms with local adaptation as appropriate\textsuperscript{13}. In the Bangladeshi Hawkes et al. study, “adaptation” of risk assessment was made due to concerns for cultural appropriateness. These adaptations, however, were not clearly reported thus limiting our understanding the role risk assessment did or
did not contribute to the point-of-care syndromic management of vaginal discharge in this setting.

Local adaptation of risk assessment is likely necessary and common in many settings due to varying sociocultural dynamics. As mentioned above, the quality of syndromic management may be improved by incorporating risk determinants and risk scores per collaborators from the WHO\textsuperscript{13}. Risk factors described in the literature, however, are specific and most valid for the population in which they were identified and assessed and are not easily transferable to other populations and cultures. The set of characteristics that indicate risk in one community may be different from those in another community and thus illustrate the importance of needs assessment and community partnership. Key informants and focus groups may be used to provide understanding of local terminology for symptoms, about beliefs concerning their causes, and about how they are approached in individual communities.

Several limitations were inherent to the Hawkes et al. study. Laboratory results were not available for all women due to "occasional" shortage of reagents and the detail regarding quantity or proportion of women for whom reagent was not available was not reported by the authors thus making the interpretation of results more difficult\textsuperscript{15}. Additionally, no calculations or estimations of the cost of missed diagnosis and resulting spread of infection, increased risk of HIV acquisition, and subsequent morbidity was assessed in the portion of the study commenting on cost. Finally, as mentioned above, adaptation of risk assessment was made for this population but this adaptation was not clearly illustrated.
Kaufman et al. evaluated the effectiveness of field-based methods for RTI diagnosis. The study was population-based and had a total of 1,157 participants. Diagnostic methods used in this investigation include the identification of syndromes in conjunction with simple field microscopy and basic biochemical tests in two rural counties of Yunnan Province, China. This was performed by comparing this diagnostic approach to gold standard methods. The basic biochemical tests included the use of pH paper, KOH staining, and leukocyte esterase dipstick. Wet mount microscopy was an additional in-clinic measure used in this evaluation.

The most prevalent RTI among participants was candida at 20%, followed by trichomonas at 16%. The prevalence of chlamydia and gonorrhea infection was 6% and 0.3%, respectively. Forty-nine percent of all of the women tested had none of the 5 infections assessed, 42% had one infection, 9% had two infections, and <1% had more than two concurrent infections.

The self-reporting of symptoms as a diagnostic method revealed a low sensitivity and specificity. A range of 42 to 100% of cases would be missed using symptomatology alone. The clinical exam provided greater accuracy than the use of symptoms alone, but with great variability of sensitivity of clinical signs from 10-89%. The clinic-based tests were particularly poor for gonorrhea and chlamydia detection. These methods of diagnosis were not assessed collectively. The use of these methods in combination would have likely increased their ability to detect RTIs.
The rural setting of the study may have contributed to several limitations. The importation of important supplies to the central laboratory was compromised on several occasions with respect to chlamydial diagnostic test; the authors do not further illuminate how this may have affected the validity of the study\textsuperscript{16}. Additionally, the authors report that a number of specimens collected for chlamydia analysis dried out or were otherwise damaged in transport to the central laboratory.

The study may have overestimated the prevalence of bacterial vaginosis by the use of their diagnostic methods at the central laboratory. The organism generally responsible for bacterial vaginosis, \textit{Gardnerella vaginalis}, is a normal part of the vaginal flora but becomes pathologic with overgrowth. The growth of this organism in culture was used in this study as the gold standard diagnosis for bacterial vaginosis\textsuperscript{16}. The presence of this organism in culture, however, does not distinguish between normal and abnormal growth and thus likely substantially overestimates the diagnosis of bacterial vaginosis by the central laboratory. Furthermore, the local research team did not know the collection of separate samples for BV and gonorrhea diagnosis was necessary. As a whole these measurement issues may substantially limit the internal validity of the study.
Table 1. Summary of studies evaluating the effectiveness vaginal discharge algorithms for the detection of cervical infection.

<table>
<thead>
<tr>
<th>Author</th>
<th>Location</th>
<th>Population type</th>
<th>Method</th>
<th>n</th>
<th>Comparison test</th>
<th>Sensitivity/Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>George et al.</td>
<td>Tamilnadu, India</td>
<td>Population-based (rural)</td>
<td>Algorithm using risk assessment and examination</td>
<td>1,157</td>
<td>Culture, microscopy, serology, PCR</td>
<td>43.3 / 61.6 / 10.7</td>
</tr>
<tr>
<td>Hawkes et al.</td>
<td>Matlab, Bangladesh</td>
<td>MCH/ FP clinic</td>
<td>WHO algorithm or adapted algorithms using speculum and simple Dx tests</td>
<td>320</td>
<td>Culture, microscopy, gram stain, serology, PCR</td>
<td>100 / 3 / 56 / 2</td>
</tr>
<tr>
<td>Kaufman et al.</td>
<td>Yunnan Province, China</td>
<td>Population-based (rural)</td>
<td>Self-reported symptoms</td>
<td>1,153</td>
<td>Culture, microscopy, gram stain, EIA</td>
<td>29 / 70 / 5</td>
</tr>
</tbody>
</table>

MCH = maternal child health
FP = family planning
VD = vaginal discharge
PPV = positive predictive value
PCR = polymerase chain reaction
EIA = Enzyme Immunosorbent Assay

Of note, the 3 effectiveness studies captured by this search and subsequent review reflect what are traditionally thought of as “low-risk groups” and predictable low-prevalence groups. Populations from antenatal, maternal child health, and family planning clinics are historically considered at low-risk for RTIs. In contrast, populations generally considered to be “high-risk” frequent STD and sex worker clinics. This restriction in population captured by the review, however, may be appropriate given the population for which it is meant to apply, the rural communities of Honduras. Most women in Honduran rural communities are married and thus typically considered low-risk for STIs. However, as the trend toward urbanization continues and the sustainability of subsistence farming wanes more men in the communities are migrating for work. There are a plethora of
examples in the literature that illustrate the risk of extramarital sexual relationships with migrating populations. Thus the phenomena of migration for employment by men in the community may eventually elevate the risk and prevalence of RTIs in these communities but currently the baseline risk is likely to be low.

Finally, it is worth noting that the positive predictive value of a test or diagnostic method shifts with the prevalence of disease in the population being studied. As the prevalence of disease in a population increases the positive predictive value follows and vice versa, therefore, the effectiveness of syndromic management revealed by these low-risk, low-prevalence studies likely represent the lower end of syndromic management quality. Given the paucity of epidemiologic data in these communities and in Honduras, in general, we can expect at least this effectiveness.

