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# Addressing Congenital Syphilis in Rural Haiti: Beyond Maternal Screening and Treatment

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# Addressing Congenital Syphilis in Rural Haiti: Beyond Maternal Screening and Treatment

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Master of Public Health Thesis

Addressing Congenital Syphilis in Rural Haiti: Beyond Maternal  
Screening and Treatment

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## I. INTRODUCTION

This is a two part research study. The first phase was conducted in 2008 and the second in 2010. The overarching goal was to help the Haitian Health Foundation, (HHF), a non-governmental organization (NGO) in Haiti to improve its congenital syphilis prevention program. The author's approach may be best described as one directed toward quality improvement. The World Health Organization (WHO) strategy and rationale for the global elimination of congenital syphilis was used as a roadmap for improving current systems and creating new interventions.

The structure of this thesis is as follows:

- Following this introduction, Part II provides background information. This includes medical information on syphilis and congenital syphilis including epidemiology, pathogenesis, clinical manifestations, diagnosis and treatment. The *WHO Strategy and Rationale for the Global Elimination of Congenital Syphilis* is described. The background depicts the context in which this research was conducted, including Haiti's geography, demographics, history, politics, economics and health indicators. Program and service information about the Haitian Health Foundation (HHF) is presented.
- Part III describes the 2008 phase of research, which focused on prenatal care seeking patterns of rural Haitian women and the feasibility of instituting an infant treatment protocol for infants born to syphilis positive women. The methods and findings are presented and discussed.
- Part IV details the events that occurred between the 2008 and 2010 research periods.
- Part V discusses the 2010 research phase, which concentrated on male partners of women with positive syphilis screening tests during pregnancy and their care-seeking practices.
- Part VI summarizes the lessons learned and application to similar programs

## **II. BACKGROUND**

### **SYPHILIS AND CONGENITAL SYPHILIS**

#### **Epidemiology**

The global prevalence of syphilis declined precipitously with the widespread availability of penicillin in the Western world in the years following World War II. Following periods of disease resurgence among homosexual men and drug users in the 1980s, incidence of syphilis in the United States continued to drop. In 2000, 6,000 cases of primary and secondary syphilis were reported nationwide. This figure increased to 8000 in 2004, primarily due to an increase in infections among men who have sex with men (MSM). Rates were highest in HIV positive men taking antiretroviral therapy, indicating an increase in high risk sexual behavior among these individuals. Internet-based interventions were subsequently developed to target this population. (Holmes et al., 2008)

Despite recent resurgences, overall syphilis prevalence remains low in the United States and Western Europe. (Holmes et al., 2008) However, with an approximated annual global incidence of 12 million, syphilis remains a prominent public health issue in many parts of the world. (WHO, 2007) An estimated 8 million of these cases occur in sub-Saharan Africa and Southeast Asia. Regional increases in primary disease have also been associated with the breakdown of public health systems, such as occurred in many cities of the former USSR in the early 1990s. (Holmes et al., 2008)

Syphilis in heterosexual adults in the UK (James, Berger, Elston, 2011), US and Canada have led to subsequent elevations in congenital syphilis rates. (Follett, Clarke, 2011) However, the disease remains rare in developed nations. In the US in 2009 and Canada in 2006 respectively, 10 and 1.97 cases of congenital syphilis were reported per 10,000 live births. In stark contrast, 21% of perinatal deaths in sub-Saharan Africa can be attributed to congenital syphilis. (James, Berger, Elston, 2011) Globally, congenital syphilis affects a greater number of infants than any other neonatal infection, and far surpasses HIV and tetanus. (Krüger, Malleyeck, 2010 and WHO,

2007) Exact rates are difficult to ascertain. Laboratory testing is often limited or unavailable in low resource settings. Early symptoms are often absent or nonspecific, complicating clinical diagnosis. The WHO approximates the annual global incidence of congenital syphilis to be between 700,000 and 1.5 million. (Krüger, Malleyeck, 2010) This includes at least 500,000 miscarriages or stillbirths and over 500,000 infant born prematurely, with congenital syphilis, or with low birth weight. (WHO, 2007) Given the global distribution of venereal syphilis, it is unsurprising that over 90% of cases of congenital syphilis occur in developing countries. (Krüger, Malleyeck, 2010)

### **Etiology**

Syphilis is caused by systemic infection with the bacterial spirochete *Treponema pallidum*. (Holmes et al., 2008 and WHO, 2007)

### **Pathogenesis**

In adults, transmission of *T. pallidum* is sexual and occurs through direct contact with mucocutaneous syphilitic lesions. (CDC, 2006) The relatively long, 33 hour, doubling time of the *T. pallidum* bacterium leads to an equally prolonged incubation period averaging three weeks, but potentially lasting up to ninety days before the syphilitic chancre of primary disease appears (see Clinical manifestations below). (Holmes et al., 2008) Circulating immune complexes are universally present in secondary syphilis. Their deposition is postulated to contribute to mucocutaneous manifestations, as well as instances of iritis, anterior uveitis, glomerulonephritis and nephrotic syndrome. (Holmes et al., 2008)

*T. pallidum* passes from a syphilis-positive woman to her fetus through the placental circulation. The spirochete enters the fetal bloodstream. The liver is typically penetrated immediately, and *T. pallidum*-induced inflammation results in destructive changes. Similar alterations occur in the skin, mucous membranes, bones, and central nervous system. (Follett, Clarke, 2011)

Transmission may occur as early as nine weeks of gestation, but most often takes place between sixteenth and 28th weeks. (WHO, 2007) Vertical transmission will occur in most pregnant women with untreated syphilis of less than a year's duration. Rates vary according to maternal stage of syphilis. (WHO, 2007) Follett and Clarke (2011) estimate these figures according to the literature to date:

<b>Table II-1: Risk of Perinatal Transmission as Related to Maternal Stage of Syphilis</b>		
<b>Stage</b>	<b>Incubation Period</b>	<b>% Risk of Perinatal Transmission</b>
Primary	3-90 days (mean 21 days)	70-100
Secondary	2-12 weeks	70-100
Early Latent	< 1 year	40
Late Latent	≥1 year	10
Tertiary	Years to decades	Unknown

Adapted from (Follett, Clarke, 2011)

### **Clinical Presentation of Venereal Syphilis in Adults**

Untreated syphilis in adults progresses through defined stages as detailed below. (WHO, 2007)

#### ***Primary Syphilis (Chancre)***

Syphilis in the adult initially manifests with a 0.5-1.5 red papule at the site of inoculation, most often the genital, perineal or perianal regions. (James, Berger, Elston, 2011 and Holmes et al., 2008) The lesion appears 10-90 days (on average, 21 days) after sexual contact. After approximately 1 week, the papule erodes centrally and evolves into the classic Hunterian syphilitic chancre. Typically, this is a round to ovoid eroded, but not ulcerated, papule, with peripheral induration. The base of the erosion has a dark, velvety-red, laquered appearance and exudes a serous fluid. (James, Berger, Elston, 2011 and Holmes et al., 2008) While this lesion is classically described as painless, this is not always the case. Painless regional lymphadenopathy usually develops 1-2 weeks after the appearance of the chancre. (James, Berger, Elston, 2011)



Chancres are less commonly observed in women, as they are frequently located on the vagina or cervix. (James, Berger, Elston, 2011 and Holmes et al., 2008) In men, the chancre is most often on the penis or in the case of MSM, on the anus. Extragenital chancres have been described on the lips, tongue, tonsil, female breast, and index finger. While the Hunterian chancre is the classic presentation, it is important to note that atypical presentations are common. The chancre usually heals spontaneously and without scarring in 1-4 months. (James, Berger, Elston, 2011)

### ***Secondary Syphilis (Acute Disseminated)***

The variable systemic symptoms of secondary syphilis are manifestations of hematogenous and lymphatic dissemination of *T. pallidum*. These symptoms generally develop weeks to months following development of the syphilitic chancre and include low-grade fever, malaise, sore throat, headache, weight loss, myalgias, lymphadenopathy and cutaneous or mucosal rash. Periosteal inflammation is usually asymptomatic, but is estimated to be apparent upon imaging in about a quarter of cases. Subclinical hepatitis may occur. Cases of symptomatic hepatitis, iritis, anterior uveitis, glomerulonephritis, and nephrotic syndrome have been documented. (Holmes et al., 2008)

Mucocutaneous manifestations are often the most prominent and specific signs of secondary syphilis. (James, Berger, Elston, 2011 and Holmes et al., 2008) A skin rash is seen in approximately 80% of patients (James, Berger, Elston, 2011) The initial eruption is of diffuse, subtle, copper-colored macules. Within a few days, this gives way to a symmetric eruption of discrete, red to reddish-brown, 0.5-2.0 cm papules, which often involve the palms and soles. Pustular lesions may be observed on acral surfaces. Annular facial lesions may be seen in dark-skinned patients. Condyloma lata are broad, flat-topped gray or white papules found in moist areas such as the groin and axillae. (James, Berger, Elston, 2011 and Holmes et al., 2008) They often appear adjacent to a syphilitic chancre due to direct treponeme spread. (Holmes et al., 2008)

Rarely, scalp alopecia with an irregular “moth-eaten” appearance may occur. (James, Berger, Elston, 2011 and Holmes et al., 2008)

Mucous membrane lesions occur in about one-third of secondary syphilis cases. The most common early manifestation is diffuse pharyngitis. (James, Berger, Elston, 2011) Oral lesions resembling apthous ulcers are also common. Larger (usually about 5 mm) macerated, grayish erosions called mucous patches are characteristic of secondary syphilis and may occur in the oropharynx or female genitalia. (Holmes et al., 2008 and James, Berger, Elston, 2011)

### ***Latent Syphilis***

Asymptomatic individuals with historical or serological evidence of syphilis and no history of treatment have, by definition, latent syphilis. Formally, a negative lumbar puncture is required to rule out the possibility of asymptomatic neurosyphilis. (Holmes et al., 2008) After the signs and symptoms of secondary syphilis have subsided, 60-70% of untreated patients remain asymptomatic with positive syphilis serology for life. Vertical transmission may occur from an infected mother to her fetus during at least the first two years of the latent period. (James, Berger, Elston, 2011) Latent syphilis is divided into early latent and late latent periods based on risk of secondary relapse and differing treatment guidelines (see *Treatment* below). (James, Berger, Elston, 2011 and Holmes et al., 2008) One landmark study showed that 25% of relapses occur within the first year following infection. Thus, the US public health service defines this as early latent syphilis. Late latent syphilis is defined by the asymptomatic period greater than a year after infection. (Holmes et al., 2008)

### ***Tertiary Syphilis***

Tertiary symptoms of syphilis appear in about a third of patients with untreated syphilis any time from 1 to over 20 years after initial infection. Neurosyphilis is the most common manifestation, followed by cardiovascular disease and gummas. The skin, bones, central nervous system and viscera may be affected. Prior to widespread availability of penicillin treatment, tertiary manifestations were a major cause of morbidity and mortality in adults infected with

syphilis. Apart from neurosyphilis, they are now rarely observed in the developed world. (Holmes et al., 2008) However, the author hypothesizes that tertiary syphilis may continue to be a notable health issue in low resource settings where prevalence of the disease is high and infrastructure is less reliable.

Neurosyphilis encompasses a broad range of clinical syndromes, from asymptomatic cerebrospinal fluid (CSF) abnormalities often present in primary or secondary syphilis to acute syphilitic meningitis to meningovascular syphilis and long term sequelae such as tabes dorsalis and generalized paresis. Most initial CSF abnormalities resolve, even without treatment. Persistent abnormalities are predictive of progressive neurosyphilis. Normal CSF examination 2 years following untreated syphilis infection virtually rules out the possibility of further neurosyphilis, whereas 87% of patients with CSF abnormalities 5 years after initial exposure will develop neurosyphilis. (Holmes et al., 2008)

Cardiovascular manifestations of syphilis appear in cases of latent disease of 15-30 years and include aortic aneurysm due to aortitis and inflammation of nutrient vessels, aortic insufficiency due to aortic dilatation, coronary artery stenosis due to coronary endarteritis, and myocarditis. Broad availability of antibiotic treatment for syphilis has these clinical syndromes exceedingly rare. Incidence of cardiovascular syphilis in men is three times the rate of that in women. The reason for male predominance is unknown but is speculated to be a result of prolonged periods of physical labor. (Holmes et al., 2008)

Late benign syphilis, or gumma, is a proliferative granulomatous inflammatory process that can cause local tissue destruction, scarring and stenosis. Gummas occur most commonly in skin and bone, and are also seen in the mucosa, viscera, muscles, and ocular structures. Like cardiovascular syphilis, they are rarely seen in the developed world. Grossly, gummas appear as nodules on tissues and organs, which centrally necrose and eventually fibrose. Their effects can be devastating when they are located in areas such as the brain, spinal cord, or trachea, where they can cause stenosis. (Holmes et al., 2008)

## Clinical Presentation of Congenital Syphilis

Most adverse birth outcomes due to syphilis occur in mothers with early syphilis due to relatively increased infectivity during these stages.(see Table II-1) (James, Berger, Elston, 2011 and WHO, 2007) When *T. pallidum* transmission occurs shortly after the fourth month of gestation, miscarriage occurs in 40% of cases. (James, Berger, Elston, 2011)

Congenital syphilis is initially asymptomatic in about half of cases. (Follett, Clarke, 2011 and WHO, 2007) Signs and symptoms usually develop within the first months of life, but may not appear until after a year of age. (WHO, 2007) Clinical presentation is highly variable (Krüger, Malleyeck, 2010) and ranges from mild, nonspecific symptoms to diffuse organ involvement. (Follett, Clarke, 2011)

During the neonatal period (the first 28 days of life), symptomatic congenital syphilis can be indistinguishable from other forms of neonatal sepsis. This may reflect treponemal septicemia. Neonates with congenital syphilis are often born prematurely, small for gestational age (SGA) and with low birth weight (LBW). Fever, hepatosplenomegaly, jaundice, and bullous rash are typical early signs. (Krüger, Malleyeck, 2010)

During infancy, SGA and LBW may be exacerbated by feeding problems, ultimately resulting in poor growth and malnutrition. Congenital syphilis in infants resembles secondary illness in adults, and mucocutaneous signs are prominent. Perhaps the most common is nasal congestion with thick, purulent, and sometimes bloody discharge, often referred to as “snuffles.” (Krüger, Malleyeck, 2010)

<b>Table II-2: Manifestations of Congenital Syphilis by Organ System</b>	
Gestational	Stillbirth, prematurity, low birth weight, small for gestational age, feeding difficulties/failure to thrive; affect up to 40% of infected infants
Reticuloendothelial	Lymphadenopathy, fever, anemia, leukopenia or leukocytosis, thrombocytopenia (30%), hepatomegaly with or without

	splenomegaly (50-90%), and nonimmune hydrops
Mucocutaneous	Purulent rhinitis (“snuffles”) typically earliest and most common manifestation; dermal skin eruptions often affecting acral surfaces, mouth rhagades, mucous patches
Skeletal	Symmetric long bone lesions more common in upper extremities, metaphyseal lesions; osteochondritis, periostitis, osteitis, dactylitis
Neurologic	Meningitis, hydrocephalus, cerebral infarct, cranial nerve palsy/deafness
Ocular	Glaucoma, chorioretinitis

(Follett, Clarke, 2011 and Krüger, Malleyeck, 2010)

### Differential Diagnosis

In adults, a primary syphilitic chancre must be distinguished from the genital ulcer of chancroid, the primary lesions of granuloma inguinale and lymphogranuloma venereum, and herpes simplex. (James, Berger, Elston, 2011 and Holmes et al., 2008)

Particularly in the absence of palm and sole involvement, the papular eruption of secondary syphilis may closely resemble pityriasis rosea, psoriasis, drug eruption, or lichen planus. (James, Berger, Elston, 2011 and Holmes et al., 2008) Sore throat, fever, and lymphadenopathy may suggest infectious mononucleosis or acute HIV. (Holmes et al., 2008)

### Diagnosis

The diagnosis of syphilis in adults generally hinges on laboratory testing. Table II-3 allows comparison of these various assays. In patients with genital erosion suggestive of a syphilitic chancre, dark field microscopic examination should ideally be performed. This method entails immediate microscopic visualization of plasma obtained from the base of the skin erosion. Identification of *T. pallidum* in a cutaneous sore is diagnostic of venereal syphilis. This method should not be used to assess oral lesions, as commensal spirochetes of the oral mucosa may resemble *T. pallidum*. A negative dark field examination does not rule out syphilis. If this occurs, repeat examination should be performed daily for several days.

The direct fluorescent antibody test (DFAT-TP) can also be used to identify *T. pallidum* in skin lesions. Unlike dark field microscopy, DFAT-TP can be used reliably in oral lesions. Multiplex polymerase chain reaction (PCR) is an additional option for diagnosing syphilis from a genital ulcer, and has the capacity to diagnose multiple infectious agents simultaneously. (James, Berger, Elston, 2011)

In patients without a presenting lesion, non-treponemal and treponemal assays can be used. Non-treponemal tests include the rapid plasma reagin (RPR) and venereal disease research laboratory (VDRL) tests and are designed to detect the presence and amount of antibody to diphosphatidylcholine or cardiolipin, a component of mammalian cell membranes that is incorporated and, presumably, modified by *T. pallidum*. Cardiolipin is found in *T. pallidum* and in human tissues, so a positive non-treponemal test result is not specific for the diagnosis of syphilis. (Holmes et al., 2008 and WHO, 2007). Test results are reported qualitatively as reactive or non-reactive, and as a qualitative titer, which is the greatest dilution of CSF or serum at which the test is still positive. The RPR is used most often on human serum, and the height of the antibody titer tends to correlate with the activity of the syphilitic infection. Antibody levels subside with treatment and usually become negative within 1-2 years. Thus, non-treponemal tests can be used to assess and track patient response to therapy. An exception to this rule is patients with a long duration of disease prior to treatment, who may demonstrate a persistently positive RPR. (Holmes et al., 2008)

Advantages of non-treponemal tests include their low cost and sensitivity, especially in diagnosing early infection. (WHO, 2007) 80% of patients with primary syphilis will have a positive RPR. (Holmes et al., 2008) Furthermore, unlike treponemal tests, non-treponemal assays can distinguish active infection from adequately treated syphilis. While results can be obtained relatively rapidly, a laboratory with a trained, experienced technician and a microscope or rotator for processing of whole blood specimens is required. (WHO, 2007) Patients with certain autoimmune diseases, such as lupus erythematosus and antiphospholipid syndromes may have

persistent false-positive RPR results. Immunizations and acute viral infections such as those with varicella and Epstein-Barr virus may cause transient false-positive RPRs.

Treponemal tests detect surface-exposed proteins of *T. pallidum* and are highly specific. Until the 1970s, the standard treponemal test was the fluorescent treponemal antibody-absorption test (FTA-ABS). The FTA-ABS has been widely replaced by the Treponema pallidum hemagglutinin assay (TPHA) and Treponema pallidum particle agglutination assay (TPPA) in the developed world. An enzyme immunoassay (EIA) is also available. (Holmes et al., 2008) Treponemal tests are often used as confirmatory tests for syphilis in patients with positive non-treponemal screening results. However, as demonstrated in Table II-3, conducting the aforementioned treponemal tests requires moderate to extensive skill and expensive laboratory equipment. In the developing world, rapid treponemal tests can be used as a simple and inexpensive alternative. (WHO, 2007)

Rapid point-of-care treponemal tests use whole blood and require minimal skill to perform. They are a cost-effective and easy-to-use alternative confirmatory test. Importantly, rapid tests can also be used in areas where laboratory services are not available, such as rural Haiti. As with other treponemal tests, these assays cannot distinguish active from treated infection and cannot be used to monitor treatment efficacy. In low prevalence areas, the WHO recommends presumptive treatment of all individuals with a positive rapid treponemal test. In areas with high syphilis prevalence such as the Grand'Anse region of Haiti, the WHO maintains that the risk of missing a maternal infection is greater than that of unnecessary re-treatment. The WHO recommends that all pregnant women be screened for syphilis by RPR or rapid treponemal test by 16 weeks gestation. If initial screening is negative, testing should be repeated in the third trimester. (WHO, 2007)

	<b>For patients presenting with an ulcer or other lesion</b>			<b>For screening</b>					
	<b>Dark-field microscopy</b>	<b>Antigen detection (DFA-TP)</b>	<b>DNA detection (PCR and RT PCR)</b>	<b>Non-treponemal tests</b>		<b>Treponemal tests</b>			
				<b>RPR</b>	<b>VDRL</b>	<b>Rapid test</b>	<b>EIA</b>	<b>TPHA/TPPA</b>	<b>FTA-ABS</b>
<b>Sensitivity</b>	74-86%	73-100%	91%	86-100%	78-100%	84-98%	82-100%	85-100%	70-100%
<b>Specificity</b>	85-97%	89-100%	99%	93-98%	98-100%	94-98%	97-100%	98-100%	94-100%
<b>Ease of use</b>	Easy	Moderate	Complex	Easy	Easy	Easy	Moderate	Complex	Complex
<b>Level of use</b>	Exam room, on-site lab	Intermediate or referral lab	Referral lab	Exam room, on-site lab	Exam room, on-site lab	Exam room, on-site lab	Intermediate or referral lab	Referral lab	Referral lab
<b>Equipment</b>	Light microscope with dark-field condenser	Fluorescence microscope	Microfuge Thermal cycler Incubator Microwell plate reader	Rotator	Light microscope	None	Incubator Microwell plate washer and reader	Incubator Microwell plate washer and reader	Fluorescence microscope
<b>Training</b>	extensive	moderate	extensive	minimal	minimal	min	moderate	extensive	extensive
<b>Average Cost</b>	\$0.40	\$3	\$14	\$0.50	\$0.50	\$0.55-3.0	\$3	\$3	\$3

DFA-TP: direct fluorescent antibody test for *Treponema pallidum*; RPR: rapid plasma reagin test; VDRL: Venereal Diseases Research Laboratory test; EIA: enzyme immunoassay; TPHA/TPPA: *Treponema pallidum* haemagglutinin assay/*Treponema pallidum* particle agglutinin assay; FTA-ABS: fluorescent treponemal antibody-absorption test; PCR: polymerase chain reaction; RT PCR: real time PCR. All costs are in \$US. Adapted from (WHO, 2007)



The diagnosis of congenital syphilis is not as straightforward as that of venereal syphilis. During pregnancy, maternal IgG, including antibodies to *T. pallidum* in syphilis-positive women, traverse the placenta. These antibodies persist until 15 months of age, thus, treponemal tests are unreliable in during this period. Maternal antibodies and congenital infection can both produce a positive RPR result. The two can be distinguished by comparing maternal and infant antibody levels. An infant antibody level  $\geq 4$  times the maternal antibody level is consistent with congenital infection in children under 15 months. Available laboratory methods for the diagnosis of congenital syphilis are summarized in Table II-4. Of note, as rapid treponemal tests cannot be used, serologic evidence of congenital syphilis cannot be established in the absence of a laboratory. (WHO, 2007)

All infants born to mothers with a positive syphilis test during pregnancy should undergo a thorough physical examination for signs of congenital syphilis such as nonimmune hydrops, jaundice, hepatosplenomegaly, rhinitis, skin rash or extremity pseudoparalysis. Pathologic examination of the placenta or umbilical cord and dark field microscopic examination or DFA staining of suspicious lesions or bodily fluids is also recommended. (CDC, 2006) However, these laboratory studies are unlikely to be available in resource-poor settings.