Cost-effectiveness of Syndromic Management

Sahin-Hodoglugil et al. assessed the cost-effectiveness of syndromic management, gold standard laboratory diagnosis, and mass treatment in the management of cervical infections with gonorrhea and chlamydia. The gold standard, as mentioned above, is the most accurate and reliable way to diagnose RTIs and is through laboratory diagnostic techniques such as polymerase chain reaction detection of gonorrhea and chlamydia in urine and cervical specimens. The cost and resources required for this approach, however, is prohibitive in most resource-poor settings. Consistent with previously described studies, vaginal
discharge is the most problematic of syndromic protocols with sensitivities ranging from 23-96% and specificities from 34-84% and with the quality increasing with RTI prevalence. Finally, when mass treatment is used it may be community wide or targeted. Although mass treatment covers those with asymptomatic infections there is concern for growing drug resistance of microorganisms.

This study performed a sensitivity analysis followed by a decision tree analysis of vaginal discharge syndromes and cervical infections using three models and corresponding probabilities as determined by review of the literature. These probabilities were later placed into a hypothetical model of 1 million women in Africa. Ten thousand “Monte Carlo simulations” were run to test the robustness of cost-effectiveness estimates to changes in underlying assumptions and to determine the major factors that influence cost and effectiveness of each strategy. This model required the consideration of the probability of infection, probability of symptoms, probability of seeking care in women with and without symptoms, probability of diagnosis, type of medication used, and finally the cure rates of the medications used. The authors recognize, however, that “No single protocol carries with it all the desired conditions of an optimal cost-effectiveness program. The treatment-seeking behavior, STD prevalence, and coverage of each locale must be evaluated to determine the most cost-effective and highest impact program.”

Gonorrhea and chlamydia are responsible for almost half of the 333 million new curable STIs occurring annually worldwide among men and women
aged 15 to 49 years. As mentioned earlier, the highest STI prevalence in the world is found in Sub-Saharan Africa with an annual incidence rate of 11-35% of curable STIs. This is also the area where world’s most severe HIV epidemic is observed. Thus, our inability to accurately and consistently diagnose and manage these cases based on syndromes of vaginal discharge or other approaches in the limited resources of this environment is particularly disturbing.

According to the Sahin-Hodoglugil et al. model the total cost of syndromic management is the lowest of those compared but also carries the lowest impact at approximately 40% cure of all positive cases. Syndromic management, however, also has low programmatic costs and greater ease of implementation. Quality, or sensitivity and specificity, of this approach vary with prevalence of infection as well as inclusion of additional of risk assessment or scoring system, and the performance of providers recognizing signs and symptoms as mentioned above.

The model estimated the impact for the gold standard laboratory approach at approximately 48% cure rate. Whereas mass treatment provided the greatest impact at a cure rate of 80-86% and appeared to be the most cost effective. Coupled with this approach, however, is the threat of resistance by target microbes and non-target microbes such as E.coli, Salmonella, and Shigella species.

The Sahin-Hodoglugil et al. study did not consider the cost related to partner notification and treatment, re-infection, or complications/sequelae in the mathematical model. Additionally, the authors report being generous with
respect to the numerical probability of seeking health-care included in the model. The estimation of probabilities mined by the literature, in general, may vary largely from those in actual communities of interest and the authors note that this-type of analysis would be best used on a case-by-case basis considering the uniqueness of the programs and communities it is assessing. Finally, these authors along with several agencies and authorities continue to support the protocols of both syndromic management and mass treatment in selected cases. The lack of a more efficient or better quality approach has yet to reveal itself to the research or medical community thus leaving providers in these resource-poor communities to rely on the advantages of these protocols.

Although point-of-care testing such as syndromic management is less reliable than gold standard tests, treatment at the initial visit and the aversion of further transmission must be also be considered when weighing test characteristics. Vickerman et al. uses a mathematical model to estimate the sensitivity required of point-of-care tests that “ensures” as many STIs are averted as with current gold standard tests\(^\text{11}\). When evaluating point-of-care management of chlamydia and gonorrhea in comparison to other approaches, the likelihood of increased transmission from both delay of treatment as well as complete absence of follow-up was considered. Over time even “suboptimal” point-of-care management could have “public health value” when considering the paucity of other solutions and the probability of loss to follow-up. The follow-up or return rate coupled with the likelihood of further transmission during the delay shape the sensitivity requirements of point-of-care testing\(^\text{11}\).
One must consider the dynamics between the benefit of treating asymptomatic infections, preventing subsequent morbidity and further transmission, as well as the risks incurred by those who are unnecessarily treated. Over treatment may result in both unnecessary financial and even social consequences such as increased risk of domestic violence. The results of this model, however, support the use of the syndromic approach (a form of POC testing) in developing countries given the likelihood of a low follow-up rate. These conclusions are contrary to other studies because loss of follow-up is seldom considered although its influence on burden of disease in the population has the potential to be substantial\textsuperscript{11}.

Overall, the trend has it that for vaginal discharge, in particular, the effectiveness of Syndromic management is not ideal. Improvement of RTI control in resource-poor nations/ settings requires the development of cheap, reliable, non-invasive, and easy to use tests and would reduce the false positives and over treatment inherent in the syndromic approach. The development of these methods should be made priority given the lack of these options currently, however, RTI programs are encouraged to use the syndromic approach and continue to work with local communities to assess their unique dynamics with respect to risk in an effort maximize the quality of this form of management.
Program Plan

Rationale for the development of Honduras Health Alliance RTI Education and Clinical Management Program

Reproductive tract infections (RTIs) are recognized as a major cause of reproductive morbidity in developing countries\(^{13}\). These infections may be sexually or non-sexually transmitted and include trichomonas, candida, bacterial vaginosis, chlamydia, gonorrhea, syphilis, chancroid, and genital herpes. HIV is also a major source of sexually transmitted morbidity and mortality in developing countries but will not be the focus in this program. Untreated reproductive tract infections may lead to a whole host of problems including pelvic inflammatory disease, ectopic pregnancy, infertility, fetal loss, neonatal and infant infections, premature death, and increased risk of HIV transmission\(^{13}\).