<b>Table II-4: Diagnostic Testing for Congenital Syphilis</b>			
<b>Surveillance definition</b>	<b>Test</b>	<b>Level of Laboratory</b>	<b>Comments</b>
Infant antibody level 4x higher than maternal antibody level	RPR	Local or regional	Low sensitivity (<30%), treatment may diminish antibody response
IgM antibody in serum or cerebral spinal fluid	EIA or immunoblot	Regional or reference	Performance satisfactory for symptomatic infants; unknown performance for asymptomatic infants; false-positive results may be due to rheumatoid factor or cross-reaction with other treponemes
Direct detection of <i>T. pallidum</i> in lesions, tissues or secretions	Dark-field microscopy	Regional	Dark field sensitivity diminished if lesion wiped with antiseptic; all tests affected by age of lesion and treatment
	DFA-TP	Regional	
	PCR	Reference	

**Table II-4.** DFA-TP: direct fluorescent antibody test for *Treponema pallidum*; RPR: rapid plasma reagin test; EIA: enzyme immunoassay; PCR: polymerase chain reaction.

Adapted from (WHO, 2007)

### **Adult Treatment**

Parenteral penicillin G is the treatment of choice for treatment of syphilis in adults, and is the only approved therapy to prevent vertical transmission of disease in pregnant women. The CDC recommends that pregnant women with syphilis of any stage and penicillin allergy undergo desensitization and subsequent penicillin treatment.

Primary, secondary and early latent syphilis in any adult is effectively treated with 2.4 million international units (IU) of benzathine penicillin G, administered in a single intramuscular (IM) dose. For non-pregnant patients with early syphilis and penicillin allergy, treatment with ceftriaxone, tetracycline or doxycycline may be considered.

Patients with late latent syphilis or latent syphilis of unknown duration should be treated with 3 such doses of benzathine penicillin G, administered at weekly intervals. (CDC, 2006) Pregnant women with late latent disease should be treated accordingly. However, a single 2.4 million IU dose should be sufficient to prevent fetal infection. (WHO, 2007) Treatment of gumma

and cardiovascular syphilis are identical that of late latent syphilis. The treatment of neurosyphilis is more involved and entails 10-14 consecutive days of intravenous (IV) or IM treatment.

### **Sexual Partner Treatment**

Identification and treatment of sexual partners is a key component of syphilis control and prevention in the population. (Holmes et al., 2008) Because the mucocutaneous manifestations of syphilis usually resolve during the first year following infection, transmission to sexual partners after this period is rare. (CDC, 2006) In the United States, partners are defined as those exposed to an individual with early syphilis within 90 days of symptom development or diagnosis. (Holmes et al., 2008) The CDC recommends presumptive treatment of these individuals with a single 2.4 million IU dose of benzathine penicillin G. (CDC, 2006) The WHO recommends such treatment of all sexual partners of syphilis-positive pregnant women. (WHO, 2007)

Recent resurgences in syphilis may be partially attributed to funding cuts for public health personnel to find and treat named sexual contacts. Lack of funding for such epidemiologic tracing programs likely also contributes to elevated syphilis in less developed settings. (Holmes et al., 2008)

### **Infant Treatment**

As mentioned, the presence of maternal IgG in infant serum can complicate serologic testing. Thus, treatment decisions in infants born to syphilis-positive mothers are based upon adequacy of maternal treatment, presence of clinical, laboratory or radiographic evidence of syphilis, and comparison of maternal and infant titers by non-treponemal test at delivery. (CDC, 2006)

The CDC defines “proven or highly probable” congenital syphilis as an abnormal physical examination consistent with congenital syphilis, a non-treponemal serologic titer fourfold higher than the mother’s titer, or a positive dark field or fluorescent antibody test of a body fluid. (CDC, 2006). Of note, physical examination may be the only available diagnostic tool

in resource-poor and rural settings which lack laboratory facilities. It is recommended that such infants be treated with one of the following regimens:

- Aqueous crystalline penicillin G 100,000–150,000 units/kg/day, administered as 50,000 units/kg/dose IV every 12 hours during the first 7 days of life and every 8 hours thereafter for a total of 10 days.
- Procaine penicillin G 50,000 units/kg/dose IM in a single daily dose for 10 days.

If more than a single day of either of these treatments is missed, the course should be re-started. (WHO, 2007 and CDC, 2006)

For infants born to syphilis-positive mothers who do not fit the criteria for “proven or highly probable” congenital syphilis, the CDC recommends a single IM dose of benzathine penicillin G 50,000 units/kg. In asymptomatic infants of mothers treated adequately during pregnancy for syphilis with non-treponemal titers less than fourfold higher than maternal titers, some specialists do not recommend treatment. However, others choose to treat with a single dose of benzathine penicillin, particularly where follow-up is uncertain. (CDC, 2006) In resource-poor settings, the WHO recommends a single dose of benzathine penicillin at the aforementioned dose, independent of maternal treatment and without additional tests. (WHO, 2007)

## **WHO STRATEGY AND RATIONALE FOR THE GLOBAL ELIMINATION OF CONGENITAL SYPHILIS**

In 2007, the WHO published *The Global Elimination of Congenital Syphilis: Rationale and Strategy for Action*. This document is based on deliberations that took place during a December 2004 meeting in Geneva Switzerland entitled Technical Consultation on the Elimination of Congenital Syphilis. The WHO deems reduction and eventual elimination of congenital syphilis an important means of furthering the Millennium Development Goals (MDGs). The MDGs were adopted by all UN Member States in 2001, and syphilis reduction is important to three of the eight goals.

MDG 4 seeks to reduce the mortality rate in children under five years of age by two-thirds between 1990 and 2015. Decreasing congenital syphilis rates will decrease the incidence of low birth weight, perinatal death and the sequelae of congenital infection. MDG 5 aims to reduce the maternal mortality ratio by 75% between 1990 and 2015. Reducing the incidence of congenital syphilis will result in fewer spontaneous abortions. Screening and treating pregnant women for syphilis will also reduce disease-related morbidity in this population. MDG 6 endeavors to halt, and begin to reverse, the spread of HIV/AIDS, malaria and other major diseases. There is evidence that infection with syphilis and other STIs increases a woman's risk of becoming infected with HIV. Thus, reducing syphilis rates may also decrease HIV transmission. (WHO, 2007)

The WHO's overarching goal is to eliminate congenital syphilis as a public health problem. This entails prevention of syphilis transmission from mother to child. The following are specific means toward this end:

- Early antenatal care for all women, with universal syphilis screening and prompt treatment of those infected
- Treatment of all sexual partners of infected women, promotion of condom use during pregnancy, and infection prevention counseling for all women
- All neonates born to RPR-positive mothers should be given a single dose of penicillin as prophylactic treatment.

The WHO maintains that these interventions are feasible and cost-effective, particularly given the high cost of complications due to syphilis in pregnancy and low testing and treatment costs. Despite this, congenital syphilis remains a major global health issue. Thus, systemic improvement is warranted. (WHO, 2007)

The WHO advocates increased awareness of congenital syphilis and sustained commitment to the interventions necessary to its eradication. The approach is grounded on four "pillars." The first pillar is to ensure political commitment on global, national, regional and local

levels. The second is to enhance access to and quality of maternal and newborn health services. The third pillar is to screen and treat pregnant women and their partners. The fourth is to establish and strengthen surveillance, monitoring and evaluation systems. (WHO, 2007)

On a national level, the WHO recommends that interventions be country-driven, taking into account cultural, epidemiological and antenatal care conditions. An integrated approach linking syphilis testing and treatment with other maternal and newborn health services, primary health care services and sexual and reproductive health initiatives is advised. Women should be given rights to information, counseling and confidentiality. Finally, partnership and collaboration with existing health ministries and non-governmental organizations is essential to maximizing programmatic success and resource utilization. (WHO, 2007)

## **HAITI**

### **Haiti Today**

Haiti occupies the western third of the island of Hispaniola in the Caribbean basin. The Dominican Republic occupies the remainder of the island. (De Ville de Goyet, Sarmiento, Grünewald , 2011) In past centuries, Haiti was heavily forested, but at present, less than 2% of the country's surface area is covered by trees. Deforestation continues as poor families continue to seek wood for charcoal. Lack of vegetation renders Haiti highly susceptible to erosion and in the rainy season, catastrophic mudslides and flash floods. (Carroll, 2008)

The population of Haiti is approximately 10 million (De Ville de Goyet, Sarmiento, Grünewald , 2011 and WHO, 2009) and is fairly evenly split between urban and rural areas. In urban areas 91% of the population has access to adequate water sources and 52% to adequate sanitation facilities. In rural areas, these figures are 59% and 25%, respectively. Haiti's national languages are French and Haitian Creole. (De Ville de Goyet, Sarmiento, Grünewald , 2011) The population is young, with 38% of the population under the 15 years of age. Approximately half of adults are literate. (USAID, May 2010)

Haitian politics have traditionally been volatile and unstable. Since 2004, a strong UN presence has been the primary means of maintaining peace. (De Ville de Goyet, Sarmiento, Grünewald , 2011 and Farmer, 2011) Haiti is rated by Transparency International as one of the most corrupt nations in the world. The WHO reports high levels of inequity and inequality. (De Ville de Goyet, Sarmiento, Grünewald , 2011)

Haiti's socioeconomic situation is fragile. It is one of the poorest countries in the world and is the least developed in the Americas. Gross national income per capita is less than \$2,000 per year, and 53.9% of the population lives on less than \$1 per day. 80% of Haitians live below the national poverty line. (USAID, May 2010) Severe environmental deterioration and deforestation combined with stunted development have led to a lack of export industry and in turn, a large deficit. Government services and infrastructure are minimal. Most basic services are delivered through multiple individual NGOs. Educated and skilled workers continue to leave the country for opportunities abroad, contributing to a nationwide "brain drain." (De Ville de Goyet, Sarmiento, Grünewald , 2011) This includes skilled health care professionals. In Haiti, there are 0.2 physicians per 1,000 people, most of whom are located in Port au Prince. (USAID, May 2010)

A native Haitian and recent physician graduate of the Université Notre Dame d'Haïti in Port-au-Prince described her perspective on Haiti's physician shortage and "brain drain":

There is a shortage of doctors here, so people do what they can. This year, there were 320 graduates from the four medical schools: about 100 from the state school and 60, 30 or 32 and 16 from the three private schools, respectively. Those numbers aren't exactly right because they don't add up. But what I'm sure of is that there are 320 graduates for a population of eight million people, which isn't nearly enough. This is why the government asked the Cubans to come. They are paid by the Cuban government and by the international organizations. They're paid much more than the Haitian doctors. They get a lot of money in US dollars, plus a house with 'some comforts.' If the Haitian doctors were paid like that, they would stay. In Haiti, there is a lack of materials. The competence of a Haitian doctor diminishes quickly. We need to have continuing education like the Cuban doctors. Cuban medicine is more advanced than Haitian medicine. The Cuban doctors return home from time to time and get training. The problem is that they are not used to working with so few materials. And they're not efficacious with problems like kwashiorkor, which don't exist

in Cuba. We used to get the best Cuban specialists here. Now, sub par doctors are sent from Cuba.

I had never seen an ultrasound machine until I went to Belgium. The doctors there told me to read the results for a patient, and I needed a crash course in ultrasounds to do so. We learn a lot of theory here in Haiti, and we learn a lot about things that we don't see. We don't learn a lot about technology because we don't have a lot of it. We need to have more spots in our medical schools for students. The resources that are used to recruit and pay doctors from Cuba should be used to pay Haitian doctors. The Haitian doctors would benefit from training in Cuba and more resources. There are already Haitians who go to Cuba to study medicine. They get frustrated when they come back to Haiti because they're not used to having so few resources. In Haiti, doctors have to treat solely based upon clinical impressions. They can't use lab tests to aid in diagnosis. The doctors trained in Cuba go to practice in Spain.

This is what needs to happen: the money that is currently going to the Cuban doctors needs to go to Haitian doctors. We need to have more materials in Haiti, and more organization. We need to have more spots for students in medical schools so that we can train more doctors. That way, even if some doctors leave, there will still be more doctors in Haiti. The Haitian government exploits Haitian doctors right now. It's not the fault of the Cuban doctors; it's the fault of the Haitian government. (Lafalaise, 2008)

Haiti's political and economic struggles have ultimately resulted in fragile and fragmented infrastructure and extremely poor provision of basic needs, including health care. (Farmer, 2011) While many of Haiti's health indicators improved during recent decades, several have declined and all remain unacceptably low—the worst in the western hemisphere. The average life expectancy in Haiti is 60 for men and 63 for women, slightly below the global averages of 66 and 71 and substantially lower than the regional averages of 73 and 79 years. (WHO, 2009)

The prevalence of infectious disease is extremely high. 19/1,000 adults between 15 and 49 years of age is infected with HIV. This is 4 times the regional average and nearly 2.5 times the global prevalence. The prevalence of tuberculosis is also high, 312/100,000, compared with 38/100,000 throughout the rest of the region. (WHO, 2009)

Child and maternal mortality rates are very high. 87/1,000 Haitian children die before the age of 5, nearly five times the regional average of 18/1,000. Most of these children under five die of infection, namely diarrhea and pneumonia. Infant mortality has increased to 80.3 from 73.8 in 1996. Approximately 30% of children are growth stunted. The national maternal mortality ratio is between 300-680 per 100,000 (large range due to great variation in estimates and under-



reporting) live births. Even the lowest estimate of 300 is close to five times the regional average. Overall, only 26% of births are attended by skilled health personnel, and there is tremendous disparity between rich and poor. 68% of women in the wealthiest quintile of the population give birth with skilled professionals compared to 6% percent of women in the poorest quintile. (WHO, 2009)

Economics also play in important role in child mortality rates. Under-5 mortality rates are 125/1,000 in the poorest quintile and 55/1,000 in the wealthiest quintile. There are also important rural-urban divides. 15% of rural births are attended by skilled health professionals versus 47% of urban births. 114/1,000 children under 5 die each year in rural areas versus 78/1,000 in urban areas. (WHO, 2009) Clearly, the poor and those living in rural areas of Haiti suffer from an especially dire lack of access to health care. Despite the pressing health issues that confront Haiti, government health expenditures average only 29 US dollars per capita and compose only 6.1% of the GDP. (WHO, 2009)

### **Haiti's History**

One must understand Haiti's history to adequately comprehend its current economic, political and ecologic struggles. Haiti, or *Ayiti* as it was called by its natives, was inhabited by the Taíno Indians when Christopher Columbus arrived in 1492. The European settlers enslaved the natives and subjected them to brutal treatment. By the time *Ayiti* was sold to France in 1697, the entire Taíno population had been obliterated. *Ayiti*, called Saint-Domingue by the French, rapidly became the leading world exporter of coffee, sugar and other tropical produce. The French brought in African slaves to work their plantations, and by the 1790s, these slaves composed 85% percent of Saint-Domingues's population. In 1791, a major slave uprising progressed into a colony-wide revolution. The slaves held back the French, as well as German, Polish, Swiss and Dutch reinforcements from Europe. The French retreated, and on January 1, 1804, former slave Dessalines declared Haiti a sovereign nation. (Farmer, 2011)

Peasant farmers continued to grow some coffee, sugar and cotton for export to Europe and the US, but the newly independent Haiti was relatively geographically and economically isolated. In 1825, France demanded reparations for the loss of their plantations and their slaves. The amount was enormous—150 million germinal francs, the equivalent of 21 billion US dollars—but the Haitians pledged to pay the entire debt for fear of further alienating potential trade partners such as the US. The prevailing view among Haitians was, and is, that the demand for reparations was undue punishment for asserting their independence, and the Haitian economy struggled under that weight for 125 years. (Farmer, 2011)

A series of internal coups paved the way for a nineteen year US occupation of Haiti from 1915-1934. The occupation was justified as a means of maintaining peace, however economic incentives likely played an important role. The Haitian army was disbanded, and the Americans took control of the Haitian treasury. Opposition to American occupation was strongest in rural regions where Haitians were enlisted in forced labor for road building and other public works projects. In 1919, the Haitians revolted. It is estimated that over 3,000 Haitians were killed and 12,000 injured as the Marines brutally repressed the rebellion. (Farmer, 2011)

The US army maintained its influence in Haiti until 1957 when François “Papa Doc” Duvalier was “selected” president in reputedly fraudulent elections. Duvalier’s regime was highly repressive and corrupt and many Haitians, including professionals and intellectuals, fled under his regime. Papa Doc’s successor, his son Jean-Claude (“Baby Doc”) perpetuated his fathers’ policies. By 1986, pro-democracy demonstrators rebelled and forced Baby Doc into exile in France. A new constitution was drafted declaring Creole the national language. Violent power clashes erupted between the Haitian military and pro-democracy demonstrators. Leaders of this movement included Father Jean-Marie Vincent, a Catholic priest who worked with northwestern peasant farmers, and Salesian priest Jean-Bertrand Aristide. (Farmer, 2011)

Free elections were attempted in 1987, but undermined by a polling station massacre. The 1988 elections organized held under martial law were fraught with bribery. Voters were openly

offered cash and money to vote for the army's favored candidate, Leslie Manigat. Father Aristide's popularity continued to grow in the face of multiple assassination attempts. Under pressure from the international community and persistent widespread violence, the military conceded to a democratic election on December 16, 1990. Aristide won by a landslide with 67 percent of the vote: a remarkable triumph for the general Haitian population and those who supported the establishment of democratic rule. (Farmer, 2011)

However, the military and a handful of wealthy Haitian families continued to oppose Aristide and his democratic ideals and ousted him from power in a violent coup. Aristide's supporters vehemently protested, and the military responded with escalating force. The economy, crop output and exports continued to decline under the weight of a US economic embargo and continued deforestation and erosion. Mass exodus ensued as tens of thousands Haitians fled the country, including Aristide, who went to Venezuela. The "refugee crisis" focused an increasing degree of international attention on Haiti. Restoration of Haitian democracy was included in the 1992 Clinton-Gore US presidential platform. (Farmer, 2011)

However, it was not until 1994 that President Clinton intervened and Aristide was restored to power in a nonviolent transfer of leadership. In an effort to end perpetual cycles of violence Aristide demobilized the Haitian army. In 1995, he became the first Haitian president to turn the government over to another elected official previous Prime Minister, René Préval. Préval, in turn, served his entire term and peacefully transitioned power back Aristide, who won the 2000 election with 90% of the popular vote. (Farmer, 2011)

There is substantial controversy regarding the period between 2000 and 2004. It is clear that Haiti's increasing economic fragmentation and depletion was a significant issue. Haiti's debt to France weighed heavily on the economy, and in 2003, Aristide asked the French government for repayment. US government policy also played an important role in Haiti's economic decline by cutting off aid to the public sector and channeling it to NGOs. It is widely speculated that the US contributed to the violence that erupted in 2004. Aristide and his wife were transported to the

Central African Republic. Whether this was their desired destination or whether the US administration was implicated in their kidnapping has been debated. (Farmer, 2011)

The US appointed an interim government for Haiti, and a heavy UN peacekeeping presence (MINUSTAH, the United Nations Stabilization Mission in Haiti) was established. Haiti's infrastructure continued to crumble, including public health, public education, judicial and law enforcement systems. Port-au-Prince became the kidnapping capital of the world. There was a general lack of basic necessities, including food, fuel and sanitation. MINUSTAH was unpopular with the Haitians and, given the political and economic difficulties of the time, had difficulty establishing security. (Farmer, 2011)

In 2006, democratic elections were held, and René Préval was elected for a second term. Haiti's economic troubles persisted, contributing to continued political and social instability. A 2008 spike in international food and fuel prices led to widespread riots in Port-au-Prince and a vote of no confidence in Haiti's Prime Minister. (Farmer, 2011)

### **The Haitian Health Foundation (HHF)**

Connecticut orthodontist Jeremiah J. Lowney began traveling to Haiti in 1982 to provide free dental care to the poor. In 1985, he established the Haitian Health Foundation (HHF) at the request of Mother Teresa. HHF's mission is "to improve the health and well being of the poor, sick, and the infirm of the greater Jérémie area, with a focus on women and children." The foundation currently serves a population of over 200,000 from the southwestern city of Jérémie and over 100 surrounding mountain villages. It accomplishes its mission through a public health outreach program, clinical outpatient services, nutritional rehabilitation services, safe motherhood services, community development programs, self-help programs, emergency response interventions and programs to facilitate the exchange of knowledge and expertise between Haitians and the international community. (haitianhealthfoundation.org, 2012). Virtually all local staff members, including physicians, dentists, nurses, technicians, outreach workers, educators, and ancillary workers, are Haitian.

The fundraising base of HHF remains in Norwich, Connecticut. HHF is not for profit, and relies heavily on donations from individuals, private foundations, religious organizations, civic groups, schools, and businesses in the US. Donors include USAID Haiti, USAID US and Catholic Relief Services. In February 2012, Charity Navigator awarded HHF a 4-star rating (out of 4 possible stars) for the 5<sup>th</sup> consecutive year, placing the foundation in the top 4% of American charities for good governance and ethical practices. (haitianhealthfoundation.org, 2012) Charity Navigator's 2011 report highlighted HHF's high level of transparency and accountability. Furthermore, HHF was noted to dedicate nearly 92% of donor dollars to program expenses, with only 8% overhead designated for administrative costs. (charitynavigator.org, 2012)

***Klinik Pep Bondye-a (People of God's Clinic)***

HHF's outpatient clinic in Jérémie, the Klinik Pep Bondye-a, or People of God's Clinic, features fully equipped and staffed medical and dental clinics, an eye examination room and diabetes treatment center. The clinic has a pharmacy, clinical laboratory, x-ray and sonogram services. (haitianhealthfoundation.org, 2012)

***Sant Lespwa (Center of Hope)***

The Center of Hope was built in 2001 and provides residential services in Jérémie to the region's at-risk pregnant women, and severely malnourished children. A majority of children in the rural Grand'Anse are born at home with the help of trained traditional birth attendants. Many women live far from Jérémie and the nearest hospital along treacherous mountain roads. Those with birth complications may die during multi hour voyages by foot, motorcycle, or ambulance en route to the hospital. The maternal waiting home allows pregnant women from distant villages with complications (severe anemia, gestational diabetes, pre-eclampsia) to receive treatment as well as spend the final weeks of their pregnancies within minutes of the local *Hôpital Saint-Antoine* substantially reducing maternal and newborn mortality. The Center of Hope's Kwashiorkor Center provides care for severely malnourished children, including progressive re-feeding and caregiver support.

The Center of Hope also provides outpatient prenatal and postnatal care and health education. Nutritious, protein-rich meals are provided to pregnant women and malnourished children who are not ill enough to be admitted to the Kwashiorkor Center.

(haitianhealthfoundation.org, 2012)

### ***Rural Outreach***

HHF provides health care to over 100 rural villages in portions of the communes of Jérémie, Moron, Bonbon and Roseaux in the Department of the Grand' Anse. Services include prenatal and postnatal health care, immunization administration and tracking, supply of vitamins and other supplements, sick visits, and health maintenance counseling. A census-based system allows HHF to track health and development outcomes at the household level throughout the catchment area. Data is stored and maintained electronically through the PHACT database.

(haitianhealthfoundation.org, 2012) PHACT is updated continuously through periodic censuses and codes household and individual information by unique numeric identifiers. Stored information includes demographic information, socioeconomic indicators, immunization status, maternal and child weights, pregnancy history, prenatal care, birth outcomes, and child spacing. (Lomotey et al., 2009)

Most villages have a health agent: a village resident who is trained by the MSPP (funded by HHF); and who provides health education and primary care to 3,000-4,000 inhabitants. Health agents act as a liaison between HHF nurses and the community to facilitate provision of higher levels of care. They are supervised by HHF nurses and medical doctors and evaluated frequently. Health agents facilitate local mothers', fathers' and youth groups, which provide forums for community collaboration and health education. Many health agents also host HHF-sponsored health education fairs in their villages. Most education is provided through songs, skits and stories, in congruence with the low levels of literacy and the strong oral traditions predominant in Haitian culture. (haitianhealthfoundation.org, 2012)

### ***Syphilis Testing and Treatment***

HHF's syphilis testing and treatment program was established in 1999, in part with the support of donors such as the Hilton Foundation who allotted funds specifically for eradication of syphilis. (Lewis, 2008) Universal rapid test prenatal screening at rural health posts was initiated in 2001. All pregnant women presenting to these posts were tested for syphilis by Abbot Determine rapid test, ideally at the first prenatal visit. If the test was positive, the woman received an initial dose of benzathine penicillin. (Lomotey et al., 2009) If present, the male partner was also treated with benzathine penicillin. However in most cases, a woman who tested positive for syphilis was given a letter for her partner, instructing him to report to a local health agent or health post. (Gebrian et al., 2008) Following work by Lomotey et al in 2007, couples to receive oral and written referral to the Center of Hope for HIV screening and confirmatory RPR testing for the woman. (Lomotey et al., 2009) The couple was also scheduled for follow-up at the nearest health post or dispensary for 2 additional doses of penicillin to be administered at weekly intervals. At times, HHF nurses also left penicillin, vials and syringes so that subsequent treatments could be administered by a qualified health agent. Not all health agents were trained to administer penicillin injections. This was related to years of experience and skill level. (Gebrian et al., 2008)

Similar syphilis and treatment procedures were established at the Center of Hope. All women were screened for syphilis at the first prenatal visit. RPR testing was done directly, which allowed for a decreased incidence in false positive test results in previously treated women, but also delayed receipt of results and penicillin treatment by one day. All testing and treatment of women was documented in their prenatal charts, as well as in notebooks used to track syphilis and HIV results. Male partner treatments were documented in the notebooks, but not prenatal charts. (Gebrian et al., 2008)

Referral to the Center of Hope was necessary for rural women because RPR testing and HIV screening were not feasible at local health posts. Laboratory facilities were not available in

the rural setting. While rapid HIV tests were available, lack of available staff to conduct comprehensive, government-mandated pretest and posttest counseling precluded HIV screening at rural health posts. (Gebrian et al., 2008)

Symptomatic individuals received RPR testing for syphilis and HIV testing at the Klinik Pep Bondye-a. Test results and treatments for these individuals and their sexual partners were tracked through medical charts and syphilis and HIV-specific notebooks, as at the Center of Hope. (Gebrian et al., 2008)

### ***Economic Relief, Community Development and Education***

Since 1997, HHF's Happy House program has helped to provide housing to some of the poorest families in the Grand' Anse region. Local materials and labor are used, and recipient families assist with the construction process. The St. Pius village adjacent to the Klinik Pep Bondye-a in Jérémie provides supervised housing for elderly, disabled and orphaned individuals who would otherwise be homeless.

Sponsors in the US, Europe and Canada are matched with needy Haitian families through HHF's Save-a-Family program. Monthly donations supply the families with shelter, food and education for children. HHF also assists rural communities with basic infrastructure needs, such as latrine building, road building and repair and the establishment of community banks.

Adolescent girls and young women who participate in the Responsible Sexuality Soccer Program receive responsible sexuality and health education from HHF nurses. Participation in the soccer program promotes self esteem and physical fitness, while providing a productive social outlet. (haitianhealthfoundation.org, 2012)

### ***Academics and Professional Development***

HHF staff and volunteers participate in data collection and analysis, much of it in partnership with major universities in the U.S. and abroad. Collaboration with the University of Connecticut is particularly well established. The author was the fortieth student from this



institution to conduct on site research with HHF. Peer-reviewed research affirms the effectiveness of HHF's programs and guides future development. (haitianhealthfoundation.org, 2012)

## **GESTATIONAL AND CONGENITAL SYPHILIS IN HAITI**

Few studies have been done to assess the prevalence of gestational syphilis and the incidence of congenital syphilis in Haiti. Statistics are particularly lacking for rural regions of the country. (Lomotey et al., 2009) A 2006-2007 study sponsored by the CDC estimated the national gestational syphilis rate to be 3.6%. (GHESKIO, 2007) This was consistent with a prior estimate of 3.7%. (GHESKIO, 2004) The prevalence of gestational syphilis was found to be significantly higher in the rural Grand'Anse region at 6%. (GHESKIO, 2007) Interestingly, studies done in another rural area of Haiti, the northern Artibonite region, also showed gestational syphilis rates of nearly 6%. (Fitzgerald et al., 1998 and Desormeaux et al., 1996) Given such high rates of gestational syphilis, rapid testing of all pregnant women with immediate treatment has been proved to be cost-effective in both rural and urban settings in Haiti. If implemented nationwide, this intervention is projected to prevent 1,125 cases of congenital syphilis and 1,223 stillbirths and neonatal deaths each year. (Schackman et al., 2007)

### **Gestational and Congenital Syphilis in the Grand'Anse: Previous Research**

In 2007, a team from the University of Connecticut and HHF conducted a retrospective observational study to assess the prevalence of maternal syphilis and estimate the rate of congenital syphilis in five rural villages in the HHF catchment area. (Lomotey et al., 2009) Of the 410 women in the sample of women screened for syphilis by rapid treponemal assay during pregnancy, 31 (7.6%) were sero-reactive. Average gestation at time of testing was 25 weeks, which correlated with entry into prenatal care at an average of 23 weeks. Women who tested positive during pregnancy were significantly more likely to have had a negative pregnancy outcome than those who did not. Lomotey et al. estimated the rate of congenital syphilis in the

region at 767 per 100,000 live births. (Lomotey et al., 2009) The following case definition, as defined by the CDC, was used:

A case of congenital syphilis is defined as:

- A condition affecting an infant whose mother had untreated or inadequately treated syphilis at delivery regardless of physical findings in the infant.
- An infant or child who has a reactive treponemal test.
- An infant or child with any physical or other evidence of congenital syphilis.
- Syphilitic stillbirth (stillbirth occurring to a woman with untreated or inadequately treated syphilis, with inadequate treatment defined as any non-penicillin therapy or penicillin given less than 30 days before delivery). (CDC, 2003)

Lomotey et al.'s 2007 study showed that the prevalence of gestational syphilis in the HHF rural catchment area to be higher than previously suspected. Furthermore, by demonstrating a statistically significant relationship between maternal syphilis and adverse birth outcomes, the study demonstrated that congenital syphilis is a major cause of perinatal morbidity and mortality in the region. The overarching conclusion was that maternal and congenital syphilis are under-recognized but significant problems in the rural Grand'Anse region. Increased program interventions and public education were recommended.

Delayed initial presentation for prenatal care was cited as a major barrier to reducing rates of gestational and congenital syphilis in the HHF rural catchment area. 11% of women in the study were tested for syphilis within 30 days of delivery, defining them ineligible for adequate treatment by CDC standards. Potential explanations for this delay were speculated to be lack of knowledge about the need for early prenatal care, social and financial costs of leaving work to attend visits, desire to keep pregnancy secret in early stages, and lack of confirmation of pregnancy. The authors recommended further research to improve understanding of prenatal-care-seeking practices of rural Haitian women, as well as enhanced education for women

regarding the importance of early prenatal care. Further studies involving a larger number of villages were also recommended to examine risk factors for gestational syphilis, document barriers to early prenatal care by using ethnographic methods, and develop and utilize methods for more in-depth documentation of congenital syphilis. (Lomotey et al., 2009)

Lomotey et al. noted that the exclusive use of a non-treponemal rapid test was a limitation of the 2007 study, as this assay does not distinguish between infectious and successfully treated syphilis. As a result, HHF subsequently established the aforementioned protocol for referral to the Center of Hope for confirmatory RPR testing and HIV screening of rural syphilis positive women. (Lomotey et al., 2009)

### **III. 2008 RESEARCH PHASE**

#### **GOALS (2008)**

The 2008 research phase was designed to assess the efficacy of HHF's congenital syphilis prevention program in rural outreach zones following implementation of Lomotey et al.'s recommendations, answer questions raised by Lomotey et al.'s work, and consider the 2007 WHO publication *The Global Elimination of Congenital Syphilis: Rationale and Strategy for Action* when making recommendations for improvement. Specific goals were as follows:

- Identify factors that may influence whether women are adequately treated for syphilis during pregnancy.
- Identify potential and existing barriers to syphilis positive rural women presenting for follow up RPR testing and HIV screening in Jérémie.
- Assess the rate of active syphilis among women with positive treponemal rapid assays (versus syphilis adequately treated in the past).
- Determine the rate at which male partners of syphilis positive women present for treatment.
- Identify potential and existing barriers to routine treatment of sexual partners of syphilis positive pregnant women.
- Explore and evaluate the feasibility of implementing additional, child-centered interventions to prevent sequelae of congenital syphilis in infants whose mothers were inadequately treated during pregnancy.

#### **RESEARCH QUESTIONS (2008)**

The following questions refer to rural women who test positive for gestational syphilis by rapid treponemal assay at an HHF rural health post:

- Is maternal presentation for follow up testing and treatment at the Center of Hope associated with higher economic status, partner cohabitation, and history of poor birth outcomes?
- Do all women with positive treponemal assays have active syphilis (demonstrated by positive RPR)?
- Is a treatment protocol for infants born to syphilis positive women feasible?

## **METHODS (2008)**

### **Sample**

The sample was composed of the 162 women from the HHF rural health program who had a positive Abbott Determine rapid syphilis test at a prenatal visit between December 2006 and April 2008. Prenatal syphilis test results had recently been added to PHACT, thus many women were identified from the database. However, data entry was incomplete, and the remaining women were identified from paper prenatal records.

### **Qualitative Data**

The author conducted depth interviews using primarily open-ended questions. Interviews with syphilis positive women and health agents were conducted in Haitian Creole with assistance from a translator. Interviews with HHF nurses, physicians and administrators were conducted in French or English, depending on the interviewee's preference. Handwritten notes were taken during each interview and transcribed into English translations on the same day.

#### ***Interviews with syphilis positive women***

Interviews were conducted with twenty-five women from the study sample. (see Appendix 1) The purpose of these interviews was to:

- 1) Determine perceived barriers to health care access and utilization of health care resources, namely prenatal testing and treatment and treatment of sexual partners, and potential testing and treatment of infants.

- 2) Verify and add to quantitative data collected from PHACT syphilis testing and treatment and infant outcomes.
- 3) Assess women's perceptions of the risk and benefits of syphilis testing and treatment programs for infants and their willingness to participate in such programs.

Women were chosen to be interviewed based on the HHF rural health post schedule and their willingness to participate in the study. Each woman was initially asked about whether she had been to school, whether she worked and about her home life and her family. She was asked about who lived with her, whether or not she had a boyfriend or husband, and about her children: their ages and general health. This segued into a discussion of the woman's past pregnancies and their outcomes. She was asked about her most recent pregnancy and to tell the *istwa* [story] of her first prenatal visit at the rural health post. This was aimed to elicit the sequence of events that occurred when the woman tested positive for syphilis, including counseling, treatment, referral to the Center of Hope and sexual partner notification and treatment. If open-ended responses did not supply this information, specific questions were posed. Finally, the woman was asked whether, if an infant treatment protocol were to be established, she would bring her baby for treatment.

#### ***Interviews with HHF Health Agents***

HHF trained health agents acted as liaisons between rural communities and HHF rural outreach nursing staff. They had a dual role as rural community members and health care workers who understand the goals and logistics of HHF's rural health programs. Thus, health agents were able to provide insight into community perceptions, as well as a unique perspective on feasible improvements to HHF syphilis programs. Health agents were chosen to be interviewed based on availability and willingness to participate in the study. One *Animatrice* [assistant to a health agent] was also interviewed.

Health agents were asked about syphilis positive women in their zones and outcomes for the women, their sexual partners, and their babies. They were encouraged through open-ended questions to talk freely about their experiences with syphilis in their communities. Health agents

were also asked about their role in educating and counseling community members on STIs and, when necessary, providing syphilis treatment. (see Appendix 1)

### *Interviews with Nurses, Physicians and Administrators*

Interviews with nurses, physicians and administrators were tailored to each individual's professional responsibilities. (see Appendix 1) They were asked about perceptions of syphilis in Haiti and the efficacy of various aspects of HHF congenital syphilis program, particularly the newly instituted system of referral of rural women to the urban Center of Hope for HIV and confirmatory RPR testing. Health care workers were also asked about the perceived importance and feasibility of an infant treatment program. The author solicited their opinions and advice regarding the fundamental principles and logistics of policy changes, as well as their collaboration for programmatic improvement. Staff participation has been an essential to the success and sustainability of HHF programs. The Public Health Director described the philosophy behind her monthly meetings with the entire staff:

Communication is key. These meetings give me a chance to check in with everyone: to see what's working and what isn't and what problems people are having. I make everyone talk.

### **Quantitative Data and Statistical Analysis**

PHACT, the HHF database, contains information on each family in the HHF catchment area. Where available, the following parameters were obtained on each household corresponding to a woman in the study sample:

- **Notification:** Whether the man reported (directly to the author or through a health information sheet) that he had been told to present for syphilis treatment
- **Male Treatment:** Whether the man was treated with at least one injection of benzathine penicillin
- **Treatment Given By:** Whether the man received injection(s) from a health agent or a nurse

- **Cohabitation:** Whether a man lived with the woman who tested positive for syphilis. Some of the man cohabited part time because of remote employment, part time cohabitation with another female partner or both
- **Multiple Partners:** Whether the man admitted he had more than one partner (or in some cases, the health agent volunteered the information)
- **Female Treatment:** Whether the man's syphilis positive female partner had received at least one penicillin injection (per the man, health agent, or both)

Data was verified and clarified through interviews with health agents and syphilis positive women. Documentation of follow up testing at the Center of Hope, including RPR and HIV results, were obtained from separate prenatal charts at the Center of Hope.

Data was entered in Microsoft Excel and analyzed using SPSS 16.0. In addition to descriptive statistics, the research model and hypotheses were tested using cross tabulations and chi-square to determine relationships between categorical variables.

## **RESULTS (2008)**

### **QUALITATIVE RESULTS**

#### **Interviews with Syphilis Positive Women**

The following themes emerged from the interview structure and content analysis of responses. Selected quotes illustrate each theme. Creole words and expressions were used to preserve the original meaning and accurately capture concepts.

#### ***Syphilis and its Treatment***

It has been postulated that if a woman understands the potentially severe consequences of untreated syphilis, particularly during pregnancy, she may be more motivated to present for prenatal screening, follow up testing and treatment. She may also be better equipped to explain the importance of treatment to her sexual partner. (Gebrian et al., 2008)



Many women understood that they had received injections as treatment for syphilis infection. One twenty-seven year old woman with five children said:

The HHF nurse gave me shots. They were for a *mikwob* [microbe] in the blood called syphilis.

Others recalled the penicillin injections, but not their purpose. A twenty-eight year old who had three children and whose partner lived in Port-au-Prince said:

The HHF nurse gave me shots. I don't know why.

Many women also understood that untreated syphilis could lead to adverse outcomes for a fetus. However, perceptions of the infection's specific manifestations were vague or inaccurate. One woman whose husband lived in Port-au-Prince with another woman said:

The nurse told me that even if my *mari* [husband, boyfriend or sexual partner] isn't treated I must get the shots to protect myself and my baby. If I don't get the shot, my baby will be handicapped: it could be blind or missing limbs or things like that.

A woman who lived with her husband and five children said:

The nurse told me that syphilis is a *mikwob*. The baby can be infected with the *mikwob* in the woman's vagina and get damage to its bones.

A thirty-one year old woman with four children said:

I was afraid that I would die or the baby would die.

A woman who had six children, two of whom lived with other people, said:

I was very worried, because the nurse said that if I didn't want to get the shot, my baby could be born with one eye or other *pwoblem* [health problems]. The baby's buttocks could be turned inside out.

A woman who said she had gone for prenatal visits every month during her pregnancy said:

The health agent told me that there were syphilis *mikwob* in my blood. She said that if I wasn't treated, my baby could be abnormal. For example, he could be blind or born with one eye. I was worried when I found out about my syphilis test because I know that it is a serious *maladi* [illness, sickness].

One woman with two children who reported having five prenatal visits during her recent pregnancy said:

The nurse didn't tell me much about syphilis. He told me that I got it from my *mari*. He told me that my baby could have *pwoblem* if he gets syphilis: he could be too small, he

could be weak. My husband and I could have *pwoblem*, too. We could be sick, since syphilis is a *maladi*. When I found out about my syphilis test, I was worried about my health and my husband's health. I worried about our children and what would happen to them if we got sick. I wasn't so much worried about the unborn baby.

A thirty-six year old woman with eight children said:

The nurse wanted to give me a shot for a *maladi san*, but she didn't have that medicine with her. I was worried when I found out about my test results. The nurse told me that my baby could have problems: problems with his eyes, arms and feet, and problems with many other diseases. I didn't know what syphilis was. I know now that it can cause problems for me, too, but I don't know what they are.

One woman who lived with her husband and children reported the following occurred at her second or third prenatal visit:

The nurse told me that I have a *maladi san*. If it spreads, I won't feel good. My husband and I received shots, so that the *maladi* wouldn't spread in my blood and become AIDS. People who have AIDS are people that have many *mari* or *madanm* [wife, girlfriend, or sexual partner]. The health agent said that I shouldn't have sex with other partners to protect myself against syphilis. I should remain abstinent. I should do family planning. The health agent also talked to my *mari* about syphilis. I told my *mari* not to see other women.

None of the women reported having signs or symptoms consistent with syphilis prior to their positive screening tests. A thirty-one year old woman who lived with her husband and four children said:

Before my test, I didn't think I had an infection. I didn't feel sick.

A thirty-six year old woman who lived with her husband and eight children said:

The nurse told me that I was having a syphilis attack. I had been having some vaginal itching even before my visit.

Some women were concerned about their positive syphilis test results, but virtually all were reassured to learn that the infection could be treated easily:

I was worried when I found out about my syphilis test, but the nurse told me not to worry because syphilis is treatable.

A woman who lived with her husband and five children said:

I wasn't worried when I found out about my syphilis test because I knew that I would be okay.

A thirty-nine year old woman who had four prenatal visits said:

I hadn't suspected that my husband or I had an STI, and I was afraid when the nurse told me my test results.

Others believed that a positive screening test was not significant. A woman who had one child and a baby that had died said:

I wasn't worried about my positive test because I wasn't sick at all.

### ***Referral to the Center of Hope***

When this research was conducted, HHF had not yet evaluated its new referral policy for rural women with positive syphilis screening tests to receive confirmatory RPR testing and HIV testing. RPR testing was essential to tracking women's response to treatment. It required laboratory facilities and could not be conducted at rural health posts. Since syphilis increases a woman's risk of HIV infection, this screening was also essential. (WHO, 2007) However, HIV testing could not be done at rural health posts because staffing was insufficient to provide pretest and posttest counseling. Thus, it was important to understand what motivated or prevented women from following up at the Center of Hope. It is possible that some women were compliant with these referrals because of the Center of Hope's reputation for excellent prenatal care rather than for syphilis follow up alone. The HHF Public Health Director noted:

Lots of rural women come to the Center of Hope for prenatal care because they think the care is better. And they're right. The care is better. The women talk among themselves and find out about it at the market, things like that.

A thirty-six year old woman who lived with her husband and eight children said:

The nurse told me that my husband needed to be treated. I got some pills [the pills were likely supplements or treatment for another condition, such as worms, as pills are not used to treat syphilis] and for my *mari* when I went to the dispensary three months into my pregnancy. Neither of us got any shots. No one ever told me to go to the Center of Hope.

For some women, the cost of travel was prohibitive. One woman in her early twenties who lived with her parents, siblings and baby said:

I would have had to take a car to get there, and that would have been too expensive.

A thirty-one year old woman who lived with her husband and four children and sold small items and gardened for work said:

I went to the Center of Hope and got a blood test, and a young boy at the reception desk told me to come back at two o'clock with twenty-five gourdes. He said I would have to pay to get my test results. I didn't have any money, so I went home.

A twenty-one year old woman who lived with her baby, parents and cousins and had three prenatal visits at a rural health post said:

The nurse checked my blood at my first prenatal visit. She didn't say anything about the test. I received pills and a shot and was told I had syphilis. When I came back for my next prenatal visit a month later, I received a second shot. The nurse told me to go to the Center of Hope because of the syphilis, but I didn't go because my mother was sick at the time.

When asked why she did not go when her mother recovered, she said:

I don't know where it is.

One thirty-nine year old woman reported a positive syphilis test just before her delivery and said that she did not see the point of following up at Center of Hope after she had given birth:

The nurse told me I had syphilis. She gave me a shot and told me to go to the Center of Hope, but I gave birth so soon after.

Women who went to the Center of Hope generally reported positive experiences. One woman who lived with her husband and five children and reported having nine prenatal visits during her most recent pregnancy said:

I was told I had a *mikwob*, and I got shots at the rural health post several times for the *mikwob*. I also received a letter to go to the Center of Hope and went there because of the *mikwob*. I had a blood test and a vaginal test at the Center of Hope, and the nurse there told me I was fine.

Interestingly, there were women who did not understand the reason for referral but presented to the Center of Hope simply because they were instructed to do so by a nurse. A thirty-one year old woman who said she had many prenatal visits during her only pregnancy recalled:

The nurse gave me a letter and told me to go to the Center of Hope, so I went. I didn't receive any food, but I've heard about other mothers about receiving food. The visit was free. I got a blood test at the Center of Hope, but I don't know what it was for or what the results were. I was told the results would be sent to the nurse at the rural health post, but I never saw her again.

### ***Male Partner Treatment***

Sexual partner treatment had been an essential component of HHF's congenital syphilis prevention program since its inception. However, men's perceptions of venereal and congenital syphilis had never been assessed, nor had their treatment rate.

It appeared that patient education by a health agent or nurse was an important determinant of male treatment.

A woman who lived with her husband and five children said:

The health agent gave my *mari* two shots. He talked to both of us about the *mikwob*. He said we should both have injections before having sexual relations. This was important to our health, he said.

Another woman who lived with her husband and children and reported she had attended monthly prenatal visits said:

The nurse said that I had a *mikwob*, and gave me shots for it. My *mari* got shots, too. The nurse said that if he wasn't treated, too, the treatment would be worthless. The nurse gave me a total of two treatments. I talked to my *mari* about syphilis. I told him it is a serious *maladi*. He could have it in his blood and die if he isn't treated. My *mari* got one treatment.

A woman who lived with her husband and five children said:

The nurse told me that if I get treated, but my *mari* doesn't, it will be like washing my hands and then sweeping the floor with them. The disease won't stay treated. So I got my syphilis shot and came back again a second time for more shots. My *mari* got his shot from the nurse on a different day. If my *mari* has other *madanm*, she need to be treated, too, so we won't get re-infected.

The health agent had a particularly important role in male education and treatment. Men often did not attend prenatal visits at the rural health post with their wives and thus could not be treated and educated by an HHF nurse. Supplies for penicillin administration were left with the health agent:

The nurse at the health post left shots for me and for my *mari* with the health agent. The health agent gave me my second dose of penicillin, and gave one to my husband.

A twenty-five year old woman who had three prenatal visits said:

The health agent told me that I need to come with my *mari*. He has a *madanm* in Port-au-Prince, and the health agent says that she needs to be treated, too.

Some women reported that they were unaware that their *mari* required syphilis treatment. One woman who lived with her husband and baby and had four prenatal visits said:

The nurses never told me that my *mari* needed to be treated for syphilis, so he was not treated.

Remote employment was an important reason that male partners were not treated. Employment opportunities are lacking in the Grand'Anse, and many men *ale vini*, which in Creole means "come and go." They work in a larger city, usually Port-au-Prince and return to the Grand'Anse at intermittent intervals. Most women said that their *mari* would be treated upon their return. One woman whose seventeen year old brother took care of her two children when she was at work said:

The nurse gave me three shots and left penicillin with the health agent for my *mari*, who is in Port-au-Prince. I've told my *mari* about my syphilis test. He says he will come to get the shots, but hasn't been able to yet because he is working.

A twenty-seven year old woman with five children said:

My *mari* is in Port-au-Prince and hasn't been back since I found out about my syphilis test. I'll talk to him about getting treated. I don't think there will be any problem.

A thirty-one year old woman who lived with her husband and four children said:

The nurse told me that my *mari* should be treated, and I talked to him about this. However, he has been too busy working in Léon to go for treatment. He did go to see the health agent, but I don't know what they talked about. I wasn't there, and my *mari* didn't tell me anything. I want him to get treated because he could re-infect me.