There appear to be insufficient resources, lack of funding and services, for reproductive health education and management for women in rural Honduran communities. Resources for general health are also limited and available to only 64% of Hondurans while those living in rural communities have even greater limitations\(^{18}\). The paucity of resources and infrastructure for reproductive health in particular is reflected in the lay person’s knowledge of reproductive health and disease. For example, in 2001 only 13% of women had heard of Chlamydia in southwestern Honduras, and only 24% had heard of genital herpes\(^{18}\). In contrast, HIV/AIDS education interventions and efforts have been successful as reflected by the reported 99% of southwestern Honduran women having heard of AIDS. Finally, there have been reports of declining trends in knowledge of reproductive
health in disease as evidenced by reported recognition of syphilis and gonorrhea in 1996 of 54% to 45% respectively compared to 52% to 28% in 2001\textsuperscript{18}.

**Needs Assessment**

The need for reproductive health care and education in six rural communities Guasale, Espabeles, Guanacaste, Potreritos, Los Torreros, and Papalon, in particular, was initially assessed by a UNC Chapel Hill medical student in 2002. This in-the-field assessment was initially informal with one-on-one interviews with community women and larger meetings of women’s groups through *Amas de Casas* (Women of the House)\textsuperscript{19}. The following summer a more formal needs assessment was conducted following the Asset Model. The Asset model emphasizes the strengths, assets, abilities, and resources available in a community thus identifying and then supporting and augmenting these inherent resources in the development of interventions\textsuperscript{20}. During this assessment surveys were used to estimate the knowledge possessed by women in these communities with respect to reproductive health, behaviors, and attitudes as well as community access to reproductive health-related information and clinical evaluation and services\textsuperscript{19}. During this later evaluation focus groups were also used as an assessment tool. These assessments have not been completely analyzed and interpreted at this time. The initial analysis of these assessments, however, reveals limited RTI and safe sexual behavior knowledge and limited access to this information\textsuperscript{19}. Furthermore, clinical evaluation was not readily available and where present did not provide current gold standard diagnostic methods for RTIs.
The lack of modern diagnostic methods thus limited the assessment to indirect measures of reproductive health rather than epidemiologic measures.

The Honduran Health Alliance thus aims to fulfill the need for improved RTI education and safe sexual behavior knowledge in these communities and provide annual clinical evaluation and management through the comprehensive approach of Syndromic management.

Program mission: The RTI education and clinical management project of the Honduran Health Alliance is committed to improving reproductive health status by 1) increasing community education in reproductive health and disease 2) improving access to reproductive health-related information, and 3) providing relative clinical assessment in 6 rural Honduran communities. HHA is collaborating with community members, Honduran lay health workers, and the United Communities to:

- Promote safer sexual behaviors among community members
- Promote health care-seeking behavior by providing a basic understanding of reproductive anatomy and RTI sign and symptom recognition
- Participate in the development of a community environment that facilitates access to further health education and information
- Provide comprehensive management of RTIs

Stakeholder & Suggested program activities: The HHA was initiated as a grassroots program by University of North Carolina medical students in 2002 and has since established a coalition of stakeholders. The technical feasibility of the program has undergone two successful pilots in Honduras. These pilots have
helped to illustrate what works best in practice and what the challenges are to implementing a successful program. Ultimately, the program hopes to build efficiency and competence with each year to enhance the sustainability.

Stakeholders include rural Honduran community members, lay health workers, and the United Communities cooperative as well as UNC participating medical students and their faculty preceptors. The program will use a combination of educational strategies and clinical interventions to promote greater reproductive health, safer sexual behaviors, and health care-seeking behaviors. The program aims to align itself with the major international movements in reproductive health and development and the human rights approach that is promoted by these movements.

Underlying these efforts are guidelines and recommendations provided by the World Health Organization, Family Health International, and a whole host of other non-governmental organization promoting reproductive health and initiating programs globally. These organizations illustrate both individual and population-level approaches to STD prevention. They propose that 1) reducing the rate of exposure 2) reducing the efficiency of transmission and 3) shortening the duration of infectivity contributes to STD prevention. For example, on an individual level, promoting the avoidance of risky sexual behaviors / fewer sex partners and condom-use contributes to a reduction in exposure and efficiency of transmission, respectively. Whereas, promoting health-care seeking behaviors, avoiding sex until cured, and partner notification contribute to shortening the duration of infectivity.
HHA has and will use these recommendations in the following activities:

- Work with university faculty and affiliates to provide background education necessary for participating medical students

- Provide annual workshops, Charlas, for community members about safe sexual behaviors and practices, about signs and symptoms of RTIs, and about a plan of action to follow if these exist

- Provide annual workshops, Charlas, to lay health promoters of the content mentioned above as well as teaching tips and techniques that will facilitate their ability to disseminate this information to their respective communities thus improving community access to information year-round

- Provide annual clinical evaluation to women in these rural communities following the comprehensive approach of Syndromic Case Management

**Program context**

The implementation of the HHA reproductive health programs may benefit from the sociopolitical momentum provided by current programs and movements in reproductive health globally, particularly with respect to low-resource settings. Global reproductive movements are often initiated in the wake of international conferences and the goals and priorities in reproductive health developed there in consensus with the attending nations. Landmark conferences include the International Conference on Population and Development in Cairo, Egypt; the United Nations 4th World Conference on Women in Beijing, China; the Millennium Development Goals; and the Reproductive Health Strategies of the 57th World Health Assembly\(^6,22,23,24\). Additionally, there are a multitude of models for reproductive health programs in developing countries that are adaptable to specific local environments. These models and movements may aid in strengthening the trust and confidence of supporting agencies.
**Political context:** Honduras is a predominately Catholic country that has undergone the ebb and flow of papal movements with respect to the social involvement of the church. As evidenced by growing trends in contraceptive use, however, this conservative setting does not necessarily prevent progress toward improving reproductive health in Honduras. As noted earlier in this manuscript, the UNFPA has received governmental support in their family planning efforts reassuring the potential efficacy of promoting condom use, and addressing adolescent sexual health and education inherent in this program in a historically conservative climate.

**Local priorities:** Locally, a cooperative of seven communities in Choluteca comprise the *Comunidades Unidas* (United Communities). Since its inception the United Communities (CU) has fostered communication between the local pueblos and has advocated for the development of roads and latrines in the communities. Further infrastructure developments of interest to the United Communities are ensuring potable water, sanitation, and basic health care. An early alliance was formed between the CU and North Carolina through the Episcopal Diocese. It is through this connection that the HHA developed a relationship with a local Honduran representative to coordinate its efforts.

**Local Health System:** Two of the communities of interest have publicly funded clinics, *Centros de Salud*, which are staffed by nurses and offer basic medical services and supplies. A hospital is present in the city of Choluteca which resides up to 40 kilometers from these communities. Reliable transportation modalities are not readily available somewhat complicating accessibility.
volunteer lay health worker or health promoter is present in each community who receives cursory training via the efforts of religious organizations in basic medicine and hygiene to be shared with their respective communities\textsuperscript{19}.

\textbf{Acceptability to the recipients:} The peripheral association with the Episcopal diocese may increase community participation and approval given the religious propensities of Honduran culture as well as cultural trends that trust and respect the medical community. Additionally, the HHA will involve community members at every level of program planning and implementation in an effort to maximize participation and ultimate investment.

\textbf{Potential funding sources:} It is necessary to secure funding sources annually due to the absence of longstanding resources. The program framework, however, utilizes the efforts of volunteers and thus minimizes cost. Volunteers include a minimum of twelve medical students per year, two clinical preceptors, lecturers for medical student background education, and representatives from the United Communities. Furthermore, the Honduran International Planned Parenthood affiliate, Ashonplafa (Asociación Hondureña de Planificación de la Familia), and the UNC-based Medworld organization contributes to the program by providing many clinical supplies and equipment for \textit{Charlas} for free or at a reduced cost.

\textbf{Potential challenges:} Measurement issues for assessing outcomes and thus program success may create challenges in fulfilling funding agency criteria. The lack of direct measures of need and of progress due to the lack of gold standard laboratory tests may compromise the meeting of criteria set by many funding
agencies. Additionally, consistency with the community’s interests and priorities may be challenging because the immediate needs of food, shelter, etc may be more pronounced in these rural communities and thus may compete with reproductive health needs of community members.

Working with community members in the development and progression of the program has and will likely continue to ensure acceptability of the program by the recipients. Potential challenges continue to exist, however, as a large portion of program partners share differing cultural and historical background. Therefore, all participants are encouraged to demonstrate cultural sensitivity and culturally appropriate behavior at every step of implementation. Finally, geography may pose as an additional challenge as the implementation of the intervention primarily resides in a country far from where a significant portion of the plan was derived. Thus it is imperative to actively communicate with CU representatives throughout annual planning and to carefully analyze annual assessments made in the field.

**Goals and Objectives**

**Goal:** In an effort to improve overall reproductive health status of community members we will attempt 1) to improve the reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors, in reproductive-aged individuals of 6 rural communities in southern Honduras 2) to improve access to this information in these communities via the
training of lay health promoters and 3) to provide annual clinical management of
RTIs through the Syndromic approach in women.

**Short-term objectives:**

1) Within one year, community surveys assessing community member & lay
health promoter RTI and safe sexual behaviors knowledge base will be
valid and reliable.

2) Within one year, the HHA will have gained substantial structure in the
framework of its programs and interventions in an effort to ensure
sustainability.

3) Within two years, the clinical management portion of HHA programs will
be effectively structured and perform efficiently.

4) Within two years, there will be measurable changes in reproductive health
knowledge, attitudes, and behaviors particularly with respect to RTIs and
safe sexual behaviors in community members & lay health promoters.

**Long-term objectives:**

1) Within five years, there will be measurable changes in reproductive health
knowledge, attitudes, and behaviors particularly with respect to RTIs and
safe sexual behaviors in community members & lay health promoters.

2) Within five years, there will be improved community access to education
and information about reproductive health and disease via well-trained lay
health promoters.

3) Within seven years, there will be measurable changes in the clinically
documented cases of RTIs diagnosed via the Syndromic approach.

4) Within seven years there will be improved overall reproductive health
status in the communities.
**HHA RTI Education and Clinical Management Program LOGIC MODEL**

<table>
<thead>
<tr>
<th>Resources</th>
<th>Activities</th>
<th>Outputs</th>
<th>Short &amp; long-term outcomes</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>In order to accomplish our set of activities, we will need the following:</td>
<td>In order to address our problem we will conduct the following activities:</td>
<td>We expect that once completed or underway these activities will produce the following evidence of service delivery:</td>
<td>We expect that if ongoing, these activities will lead to the following changes in 1-3 then 4-6 years:</td>
<td>We expect that if completed these activities will lead to the following changes in 7-10 years:</td>
</tr>
</tbody>
</table>

- Funding
- Staff
- Relationship with UNC partners (elective preceptor, administrators, teaching and clinical faculty)
- Best practices from established programs (WHO, JPHEIGO, FHI)
- Survey data
- Sociopolitical momentum provided by current programs and movements in reproductive health globally, particularly with respect to low-resource settings

**Educational activities**
- Provide annual workshops, **Charlas**, for community members about safe sexual behaviors and practices, about signs and symptoms of RTIs, and about a plan of action to follow if these exist
- Provide annual workshops, **Charlas**, to lay health promoters of the content mentioned above as well as teaching tips and techniques that will facilitate their ability to disseminate this information to their respective communities thus improving community access to information year-round

**Clinical activities**
- Provide annual clinical evaluation to women in these rural communities following the comprehensive approach of Syndromic Case Management

**Outputs**
- Measurable changes in community understanding of reproductive health and disease including safe sexual behaviors and health care-seeking behavior
- Measurable clinical changes in reproductive health in community women
- Tracking epidemiologic changes in RTI incidence or prevalence is not technically feasible currently due to the limitations in available laboratory facilities and diagnostic methods

**Short-term**
- Community surveys assessing community member and community health promoter RTI and safe sexual behaviors knowledge base will be fortified and reliable
- The HHA will have gained substantial structure in the framework of its programs and interventions.

**Long-term**
- Measurable improvement in RTI and safe sexual behaviors knowledge base in community members
- Measurable improvement in the RTI and safe sexual behaviors knowledge base in community health promoters
- Measurable clinical changes in reproductive health in community women
- Improved community understanding of reproductive health and disease including health sexual behaviors and health care-seeking behavior
- Improved community access to education and information about reproductive health and disease via well trained lay health promoters
- Improved reproductive health in community women as assessed clinically by Syndromic Management
- Dissemination of reproductive health education and information to neighboring communities and future generations
- Improved community capacitance
Application of program theories

Ecology is the interrelationship between organisms and their environment. An ecological model of health behavior and health promotion takes into account the physical environment and its relationship to people at individual, interpersonal, and community level. Thus the many dimensions that influence behavior are considered. We will attempt to adopt this comprehensive approach as our program activities and strategies include individual and community and the interpersonal relationships that connect them. The following theories provide an additional framework for which we will attempt to inspire and implement change. There are a whole host of program theories that are appropriate for our plan, the following; however, are the primary ones.