A twenty-five year old woman who lived with her baby and her parents, siblings and aunt and uncle said:

The nurse told me that I had syphilis. She said that it's sexually transmitted, and my *mari* needs to be treated with a shot. But my *mari* has been living in Port-au-Prince for the past five years. He comes back to visit every year, but he hasn't been back since I found out about my syphilis test. He said he will come and get the shot in September. There won't be any problems for that.

In contrast to women, men seemed to prioritize work over health. One woman who lived with her husband and nine children reported:

My *mari* said that 'he's working' and he's not going to get the shot.

Several women said that their husbands were influenced by peers to refuse penicillin treatment. A twenty-eight year old woman with three children whose husband lived in Port-au-Prince said:

*My mari* wasn't there on the day of my appointment. Some people in the village gave him bad advice. They told him that if he got the shot, he could have a problem with his penis. He might not be able to have sex. So he didn't get the shot. I know that this isn't true and I told my *mari* so, but he wouldn't accept it. My *mari* isn't very educated. He thinks he will get sick if he gets the shot. I told him to see the health agent, but I don't know if he went. I think he should go. I'm taking medicine. I told him that I could be re-infected if he doesn't get treated, but this doesn't motivate him. He doesn't want go to the Center of Hope because he isn't having any pain.

A twenty-seven year old woman who lived with her husband and baby said:

*My mari's* friends gave him bad advice, and when you walk with people, you listen to them. My *mari* was afraid of the shot and did not want to get it.

As with female treatment, supply shortages and family obligations interfered with male treatment.

A forty year old woman who had two children with her husband (and whose husband had six other children in Port-au-Prince) said:

When I came back to the health post with my *mari*, they were missing some of the materials for the shot—the needle or the syringe, I'm not sure—so they weren't able to give us the shots. He couldn't come back again because his son was sick and he had to go to Port-au-Prince.

### ***Infant Testing and Treatment***

It was important to discuss perceptions of infant treatment and logistics of the process with women before creating and instituting a protocol.

Nearly all women viewed infant treatment as important. The resounding consensus was that,

Yes, I would bring my baby if he could get treated.

Women cited poor birth outcomes as an incentive for having their babies treated for syphilis. One woman who lived with her husband and five children said she was happy to know she could do something for the baby she was about to deliver because:

I've been having problems during this pregnancy: belly pain and trouble swallowing food completely. I had a miscarriage during my last pregnancy. I had a fever and miscarried after two months. I was sick when my first baby was born. I was getting better, and then my baby died. He hadn't been sick. His eyes just rolled back in his head and he passed out in my arms. I took him to the hospital.

Ideally, women would bring their infants to the Center of Hope for full evaluation, including RPR testing. However, for many women with few resources who lived in remote areas, travel costs were an issue. One woman with three children who did not live with her husband said:

I would want to like to bring my baby to the Center of Hope to be tested and treated, but it would just be too expensive.

### **Interviews with Health Agents**

The following themes emerged from the interview structure and content analysis of responses:

#### ***Community Involvement and Health Monitoring***

Health agents reported living in their zones for all or most of their lives. Their stories demonstrated that they were respected and integral members of their communities and well attuned to local health outcomes. When asked about prenatal care and pregnancy outcomes for specific women in their zones, health agents reported the following:

The woman had her first shot at the rural post and then went to the Center of Hope for her second treatment. I treated her partner with two injections. The woman has four healthy children now.

The woman received her first injection from a nurse at the health post, and I administered a second injection. The woman was in Port-au-Prince with her *mari*, but she came back before she delivered the baby. The baby was born two months ago. He is her first and is healthy. The husband is still in Port-au-Prince.

A health agent with ten years of experience talked about a woman her zone:

I told her to go to the prenatal post when she was pregnant. She went and received her first shot. She was referred to the Center of Hope, but did not go and never received any more treatment. She is not in good health. She is small and weak and continues to lose weight. She has a vaginal infection, and I referred her to a doctor at the nearby dispensary. She will go tomorrow. Her baby is small and weak and has had an eye infection since birth.

The same health agent described a different woman in the zone:

This woman is very, very underweight. She has three children, and she is pregnant again. She had her first prenatal visit and first penicillin shot at our local health post. She had the second shot eight days later at another rural post. Her *mari* had his first shot when the woman had hers, but he was not present for her second visit because he was with his other *madanm*. The woman is aware that her *mari* has two *madanm*: sometimes he is with her, sometimes he is with his other *madanm*. The second *madanm* lives *an deyo* [far



away, or outside the HHF catchment area] and was not treated at all. I will talk to the man about getting shots for his second *madanm*.

The woman tested positive for syphilis at her prenatal visit. I gave her two penicillin injections. The nurses gave the patient a letter telling her to go to the Center of Hope. She went, but it was a holiday for HHF and she was not seen. The baby was born a couple of weeks ago and is very healthy. The woman had another baby before, but that baby died.

Health agents were also knowledgeable about women who came from *an deyo* [far away, outside of the HHF catchment area]. A health agent with ten years of experience said:

That woman comes from *an deyo*. She went to the Center of Hope and stayed to have her baby. She does not have a *mari* at home, so no partner was treated. Her baby is in good health. She has other children, but I'm not sure how many.

This woman lives *an deyo*, but she received injections twice from the nurse at the health post. I talked to the *mari* about syphilis and gave him one injection. The woman went to the Center of Hope for delivery because of advanced maternal age.

Health agents also observed epidemiologic trends in their zones. A health agent with ten years of experience attributed the high syphilis rate in her area to migrants from the capital city:

There are a lot of women from Port-au-Prince here. A lot of them are positive. But syphilis is rare among women that have always been in the area.

### ***Syphilis Education and Treatment***

One of the health agent's roles was to facilitate mothers' and fathers' groups, which provide a forum for discussion of health issues such as STIs. Some health agents said that they also used the groups as an opportunity to address the issue of syphilis with affected couples. In addition, some health agents were trained to administer penicillin injections. (Others who did not have adequate experience or skill were required to refer patients to a nurse for this.) A rural nurse described this process:

Usually I leave the penicillin for the woman and her partner with the health agent. The health agent knows everyone, so he will make sure that the right woman gets the treatment. The health agents know how to do intramuscular injections and that sort of thing... The health agent tells the nurses, sometimes in writing, that the treatment was administered.

An *Animatrice* [assistant to a health agent] with seven years of experience described procedures in her zone:

When a woman here tests positive for syphilis, the nurse gives her an injection of a medicine and refers her to a dispensary or to the Center of Hope. The *mari* is given an appointment with the nurse to have the same shot as the woman. The health agent talks to the *mari* and *madanm*. He tells them to take medicine and come to their appointments. The mother takes the medicine in order to protect the baby against the *maladi*.

The *Animatrice* talked about her role as a health educator:

I do education on topics like family planning and HIV/AIDS. I work with mothers' groups, fathers' groups and youth groups. I measure babies' weights and give them vitamin A treatments.

When asked what she told community members about syphilis, she said,

I tell them about the signs and symptoms of syphilis: body itching, vaginal itching, lesions on the vagina, vaginal burning, burning during urination. I tell them what they can do. They should get a test if they have symptoms. They should also go to the Center of Hope.

When asked what was done when a woman in her zone tested positive for syphilis, a health agent with ten years of experience said:

She is given counseling, sometimes by the nurse, sometimes by me when she comes to see me for her second shot. The nurse leaves penicillin for the women with me. I had two people come to my house this morning for their penicillin shots: a pregnant woman who tested positive for syphilis last Tuesday and her *mari*. I gave them their shots and recorded it in the notebook to send to HHF. This is a new thing in our zone, this notebook.

She then described her role in community STI education:

I talk to many different groups about syphilis: mothers' groups, fathers' groups, groups at the dispensary, youth groups, groups in the 'health community,' such as the 'emergency community.' Especially with the youth group, I also talk about other infections. The advice I give is if you have sex, don't do it with just anyone. You should only have sex with your *madanm* or *mari*. It's important to be monogamous. People should go to the dispensary if they have signs or symptoms of infection. With syphilis, they might have *bouton* [sores, skin lesions] where the *mikwob* entered that later go away. The *mikwob* stays in the blood and can attack and cause *bouton* and *pwoblem* in the blood. There are three stages of syphilis: primary, secondary and tertiary. People with secondary or tertiary syphilis need to go to the dispensary. I tell people that if they have multiple partners, they should use condoms. No one will tell you all of his secrets, about all of the *maladi* he has, so you need to protect yourself.

If a pregnant woman has syphilis, the baby can have *pwoblem*. It can die inside the mother, it can be born with an eye infection, or it can have arm or foot weakness. Here, we treat the mothers with penicillin as a means of prevention. HHF works a lot on prevention. If a baby does get sick, the baby has to go to the dispensary.

The health agent said that she learned to give penicillin injections to adults,

At the health agent school [HHF training program]. That is also where I learned how to do syphilis education.

A health agent with ten years of experience who had always lived in her zone said:

When a woman tests positive, the nurse tells me about it and refers the woman to the Center of Hope. I know of seven or eight women in my zone who are syphilis positive. I meet with mothers' groups on Sunday, and talk to the syphilis positive women separately. I tell them to bring their *mari* to me to be treated with injections. Some of the women bring their *mari*, and some do not. When the women bring their *mari*, I give them an appointment for treatment at the rural post. It is impossible for the *mari* to go to the Center of Hope like the women, but they can go to the post.

She added that since syphilis had become so prevalent in her area, she planned to provide additional community education:

On Saturday, I will hold an education session on syphilis. I will talk about what can happen if syphilis is not treated. The *maladi* can last and the baby can have *pwoblem*, especially with the eyes. I will also explain that it is important for the *mari* to be treated, and if he has other partners, for him to tell his other partners, as well.

A health agent with ten years of experience who had lived in her zone for twenty years said:

I know of five syphilis positive women living here. I run four mothers' groups and one fathers' group, and I meet with them each month to discuss different topics. When there is a positive syphilis test, I talk to the groups about the importance of treatment for mom, dad and other partners. I never give the penicillin injections myself because I haven't been trained to do it.

A woman who had always lived in her zone and had been the health agent for ten years said:

When a woman tests positive for syphilis, the nurses tell me about it. I know about two women here who are syphilis positive. One has left the area and one is still here. I am learning right now how to give penicillin injections.

A health agent of five years who had always lived her in her zone pointed to fathers' groups as a key means of providing health education to men, who, unlike women, did not regularly access the health care system:

I feel that fathers' groups are particularly important in raising men's awareness of syphilis and encouraging partner treatment. I will talk to my mothers' and fathers' groups about syphilis this Saturday.

### ***Barriers to Elimination of Congenital Syphilis***

In telling the stories of women in their zones with positive syphilis screening, health agents described what they viewed as obstacles to maternal and male partner treatment.

One health agent with ten years of experience attributed a poor birth outcome to delayed maternal presentation for prenatal care:

She was pregnant with her seventh child and tested positive for syphilis at her prenatal visit. She received two injections before going for her visit at the Center of Hope. She waited a few days before going for her visit, and was told that it was too late for her to receive any more treatment. She was given food rations, as promised. Her *mari* was treated with one shot, but did not receive the second shot because it was too late. The baby is very weak and is not gaining weight. He has many *bouton* [skin lesions, sores].

One health agent with five years of experience expressed frustration with a woman in his zone whom she felt was at risk for re-infection and continued poor birth outcomes:

This woman is a prostitute. She has many partners. I have talked to the woman and her true *mari*. I told the woman to use a condom when she sleeps with her other partners.

Another health agent with ten years of experience described a similar struggle with a mentally handicapped woman in her zone who had many sexual partners:

The woman is 'crazy.' She stays with her grandmother, but she gets around. Many men take advantage of her. I knew that she was syphilis positive. She has many partners. I don't know anything about her first child, since she was in different zone before. The second baby is still at the Center of Hope because the woman can't take care of him. I've heard that people here have offered a house to her grandmother. HHF will give the children to the grandmother.

Health agents also expressed frustration with couples they viewed as *pa motive* [unmotivated] or *negligent* [negligent, careless] to attend to their health. A health agent with five years of experience who had always lived in his zone cited two specific cases:

The woman was referred to the Center of Hope. She said she would go, but didn't. It was not due to a lack of money. I talked with her partner about getting treatment, but he said he had no time to go. He said he had too much work. He was *pa motive* by the prospect of re-infection.

This woman is still pregnant. She had one treatment in May or June, but she has been *negligent* and has not come back for more treatments. She may come to the health post on Monday or Tuesday. Her *mari* has not yet been treated, and I have not yet spoken to him. The woman has given birth to five children already, and one died.

For some women who were *motive* [motivated] to seek comprehensive prenatal care, health agents noted that cost could be a barrier to syphilis treatment and follow up:

This woman had eight prenatal visits in our zone. She received her first treatment at a health post. She was referred to the Center of Hope, but didn't go. She did not have

enough money to pay for transport. Her *mari* was treated on another day at a different post. The baby was born about three months ago and is in good health. The woman's first baby died, but she has three healthy children now.

Occasionally, health agents were misinformed about HHF protocols. When asked about referral of syphilis positive women to the Center of Hope, one health agent with ten years of experience responded:

There is no need to send them to the Center of Hope. We do all of the treatments here.

While it was true that the health agent could administer syphilis treatments, it appeared that she was not aware that women were referred for confirmatory RPR and HIV testing.

A health agent with ten years of experience talked about a man who received one syphilis treatment refused to subsequent penicillin injections:

The woman had a positive syphilis test at her prenatal exam and was treated with a first dose of penicillin. Her partner was also treated with one shot. The woman was referred to the Center of Hope and went for her visit, where she received another shot and 'medicine.' [iron supplements were the most common pill given at prenatal visits] The health post nurse told the *mari* to come back for a second treatment, but he said the first shot was too painful and didn't come back."

In this case, the health agent worried that the man's insufficient treatment may have caused his child to be infected with congenital syphilis:

The baby was born in 2007, and since birth, has had many *bouton* [skin lesions, sores] and an infection and pus in its eyes. The woman hasn't had any stillbirths or miscarriages, and none of her babies have died, as far as I know. She is currently pregnant again.

[While it is possible that this child had congenital syphilis, it was unlikely that its father's failure to present for a second penicillin injection was the cause. A single injection is usually sufficient to prevent syphilis transmission to a fetus, although in some cases this is inadequate to prevent sequelae in infected adults. (WHO, 2007)]

Health agents echoed syphilis positive women in implicating health post supply shortages and remote employment as barriers to male partner treatment. In the case of one man in her zone, a health agent with ten years of experience cited both as issues:

The woman went to the Center of Hope several days before the baby was born. Her *mari* has not been treated. The HHF nurses have not given me the penicillin shot to treat him. I

talked to the *mari* and he agreed to go to the rural post for treatment, but now he is living *an deyo*. When people live that far away, it is hard to communicate with them.

When asked about a male partner in her zone, a health agent with ten years of experience said,

The *mari* is in Port-au-Prince and hasn't been back for treatment.

Health agents also agreed with women that convincing asymptomatic men to comply with syphilis treatment was challenging. One health agent told the following story about a man in his zone:

The *mari* was not treated because according to him, he is not sick. I've invited him to come and talk with me on Sunday.

He added that a health agent may have more influence over a man than his wife in these matters:

Sometimes, a *madanm* talks, and her *mari* doesn't listen, but he will listen to the health agent. I will talk to him about syphilis and how it is transmitted and treated. Both *mari* and *madanm* need to be treated for the treatment to work. The shot is expensive. It is free to the patient, but it is expensive for Sister Maryann [the HHF Administrator] and HHF.

A health agent with ten years of experience described how she educated a man on syphilis to facilitate his compliance with treatment:

The nurse treated this woman with two injections of penicillin. The woman also went to the Center of Hope. I gave the *mari* one injection, and he was in agreement with the treatment. I told him that he has a treatable *mikwob*. If he is not treated, the baby can have *pwoblem*. The baby can have eye problems and be blind. The mother can have more babies with health problems. Any other partners need to be treated, too, or the disease will not go away. The baby was born and is healthy. I don't know if the couple has any other children.

The same health agent then shared an instance in which she was unsuccessful in reaching out to a man in her zone:

I treated the woman with two penicillin injections, but I've had a lot of problems with her *mari*. He came to my house, and I told him to come back for an injection, but he would not accept this. He said he is not sure that his *madanm* is really sick. He has many partners, the *mari*. The woman has two healthy babies already, and is in the last month of her current pregnancy.

In several cases, women moved out of their zones and were lost to follow up. Three health agents, each with ten years of experience cited cases in their zones:

That woman went to Port-au-Prince. I don't know what happened to her.

I know that woman, but I don't have any information on her. She lives in Jérémie now.

That woman lives *an deyo*, so I do not know much about her. She needs to come to a health post to be re-censused. I do know that she want to the Center of Hope for treatment, but her *mari* was not treated.

### **Interviews with Nurses, Physicians and Administrators**

With the exception of a resident and attending physician from the Hôpital Saint-Antoine, all interviewed and quoted staff were HHF employees and worked as administrators or care providers at the HHF Clinic, Center of Hope or rural outreach zones. The following themes emerged from the interview structure and content analysis of responses:

- Prevalence of Congenital Syphilis
- Syphilis Education
- Documentation
- Creating an Infant Treatment Protocol
- Concerns for Anaphylactic Reaction to Penicillin in Infants
- Sexual Partner Notification, Treatment and Education
- Condom Use

### ***Prevalence of Congenital Syphilis***

Lomotey et al.'s 2007 work estimated the rate of congenital syphilis at 767/10,000. The author sought to determine whether health care workers think congenital syphilis is an issue in their area. The Behavior Change Coordinator described a child he felt displayed the classic physical signs of congenital syphilis:

I have seen one child I was certain had congenital syphilis. I may have seen others who had the disease and were sick but did not present with distinctive diagnostic characteristics. This particular child was three or four years old and had skin eruptions that were inconsistent with impetigo. The child tested positive for syphilis by rapid test. The mother had not been tested during her pregnancy. I referred the mother and child to the hospital, but they were unfortunately lost to follow up, as they were visiting from Port-au-Prince for only a few days.

A nurse who had worked for seven years at the Center of Hope was asked if she had ever seen a baby with signs of congenital syphilis:

No, the babies are always in good health.

However, she noted that her experience was limited:

We don't see what happens to the babies. The doctors take care of that.

When asked about his clinical experience with congenital syphilis, the Medical Director responded:

Honestly, we haven't had a single documented case at HHH.

A graduate of Haiti's public medical school with a Social Service appointment at HHH discussed her experience with congenital syphilis:

Most of what I know about congenital syphilis is from the literature: Harrison, Cecil. I had a professor for infectious disease in medical school. He covered all infectious diseases, even those that are never seen in Haiti like Lyme disease. We talked about syphilis during that course, and there was a section on congenital syphilis. I didn't see much syphilis during my internship. I saw syphilis in adults, and have done RPR screening in pregnant women.

I've only seen two cases of congenital syphilis, and both were during my rotation on the obstetrics service. I didn't have a chance to follow up on either one. The first time, when the woman delivered, the fluid was completely discolored. It was white. The attending physician said to the staff, 'Okay, now we're going to put on some more protection.' After that, the rest of the delivery was normal. The child had an RPR... At the *Hôpital Justinien* in Cap-Haïtien, an RPR was recommended for all newborns. The second time, the child was already born. When I saw the baby, it was several days old. It had purulent secretions coming from its nose. It had a little fever, too, maybe thirty-eight degrees, but otherwise it didn't have any symptoms. The attending physician spoke to us about the difference between nasal congestion and the snuffles. Nasal congestion results from the nose's normal secretions. The snuffles are purulent secretion associated with syphilis. I didn't see any cases of congenital syphilis during my pediatric rotations. I know that the protocols where I was working called for RPR testing of children, but I never witnessed the treatment of a child with congenital syphilis. I know that for mothers, we give 2.4 million units of benzathine penicillin: half a vial in each buttock. We do this for three weeks, so that means additional treatments at days eight and fifteen after the initial treatment. If the woman is allergic to penicillin, we treat with erythromycin. If the mother is treated with erythromycin and not penicillin, the baby must be treated with benzathine penicillin at birth. I don't know what the dose would be, or the injection site. I don't think about congenital syphilis because I've seen so little of it.

The physician noted that the prevalence of syphilis among pregnant women was high:

We usually give the results of fifteen syphilis tests each day, and at least one or two are positive.



She noted that due to its protean clinical manifestations, syphilis was likely under-recognized:

On some level, people know, but they don't think about syphilis. We give all pregnant women at the Center of Hope RPR and HIV tests. We always discover these diseases by chance. One difficulty is that the signs of syphilis are not clear enough for us to educate people on how to look for it. I had a patient here, a pregnant woman who refused penicillin treatment. I told her that she had syphilis, and she didn't want the treatment. I don't know why. Maybe it was because she was pregnant. People have strange reasons for refusing treatment. The woman left without medicine. Unfortunately, the doctor's job is to recommend.

### *Syphilis Education*

It was important to understand the types of language and methods health care workers used to provide education. The author also sought to understand the effectiveness of different approaches.

A rural nurse said he told women with positive syphilis screening tests:

...about the health risks of syphilis for her and for her baby. About how the disease is transmitted and how important the treatment is both for her and her partner. If she's positive, her partner definitely is, too. If the partner isn't treated, too, she'll only be re-infected again.

When asked if he thought most women understood what he told them, the nurse said:

It depends. It really depends on the level of education and knowledge.

A rural nurse supervisor talked about what was done for women with positive syphilis tests at rural health posts:

We give the woman three shots. We leave shots for her and her husband with the health agent, if necessary. We also give counseling. We tell the woman how important it is for her to be treated and how important it is for her partner to be treated. If he has any other partners, they need to be treated, too. Otherwise the treatment is worthless. We talk about the signs of syphilis and tell her that she could transmit it to her baby. The baby could be born blind or with malformations, such as a missing arm, leg or foot. There is also an increased risk of stillbirth.

A nurse midwife from India with six years of experience at HHF said:

It is not enough to say to a woman that she has syphilis and needs treatment. People are not educated, and they don't know why they need to be treated. They don't understand the importance... Also, there are some education topics that need to be addressed every day [during daily prenatal education sessions at the Center of Hope]. It doesn't have to take long, maybe five minutes per day. But if it's not done every day, there are people who will miss it. Women need to be informed of the specific consequences of not being treated properly: for them, for their partners, for their babies. This is the most important thing, and it's not done. I think that a lot of the nurses don't even know what can happen

to a mother who isn't treated and her baby. We need to educate the nurses, and then the mothers. The nurses are ready to help, but we need to teach them more about this first.

A nurse at the Center of Hope with twenty-six years of experience said:

Most pregnant women with a positive syphilis test are in the first stage of the disease, which means they are not yet sick. They don't have a rash, which appears during the second stage, or any of the more serious symptoms of the third stage. We try to do a lot of education to increase the woman's and her partner's awareness. This is a sickness that can cross the placenta and infect the baby, like AIDS. The baby could be stillborn or become sick. The mother could go crazy if she isn't treated. Both the mother and her partner must be treated. We treat them with one vial of benzathine penicillin. They have an appointment eight days later for the second dose and eight days after that for the third dose. They both need three doses to be completely cured. If the couple is from a rural area, the treatments can be continued by the health agent. Follow-up is very important to ensure that both the mother and her husband receive all three doses. It's important to protect everyone: the mother, the baby and the husband. Usually the mother comes every month for her prenatal visit. If she doesn't come back or her husband doesn't come back for a syphilis treatment, we write to them.