Individual level change:

The Health Belief Model (HBM) acknowledges beliefs and attitudes that when addressed may motivate an individual to adopt preventive behaviors. In general, these beliefs include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. The use of this model may be particularly appropriate for RTI prevention programs in which knowledge, attitudes, and behaviors are the cornerstone of prevention and ultimately declining disease and improving reproductive health status.

Each individual has their own perception of the likelihood of experiencing a condition or disease and the accompanying effects they will have, that is, perceived susceptibility and seriousness, respectively. As illustrated earlier in this
paper, many women in rural communities of Honduras have never heard of many RTIs thus limiting their perceived susceptibility and seriousness of RTIs. Therefore, improving their base-line knowledge of existence of many RTI and their transmission patterns may profoundly impact their preventive behaviors. Additionally, promoting understanding of potential complications or sequelae of RTIs, or their seriousness, may further inspire the adoption of preventive behaviors. Furthermore, education in symptom recognition and available treatment may further augment ones perceived benefits and perceived barriers of taking action, cues to action, and self-efficacy.

Community-level Change

The community organization theory utilizes empowerment building to stimulate problem solving and activate community confidence and skill to solve problems effectively. By training promoters in reproductive tract infection prevention strategies and the signs and symptoms of RTIs coupled with the appropriate action to take for suspected infections we hope to contribute to community empowerment. Ideally, these interventions will create and/or strengthen a community resource, the lay health promoters, which will contribute to citizen activation, problem solving, and ultimately community confidence.
Implementation plan

Program goal
To improve the knowledge base of reproductive health, particularly with respect to RTIs and sexual behaviors, in reproductive-aged individuals of 6 rural communities in southern Honduras, and to provide annual clinical management of RTIs through the Syndromic approach in women, thereby reducing the RTI-related morbidity among community members.

Key objectives:
- Improve RTI and safe sexual behaviors knowledge base and health care-seeking in community members
- Improve access to education and information about reproductive health and disease for community members
- Improve RTI and safe sexual behaviors knowledge base in community health promoters
- Improve RTI-related morbidity in community members

Initial strategies

Educational activities
- Work with coalition to develop appropriate curricula for medical student background information and Charla participation
- Work with coalition to develop culturally appropriate curricula for reproductive health and sexual behavior Charlas
- Work with coalition to improve RTI and safe sexual behaviors knowledge base and health care-seeking in community members through annual Charlas
- Work with coalition to improve RTI and safe sexual behaviors knowledge base in community health promoters members through annual Charlas

Clinical activities
- Work with coalition to arrange annual comprehensive clinical management and follow-up of RTIs through the Syndromic approach
Honduran Health Alliance
RTI education and clinical management project

*Abbreviated Annual Administrative Timeline*

<table>
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<tr>
<th>Activity</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
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## Abbreviated “in-field” timeline

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<th>Thurs</th>
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<td>Tue-prep</td>
<td>To El Corpus</td>
<td>Leave for communities &amp; annual assessments</td>
<td>Community Charles &amp; annual assessments</td>
<td>Community Charles &amp; annual assessments</td>
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<td>Ashonplafa-Choluteca</td>
<td>Leave for community follow-up</td>
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<td>Return to El Corpus</td>
<td>Debrief in El Corpus</td>
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Daw 40
### Overview of resource needs

#### HHA RTI education & clinical management program

<table>
<thead>
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<th>Educational Supplies:</th>
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<tr>
<td>Orientation Course Packet Production</td>
<td>$20 per packet</td>
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<tr>
<td>Materials for In-Country Workshops</td>
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<td>Info Packets for Community Health Educators</td>
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<td>Pelvic Training for MS1s by WHEC</td>
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<td>Microscope</td>
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<td>Exam Tables (2)</td>
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<td>Slides &amp; covers</td>
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<tr>
<td>Phone Calls (Domestic &amp; International)</td>
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<th>Preceptors (2):</th>
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<tr>
<td>Travel</td>
<td>$700 per person</td>
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<tr>
<td>Food/Lodging/Transport (1wk/person)</td>
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<td>$210</td>
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<table>
<thead>
<tr>
<th>Students (12):</th>
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<tbody>
<tr>
<td>Travel (roundtrip airfare)</td>
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<td>$8,400</td>
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<tr>
<td>Food, Lodging &amp; Transport ($15/day plus cultural activities)</td>
<td>$458 per student</td>
<td>$5496</td>
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**Total**                                     |  | **$22,006** |
HHA RTI Education & Clinical Management Program Evaluation Plan

Evaluation Overview

Program evaluation will enable the HHA to assess the degree to which it is meeting its objectives and provide direction for ways in which the program can improve. A well planned, comprehensive evaluation will reveal in detail whether the RTI Education and Clinical Management program of the HHA will improve community understanding of reproductive health and disease including healthy sexual behaviors and health care-seeking behavior, improve community access to education and information about reproductive health and disease via well trained lay health promoters, and finally, improve reproductive health in community women.

The evaluation plan will be developed in parallel with the plan of the program in an effort to ensure a well-ordered process of assessing appropriateness for stakeholders, efficiency of resource-use, effectiveness of interventions, and impact on the community. The evaluation will be designed to reveal the knowledge, attitudes, and behaviors of community members and participants with respect to the program focus and illustrate any outcomes that were not initially intended in the development of the program. In essence, the implementation or the process in which the activities were carried out will be assessed as well as the outcome or the degree to which these activities led to the changes intended in the program development.

An internal evaluator or program participant will carry out major portions of the evaluation. This internal evaluation will be most appropriate, for example,
with the implementation of educational interventions. Those presenting *Charlas* may be best suited to assess the efficiency in which they were delivered and any improvement in the participant’s receptiveness to these sessions. Additionally, internal evaluators may be appropriate for assessing implementation of clinical interventions, as the efficiency of the delivery of these particular interventions will be most obvious to them. Furthermore, allowing the coalition to evaluate themselves may assess the efficiency in which all voices and concerns are heard and addressed in carrying out the program.

Ultimately, external evaluation will be necessary to provide evidence of program effectiveness that will allow the program to be accountable to funding agencies. This type of assessment may contribute to the recruitment of a long-term funding source. Additionally, this level of assessment may provide assurance to other communities in which this program may be introduced either locally or abroad as the HHA seeks to participate in the global movements in reproductive health.

**Evaluation Design and Methods**

The logic model developed by the HHA in the program planning was designed to provide a straightforward way of tracking the flow of implementation and outcomes. Multi-dimensional strategies and activities were developed by the HHA to educate community members and lay health promoters about safe sexual behaviors and health care-seeking behaviors and to provide annual clinical management of RTIs via the Syndromic approach. These approaches are thus most appropriately evaluated through a variety of assessment tools including both
qualitative and quantitative methods, and observational as well as quasi-experimental study design.

Short-term evaluation will focus on strengthening assessment tools and assessing the implementation process, that is, the context, activities, outputs, and modes of program improvement. For example, this evaluation will address whether the assessment tools use language common to our target audience coupled with a culturally appropriate delivery. Long-term evaluation will focus on the degree to which the intended outcomes and impact of the program are being realized, or the extent to which reproductive health knowledge base has broadened and reproductive morbidity has been reduced in community members.

General Study Design
The short-term, primarily implementation portion of the evaluation, lends itself most appropriately to observational design and both qualitative and quantitative methods. The long-term evaluation will also utilize both qualitative and quantitative methods. This largely outcome portion of the evaluation, however, will also follow quasi-experimental design using such methods as community-level pre/post surveys.

Study Methods

Short-term Implementation Evaluation
Formation of assessment tools: Open-ended interviews with key informants and focus groups with community members have and may continue to be used to provide understanding of local terminology for reproductive tract symptoms,
about beliefs and behaviors associated, and about how they are generally approached by the individual. This information has and will further illustrate the context in which the program is seated and allow educational interventions to be more effectively designed and delivered. Ultimately, this information may aid in the development of appropriate assessment tools. For example, survey material may be developed that will most appropriately capture our data of interest by limiting misinterpretation by community members or number of non-responders.

Program organization / structure: The structure and clarity of the program framework will be assessed in an effort to demonstrate program sustainability by reviewing documents provided by program directors and conducting open-ended interviews with them. A well-ordered framework and clear administrative roles are particularly important for this program given the turnover of medical student participants.

On-going community assessment: The appropriateness of curricula, adequacy of structure, and effectiveness of Charla delivery will be assessed by open-ended interviews, surveys, and focus groups of community members and lay health promoters. These surveys will provide a baseline point for community-level pre/post surveys that will assess the effectiveness of the interventions on knowledge, attitudes, and behaviors with respect to RTI-related reproductive health and self-reported reproductive health status and access to RTI-relevant
information. In essence, this assessment will serve as an ongoing community assessment tool of our outcomes of interest.

*Clinical implementation:* The implementation of the clinical portion of this program will be assessed primarily by document review and open-ended interviews with clinicians and program directors. These documents will provide assurance that clinicians are trained in Syndromic management, and that records are completed in a way that assures patient privacy and promote ease of follow-up and continuity of care. Program directors and clinicians can provide recommendations for modes of improvement.

*Long-term Outcome Evaluation*

*Indirect Outcome Measure:* A large portion of program outcomes will be assessed by indirect measures using the observational methods of document review, open-ended interviews, and focus groups as well as the quasi-experimental methods. Through community-level pre/post surveys we will examine changes in knowledge, attitudes, and behaviors with respect to RTI-related risk and reproductive health as well as self-reported reproductive health status and access to RTI-relevant information. We will assess these same changes in lay health promoters with individual pre/post surveys. Furthermore, when evaluating these outcomes at the community level, in particular, we will look for any patterns or subsets within the population who did or did not demonstrate or report improvement. For example, were young women less receptive to the interventions...
than older women, or was there an identifiable trend in improvement for those who participated in the interventions compared to those who did not, etc?

Direct Outcome measures: A more direct measure of reproductive health status will be provided by a document review of clinical records that will allow us to observe the number of community members treated for an RTI by our clinic annually. These cross-sectional reviews will ideally reveal a trend or pattern of improvement over time. These trends may then lend support to those more indirect observations.

Study Limitations

The difference in language and cultural dynamics between the target population and the majority of those planning the program may prevent the development of highly effective interventions and assessment tools. This program and the larger HHA from which it is a part have sought to avoid these barriers by involving community members in the planning and implementation of the program whenever possible. Additionally, community members and key informants are and will continue to be involved in the development of assessment tools and will review surveys and focus group curricula before they are used.

The most apparent limitation to our evaluation methods may be the dependence on volunteers in the participation of interviews, focus groups, surveys etc. as well as the interventions themselves. Those coming forward in the community to participate may be more proactively involved in their health overall and thus dilute the effects of the interventions with their own higher baseline of

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health and healthy knowledge, attitudes, and behaviors. Ideally the small size of these communities and high, active participation will limit this potential phenomenon.

**HHA RTI Education & Clinical Management Program Objectives**

**Goal:** In an effort to improve overall reproductive health status of community members we will attempt 1) to improve the reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors, in reproductive-aged individuals of 6 rural communities in southern Honduras 2) to improve access to this information in these communities via the training of lay health promoters and 3) to provide annual clinical management of RTIs through the Syndromic approach in women.

**Short-term objectives:**

5) Within one year, community surveys assessing community member & lay health promoter RTI and safe sexual behaviors knowledge base will be valid and reliable.

6) Within one year, the HHA will have gained substantial structure in the framework of its programs and interventions in an effort to ensure sustainability.

7) Within two years, the clinical management portion of HHA programs will be effectively structured and perform efficiently.

8) Within two years, there will be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members & lay health promoters.

**Long-term objectives:**

5) Within five years, there will be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members & lay health promoters.
6) Within five years, there will be improved community access to education and information about reproductive health and disease via well-trained lay health promoters.

7) Within seven years, there will be measurable changes in the clinically documented cases of RTIs diagnosed via the Syndromic approach.