A nurse with seven years of experience held daily health education sessions at the Center of Hope and talked to about syphilis education and management at the urban clinic:

*Part of my job is to conduct education sessions about different topics. It's important to educate people about sexually transmitted infections. We educate all pregnant women and sometimes their husbands. We hope that women convey the messages to the husbands that don't come. I talk about syphilis once or twice per month. There are several key messages that I try to convey. Syphilis is a sexually transmitted infection which is dangerous for a pregnant woman because it crosses the placenta. Syphilis has three stages, and the third is very dangerous. There are things I tell women to do to prevent syphilis. Fidelity is important. They should have one partner only. They should get an RPR and HIV test before having sex with a new partner. There is AIDS to worry about, too. I tell everyone that they should have an RPR and an HIV test. These tests are free at the Center of Hope. There are people that do this. We have people that come for this just about every day.*

Women that test positive at the Center of Hope are usually in the first and second stages. Sometimes they have symptoms, and sometimes they don't. Most commonly we see a chancre or a rash. All pregnant women at the Center of Hope are tested by RPR. Treatment is three doses of benzathine penicillin 2.4 million units, half the vial in each buttock, with eight days between doses. It's the same for the woman, the man, and all other sexual partners. If the woman and her partner are not treated, the baby could die or be born with malformations. The woman could have a stillbirth.

HHF had established *mesaj* [key messages] to standardize health education on topics such as childhood diarrhea and pneumonia. (Gebrian et al., 2008) The author asked the Behavior Change Coordinator about key messages to guide syphilis education:

We don't really have the *mesaj* established yet. In the past, we've always combined syphilis with AIDS education. Separating it out is new. Right now, we are mostly brainstorming. I recommend that we establish *mesaj* for syphilis education. We should print them on laminated cards and post them at the Center of Hope to make everyone aware of these messages.

### ***Documentation***

During initial clinical observations and quantitative data gathering, the author observed discordant information on women's syphilis test results and treatment in PHACT, paper prenatal records, and patient lists. The author solicited health care workers' advice in improving documentation systems to ensure quality of care.

One rural nurse commented on the complexities of documenting syphilis treatments given to rural women by multiple providers, namely HHF nurses and rural health agents:

This is a complicated system, and things don't always get documented the way they should be.

The nurse midwife from India recommended:

What we need to do is to keep better track of treatments. This could be done with a paper stapled to the vaccination card. The woman keeps the vaccination card with her. This way, treatments that are given by the health agent in the absence of a nurse will be documented.

### ***Creating an Infant Treatment Protocol***

Multiple issues were addressed during the process of creating an infant treatment protocol:

- Perceived necessity of an infant treatment protocol
- Logistics, including staffing, infant injection site, necessary materials, and calculation of weight-based dosing.
- Perceived safety of infant treatment with intramuscular penicillin

When asked about HHF's management of infants born to syphilis positive women, the Obstetrics Coordinator, a nurse midwife said,

In terms of the baby, we do nothing. We don't give intramuscular penicillin to babies because there are too many risks.

A Center of Hope nurse with twenty-six years of experience said:

For mothers who are negligent and aren't treated completely, I would like to test the babies to see if the disease has been transmitted. However, we don't do this yet.

A new physician with a Social Service appointment at HHF said that at the Center of Hope:

A problem is that many women come late. We should be doing RPRs on the children. There is no reason not to. The tests are accessible. I don't know if they are free for the woman, but there is an organization that gives them to us at the Center of Hope for free.

Some nurses hesitated to comment on the feasibility of infant penicillin treatment because they felt such decisions should be deferred to a superior. When asked about the possibility of treating infants with benzathine penicillin, a nurse with seven years of experience at the Center of Hope said:

You'll have to check upstairs with the doctor or with the head nurse. The baby can be treated with crystalline penicillin. It might be possible to treat with benzathine penicillin, too. I'm not sure. It would be a different dose for a baby... It's still an intramuscular injection, though.

A rural nurse supervisor said:

That is for the doctor to decide. The nurse doesn't give treatment orders. The nurse carries out the doctor's orders.

One nurse said that he would feel comfortable administering intramuscular injections to infants regularly as part of a syphilis treatment protocol because:

I know how to do it. I treated a baby with several intramuscular injections of a cephalosporin for an infection. It worked. He got better.

When asked if HHF had a written syphilis testing and treatment protocol, the Medical Director responded,

Not yet, but I'm hoping that your research will help us justify one... Right now, there is no protocol for the screening of all babies: only for symptomatic babies who are seen at the Center of Hope. We have to do an RPR on the babies because the rapid test is not recommended for them. There is the problem of maternal antibodies to keep in mind, in terms of testing. If an infant tests positive, the baby is sent to the local hospital for a physical exam. Most, I would say eighty percent, of these children don't receive any treatment. The ones that are treated receive procaine penicillin injections each day for ten days. [as recommended by the WHO for infants with physical or serologic evidence of congenital syphilis] There aren't currently any protocols for infants involving benzathine penicillin. But we might try another protocol at the Center of Hope using benzathine penicillin. Both the RPR and HIV tests are PEPFAR-funded, [he added, implying that infant treatment at HHF would be financially feasible].

A resident pediatrician at the local *Hôpital Saint-Antoine* confirmed hospital policy for treatment of congenital syphilis:

If a baby has symptoms of congenital syphilis upon physical examination, we test the child for syphilis using an RPR. If the RPR is positive, the child is treated with ten days of procaine penicillin intramuscular injections.

When asked if anything was done at the *Hôpital Saint-Antoine* to prevent poor outcomes in infants born to syphilis positive women, the pediatric resident responded:

You mean babies without symptoms? No.

An attending obstetrician gynecologist at the *Hôpital Saint-Antoine* said:

It isn't necessary to do anything [for asymptomatic infants born to syphilis positive women].

For HHF's protocol, the Medical Director advocated the following:

We should test all children of syphilis positive mothers by RPR. Then we will examine the children. Children with normal physical examinations will be treated using benzathine penicillin. Children with abnormal physical examinations will be treated with procaine penicillin.

Initially, the HHF Director resisted presumptive treatment of infants at rural health posts, even for those who lived *an deyo* and were unable to present to the Center of Hope for RPR testing:

I don't think we should treat without an RPR.

However, he said that if the WHO recommended universal presumptive treatment, he would be amenable to instituting such a policy at HHF:

I will go along with whatever the literature says. It is not up to me to make this decision: it is up to the literature.

To ensure quality of care, the HHF Medical Director recommended that the new protocol be as specific as possible:

It won't be a problem for me to write a protocol, including dose, the size of the needle and injection site.

Health care workers were asked about how intramuscular injections of penicillin should be performed in newborns so that this could be specified in the protocol. Initially, the HHF Medical Director suggested:

Injections in the buttocks, just like adults. It's not too much medicine.

A pediatric resident at the *Hôpital Saint-Antoine* commented on intramuscular procaine penicillin administration to infants:

The injection is administered into the baby's thigh.

A nurse at the Center of Hope with twenty-six years of experience and had given intramuscular injections to babies said:

You have to take precautions. An adult, you can just stretch the skin flat and give the injection. For the baby, you need to pinch up the skin, like this, to make sure that you don't hit bone. [When asked specifically about the safety of penicillin administration] I don't know if it would be okay for the baby.

### ***Concerns for Anaphylactic Reaction to Penicillin in Infants***

The HHF Medical Director was concerned that nurses were not comfortable administering penicillin to infants:

I do prefer the hospital for first-time penicillin injections because of the risk of allergic reaction. The nurses at the Center of Hope aren't completely comfortable with the administration of penicillin because of the possibility of allergy. It is not the size of the dose they are worried about. It is only in the hospital that comprehensive management of an allergic reaction is possible

However, he did note:

We have a well-established protocol at the Center of Hope for cases of allergic reaction. The protocol includes different dosages [of epinephrine treatment] based on age and size.

A nurse with seven years of experience at the Center of Hope expressed her concerns about administering penicillin to infants:

Penicillin is a very strong drug. Even adults need to eat before they take it. There is also the possibility of allergic reaction.

When asked what might happen during an allergic reaction, she said:

Loss of consciousness, a rash, the heart can stop beating. Many things can happen. The person can die if he doesn't receive the antidote. These reactions can happen in an adult, too. Usually an allergy is known, and we use erythromycin instead of penicillin. That is a danger with a baby: we don't know if he is allergic. [For treatment of allergic reaction] we give a phenergan injection. There is a protocol for that, too. I've never had to do it, but I've heard stories from colleagues who have. It happens... Something like that would be better done at the hospital, but...I could do it if I had to.

The HHF Behavior Change Coordinator agreed that

The main concern in administering penicillin to an infant, as well as to an adult, is an ‘allergic reaction’ or ‘shock’ during which the person falls on the floor. It is important that all health care workers carry epinephrine or a similar medication to counteract these kinds of reactions.

HHF’s Public Health Director noted that the issue of anaphylaxis was particularly important in the rural setting:

Nurses are trained to be terrified of anaphylaxis. We’re in the middle of nowhere here at the health post. If you give someone a shot, and that person dies, it’s your fault. You are blamed for it.

When asked about the potential sequelae of penicillin allergy in a newborn, the HHF Medical Director described:

...a tremendous range. Reactions like a skin rash are completely banal. Other reactions, such as cardiac arrest and respiratory problems, can be fatal. The nurses at the Center of Hope don’t always feel prepared to deal with a reaction like this...There aren’t always doctors around, especially not trained doctors.

The HHF Medical Director suggested adding indications for management of infant anaphylaxis to the syphilis treatment protocol. He maintained that if nurses felt well prepared for the worst case scenario, they would be more comfortable treating infants with penicillin:

Our goal with this protocol is to instill confidence in the nurses make them feel comfortable that they know how to administer these injections and what to do in the case of an adverse reaction.

When asked about the risks associated with penicillin use in newborns, an HHF rural nurse with experience giving intramuscular antibiotics to children said:

There is always the possibility of allergic reaction. But this is very rare. I forget the exact figure, but I think it is something like one in a thousand. So I wouldn’t be worried...I would feel comfortable [giving penicillin treatments at rural health posts].

One HHF nurse was asked about the use of intramuscular epinephrine to counteract anaphylaxis in children:

Epinephrine? I don’t know. I would have to see the literature on that.

### ***Sexual Partner Notification, Treatment and Education***

While the author posed few questions about male sexual partners, health care workers were vocal in expressing their opinions on the topic.

The HHF Behavior Change Coordinator asserted:

I see the treatment of sexual partners as one of the most important and pressing issues in effectively treating pregnant women and avoiding transmission to babies.

When asked if most syphilis positive women brought their partners to be treated, a rural nurse said:

Most of them do. Except the ones whose partners are in Port-au-Prince...There is a huge migration going on. Lots of men go there to work.

The nurse at the Center of Hope with twenty-six years of experience described procedures at the urban clinic:

Sometimes the husbands don't want to come. We write to them if we have to. We tell the treated mothers not to have sex with their husbands until the husband has been treated, too. Otherwise, the treatment will be useless and she will have to receive another course of three injections. Her body could become resistant to penicillin if she is given too much, which isn't good...We also tell both the husband and the wife that they must bring any other partners to be treated.

Another nurse who had worked at the Center of Hope for seven years added:

Most syphilis positive women who receive testing and treatment at the Center of Hope bring their partners for treatment. Some of the partners are resistant. Then we send them a letter. That is usually effective... Men are more reticent, especially in Haiti. We talk to them, and they finish by accepting the treatment.

She described experience with one couple:

The woman brought her husband for treatment, and he refused because he hadn't eaten. So I gave him some food and he accepted the treatment with no problem. He and his wife both came back for two additional treatments.

When asked if most women with positive syphilis screening at the Center of Hope brought their partners for treatment, a young physician said:

Sometimes the partners come in for treatment, and sometimes not. Usually, if I see a man at the Center of Hope, he is there for syphilis.

She described her perceptions of the barriers to male treatment:

It's the social stigma. They're ashamed. Or the man doesn't believe his wife. When a man is in a union libre [living with a woman but not married], he isn't always attached



enough to comply. There isn't enough education. We only tell them that syphilis can cause the woman to lose her baby. We talk about AIDS, AIDS and AIDS only.

HHF's Behavior Change Coordinator described his perception of the barriers to male partner treatment:

About 40% of men come for treatment. Many of the men are asymptomatic and do not understand why they should come to the clinic if they are not sick. There is also the problem of shame associated with having an STD that might prevent a man from coming in for testing and treatment...It is important to address the psychological issues that accompany this issue. Men are more reticent than women to come in for testing and treatment...It is important when counseling these men to avoid any words that might imply blame. Also, the health care worker should take the man aside and talk to him in a separate room about his sexual history. If he has other partners, he should bring those partners in, as well. He is told to avoid sexual contact until everyone is treated. Universal awareness is extremely important. The more that men and women know about syphilis testing, outcomes and treatment, the more likely they will be to comply with treatment. The process can cause problems at home, but this usually resolves quickly, within three days or so.

A new physician with a Social Service appointment at HHF advocated for increased outreach and education for men:

We need to direct men's education toward STIs and tell them about the consequences that affect them personally. Then they'll be interested. Telling them that their wife could lose the baby isn't scary. However if we talk about the direct relationship to themselves, if we say that they are putting themselves at risk for other diseases like AIDS, then they will listen. We can use the current milieu for additional syphilis education, but we need to do more of this education in the mountains. Not many men come to the Center of Hope. By doing this education at rural health posts, we will reach many more men.

When asked if fathers' groups played a role in fulfilling this need, she said:

They don't really exist for health education. Health is really considered the woman's domain. Men are grouped more to talk about politics, things like that. We need to invite the men to talk about health issues. We need to focus their education on STIs because that will interest them. Men aren't interested in vaccinations and things like that.

### *Condom Use*

The author learned of HHF's policy on condoms after the start of the 2008 research phase.

The HHF Public Health Director explained that the organization does not promote condom use because of its ties with the Catholic church:

HHF can't hand out condoms or officially promote their use because HHF built on bishop's land and because the HHF Administrator must follow the Bishop's and Pope's ordinances.

However, she felt that this policy was not a major problem, given the traditional Haitian perception of condom use:

There is a tradition in Haiti of using condoms with a mistress and nothing with one's wife. Telling a woman to use condoms is like calling her a whore.

The Behavior Change Coordinator inferred that abstinence could be recommended an alternative to condom use. He nonetheless mentioned "barrier methods" to block STI spread:

...Syphilis positive men and women are told to refrain from sex or use a barrier method... These precautions must not be abandoned until all partners are treated.

One rural nurse said that he recommended that women use condoms if their husbands *ale vini* for employment and returned home for a short visit:

We tell those women to use a condom if the partner comes home for a short trip, even though HHF does not support this method of family planning... They need to protect themselves from re-infection. We also tell the woman to write a letter to her partner to inform him of her syphilis-positive status and that he and any other partners he has should be treated.

## QUANTITATIVE RESULTS

Table III-1 depicts the characteristics of the 162 syphilis positive women in the study sample. A comparison with a matched sample of syphilis negative women was not done at the time.

### Variables (Characteristics of Syphilis Positive Women)

- **HHF membership:** Whether the woman's family had been censused by HHF and she had a unique numerical identifier
- **Age** (in years)
- **# Gestations**
- **# Living Children:** At the time of the study

- **# Penicillin Treatments:** None, one or two. Until May 2008, HHF policy was to administer two (rather than three) injections of benzathine penicillin to women with positive syphilis screening tests.
- **History of Stillbirth:** By definition, fetal demise after twenty weeks
- **History of Miscarriage:** By definition, demise before twenty weeks
- **# Children Died:** This variable encompasses the potential sequelae of maternal syphilis infection: stillbirth, miscarriage, and child death under the age of five. It also avoids the potential confusion associated with differentiating a stillbirth from a miscarriage.
- **Cohabitation with *Mari***
- ***Mari* Treated:** Whether the woman's male partner received at least one penicillin injection
- **Center of Hope Follow Up:** Whether the woman presented to the Center of Hope during her pregnancy
- **RPR (Center of Hope):** Whether the woman's RPR result was positive or negative
- **HIV (Center of Hope):** Whether the woman's HIV screening test result was positive, negative or indeterminate

<b>HHF membership</b>	57% HHF member		43% Extension	
<b>Age (mean: 28 years)</b>	23% 17-24 y	27% 25-29 y	30% 30-34 y	20% 35+ y
<b># Gestations</b>	mean: 4.6 (range: 1-11)			
<b># Living Children</b>	mean: 3.4 (range: 0-9)			
<b>History of Stillbirth</b>	14% yes		86% no	
<b>History of Miscarriage</b>	14% yes		86% no	
<b># Children Died</b>	32% none	38% 1		30% 2+
<b>Cohabitation with <i>Mari</i></b>	75% yes		25% no	
<b># Penicillin Treatments</b>	30% no injections	24% 1 injection		46% 2 injections
<b><i>Mari</i> Treated*</b>	22% yes	36% no		42% unknown
<b>Center of Hope Follow Up</b>	40% yes		60% no	

<b>RPR (Center of Hope)**</b>	56% positive	44% negative	
<b>HIV (Center of Hope)**</b>	5% positive	92% negative	3% indeterminate

\* This parameter was verified for only 94 of the 162 men. Assumptions could not be made about the men with missing data points, so a separate “unknown” category was added to account for them.

\*\*Test results were only available for the 65 women who had followed up at the Center of Hope. Of note, 64 RPR results were documented (a result was missing for one woman). 62 HIV results were documented (missing for 3 women).

Table III-2 provides a summary of the sources used to compile the data in table III-1.

Data sources were not always complete. For example, a woman may have had a paper chart, but her age may not have been recorded there.

**Variables (Available Data Sources)**

- **PHACT**—HHF computerized database. Data was available from this source for women who were HHF members and had known HHF identification numbers. PHACT was used to gather information on all variables.
- **Paper Chart (Rural)**—These charts were rural women’s prenatal medical records. They were used to gather data on **HHF membership, Age, #Gestations, # Living Children, # Penicillin Treatments, History of Stillbirth, History of Miscarriage and # Children Died.**
- **Center of Hope Chart**—Women who presented to the Center of Hope for prenatal care had medical charts there. The charts were used to gather data on **HHF membership, Age, # Penicillin Treatments, Center of Hope Follow Up, RPR (Center of Hope) and HIV (Center of Hope).**

<b>Table III-2: Available Data Sources</b>		
	Records Available	No Records
<b>PHACT</b>	57%	43%
<b>Paper Chart (Rural)</b>	73%	27%
<b>Center of Hope Chart</b>	10%	90%

Table III-3 separates data for key outcomes (Center of Hope Follow Up, RPR (Center of Hope) and *Mari Treated*) according to whether women were HHF members or from Extension zones.

<b>Table III-3: HHF Members Compared to Extension Zones</b>				
	<b>HHF members</b>		<b>Extension</b>	
<b>Center of Hope Follow Up</b>	41% yes	59% no	24% yes	76% no
<b>RPR (Center of Hope)</b>	56% positive	44% negative	53% positive	47% negative
<b><i>Mari Treated</i></b>	22% yes		3% yes	

### Chi Square

*Mari Treated* was associated with Cohabitation with *Mari* ( $X^2=6.98$ ,  $p=0.008$ ) and with HHF Membership ( $X^2=8.06$ ,  $p=0.005$ ) *Mari Treated* was not associated with # Gestations, # Living Children, History of Stillbirth, History of Miscarriage or History of # Children Died.

Center of Hope Follow Up was associated with HHF membership. ( $X^2=7.19$ ,  $p=0.03$ ) None of the following parameters was found to be associated with Center of Hope Follow Up: Age, # Gestations, # Living Children, Cohabitation with *Mari*, History of Stillbirth, History of Miscarriage or # Children Died. There was no association between RPR (Center of Hope) result and # Penicillin Treatments, History of Stillbirth, or History of Miscarriage.

### CLINICAL OBSERVATIONS

The following rural health post procedures were identified:

All pregnant woman were screened for syphilis by rapid test (ideally at the first prenatal visit), and the result was recorded in her paper prenatal record. RPR+, RPR R (with an “R” for *reactif* [reactive]), or RPR pos (*positif* [positive]) signaled a positive result. RPR-, RPR NR (*non-reactif* [non-reactive]) or RPR neg were generally used for a negative result. Nurses explained

that writing “RPR” allowed them to avoid writing “syphilis” in a woman’s chart, which could carry stigma. It was not clear why nurses did not write “rapid test,” “Abbott,” or another code which would not be confused with an actual RPR test. In addition, rapid test results for each woman were recorded on a separate sheet of paper for input into the PHACT database.

When a woman tested positive for syphilis, she was counseled and treated that day with her first dose of benzathine penicillin 2.4 million units IM, and the treatment was documented in the chart. If her partner was present, he was counseled and also treated with his first dose of IM penicillin. If the partner was not present, the woman was informed that the man needed to be treated, and arrangements were made for this and for the woman’s remaining two penicillin treatments, to be given at eight day intervals. In many cases, the health agent had been trained to administer penicillin injections, and the nurses left materials for this. If the local health agent was not trained, the patient was referred to another dispensary or health post or to the Center of Hope for additional treatments. When the woman returned for subsequent prenatal visits, the HHF nurse looked in her paper chart to verify whether she had received all three penicillin injections.

### **Limitations of data**

Data was collected from a variety of sources, including paper prenatal charts, HHF’s PHACT database, and from health agents. As a result, all parameters were not available for all members of the sample, and the same parameters were often obtained from different sources for different individuals. More data was available for women with HHF census numbers because their demographic information was available in PHACT. Quantitative data obtained from health agents was obtained retrospectively, and thus relied on the informant’s memory of past events. This was also more complete for HHF members. Two of the twenty-five women interviewed were mentally handicapped and, according to community member reports, had been so since birth. Local health agents provided information during qualitative interviews with these women.

### **DISCUSSION (2008)**

## Syphilis

Most women reported that they were asymptomatic when they were tested for syphilis and did not suspect they had an infection. This was consistent with a high prevalence of latent or adequately treated syphilis. The high percentage (44%) of women with positive rapid tests but negative RPR results indicated that many of these cases represented syphilis that had been adequately treated in the past. This was not unexpected, given that the gestational syphilis rate area was high, rural prenatal outreach was excellent and HHF's prenatal syphilis screening and treatment program were well established. Negative RPR rates differed little between women from the HHF catchment area (43%) and women from extension zones (47%). As these women received prenatal screening at HHF health posts and went to the Center of Hope for follow up, it is likely that they utilized HHF health care services and had been treated by HHF providers in the past. This indicates that many women received repeated penicillin treatments.

Following syphilis treatment, some women still did not know why they had received injections or know they had syphilis. Lack of symptoms likely played a major role in this. It did not appear that denial of illness prevented women from accepting penicillin treatment. Women who understood they had been infected with syphilis described it as a *maladi* or *maladi san* [illness or blood illness] caused by a *mikwob* [germ, microbe] which could cause *pwoblem* [health problems] for them, their husbands and their children. However, knowledge of the specific manifestations of syphilis was lacking. Women reported that syphilis could cause a baby to be born with the buttocks turned inside out, missing limbs, or cause vaginal itching in women, all of which were inaccurate. Most women seemed to have a more vague knowledge of the detrimental effects of syphilis, in that it could cause *maladi* or *pwoblèm* in women, their sexual partners and babies.

Women expressed concerns about their own health and the health of their *mari* [husbands] and children. One woman said she had been worried she or her baby would die, and another was concerned that her syphilis infection would become AIDS. Women were reassured

when nurses and health agents told them syphilis was easily treatable with [penicillin] injections. Most said that nurses and health agents had told them that the injections would prevent adverse health outcomes. They said this motivated them to be treated and to encourage their husbands receive treatment.

### **Syphilis Education**

Women said they had learned about syphilis from health care agents and rural nurses. Health agents reported that they educated community members on a broad range of health topics. Much of this education was done through mothers' and fathers' groups. Health agents agreed that women more frequently participated in educational sessions than men. Health agents said that when they counseled community members about syphilis, they talked about the physical manifestations of syphilis in adults and of congenital syphilis. Some of the sequelae described, such as miscarriage stillbirth, skin lesions, genital lesions and limb paralysis in children were accurate. Others, such as vaginal itching and burning, burning with urination and neonatal conjunctivitis, were not. However, the latter are signs and symptoms of chlamydia, gonorrhea, and patients who have them merit a full STI work up. Health agents stressed the importance of treatment for the pregnant woman, man and any other sexual partners. One health agent said she encouraged members of her community to be monogamous to reduce their risk of contracting STIs.

Nurses took a similar approach to counseling. Like the health agents, they focused on the physical manifestations of syphilis and importance of treatment for pregnant women, her *mari*, and all other sexual partners. One nurse educator also emphasized fidelity. Some nurses doubted the adequacy of existing interventions for syphilis education. One rural nurse said that his patients' level of understanding was highly dependent on their educational level. Patients who had been to school and had a broader general knowledge base and patients who received regular health education from mothers' and father's groups were more likely to understand what they were told about syphilis.



One nurse midwife said the availability of syphilis education was an issue. She recommended that nurse educators at the Center of Hope take a few minutes to talk about syphilis daily. It was determined that creating *mesaj sou sifilis* [key messages about syphilis], as discussed with the Behavior Change Coordinator, was an effective means of achieving this goal. These messages were composed by HHF staff as a template for efficiently and effectively counseling patients. (see Appendix 2). In addition, health agents not trained in the administration of benzathine penicillin IM injections were scheduled for training during an upcoming pneumonia management course at the Center of Hope.

### **Center of Hope Referral Program**

41% of women from the HHF catchment area and 24% from extension zones presented to the Center of Hope for confirmatory RPR testing and HIV screening. HHF membership was significantly associated with maternal follow up at the Center of Hope. ( $X^2=7.19$ ,  $p=0.03$ ) This is unsurprising because women from the HHF catchment area likely had regular contact with local health agents who encouraged them to go to Jérémie. Of the sixty-seven women who went to the Center of Hope, RPR results were available for sixty-four. It could not be discerned from the prenatal charts or testing logs whether the remaining three women received an RPR. Similarly, HIV screening results were missing for five of these women. Of the sixty-two women with documented results, 5% tested positive, and 2% had indeterminate results. This was higher than the national HIV rate of approximately 2%, (WHO, 2009) but mirrored the 5% HIV rate determined for women in HHF's prenatal programs in 2007. (Gebrian et al., 2008) Thus, the observed HIV rate in this group of women more likely resulted from regional variation than increased HIV susceptibility due to syphilis infection.

Most women who went to the Center of Hope said they did so because they were referred for syphilis treatment, or treatment of their *mikwob*. Most reported going alone. Thus, it can be assumed their male partners were not tested for HIV. Some women had additional indications for referral, such as early or advanced maternal age, severe anemia, or a history of pregnancy

complications. They may also have gone to the Center of Hope because, as noted by the HHF Public Health Director, the quality of care was better. According to one health agent, a woman from her zone reported to the Center of Hope, but was not seen because it was a holiday and the Center of Hope was closed.

Several women who did not go to the Center of Hope claimed they were not told to do so. This may have been the case, but it is possible that women did not recall being referred. It is also possible that women ignored the referral if they did not understand the reason for it. One woman said she did not receive her test result because she would have been required to pay for it and did not have any money. It was unknown how such a misunderstanding occurred in this case. It is possible that time was a factor. The woman had likely come from *an deyo* early in the morning and may not have been able to wait until the end of the day for her results. RPR and HIV testing were provided at no cost for rural women referred to the Center of Hope. In addition, HHF policy was to provide these women with a food ration. In contrast, transportation costs were a real issue. Women who lived many hours from the Center of Hope by foot said they would have to take a car or taxi to get there. Some said this would be too costly.

Another woman said that she did go to the Center of Hope because she gave birth just after being referred. Lomotey et al found that 46% of women initially presented for prenatal care and were tested for syphilis in the third trimester, and it is most likely that this woman was a case in point. (Lomotey et al., 2009) Supply shortages may also have delayed initial screening. It is also possible that some women did not consider her referral to the Center of Hope an immediate priority. One woman said that she did not go to the Center of Hope because she had to care for her sick mother. However, when asked why she did not seek treatment when her mother recovered, she said she did not know where the Center of Hope was. It is possible that in both of these cases that the women were what health agents called *negligent* or *pa motive*.

One health agent with ten years of experience appeared unaware of HHF's policy for referral of syphilis positive women to the Center of Hope. She said there was no need to send

these women to the Center of Hope, as all treatment could be administered in the mountains. While what the health agent said about treatments was true, she should have referred syphilis positive women and their partners for HIV screening and an RPR for the woman. This highlighted a need to continuously review HHF policies with health care workers.

### **Documentation**

There were several issues with the documentation system for HHF's rural syphilis program's documentation system. First, syphilis test results were not transcribed into PHACT. An HHF worker responsible for data entry said that if the date of a rapid test had not been recorded, she did not document in PHACT that the woman had been tested. This issue was resolved immediately by instructing workers to ask rural nurses about these cases and estimating a date of testing if necessary.

Second, there was no standardized system for documenting penicillin treatments given by health agents. When nurses left the health post, they took all paper prenatal charts with them. As a result, treatments given by health agents would only be documented in the woman's chart if the health agent contacted the nurse, and the nurse was able to recover the chart at that time. Male partner treatment was not documented at all.

An HHF nurse midwife suggested that a paper might be attached to women's vaccination card so that treatments might be documented, even in the absence of an HHF nurse or paper chart. It was agreed that when a woman tested positive for syphilis, the following were to be recorded in the "Problems" section of her vaccination card:

- "RPR+" (This alerted nurses to the woman's syphilis positive status while avoiding stigma that could result from writing "syphilis.")
- Dates of the woman's penicillin treatments (x3)
- Date of her male partner's treatments (x2)
- Date of child's treatment (benzathine or procaine penicillin)

- Woman's RPR titer, if applicable
- Child's RPR titer, if applicable

Future versions of the vaccination card template would be modified to include these parameters.

It was also decided that when a pregnant woman tested positive for syphilis at a rural health post, the following were documented in her prenatal chart:

- Referral to the Center of Hope
- The number of penicillin vials given to the health agent for future treatments of the woman and her sexual partner(s)

The medical charts of syphilis positive women were marked as follows to remind nurses to check that the woman, her partner and child had been treated:

- Center of Hope: a red "X" on the cover of each chart
- Rural Outreach Programs: The woman's name was highlighted in pink.

### **Sexual Partners**

Health care workers commented on male partner treatment as an essential and perhaps inadequately addressed aspect of congenital syphilis prevention. Nearly all pointed out the importance of treating both sexual partners for syphilis, and noted that getting men to be treated had been a particular challenge. This observation was corroborated by the data. Treatment was reported for only 22% of male partners. While data was missing in some cases, *lack* of treatment was confirmed in 36% of cases. This was surprising, given that partner treatment had always been an integral aspect of HHF's congenital syphilis prevention program.

Most women said that their *mari* did not accompany them to the health post for their prenatal visit and were treated by a health agent on a different day. It appeared that men who received syphilis treatment were encouraged to do so by their wives and health agents. Women reported that health agents and nurses told them that syphilis is a sexually transmitted infection and that both partners must receive injections for treatment to be effective. Women then

conveyed this information to their male partners. The association between male cohabitation with the female partner affirms women's role in encouraging their partners to be treated. ( $X^2=6.98$ ,  $p=0.008$ )

Health agents also reported that they provided counseling and continually urged reticent men to come for treatment. One male health agent commented that a man who did not listen to his wife about the necessity of penicillin treatment may listen to a health agent. If this were true, it would be useful to know whether men listened to this health agent because he was a man or because of his role in the community. One female health agent reported continued difficulty convincing a man in her zone to accept treatment for syphilis, despite extensive counseling. HHF membership (and therefore, regular contact with a health agent) was significantly associated with male treatment, ( $X^2=8.06$ ,  $p=0.005$ ) indicating that health agents played an important role in encouraging men to be treated, administering the injections or both.

Some women said they did not know their husbands needed treatment. Others said their *mari* were unavailable due to remote employment, often in Port-au-Prince. Women said that these men would be compliant with treatment upon their return, but in some cases, it was not clear whether this referred to any short trip or to a definitive, long term return to the area. Some women whose *mari* worked nearby reported that the men were too busy with work to present for treatment.

There were instances in which women reported that they or their husbands were not treated due to a lack of supplies at rural health posts. The author similarly observed supply shortages at health posts, leading to lack of syphilis testing or treatment. The author did not observe this at the Center of Hope. It appeared that shortages of syphilis testing and treatment supplies at rural health posts resulted from lack of a system to ensure that enough supplies were brought to each post, rather than an overall deficiency in materials (not having sufficient supplies at HHF). Some men refused treatment because they did not believe they were sick. Perhaps they

believed this because they were asymptomatic. Two women reported that their partners received “bad advice” from their friends or other villagers counseling them against treatment.

- To address the issue of men who were remotely employed, The HHF Medical Director proposed the drafting a letter to be sent to male sexual partners of syphilis positive women who are living or working in Port-au-Prince. The letter was to be sent by rural outreach and Center of Hope nurses to each man and inform him of the following:
- He had an infection and should be treated as soon as possible.
- He should be treated free of charge at any clinic in Port-au-Prince. (A signed prescription for three 2.4 million unit doses of benzathine penicillin G to be administered at eight day intervals was enclosed in each letter).

It was proposed that in the future, a partnership between HHF and a clinic in Port-au-Prince might facilitate this process.

Health care workers cited denial of illness (due to lack of symptoms) or disbelief (of one’s wife or a health care worker) as important reasons that men were not treated for syphilis. Other reasons included lack of familiarity with the health care system, shame and remote employment. They commented on the unique considerations associated with male outreach and STI counseling. The Behavior Change Counselor said that because of potential shame or stigma associated with syphilis infection, it was important to talk to men privately and not to use any language that implied blame. A young physician suggested that syphilis be framed so that men would understand how the disease could directly impact their health, rather than simply that of their wife or child. One health agent said he viewed fathers’ groups as an important means of providing health education to men. It was clear that the issue of male partner treatment warranted further exploration and consideration.

Women and health agents raised the issue of multiple sexual partners. Most often, this was discussed in the context of men with multiple female partners. Women said they knew that their *mari*’s other *madanm* should be treated. Some women were angry or worried about their

health when their *mari* did not notify other sexual partners. Health agents reported that they counseled men about this. One health agent said that she would call the other *madanm* and notify her of the need to be treated. Some agents said that they also recommended condom use to men and women whom they knew had multiple partners.

Condom use is advocated by the WHO as an essential means of halting the spread of syphilis. (WHO, 2007) However, HHF policy prohibits official recommendation of condom use. Given this, it is unclear as to whether advocating condom use would be an effective tool, even if permitted. Other health care workers reported advising barrier methods of contraception or “protection” to patients with known positive syphilis serology. It is unknown whether patients took this advice.

### **Congenital Syphilis**

The HHF Medical Director said there had not been a “single documented case” of congenital syphilis at HHF. The organization’s Behavior Change Coordinator reported having seen one child with signs of disease and a positive rapid test. These observations contrasted with Lomotey et al.’s 2007 study, which estimated the congenital syphilis rate in the rural HHF catchment area at 767 per 100,000 live births. (Lomotey et al., 2009) This discrepancy was likely caused by disparate working definitions of congenital syphilis. When health care workers talked about congenital syphilis, they referred to signs and symptoms of disease and positive syphilis serology. In contrast, Lomotey et al. used the CDC case definition, which also included asymptomatic infants of mothers with untreated or inadequately treated syphilis, syphilitic stillbirths, and any child with clinical evidence of syphilis or a positive treponemal test. (Lomotey et al., 2009 and CDC, 2003)

The CDC case definition is broader, and in this author’s opinion, better encompasses the spectrum of adverse outcomes that congenital syphilis can cause. Relying on clinical presentation alone for diagnosis of congenital syphilis is problematic for several reasons. Congenital syphilis is initially asymptomatic in 50% of cases, and symptoms may not appear for over a year. (Follett,

Clarke, 2011 and WHO, 2007) A normal physical examination at birth, or at any point in time, does not rule out the possibility of congenital syphilis. Furthermore, clinical presentation of congenital syphilis is highly variable. Nonspecific signs and symptoms such as fever, hepatosplenomegaly, impaired growth and jaundice may not raise suspicion for congenital syphilis. As discussed, reliance on serologic testing is also problematic due to the persistence of maternal antibodies early in life.

### **Creating an Infant Treatment Protocol**

It was clear from the work done by Lomotey et al. in 2007 that congenital syphilis, as defined by the CDC, was an important cause of adverse birth outcomes and childhood morbidity and mortality in the Grand'Anse. Health care workers agreed with this assessment, and most agreed that more should be done for children born to syphilis positive mothers. A few women said that they would not be able to bring their babies to the Center of Hope because of the trip's expense or inconvenience. However, all women who were asked said that if syphilis treatment were to be done at rural health posts, they would bring their children. One woman who had experienced the deaths of two of her children said she hoped that an infant treatment protocol might prevent such occurrences in the future.

The author worked closely with the HHF Medical Director (and in consultation with pediatric staff at the local *Hôpital Saint-Antoine*) to develop an infant treatment protocol which would be feasible for HHF patients and congruent with WHO standards. The WHO and CDC recommended treatment of infants born to syphilis positive mothers who do not fit the criteria for "proven or highly probable" congenital syphilis with a single IM injection of benzathine penicillin G at a dose of 50,000 units/kg. (WHO, 2007 and CDC, 2006) The CDC also recommended this regimen for asymptomatic infants born to mothers treated adequately for syphilis during pregnancy with nontreponemal titers less than fourfold maternal titers when follow up is uncertain. (CDC, 2006) In resource-poor settings, such as the Grand'Anse region of Haiti, the WHO recommended that *all* infants born to syphilis-positive mothers be treated with a



single IM dose of benzathine penicillin G 50,000 units/kg, independent of maternal treatment and without additional tests.

All parties agreed that an effective protocol should differentiate between infants with a symptomatic clinical presentation for congenital syphilis and those who were asymptomatic. The author advocated universal treatment with a single IM dose of penicillin of all infants born to syphilis positive mothers. The HHF Director preferred to recommend treatment only for infants with RPR titers fourfold those of maternal titers—a situation in which the WHO and CDC recommend hospitalization and 10 days of IV or IM treatment. The HHF Medical Director chose to recommend for single dose IM penicillin treatment of asymptomatic rural infants living too far from the Center of Hope to be brought for RPR testing.

The following were specified within the protocol to facilitate treatment administration by nursing staff (see Appendices 3 and 4):

- Injection site: anterolateral thigh
- Needle size: insulin
- Instructions for diluting penicillin with sterile water
- Weight-based dosing chart

It was determined that the protocol would be implemented starting immediately for any infants who were born to women known to have a positive syphilis test during pregnancy. It was also decided that the Medical Director would draft a letter to be sent to women who had tested positive for syphilis since 2006 recommending they bring their children to the Center of Hope for evaluation. The letters were to be sent to rural women by outreach nurses and to urban women by nurses at the Center of Hope.

Several health care workers were concerned about potential anaphylaxis in infants secondary to penicillin administration. HHF's Behavior Change Coordinator reported that "the main concern in administering penicillin to an infant, as in adults, is an allergic reaction or shock

during which the person falls on the floor.” The Public Health Director pointed out that because rural health posts are in the “middle of nowhere,” HHF “nurses are trained to be terrified of anaphylaxis.” The HHF Medical Director was concerned that even nurses at the urban Center of Hope may not be comfortable administering penicillin to infants. However, he noted that sending all infants born to syphilis positive mothers to the local hospital for treatment would be logistically impossible.

Fears of anaphylaxis secondary to penicillin administration were well founded. Penicillin is the single most common cause of anaphylaxis in humans and of fatal anaphylactic reactions. (Neugut, Ghatak, Miller, 2001) However in children, anaphylaxis occurs far more commonly secondary to food allergy than drug sensitivity. (Clark et al., 2011) The frequency of true penicillin allergy resulting in anaphylaxis is estimated at 1-5 per 10,000 cases of therapy. It is more commonly seen following parenteral than oral therapy. Anaphylaxis manifests as acute onset of hypotension, bronchospasm, angioedema and urticaria and occurs minutes to 1-2 hours after penicillin administration. The reaction is mediated by preformed IgE from a previous exposure which causes massive mast cell release of histamine and other vasoactive substances. Potential sequelae include shock, respiratory compromise, bowel edema and death. (Clark et al., 2011 and Neugut, Ghatak, Miller, 2011)

It is essential to note that anaphylaxis, as well as other less severe reactions to penicillin are mediated by antibodies that are formed during previous exposures to penicillin. (Bhattacharya, 2010) Theoretically, when a woman receives penicillin therapy during pregnancy, her fetus is exposed to the medication. However, to this author’s knowledge, there are no documented of penicillin sensitization occurring in this manner, nor of anaphylaxis in a newborn due to antibiotic administration.

From the literature, it appeared that while life-threatening anaphylaxis secondary to penicillin administration is a serious and relatively prevalent issue, it is less of a concern in infants than in adults. HHF had a well-established protocol for treatment of adult penicillin

allergy with IM epinephrine. IM epinephrine injected into the anterolateral thigh would also be the treatment of choice for anaphylaxis in infants and children. (Cheng, 2011)

## **RECOMMENDATIONS AND CONSENSUS ACTIONS (2008)**

A series of recommendations were drafted by the author. Consensus actions were agreed upon in collaboration with the HHF Public Health and Medical Directors.

### **Policy**

- 1) Infants born to women who tested positive for syphilis during pregnancy were tested and treated according to protocol. (see Appendices 3 and 4)
  - a. Referral letters were sent to women testing positive since 2006 instructing them to bring their children to the Center of Hope  
*Future action: Protocol for cases of infant anaphylaxis secondary to penicillin, including weight-based dosing of intramuscular epinephrine.*
    - Letters to be sent to all male partners of syphilis positive women working in Port-au-Prince with signed prescriptions for benzathine penicillin G.  
*Future Action: Partnership between HHF and a clinic in Port-au-Prince to streamline treatment of men who are vint.*

### **Medical Records**

- 1) The following were recorded on vaccination cards of syphilis women:
  - “RPR+”
  - Dates of the woman’s penicillin treatments (x3)
  - Date of her male partner’s treatments (x2)
  - Date of child’s treatment (benzathine or procaine penicillin)
  - Woman’s RPR titer, if applicable
  - Child’s RPR titer, if applicable*Future Action: Revision of vaccination card template to include these parameters.*
- 2) The following were also documented:
  - Referral to the Center of Hope
  - The number of penicillin vials given to the health agent for future treatments of the woman and her sexual partner(s)
- 3) All paper prenatal charts of syphilis positive women were flagged

### **Education**

- 1) The key *mesaj* [educational messages] on syphilis were printed on laminated cards and posted prominently on exam room walls at the Center of Hope. (see Appendix 2)
- 2) The Medical Director held a syphilis educational session on syphilis for HHF nurses.
- 3) Health agents not trained in the administration of benzathine penicillin IM injections were scheduled for training  
*Future Action: Increased focus on male STI education through fathers’ groups, rural health posts and community fairs as well as health agent training on STI counseling.*

The HHF Medical Director met with HHF staff on August 1, 2008 to review the above recommendations.

## **FUTURE RESEARCH (2008)**

1) This study identified a need for enhanced outreach to male partners of syphilis positive women, including:

- Identification of barriers to male partner treatment
- Staff creation of male-centered education and treatment programs

2) This study identified mentally ill women as a potentially high risk population for STIs in rural Haiti. It was recommended that the verity of this observation be explored, as well as ways health care providers might protect this vulnerable population.

3) A matched pair study comparing demographic and health indicators for syphilis positive and syphilis negative women in the HHF catchment area was recommended. Understanding factors that may put women at risk for contracting syphilis could assist HHF in developing more focused outreach programs.

## **IV. 2008-2010: INTERVENING EVENTS**

Between August and October of 2008, the author's infant treatment protocol was put into place. A Haitian physician completing a year of community service for HHF took responsibility for the program and ensured that syphilis positive women identified between 2006 and 2008, their male partners, and their infants were treated. (Gebrian, 2010) After this two to three month period in 2008, changes in supply availability undermined implementation of 2008 recommendations. In

addition, a series of catastrophes impacting Haiti, the Grand' Anse and HHH targeted resources and energy toward acute emergency situations and away from HHH's syphilis programs.

(Gebrian, 2010)

The 2008 hurricane season was the worst Haiti had ever seen. (Farmer, 2011) In August-September of 2008, 4 hurricanes—Faye, Gustav, Hanna and Ike—struck Haiti in rapid succession. Approximately 800 people were killed. The effects on the country's already fragile ecology and economy were devastating. The Artibonite valley, where 80% of Haiti's rice is grown, was flooded. (IRFC, 2008) 60% of the country's harvest for the year was destroyed. (IFRC, 2008 and Carroll, 2008) Livestock were killed and food stores were washed away. (Lacey, 2008) Roads, bridges and entire cities were decimated. (IRFC, 2008 and Lacey, 2008) Prime Minister Michele Pierre-Louis commented on the storms' disastrous effects on Haiti's precarious environment: "The whole country is facing an ecologic disaster," she said. "We can't keep going on like this. We are going to disappear one day." (Carroll, 2008)

Before the 2008 hurricanes, "Life was very, very difficult," said Raphael Chuinard of the United Nations World Food program. "The malnutrition rate was too high. People were resigned to suffer." (Lacey, 2008) Hurricane induced loss of crops, livestock and food stores furthered food shortages and led to further price inflation. Health care systems, already spread thin, were unable to provide necessary services to the population. Lack of clean water and sanitation led to increased rates of skin and genital infections. Cases of typhoid, tetanus, and other infectious diseases were reported in particularly hard hit areas. (IFRC, 2008)

In the Grand' Anse an estimated 3,749 families were affected by the storms. Over 600 homes in the region were destroyed, and nearly 3 times as many were damaged. (IFRC, 2008) In the aftermath of the hurricanes, high floodwaters kept HHH staff from reaching rural patients.