8) Within seven years there will be improved overall reproductive health status in the communities.
### HHA RTI education and clinical management project logic model

<table>
<thead>
<tr>
<th>Resources</th>
<th>Activities</th>
<th>Outputs</th>
<th>Short &amp; long-term outcomes</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>In order to accomplish our</td>
<td>In order to address our problem we will conduct the following activities:</td>
<td>We expect that once completed or underway these activities will produce the following evidence of service delivery:</td>
<td>We expect that if ongoing, these activities will lead to the following changes in 1-3 then 4-6 years:</td>
<td>We expect that if completed these activities will lead to the following changes in 7-10 years:</td>
</tr>
<tr>
<td>set of activities, we will</td>
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<tr>
<td>need the following:</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Funding</td>
<td>Educational activities</td>
<td>Short-term</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Staff</td>
<td>• Provide annual workshops, Charles, for community members about safe sexual behaviors and practices, about signs and symptoms of RTIs, and about a plan of action to follow if these exist</td>
<td>• Measurable changes in community reproductive health knowledge, attitudes, &amp; behaviors with respect to RTI-related risk &amp; safe sexual practices</td>
<td>• there will be continue to be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td>• Relationship with UNC</td>
<td>• Provide annual workshops, Charles, to lay health promoters of the content mentioned above as well as teaching tips and techniques that will facilitate their ability to disseminate this information to their respective communities thus improving community access to information year-round</td>
<td>• Measurable changes in community access to RTI-related information via trained lay health promoters</td>
<td>• Improved community access to education and information about reproductive health and disease via well trained lay health promoters</td>
<td></td>
</tr>
<tr>
<td>partners (elective preceptor,</td>
<td></td>
<td>• Measurable clinical changes in reproductive health status in community women via established &amp; effective annual clinical management</td>
<td>• Measurable changes in reproductive health knowledge, attitudes, and behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td>administrators, teaching and</td>
<td></td>
<td></td>
<td>• there will be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td>clinical faculty)</td>
<td></td>
<td></td>
<td>• Improved community access to education and information about reproductive health and disease via well trained lay health promoters</td>
<td></td>
</tr>
<tr>
<td>• Best practices from</td>
<td></td>
<td></td>
<td>• Measurable changes in reproductive health knowledge, attitudes, and behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td>established programs (WHO,</td>
<td></td>
<td></td>
<td>• there will be continue to be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td>JPHIEGO, FHI)</td>
<td></td>
<td></td>
<td>• Improved community access to education and information about reproductive health and disease via well trained lay health promoters</td>
<td></td>
</tr>
<tr>
<td>• Survey data</td>
<td></td>
<td></td>
<td>• Measurable changes in reproductive health knowledge, attitudes, and behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td>• Sociopolitical momentum</td>
<td></td>
<td></td>
<td>• there will be continue to be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td>provided by current programs</td>
<td></td>
<td></td>
<td>• Improved community access to education and information about reproductive health and disease via well trained lay health promoters</td>
<td></td>
</tr>
<tr>
<td>and movements in reproductive health globally, particularly with respect to low-resource settings</td>
<td></td>
<td></td>
<td>• Measurable changes in reproductive health knowledge, attitudes, and behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clinical activities</td>
<td></td>
<td>• Improved community access to education and information about reproductive health and disease via well trained lay health promoters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Provide annual clinical evaluation to women in these rural communities following the comprehensive approach of Syndromic Case Management</td>
<td></td>
<td>• Measurable changes in reproductive health knowledge, attitudes, and behaviors in community members &amp; lay health promoters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Tracking epidemiologic changes in RTI incidence or prevalence is not technically feasible currently due to the limitations in available laboratory facilities and diagnostic methods but patient RTIs managed via the Syndromic approach will be document in an effort to ultimately reveal trends where they exist</td>
<td></td>
<td>• Improved community access to education and information about reproductive health and disease via well trained lay health promoters</td>
<td></td>
</tr>
</tbody>
</table>

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Evaluation Planning Tables

**Administrative - Short-term Objective One:** Within one year, **community surveys** assessing community member & lay health promoter RTI and safe sexual behaviors knowledge base will be valid and reliable.

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>Participant</th>
<th>Evaluation method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has a survey designed to assess safe sexual knowledge, behaviors, and attitudes been developed? Has the survey been used “in-the-field?”</td>
<td>Program directors</td>
<td>Document review</td>
</tr>
<tr>
<td>Do program participants understand the questions asked of them on survey material and in focus groups?</td>
<td>Key informants, Community members</td>
<td>• Open-ended interviews, Focus groups</td>
</tr>
<tr>
<td>Is survey material written in a culturally appropriate / sensitive manner?</td>
<td>Key informants, Community members</td>
<td>• Open-ended interviews, Focus groups</td>
</tr>
<tr>
<td>Are focus groups delivered in a culturally appropriate / sensitive manner?</td>
<td>Key informants, Community members</td>
<td>• Open-ended interviews, Focus groups</td>
</tr>
<tr>
<td>Were interviewers in consistent delivery of questions?</td>
<td>Program directors</td>
<td>Open-ended interview</td>
</tr>
</tbody>
</table>

**Administrative - Short-term Objective Two:** Within one year, the HHA will have gained substantial **structure** in the framework of its programs and interventions in an effort to ensure sustainability.

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>Participant</th>
<th>Evaluation method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are program components identified?</td>
<td>Program directors</td>
<td>Document review &amp; Open-ended interviews</td>
</tr>
<tr>
<td>Have program and evaluation plans been written for program components?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are administrative / leadership roles clear and in a written format?</td>
<td>Program directors</td>
<td>Document review &amp; Open-ended interviews</td>
</tr>
<tr>
<td>Are these roles effectively passed along with new leadership?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How could this process be improved?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Are funding sources stable?  Program directors  Document review & Open-ended interviews
Who is responsible for soliciting funding?  Program directors  Document review & Open-ended interviews
How could this process be improved?  Is staffing adequate?  Program directors  Document review & Open-ended interviews
Are their roles clearly defined?  Organizational communication  Program directors  Document review & Open-ended interviews
How are decisions made?  Are coalition members adequately represented in this process?  Program directors  Document review & Open-ended interviews
How could this process be improved?  What are the methods of communication and feedback between the coalition?  Program directors  Open-ended interviews
Are these methods effective?  How could these methods be improved?

Administrative - Short-term Objective Three: Within two years, the clinical management portion of HHA programs will be effectively structured and performed efficiently.

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>Participant</th>
<th>Evaluation method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were clinicians trained in Syndromic management?</td>
<td>Program directors</td>
<td>• Open-ended interviews</td>
</tr>
<tr>
<td>How many?</td>
<td></td>
<td>• Open/ closed-ended surveys</td>
</tr>
<tr>
<td>Were Syndromic management guidelines followed?</td>
<td></td>
<td>• Document review</td>
</tr>
<tr>
<td>How could this process be improved?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What was the process for record keeping? Did this system ensure privacy would be maintained?</td>
<td>MSs, clinical preceptors, &amp; program directors</td>
<td>• Open-ended interviews</td>
</tr>
<tr>
<td>What problems arose in the development of this system and how were they addressed?</td>
<td></td>
<td>• Open/ closed-ended surveys</td>
</tr>
<tr>
<td>Was follow-up care assured?</td>
<td>MSs, clinical preceptors, &amp; program directors</td>
<td>• Document review</td>
</tr>
<tr>
<td>What were some of the</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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barriers to follow-up care? How were these barriers overcome?