(Gebrian, 2010)

In September 2008, tragedy struck HHH. A van carrying rural nurses, outreach workers, foreign volunteers and health care supplies careened off a cliff and into the river below. The

driver and one other person were killed. Several were seriously injured. The nurse who had been in charge of the rural syphilis program suffered a broken pelvis, and was too traumatized to return to work, even following her recovery. (Gebrian, 2010)

In October 2008, a nationwide penicillin shortage brought HHHF's syphilis programs to a halt. The reasons behind the shortage were not completely understood, however, it appears that USAID budget calculation errors were at least partially to blame. Until December 2009, penicillin availability was sporadic. Occasionally, HHHF purchased penicillin on the black market, but the nationwide shortage caused prices to skyrocket, so this was not often financially feasible. When penicillin could be obtained in this way, it was often used exclusively in the urban syphilis treatment programs. Well meaning but misinformed American donors supplied pre-mixed syringes filled with procaine penicillin, which is not recommended for treatment of syphilis. (Gebrian, 2010)

For ten years, Hilton Foundation grants had financed HHHF's congenital syphilis prevention and treatment programs. However, by 2010, the organization's funding priorities had shifted, and the Hilton Foundation no longer paid for syphilis testing and treatment. This was a more important issue for HHHF's rural syphilis programs than those in urban settings. The President's Emergency Plan for AIDS Relief (PEPFAR) supplied syphilis tests that could only be used in conjunction with HIV testing, which was done at routinely the Center of Hope and the HHHF Clinic, but could not be performed in the rural setting due to lack of resources. PEPFAR provided only rapid syphilis test kits, so the RPR was no longer readily available. HHHF's 2008 infant treatment protocol had hinged on RPR testing of the mother and infant and comparing syphilis titers, so infants were no longer being tested or treated. At the same time, the adult treatment protocol was altered to include lidocaine as a means of decreasing the discomfort of penicillin administration. (Gebrian, 2010)

PEPFAR-funded syphilis testing sustained urban syphilis prevention and treatment efforts and opened new portals of entry for syphilis positive patients into the HHHF system. A new

voluntary counseling and testing (VCT) program for HIV and syphilis was instituted at HHF's urban clinic, and a designated physician and nurse tracked and cared for all of these patients. Urban pregnant women were routinely tested and treated for both diseases at the Center of Hope, and an infectious disease nurse was responsible for all women who tested positive for HIV or syphilis. In addition, children who were treated for malnutrition at the Center of Hope's Kwashiorkor Center were routinely tested and treated for HIV and syphilis. (Gebrian, 2010)

Following the 2008 hurricane season, Haitian presidential advisor Patrick Élie advocated improvement of national infrastructure: "These storms have pointed out the weakness of the Haitian state," he insisted. "Why are we surprised every time a storm hits when we know another one will come?" (Lacey, 2008) True to Élie's prediction, the next "storm" hit Haiti on January 12, 2010, in the form of a 7.0 magnitude earthquake (on the Moment Magnitude Scale, or MMS). The epicenter of the earthquake was only 25 km south of Port-au-Prince, Haiti's administrative and economic capital, and the most densely populated area in the nation. Over 200,000 homes were damaged, and over 100,000 were destroyed. More than 1,300 schools and universities and 50 hospitals collapsed. The President's Palace, Parliament, Law courts, and Ministry of Health were demolished. Over 200,000 were killed. (De Ville de Goyet, Sarmiento, Grünewald , 2011)

Although distant regions such as the Grand' Anse did not suffer the same level of destruction as the capital, rural houses were destroyed by the earthquake, its aftershocks, and resultant landslides. (De Ville de Goyet, Sarmiento, Grünewald , 2011) In the days, weeks and months following the earthquake, hundreds of thousands of survivors fled the capital city. (see Appendix 5) The Grand' Anse was one of the largest recipients, with an estimated 120,000 migrants (a 20% increase) arriving in the region by June 2010. (USAID, 2010) A survey of HHF staff revealed that the average household size had increased from seven people to twelve. The population in HHF areas increased by 18%. (Gebrian, 2010)

## **V. 2010 RESEARCH PHASE**

### **GOALS (2010)**

The goals of the 2010 phase were twofold:

- 1) Assess the status of the Haitian Health Foundation (HHF)'s syphilis treatment and prevention programs in light of 2008 recommendations and intervening events and make necessary modifications. Specific objectives included:



- Understand the nature and magnitude of these intervening events and how they impacted HHF's syphilis program.
- Update syphilis diagnosis and treatment protocols as necessary.
- Assure sustainability of HHF's program by encouraging programmatic "ownership" by HHF staff.
- Improve documentation practices for treatment of syphilis positive adults, their partners, and their children (in cases of syphilis positive pregnant women).

2) Understand barriers to sexual partner treatment for syphilis and establish interventions to improve male treatment rates. Objectives included the following:

- Understand the societal framing of syphilis and other STIs as "women's issues," and identify strategies for framing syphilis as a community problem.
- Identify reasons that male partners of syphilis-positive women do not obtain treatment.
- Evaluate existing community health education programs and their effects of local knowledge on syphilis. Consider creation of a male-centered educational program that could be used by health agents and nurses in the setting of local fathers' groups to improve men's knowledge of STIs.
- Improve the notification and treatment process for local men at risk for syphilis.
- Create and implement a protocol to notify at risk men in areas outside Jérémie of potential syphilis positive status and encourage their treatment.

## **METHODS (2010)**

### **Sample**

162 women from the HHF rural health program with a positive Abbott Determine rapid syphilis test at a prenatal visit between December 2006 and April 2008 were identified during the 2008 research phase. An additional 81 women who tested positive between May 2008 and May

2010 were identified through PHACT. In all, 243 women with a positive rapid syphilis at a prenatal visit between December 2006 and May 2010 were identified. 71 of their male partners of the 243 women were identified through 2008 interviews and through PHACT. Information was gathered on these men through qualitative interviews and information sheets distributed to health agents (see below) on 48 of these men, and they composed the final sample. 28 of the 48 men had a female partner who had tested positive for syphilis during the time of Haiti's nationwide penicillin shortage (October 2008 and April 2010).

### **Qualitative Data**

The author conducted in depth interviews using primarily open-ended questions. Interviews were conducted in English, French or Haitian Creole, depending on the interviewee's preference. Handwritten notes were taken during each interview and transcribed into English translations on the same day.

#### ***Interviews with Male Partners of Syphilis Positive Women***

Men from the sample were chosen for interview based on the HHF rural health post schedule and their willingness to participate in the study. While female partners were not invited for interview, all but four accompanied their partners and participated in conversations with the author. Nineteen additional interviews were conducted with women whose male partners were invited for interview but did not come.

All participants received syphilis education from a nurse or from the interviewer, usually at the end of the interview, although in some instances, prior to the interview. If education was done prior to the interview (at the convenience of an HHF nurse), syphilis knowledge was not assessed during the interview. All men and women who had not been treated for syphilis or had been re-exposed were treated on the day of the interview or referred to the health agent for future treatment. Any absent sexual partners requiring treatment were referred to a health agent or clinic for penicillin treatment.

#### ***Interviews with Health Care Providers***

Interviews were conducted with thirteen local health care providers including five local health agents, six nurses (three urban and one rural), one health educator, and one physician. Members of the HHF administration, including the Public Health Director, Medical Director, and HHF Administrator were also interviewed. Willingness to participate in the study was a factor in selecting each of these key informants. Health agents were also chosen based on availability at rural health posts and were brief and informal. The nurses, physician and administrators were chosen because each had direct involvement with HHF's syphilis programs.

Each of these interviews was tailored to the interviewee's professional responsibilities and experiences. Generally, interviewees were asked about:

- Their professional responsibilities, particularly as related to HHF's syphilis programs
- Perceived barriers to male treatment for syphilis
- Their suggestions for improving male treatment rates

#### ***Discussion with a Medical Technologist and Nurse Practitioner***

A discussion was held with a medical technologist and expert in the field of diagnostic testing. This key informant had worked for multiple pharmaceutical companies, and his experience included two and a half years of work in Eastern Africa and multiple week long mission trips to the Grand' Anse. The medical technologist was accompanied by an American-trained nurse practitioner who worked for the Canadian National Public Health Association's emergency preparedness division and coordinated multiple mission trips to the Grand' Anse each year.

These interviewees were chosen for their insight into health care provision in the Grand' Anse, as well as their availability and willingness to participate in the study. In addition, the medical technologist was selected for his expertise in the field of STI testing and his experience with STI screening and treatment programs in other developing countries.

#### ***Information Sheets***

Information sheets were sent to respective health agents responsible for eighty-one male partners of rural women diagnosed with syphilis between 2008 and 2009 (see Appendix 6). Health agents completed and returned thirty-seven of the forms. The other forty-four forms were not completed and returned for the following reasons: the health agent said that he did not know the man or the man no longer lived in the area, the forms could not be delivered because no health posts were being held during the study period, or the forms were forgotten or misplaced. Information sheets were used to gather data for quantitative analysis (see below).

### **Quantitative Data and Analysis**

Data on the following variables was collected for the 48 men in the sample:

- **Notification:** Whether the man reported (directly to the author or through a health information sheet) that he had been told to present for syphilis treatment
- **Male Treatment:** Whether the man was treated with at least one injection of benzathine penicillin
- **Treatment Given By:** Whether the man received injection(s) from a health agent or a nurse
- **Cohabitation:** Whether a man lived with the woman who tested positive for syphilis. Some of the man cohabited part time because of remote employment, part time cohabitation with another female partner or both
- **Multiple Partners:** Whether the man admitted he had more than one partner (or in some cases, the health agent volunteered the information)
- **Female Treatment:** Whether the man's syphilis positive female partner had received at least one penicillin injection (per the man, health agent, or both)

Data was entered in Microsoft Excel and analyzed using SPSS 16.0. In addition to descriptive statistics, the research model and hypotheses were tested using cross tabulations and chi-square to determine relationships between categorical variables.

### **Collaborative Meetings with HHF Staff**

Prior to the institution of any changes to HHF's syphilis prevention, screening and treatment programs, conferences were held with urban and rural staff. Topics included methods of syphilis treatment, partner notification, and documentation. Current practices were assessed, and barriers were identified. Suggestions for improvement were voiced and discussed. Updated treatment protocols were presented and modified according to staff consensus.

### **Literature Review**

A literature review was undertaken to understand the societal framing of syphilis and other STIs as "women's issues" and begin to identify strategies for framing syphilis as a community problem. The author found the following:

In many societies, rural Haiti included, the woman is seen as the family caregiver. She is responsible for its members' health. She brings the children for health maintenance visits and vaccinations. She cares for family members when they are ill, and acts as a liaison between the family and medical professionals when additional services are needed. (Kershaw et al., 2009 and Mbizvo, Bassett, 1996)

Importantly, women have repeated direct contact with the health care system for prenatal care. (Kershaw et al., 2009 and Mbizvo, Bassett, 1996) Pregnancy offers a unique window of opportunity to screen women for high risk conditions, STIs and chronic disease and intervene to promote long term health. Integration of HIV prevention into prenatal care has been shown to be an efficient and effective means of diminishing biological, behavioral and psychosocial risk factors for infection, especially in highly susceptible women. (Kershaw et al., 2009) Such "bundling" of care may be particularly important in resource poor settings. When health care workers and supplies are scarce, combining services may allow health care workers to offer care that would otherwise be unavailable.

Incorporating community health promotion into prenatal care also ensures that services are targeted toward the most susceptible members of society. Women and children are vulnerable

for a variety of reasons. (Magee et al., 2006 and Mbizvo, Bassett, 1996) Pregnancy and childbirth are inherently risky life events. (Presern, 2001) In addition, pregnant women have been shown to engage more often in unprotected sex, rendering them at increased risk for STIs. (Kershaw et al., 2009 and Magee et al., 2006)

Traditional gender roles and enduring patriarchal belief systems create power imbalances that may prevent women from making decisions that impact their health, such as negotiating family planning (Mbizvo, Bassett, 1996) and safer sex. (Presern, 2011) Women often have less control over the social risk factors for STI infection. Being in a monogamous relationship is not protective for women when their husbands have multiple partners (Magee et al., 2006; Mukherjee, Farmer DB, Farmer PE, 2009). Where employment is scarce, men may be obligated to work far from home, and spend long periods of time away from their families. (Mukherjee, Farmer DB, Farmer PE, 2009) Men from the Grand'Anse often seek work in Port-au-Prince, where they may have contact with other sexual partners or community sex workers. (Gebrian et al., 2008)

The female anatomy places women at increased biological risk for HIV infection. (Magee et al., 2006 and Mukherjee, Farmer DB, Farmer PE, 2009) HIV infection enhances susceptibility to other STIs. The inverse is also true. Infection with STIs such as syphilis increases the probability of contracting HIV. (Lukehart, 2011) This risk is transmitted to their children. 90% of children living with HIV acquired the disease through vertical transmission or breastfeeding. Congenital syphilis persists as an even more significant cause of perinatal morbidity and mortality in Haiti (Lomotey et al., 2009) and worldwide. (Saloojee et al., 2004)

Given women's inherent biological and social vulnerability to STI infection, and the interdependence between maternal and child health, it makes sense to target women for STI prevention, screening, and treatment interventions. (Kershaw et al., 2009 and Mbizvo, Bassett, 1996) However, this practice can have unintended social consequences. Integrating STI testing and treatment into prenatal care may imply that women are only valued as mothers, rather than

individuals: that women's health does not become a priority until they risk transmitting disease to their unborn children. Screening pregnant women for STIs may also promote the view these infections are a solely "female issue," and that men do not share equal responsibility in transmission. (Mbizvo, Bassett, 1996)

The portrayal of women as responsible for STI spread originates in 15<sup>th</sup> century Europe when syphilis was identified as a sexually transmitted illness. Italian medical writers warned men against sleeping with diseased women. Writers maintained that women were less susceptible to syphilis than men and could only be infected through repeated sexual contact. Thus, promiscuous women, namely prostitutes, became viewed as the source of STIs, while men were seen as the victims of disease. At the time, this belief led to punishment of "promiscuous women" in Scotland by hot iron branding or banishment. Later, in late 18<sup>th</sup> century France, Great Britain and Italy, prostitutes were quarantined in prisons or similar institutions. (Parascandola, 2009)

Incarceration of women continued in the World War I era United States, when thirty-two states mandated physical examination of prostitutes (and often of any arrested woman) for STIs. If examination was consistent with infection, women could be sent to detention centers for indefinite periods of time. In 1941, the Lanham Acts authorized the funding of Rapid Treatment Centers, or RTCs, for STI-infected women. Women were quarantined and hospitalized at RTCs for 8 days and treated for 6-8 hours daily with IV treatment of arsenic or bismuth compounds. Risk of toxicity and adverse reaction was high. In 1943, the efficacy of penicillin treatment for syphilis was established. It was not until after World War II when sufficient penicillin production rendered widespread syphilis treatment feasible that RTCs were shut down. (Parascandola, 2009)

The HIV epidemic has incited renewed fear and propensity toward blame reminiscent of that which occurred with syphilis prior to penicillin treatment. Dr. Joia Mukherjee, Director of the Institute for Health and Social Justice, cites the 1983 JAMA article "Acquired immunodeficiency with reversed T4/T8 ratios in infants born to promiscuous and drug-addicted mothers" as a landmark publication for establishing the perception of babies as victims of their

mothers' behavior in the HIV epidemic. (Mukherjee, Farmer DB, Farmer PE, 2009) Even the terminology associated with vertical HIV spread, "mother to child transmission," implicates maternal guilt. Central African studies in the 1990s showed increased HIV and STI prevalence among individuals with multiple partners, thus establishing STIs as markers of promiscuity in this population. (Mbizvo, Bassett, 1996) Thus, in the HIV epidemic, women are blamed not only for infection of their partners, but of their children.

Biologically, men and women are equally responsible for STI transmission. Socially, men may play a dominant role. In many cultures, women are seen as caregivers, but men hold the primary responsibility for household decisions, including those that impact the family's reproductive health. In sub-Saharan Africa (Mbizvo, Bassett, 1996) and in Haiti (Magee et al., 2006), men dictate family planning, including contraception. Thus, it is essential to involve men in STI education, treatment and screening programs. Programs will not successfully promote reproductive health unless they connect to both women and men and encourage them to act in partnership.

The question of how to involve men in STI treatment is an important consideration. Women present fairly consistently for medical care during pregnancy. There is no corresponding period in a man's life when he is similarly likely to seek care. Paradoxically, while men often make important health decisions for their families, their traditional roles do not include tasks that would place them in direct contact with the healthcare system, such as taking infants for vaccinations or caring for ill family members.

It is important to convey information about STI transmission, personal infection risk, treatment and prevention. (Magee et al., 2006) However, studies indicate that knowledge alone is insufficient to effect behavioral change. (Mbizvo, Bassett, 1996) A direct relationship should be demonstrated between men's behavior and reproductive health. (Mbizvo, Bassett, 1996) Potential denial and stigma associated with STI infection must be addressed. (Magee et al., 2006) It is important to frame issues of reproductive health as essential to individual men and to their role in



society. Interventions must take into account historically and culturally determined gender roles and dynamics of sexual relationships. (Mbizvo, Bassett, 1996) In Haiti, it is socially acceptable for men to engage in premarital sex and to have multiple sexual partners, and discouraging such behaviors as a means of addressing STI spread may be ineffective. (Magee et al., 2006)

Cultural norms associated with various STI prevention measures must also be considered. In Haiti, condom use is discouraged, and having children is favorable. (Magee et al., 2006) A 1994 study in Zimbabwe found a minority of HIV positive men using condoms with their wives, likely due in part to a cultural association with promiscuity and prostitution. (Mbizvo, Bassett, 1996) In such regions, recommending condom use to prevent STI spread may not be effective.

Similarly, promotion of abstinence as a means of avoiding STI spread has been shown to be ineffective in most populations. Establishing a strict moral line has been shown to be an effective public health strategy when applied to behaviors that are considered marginal by a society. Examples may include drunk driving and illicit drug use. However, stigmatization is not useful in cases when a disease has infiltrated the mainstream population, such as syphilis and HIV in Haiti, and its transmission results from socially accepted behavior, such as sexual intercourse. (Whitty, 1999)

Partner notification is a key aspect of any STI prevention and treatment program. A 2001 Cochrane review of eleven randomized control trials, two of which were conducted in developing countries, compared three different approaches. In the provider referral approach, a third party (a provider) notifies the sexual partner. The patient referral approach relies primarily on patients to notify their partners. Contract, or conditional, referral encourages patients to notify their partners, but institutes provider referral if patients and partners do not present for treatment by a certain date. Meta analysis showed increased rates of partner presentation for treatment when provider referral was employed or when patients were given a choice between partner and provider referral, versus patient referral alone. Contract referral also increased partner treatment rates over

patient referral. Patient-centered verbal health education by a nurse increased partner treatment by a lesser degree. (Mathews et al., 2001)

Despite increased male partner treatment rates with provider or contract referral, these methods require greater infrastructure and provider involvement. The Cochrane review concluded that further studies are warranted in developing countries to determine how to optimize scant resources when establishing partner notification programs. (Mathews et al., 2001) A 2007 study conducted in Bolivia showed that patient referral may be a more feasible and nonetheless effective starting point in low resource settings. (Klisch et al., 2007) The impact of interventions that combine provider training and patient education should also be examined. Finally, future studies should explore the potentially harmful effects of partner notification, such as domestic violence. (Mathews et al., 2001)

The longstanding perception of STIs as a primarily “female” issue is ingrained in many societies, including Haiti. It is inadvertently reinforced by STI screening and treatment programs which target pregnant women. It is crucial that policy makers address men directly, taking into account “social, psychological, economic, interpersonal power structures that determine behavior.” (Mbizvo, Bassett, 1996) Knowledge about STIs does not guarantee behavior change, especially when this information is transmitted indirectly to men through female partners. (Mbizvo, Bassett, 1996) Denial, stigma and power differentials may prevent men from seeking care, even when they know they may have an STI. A successful education program should not only increase men’s knowledge about syphilis transmission, treatment, prevention and personal risk of infection, but give them skills to seek care, avoid re-infection and promote communication with sexual partners. (Magee et al., 2006) Direct education through specifically male-centered interventions may encourage men to assume an active role in preventing disease transmission. (Mbizvo, Bassett, 1996) Clear and structured male partner notification and treatment procedures are also essential.

## RESULTS (2010)

### QUALITATIVE RESULTS

#### Interviews with Couples

As with the 2008 qualitative data, selected quotes illustrated each theme. Creole words and expressions were used to preserve the original meaning and accurately capture concepts. The following themes emerged from the interview structure and content analysis of responses:

#### *Men's Perceptions of Syphilis*

It was essential to incorporate men's view of syphilis into male-centered education and treatment interventions. When asked what they knew about syphilis, many men said they did not know anything about it. Interviewees who had heard of syphilis most often referred to it as a *mikwob* [microbe, germ], *maladi* [sickness] or *maladi san* [blood sickness].

A man who lived with his wife and two children and attended a fathers' group said:

Syphilis is an STI that causes a large *bouton* [skin lesions, sore] on the penis. If someone has syphilis, he needs to go to the health agent, dispensary or hospital for treatment. Syphilis can be transmitted by sexual contact or improper hygiene.

A man with two female partners and multiple children with each who did not belong to a fathers' group and did not present for syphilis treatment said:

Syphilis is a *mikwob*, and people must protect themselves from this *maladi*.

When asked why they had received injections, a couple with two children who did not belong to mothers' or fathers' groups said:

The injections were for treatment of the syphilis *mikrob* which is a *maladi san* that can get into the vagina and that pregnant women can pass to their babies...The HHF doctor [most likely a nurse, as physicians do not usually travel to rural health posts] talked us and said that we both needed to be treated or the treatment wouldn't work...The treatment would protect our health and our baby's health and prevent miscarriages.

The husband added:

The health agent also talked to me about this when he gave me the injections.

A couple with seven children who belonged to mothers' and fathers' groups and reported they had not received any injections during the woman's pregnancy said:

Syphilis is a serious skin illness caused by *mikwob* in dirty water.

A man who lived with his wife and young daughter, worked as a shoemaker and reported completion of over fifteen years of school said:

Syphilis is a very widespread disease that affects every region of Haiti and the entire world. A person can get syphilis if he gardens or touches an open wound and then doesn't wash his hands before eating. I had syphilis in 2004, and I almost died. I had a headache, heart palpitations, and wheezing and had to take a lot of medicine to get better. My wife has not yet had syphilis.

When asked if he had any questions, the man said he was concerned about AIDS:

I know many people with AIDS, but they don't admit that they have it. He I have never been tested, but my wife was tested at the Center of Hope, and she tested negative.

One man who lived with his wife and three children, had *ale vini* for work in Port-au-Prince until two years prior, and had been treated for syphilis during his wife's last pregnancy said:

The shots my wife and I received were for syphilis. Syphilis can cause men, women and babies to develop large *bouton* [skin lesions, sores]. To avoid this, both the man and woman need to be treated.

A man who lived with his wife and three children, had been treated for syphilis and did ironwork said:

Syphilis is a *mikwob* that can get into a person's blood and is bad for his health.

A man who lived with his wife and five children who had not been treated for syphilis said:

"Syphilis is a very serious *maladi*. Am I going to die?" He added: "Sometimes it makes me tired and sometimes thin."

One couple with two children who attended mothers' and fathers' groups and were treated for syphilis at the Center of Hope were asked about their experience with penicillin injections. The man denied being afraid of the injections. When asked if the injections frightened her, the woman reported:

I did not like the injections.

### ***Stories of Successful Male Treatment***

One woman reported that she had lived with her family in Port-au-Prince until the earthquake. All members survived the earthquake, and the woman left the city with her children, who are two and

four years old, to live with her father in the Grand' Anse. She had gone to school there before going to Port-au-Prince, where she worked in commerce. Her husband still worked in Port-au-Prince and planned to join the family in the Grand' Anse in six months. The woman said that although her husband was far away, he had received syphilis treatment:

When I was pregnant with my last child, I came to the health post here and got treatment. The nurse gave me a paper to give to my husband in Port-au-Prince. He took it to a clinic there and received treatment... My husband and I received injections for syphilis, which is a STI and can be a *maladi nan vant* [in the womb]. The baby can be infected when it is growing inside the mother.

One man who lived with his wife and healthy eighteen month-old said that he and the woman had both been to school and worked as farmers. He said that until two years ago, he had traveled to Port-au-Prince to work as a mason. He did not belong to a fathers' group. The woman had previously a mothers' group, but stopped going to care for her ailing mother. She reported receiving injections at the rural health post and at the Center of Hope during her pregnancy. The man was asked if he had received any injections:

"I was in Port-au-Prince, but I saw the health agent when I returned, and she gave me two injections... My wife told me to go [see the health agent]." When asked if he knew why he received the injections, the man said: "No." When asked if he had heard of syphilis he said: "I've heard of it, but I don't know anything about it."

Another man lived with his wife and eight children, (ages two to seventeen years), whom he reported were all in fairly good health, with the exception of the youngest. The man said the boy had a hernia and swollen scrotum and he would him to the hospital when he had money. Neither the man nor the woman had been to school, and both worked as farmers. The woman said she belonged to a mothers' group, but the man reported working too much to have time for a fathers' group. The woman, who was visibly pregnant, said that during her last pregnancy, she went to the Center of Hope:

"I was in labor for three days. I gave birth at the hospital." When asked why, she said: "The nurse at the hospital told me that he should go."

One man who lived with his wife, their two children and both sets of in laws reported that he had accompanied his wife to her prenatal visits at the rural health post:

“I wanted to help with the baby. Also, sometimes I felt like my wife wasn’t capable of going on her own.” The woman reported that she had gone to the Center of Hope twice for injections. When asked about his own treatment, the man reported: “I received a letter from the health agent. When I went to see him, he gave me two injections.”

A man who lived with his wife and three children and worked as a farmer said that when his wife was pregnant,

“I received a letter telling me to go to the hospital in Moron [local dispensary], so I went.” When asked what happened at the dispensary, the man reported: “I received injections.” When asked about syphilis, the man said he knew it was a *maladi san*.