- Document review

**Educational - Short-term Objective Four:** Within two years, there will be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members & lay health promoters.

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>Participant</th>
<th>Evaluation method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were medical students trained to deliver <em>Charlas</em>? Did they feel appropriately prepared to deliver <em>Charlas</em>? How could this process be improved?</td>
<td>Program directors &amp; medical students</td>
<td>• Document review • Open-ended interviews • Open/closed-ended surveys</td>
</tr>
<tr>
<td>Were curricula/lesson plans developed for <em>Charlas</em>? Was the format clear and organized?</td>
<td>Program directors</td>
<td>• Document review • Open-ended interviews • Open/closed-ended surveys</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were <em>Charlas</em> carried out for community members &amp; lay health promoters as planned? How many attended? How many attended the previous year?</td>
<td>Community members &amp; lay health promoters</td>
<td>Attendance rosters</td>
</tr>
<tr>
<td>How were <em>Charlas</em> advertised? Were community members &amp; lay health promoters aware of <em>Charlas</em>? What were the barriers to attendance?</td>
<td>Community members, lay health promoters, &amp; program directors</td>
<td>• Community-level pre/post surveys • Individual pre/post surveys for LHP • open-ended interviews • focus groups</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did participant repro health knowledge/attitudes/behaviors improve from the program? In community members? In lay health promoters?</td>
<td>Community members &amp; lay health promoters</td>
<td>• Community-level pre/post surveys • Individual pre-post surveys for LHP • open-ended interviews • focus groups</td>
</tr>
<tr>
<td>Were participants satisfied with <em>Charlas</em>? Why and why not?</td>
<td>Community members &amp; Lay health promoters</td>
<td>• Community-level pre/post surveys • Individual pre-post</td>
</tr>
</tbody>
</table>

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Do lay health promoters feel adequately prepared to be utilized as a community resource? | surveys for LHP
• open-ended interviews
• focus groups

Are there identifiable subsets of the community who did not demonstrate change? | Community members & lay health promoters
• Community-level pre/post surveys
• open-ended interviews
• focus groups

Educational - Long-term Objective One: Within five years, there will be measurable changes in reproductive health knowledge, attitudes, and behaviors particularly with respect to RTIs and safe sexual behaviors in community members & lay health promoters.
*Note that changes in knowledge, attitudes, and behaviors is expected to be continuous and is part of an on-going community assessment thus is part of both long and short-term evaluation and will be evaluated in the same manner.

Educational - Long-term Objective Two: Within five years, there will be improved community access to education and information about reproductive health and disease via well-trained lay health promoters.

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>Participant</th>
<th>Evaluation method</th>
</tr>
</thead>
</table>
| How do community members report learning about reproductive health and disease? Are community members aware of resources? What are the barriers to access and how can they be overcome? | Community members & lay health promoters | • Community-level pre/post surveys
• open-ended interviews
• focus groups |
| How do lay health promoters interact with the community (home visits, Charlas, etc.)? Do lay health promoters feel appropriately trained to be used as a resource for repro health information? Has this changed over time? How have lay health promoters advertised their services? | Community members & lay health promoters | • Community-level pre/post surveys
• Individual pre/post surveys for LHP
• open-ended interviews
• focus groups |
| How many community members does each lay health promoter interact | Community members & lay health promoters | • Individual pre/post surveys
• open-ended interviews |
**Clinical - Long-term Objective Three:** Within seven years, there will be measurable changes in the **clinically** documented cases of RTIs diagnosed via the Syndromic approach.

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>Participant</th>
<th>Evaluation method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly prevalence of RTIs since onset of Syndromic approach? Is there a pattern of decreasing prevalence over time? Are records clear and reliable?</td>
<td>Program directors</td>
<td>Document review</td>
</tr>
<tr>
<td>How many community members participated in clinical intervention?</td>
<td>Program directors</td>
<td>Document review</td>
</tr>
<tr>
<td>How many participants returned the following year? Total since start of program?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were community members aware of clinical intervention? How were these services advertised? What were some of the barriers to participation? How could these barriers be overcome?</td>
<td>Community members</td>
<td>• Community-level pre/post surveys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• open-ended interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• focus groups</td>
</tr>
<tr>
<td>Were participants satisfied with the clinical intervention? Why or why not? What is the mechanism of feedback for clinical experience?</td>
<td>Community members</td>
<td>• Community-level pre/post surveys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• open-ended interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• focus groups</td>
</tr>
</tbody>
</table>

**Impact - Long-term Objective Four:** Within seven years there will be improved overall **reproductive health status** in the communities

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>Participant</th>
<th>Evaluation method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was self-reported reproductive health status recorded regularly?</td>
<td>Community members</td>
<td>• Community-level pre/post surveys</td>
</tr>
<tr>
<td>Was there an observable</td>
<td></td>
<td>• open-ended interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• focus groups</td>
</tr>
</tbody>
</table>
Discussion

Honduras, like many other low-resource nations, is in need of assistance in improving the reproductive health status of its residents. The paucity of internal funding and infrastructure for reproductive health education and services has drawn a whole host of international non-governmental organizations to Honduras including but not limited to the UNFPA, USAID, and the International Planned Parenthood Federation. Additionally, the grassroots organization developed by medical students at University of North Carolina at Chapel Hill, the Honduran Health Alliance, has shared a vision with these far reaching organizations in participating in the development of sustainable efforts to improve reproductive
health in this country. This paper has attempted to clearly illustrate the lack of reproductive health resources in Honduras and provide a detailed approach and plan of a program that has and will continue to address this need.

Ideally, the structure provided by this paper will facilitate the Honduran Health Alliance in the evaluation of its programs and in the establishment of long standing funding. Additionally, the structure provided here may facilitate efficient transition of HHA leadership and will aid in the education of its participants with regard to philosophy and strategies used in its interventions. Furthermore, by formalizing the goals, objectives, strategies, and activities of this HHA program it is prepared to be disseminated more efficiently or applied to other communities.
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17 Mayaud P and Mabey D. Approaches to the control of sexually transmitted infections in developing countries: old problems and modern challenges. Sexually Transmitted Infections 2004; Vol. 80, p.174 – 182


24 The World Health Organization. 57th World Health Assembly. Reproductive Health Strategy to accelerate progress towards the attainment of international development goals and targets. 2004.