A woman who lived with her husband and three children and reported that the man belonged to a fathers’ group and worked as a farmer said:

“I went to the prenatal post during my last pregnancy in 2008...The nurse there told me to go to the Center of Hope...I went, and they gave me food and injections.” When asked what was done for her husband, the woman said: “The health agent told my husband to go see her. He did, and she gave him three injections.” The woman knew that the injections she and her husband received were for syphilis, but said she did not know anything about the disease.

One woman who lived with her three children and husband and a mothers’ group recounted:

“I came to the health post for my prenatal visits and received three injections there...My husband received injections from the health agent.” When asked, she said: “We received the shot because we had a *maladi* down below caused by a *mikwob*. The *maladi* caused itching...It was important that we get treatment to protect our child from the *mikwob*.” She said she could not remember the name of the microbe, but when prompted, said: “Yes, it was syphilis.”

A woman who had eight children (age range: six months to eighteen years) and whose husband was often away for work said:

“In the past, I lost two babies, so I went to the Center of Hope to have my child [at the Hôpital Saint-Antoine] who is now three years old. I was also told to go to the Center of Hope when I was pregnant with my youngest child, but I gave birth before I went.” When asked if her and her husband had received any injections, she said: “Yes, we have both had multiple injections in the buttocks, both at the rural health post and at the Center of Hope.” She said that the shots were for syphilis. When asked what she knew about syphilis, the woman said: “I learned about syphilis from the mothers’ group. I know syphilis can be transmitted across the placenta and through sexual contact.” The author asked if she was concerned when she learned the results of her syphilis test and she said: “Yes, I was worried about my health and the health of my child...I talked to my husband about syphilis and told him that it was an STI and he needed treatment, and he was okay with that.”

A man who lived with his wife and two children and did not belong to a fathers’ group recounted:

“I went to the rural health post with my wife while she was pregnant. We were told to go see the health agent, so we went, and she gave us injections. I didn’t know why we were going to see the health agent. I went to *konprann* [understand] what she wanted. She sat down and talked to me. The author asked the man if, after talking with the health agent, he knew what the injections were for, and he said: “They were for an STI.” When asked the name of the STI, he said he did not know.

A man who lived with his wife and three children, did ironwork and did not belong to a fathers’ group said:

“My wife was very sick with anemia during her pregnancy, and we were told to go to the Center of Hope. She stayed there for months and then delivered at the hospital [Hôpital Saint-Antoine].” When asked if he or the woman received any injections or blood tests, he said: “Yes, we both received injections. I did not receive any blood tests.” The man knew the injections were for syphilis.

### ***Referral to the Center of Hope***

HHF policy recommended that male partners of syphilis positive women follow up at the Center of Hope for HIV testing. Penicillin treatment was also administered if this had not been done at a rural health post or by a health agent. The author’s literature search findings indicated that men might be reticent to present to a formal health care facility, like the Center of Hope. Also, a 2008 interview with an HHF physician implied that STI infection was the only reason that men ever went to the Center of Hope and that they were stigmatized by being there. (Lafalaise, 2008)

A couple with two children who attended mothers’ and fathers’ groups said that an HHF nurse told them to go to the Center of Hope at the woman’s first prenatal visit. They followed the instructions. When asked what the referral was for, the woman said:

“I must have had one of the *siy danje* [danger signs] of pregnancy [which are taught in the mothers’ and fathers’ groups]” although she did not know which *siye danje* she had exhibited. The couple reported receiving injections at the Center of Hope. When asked, the husband knew what they were for: “For syphilis.”

A woman with seven children who belonged to a mothers’ group reported:

“I received a paper telling me to go to Sant Lespwa. I didn’t understand why I was told to go there, and I gave birth before I had a chance to go.”

A couple who lived with extended family and seven children reported that they went to the rural health post each month during the woman’s most recent pregnancy. The husband said he made

the two hour trip with his wife: “To accompany her.” The woman said that during one of her visits, the HHF nurse asked her if she would be able to go to the Center of Hope should the need arise [due to pregnancy complications]. The woman said she told her:

No...because I don't have enough money and I have too many children.

A couple who lived with their six children reported that an HHF nurse had told them to go to the Center of Hope during the woman's most recent pregnancy, so they went. When asked how they got there, they reported:

“We paid for a car.” When asked if the trip required an overnight stay, they said: “No. The car took us there and back on the same day.”

One woman with two children and a husband who worked in Port-au-Prince reported that during her most recent pregnancy:

I received a letter telling me to go to the Center of Hope, but I miscarried before I went...I was four months when I miscarried.

One man who lived with his wife and one year old daughter said that the HHF nurse told him to bring his wife to the Center of Hope during her pregnancy:

“We went to the Center of Hope three times while my wife was pregnant. We took a taxi...The taxi fare was a gift from a friend.” The man reported that he and his wife received injections at the Center of Hope: “My wife had four, and I received two...I had bad water in my belly which could descend and infect my wife through her vagina. I got the shots were to protect myself, my wife, and the baby from *maladi*.”

### ***Mothers' and Fathers' Groups***

As mentioned in Part III, health agent-facilitated mothers' and fathers' groups provided an important outlet for health education.

One couple with two children (one had died at a year of age in an accident) said they attended mothers' and fathers' groups regularly. She attended her group each Sunday. He worked in Jérémie and attended his group most weeks. When asked what kinds of things they learned about, they said:

We learn about infections. We learn about the *siye danje* [danger signs] while a woman is pregnant and after she gives birth, like hemorrhage and a bad headache. If we see these *siye danje*, we need to take the woman to Jérémie. We learn that if a baby has a seizure,



we need to take the baby to the hospital immediately or the baby will die. If a pregnant woman has a problem, we can call the ambulance twenty-four hours of the day.

A woman who lived with her husband and six of her seven children and attended a mothers' group every Sunday said:

"We talk about danger signs in mothers and babies. We also talk about diseases like STIs." When asked what she knew about syphilis, the woman reported, "I know that syphilis is an STI that can cause crippling and paralysis. Mothers can pass it to their babies."

A man who lived with his wife and five children and said he attended a fathers' group was asked about the subjects he had discussed at group meetings:

I can't remember...I can't remember any of the subjects I learned about there.

One man who lived with his wife and three children (ages nine months, nineteen years and twenty-three years) said:

At the fathers' group, I talk about my job. We don't talk about *maladi*.

One man who lived with his wife and three children and said he did not like attending fathers' group meetings reported:

"We talk about health issues, avoiding *maladi* and how to behave." His wife reported that at her mothers' group: "I've learned how to feed and care for my children. I've learned how to make *serum lakay* [homemade oral rehydration therapy] if they have diarrhea and about proper hygiene and water hygiene."

A father of eight who worked as a farmer said that he rarely attended fathers' group meetings because:

It's too far.

A woman who lived with her two children and sold sandals to earn a living said that at her mothers' group:

I learn about childhood *maladi*, like diarrhea.

A woman with three children who worked as a farmer said:

We learn about diarrhea, babies and syphilis.

One woman with three children who had no schooling, worked as a farmer said she attended a mothers' group each week, but:

I don't remember anything from it.

A woman who lived with her husband and three children, had never been to school, and worked as a farmer was asked what she knew about syphilis. She described what she had learned at her mothers' group:

If a pregnant woman has syphilis, her child can get sick and have a rash or other health problems. The child can even die. Syphilis is transmitted by sexual contact. It is important to receive a shot to be treated for syphilis.

A mother of three who no longer lived with her husband said that at her mothers' group:

We have a lot of education. We talk about syphilis, AIDS, fever, *serum* [*serum lakay*, which is homemade oral rehydration therapy], diarrhea...

When asked if they belonged to mothers' and fathers' group, many men and women said:

*Pa ankò.*

In Haitian Creole, *pa ankò* can be translated as "not yet" or as "not anymore." Upon further questioning by the author, it became clear that interviewees meant that they did not yet belong to mothers' or fathers' groups, but intended to join them in the future.

### ***Men's Priorities***

The most accurate assessment of men's priorities was likely gained by their recounting of their actions and rationale for their decisions. The author also ascertained men's priorities by asking them directly what they valued most and what was most important to them.

One man who lived with his wife and six children and *ale vini* ["came and went"] to work as a farmer said that he could not attend a fathers' group because:

I don't have time since I travel for work.

A man with eight children and a ninth on the way who worked as a farmer responded similarly:

I don't have time for that [attending a fathers' group]. I work too much.

One couple who lived with their two young children and both sets of in laws and worked as farmers reported that neither of them had time to attend a mothers' or fathers' group:

We both work a lot. We don't have much free time for other activities.

A woman with eight children whose husband *ale vini* ["came and went"] for work and attended a mothers' group said her husband did not belong to a fathers' group because:

He has too much work. He doesn't have enough time for that.

One father of three who worked as a farmer said:

I don't like to come to the fathers' group because I have no time, and I need to work.

When asked directly about what was most important to in their lives, men reported prioritizing work, health and family.

One man who lived with his wife and two children and had been treated for syphilis said that his top priority was:

A life of health...I think work and family are also important for all men.

A man who lived with his wife and two children, worked as a farmer and had been treated for syphilis reported that the most important aspect of his life was work. When asked what motivated him to be treated for syphilis, he said:

My own health [and] to prevent spreading the *maladi* [sickness] to others in the house.

### ***Reasons Men Were Not Treated for Syphilis***

A woman with two children who was no longer with their father told the author:

"I got injections for the syphilis in my blood. Syphilis is an STI and a *maladi* [sickness] that a mother can pass on to her baby." When asked about her former husband, she said: "He didn't receive any injections. He didn't want to." The woman said she did not know why her husband refused treatment. She continued to have sex with him after she was treated.

One man living with his wife and two year old child who was often sick with *grip* [flu] who worked as a secretary and attended a fathers' group reported that when his wife tested positive for syphilis:

“...the health agent told me to go see him...I didn’t go because I didn’t think that the issue was serious.” When asked what he knew about syphilis, the man said, “Syphilis can cause both children and adults to become *enfim*.”

A woman who lived with her husband and seven children reported that she received injections during her pregnancy. Her husband *ale vini* [“came and went”] for his farming work and had another partner. When asked if her husband received any injections, the woman said:

“No, he was working. He was staying with his other wife and family at the time.” The author asked the man why he did receive treatment upon his return, and his wife responded: “Negligence. The health agent told him to go see her.”

One man who had accompanied his wife to the Center of Hope during her pregnancy but had not received any treatment there reported:

I was told to see the health agent, but I didn’t go because I had already been the Center of Hope.

Another man with five children who worked as a farmer said that his wife went alone to the Center of Hope during her pregnancy. When asked why he did not accompany her, he said:

I was sick at that time...I did receive a letter telling me to see the health agent, and I went to Moron [a local dispensary] with my baby.

The man reported that neither he nor the baby received any injections at the dispensary.

A couple who lived with their six children (age range: two to thirteen years) described what happened during the woman’s most recent pregnancy:

She went to rural post for treatment. The nurse sent us both to the Center of Hope to receive injections. We went, but the Center of Hope was closed, so we did not receive injections.

A woman who lived with her husband and three children and attended a mothers’ group reported:

I went to the Center of Hope many times during my pregnancy...I received two shots there...My husband received a letter saying that he needed to be treated. He also went to the Center of Hope, but he did not get shots because they ran out.

It was likely that this man went to the Center of Hope during the penicillin shortage, and that this was the reason the Center of Hope “ran out” of the medication.

One mother of an eighteen month old whose husband worked in Port-au-Prince said:

My husband has not received any injections, but that is because he hasn't been here. He will receive injections when he comes.

The health agent confirmed:

I have penicillin, and I will give the man the injections when he returns.

A man who lived with his one year old and new wife (not the mother of the baby) and worked as a motorcycle taxi driver said that when his former partner was pregnant:

I received a message telling him me to go see the health agent, but I didn't go. I didn't know what it was about, and I didn't think it was important.

One woman who lived with her parents, brother, sister, husband and eleven month old child and was pregnant with her second child tearfully recounted:

I explained to my husband that he needed syphilis treatment to protect himself and to prevent re-infecting me, but he refused to go see the health agent...Now he is working *an deyo*. [far away] I don't know where he is.

A man who lived with his wife and five children who had not been treated for syphilis said that he would not come to the health post for treatment because:

This is a place for women and children.

### ***Multiple Partners***

Men with multiple female partners often had more than one household with a separate *madanm* [wife] and children in each. Men may have been reticent to admit having other partners, particularly in the presence of their wives.

One couple reported that they had lived together for nine years and had a six year old child together. The man had seven other children ranging in age from six to twenty-three years with another woman in Port-au-Prince. The woman had three other children (age range: three and half to fourteen years) with another man. When asked, the woman reported:

"I no longer have any other *mari* [boyfriend, husband]." The man said he had another *madanm* [girlfriend, wife]: "She works at the clinic in Léon." When asked if he would tell her to be treated for syphilis before they had sex again, he said: "Yes, I will tell her."

One woman who lived with her three children reported that she and her husband had lived together during her pregnancy, but did not live together anymore:

In the past, he use to *ale vini* ["come and go"] to Port-au-Prince. Now he stays mostly in Jérémie with another woman...He still comes to see me. The woman reported that during her pregnancy: "My husband received a letter telling him to go see the health agent, but he did not go. He received three injections in Chambellan [another village in the Grand'Anse] at another clinic, which is not an HHF clinic." The woman did not know if the man's other partner had received treatment for syphilis: "I will speak to him and make sure that he knows the other woman should go."

One woman who had six children with her *mari* [husband, boyfriend] reported:

"My *mari* doesn't live with me. He lives in Port-au-Prince. He doesn't work there. He has another *madanm* [girlfriend, wife], and he stays mostly with her...He comes to see me often." The woman said that during her pregnancy: "The health agent gave me an injection, or maybe more than one. She also talked to my *mari* and gave him an injection." When asked if her *mari*'s other *madanm* had received any injections, the woman said: "I don't know. She is in Port-au-Prince."

One woman who no longer had a relationship with the father of her two year old said:

I told him to bring his other wife for syphilis treatment and I'm very angry that he did not. I've been very sick and weak. My baby is sick, too. He got the maladi from my breastmilk.

### ***Absent Men***

Women who presented for interview in place of their husbands were asked about the man's whereabouts.

One woman who had stopped going to school when she became pregnant at fifteen, lived with her two children and belonged to a mothers' group said:

He is in Port-au-Prince. He works for the electric company there. When he's here, he does farming...He's been there a long time, but he still visits every four or five months.

One woman with three children who belonged to a mothers' group said:

"He is in Jérémie. He does farming work there."

When asked how often he returned, the woman said her husband returned every week.

Another woman with three children said:

He is working right now, but he is supposed to come to the health post.

The man never presented for interview.

A woman who lived with her husband and two children said:

He did not want to come today. I don't know why.

The author asked if the man was working and the woman said that no, he was not.

Another woman who lived with her husband and two children said:

He is sick in hospital in Bonbon [a larger town]. He has a fever and has been sick for a long time. He was given medicine, but he didn't take it because the pills were too big and he was afraid of choking.

When asked about the man, the health agent said the man had diarrhea.

A woman who lived with her husband, some of his family members, and their three children said that her husband was unavailable because:

He is *an deyo* [far away] taking care of his sick mother.

A woman who lived with her husband and three children and said she helped her husband on their farm said:

He is busy working today. He could not travel so far because he has too much work to do.

A woman who lived with her husband, cousins and eight children (age range six months-sixteen years) said:

My mari is in Boyer. He is a mason, and he works there. He is often gone.

A woman who lived with her husband, mother in law and two sons said:

My mari is in Jérémie today...He works on cars in many different towns. Sometimes he stays in Jérémie, and sometimes he stays with me.

One mother of an eighteen month old said that she did not live with her husband because:

He works in Port-au-Prince...He's a mechanic. He comes to visit me often.

One health agent said of a father of three who had attended a fathers' group once or twice:

He didn't want to come today. I asked multiple times.

### ***Children's Health***

Couples were asked about the general health of their children to informally assess whether any children showed signs of congenital syphilis. This was also done to gauge parents' level of concern.

Many couples reported:

They are in good health.

Other couples reported being concerned about their children's health. Parents of a two and five year old said:

They often have *gratel* [a rash], and sometimes fever and *grip* [flu].

Another couple reported that their only child, a two year old, was sick with *grip* [flu]:

He is often sick with *grip* and fever.

One couple reported that their seven children (age range: one to twenty years) were in generally poor health:

They are often sick with fevers and runny noses. One of the older children has frequent headaches. The baby often has a fever and diarrhea.

A couple with six children (age range: one to eleven years) said:

The children are often sick with fever, *grip* [flu], headache and stomachache. The baby now has *grip* and discharge from the eyes.

A couple with six children (age range two to eighteen years) reported:

“The five year old and two year old have had large *bouton* [skin lesions, sores] since they were born. The five year old's *bouton* have been so bad that she has had to go to the hospital for them.” When asked if the child received injections [as penicillin may have been administered if congenital syphilis was suspected], the couple reported, She received liquid medicine for the *bouton*, but no shots.

One couple with five children (age range: two to thirteen years) appeared sad when they presented for interview. The woman's voice was hoarse, she said from crying:

Our four month old died four days ago. He was sick.

The health agent confirmed

He was sick. He died of diarrhea and dehydration.

The couple was asked about the health of their other children

They are not in very good health. One of them has a stomachache, and the two year old is small.

A couple with three children (ages one, three and thirteen years) reported that their children all suffered from poor health.



The one year old has *gratel* [a rash] and is small. The three year old doesn't eat. I bring him to the hospital every month. He is always sick. He has diarrhea and vomiting all the time. He was treated for worms, but he never got better.

The three year old was tested for syphilis by rapid test, given parental concerns about his health and the history of maternal syphilis. His test result was negative. The parents were informed that rapid testing would not be accurate for the one year old, but the child could be presumptively treated when HHF's infant treatment protocol was reinstated.

One woman who lived with her husband, some of his family members and their three children (age range: eight months to four years) said:

The children often have *gratel* [rashes], stomachaches, poor appetites, and diarrhea. I have a stomachache, poor appetite and diarrhea, too.

A woman with three children (ages one, three and seven years old) said:

The seven year old is in good health. The three year old and one year old are not growing well, and they have *bouton* [skin lesions, sores] on their skin.

A woman with an eight year old and a three year old son said:

The boys often have a fever or diarrhea...But they are growing well.

One woman with a six year old, a four year old and a ten month old who had been treated for syphilis with her husband said:

The older children have stomachaches and fevers often...I'm concerned because the baby is sick in his eyes. I took the baby to the hospital. The baby received medication, but no treatment for syphilis, and its eyes are still red.

A couple who lived with their three children (ages nine, three and two years old) said:

The three year old isn't very healthy. He has been eating okay, but has been losing weight.

A woman with eight children (age range: two to twenty-five years) reported:

My youngest is sick with diarrhea and grip, but he is growing well.

The health agent chided the woman:

You should be coming regularly to the health post with this child so he can be regularly weighed and monitored.

When asked why she did not come to the health post more often, the woman responded:

The trip is too difficult.

### ***Counseling by Health Agents***

As interviews were conducted during rural health posts, health agents were often present.

Sometimes they were asked to clarify information provided by couples or to counsel them about syphilis. At other times, they chose to do so unsolicited. Observing these interactions provided the author valuable insight into the dynamics between health agents and the residents of their zones.

One health agent spoke sternly to a man and woman who both admitted to having additional sexual partners:

It's essential that all of your partners be treated...And if that woman has another man, that man must also be treated. And all of his partners must be treated...This is very important.

Another health agent told the author about her experience with a man who did not return for a second penicillin injection:

I've talked to the couple about syphilis and the need for treatment. If a pregnant woman is infected with syphilis and she is not treated, the baby can be born *enfim* [crippled] and with many *pwoblem* [health problems].

One health agent told a woman who had not been treated during her pregnancy that she would not administer penicillin treatment to her if she did not present with her husband:

I told the woman that she would not treat only her. I need to treat both her and her *mari* [husband] for the treatment to work.

### **Interviews with Health Care Workers**

The following themes emerged from the interview structure and content analysis of responses.

#### ***Syphilis Program Procedures and Documentation***

Before contemplating programmatic change, it was important to understand current procedures and documentation, including which of the author's 2008 recommendations had been implemented.

The infectious disease nurse in charge of the HIV and syphilis programs at the Center of Hope described prenatal STI screening procedures:

Virtually all pregnant women participate in this process and receive HIV and syphilis testing. The tests and treatment are free. Other kinds of visits and treatments are not free. When a woman tests positive, we send a letter to her husband. We treat both the woman and her partner with three doses of benzathine penicillin...Everything is documented in my notebooks and in the woman's chart.

HHF's HIV specialist and VCT Program Director noted that at the VCT clinic:

All testing and treatment is free. We now use the rapid syphilis test here.

The VCT nurse said:

I see all of the patients who come for STI testing—men, women, children—except for pregnant women. They go to the Center of Hope. I always do HIV and syphilis testing together.

An HHF rural nurse and county *responsab* [in charge of outreach for that region] described notification and treatment procedures for rural couples:

We used to send a letter to the man, but we don't do that anymore. [This was untrue.] When a pregnant woman tests positive at a rural prenatal post, the HHF nurse sets up visits with the health agent for the woman to receive injections number two and three and for the man to receive his injections. The nurse leaves benzathine penicillin so that the health agent can administer treatments. At this point, the health agent is responsible for making sure that the women come in for follow up and that their male partners come with them for treatment.

When asked about how this was documented, he said:

We have a problem with documentation in the field. After the first injection, the nurses take the patient chart back to HHF, so the health agent does not have it to document additional treatments for the woman and her partner.

The medical technologist described syphilis testing and treatment during his group's mission trips in Léon:

We conduct syphilis testing and treatment according to the WHO guidelines for use of rapid treponemal tests in developing areas and subsequent treatment of positive patients. Patients come to see us for a variety of reasons. Most of the visits are for primary care and screenings, although there are also symptomatic patients and those with risk factors for certain diseases. The patients know that we will provide them with extensive services, and they want to take advantage of this. Each pays twenty-five gourdes to have a chart, although special arrangements can be made if a patient can't pay. After this, all tests, visits, follow up, referrals and treatment is free. Patients can also request to forego chart process and receive HIV counseling and testing only.

When asked where these patients received follow up after the organization's departure, a nurse practitioner from his group said:

We go to great lengths to ensure follow up, and most patients do come back when they are instructed to. We feel it would be irresponsible to offer services if complete treatment and follow up could not be offered. If necessary treatment cannot be given in Léon or Jérémie, all efforts are made to send the patient to Port-au-Prince, the Dominican Republic, the US...wherever the treatment can be administered. The organization pays for all of this. It pays for transportation—100 gourdes to go to Jérémie—and pays for all services when a referral given. Any necessary repeat trips are also paid for. We also send case managers at Hôpital Saint-Antoine to ensure that patients receive all necessary medications and procedures and that no one takes advantage of them. My philosophy is that it is always prudent to treat, and you must have the courage to do this. It's useless to come in and diagnose patients if you're not going to do everything in your power to help them resolve the problems.

When asked about prenatal care provided by the mission group, the medical technologist said:

Most prenatal visits are for screening and prevention. We give vitamins and often do an ultrasound. We also have a standard prenatal panel of laboratory tests which includes HIV testing...I know that HHF doesn't do this in their rural program, but believe they should follow suit. This is anecdotal, but I really believe that offering HIV testing leads to behavior change. If you look at the WHO website, they advocate widespread access to VCT. In East Africa, VCT was available everywhere, even in tiny villages that didn't have a clinic.

The author asked him who conducted pre and post-test counseling in these situations. He responded:

Many different types of providers there are trained to do VCT, including health agents and nurses.

### ***Syphilis Education***

All health agents, nurses and doctors provided health education. Many cited STI education as an important (if not *the* most important) determinant of male treatment for syphilis.

The infectious disease nurse in charge of the HIV and syphilis programs at the Center of Hope reported that patient education was a major facet of her job:

I do quite a bit of education about HIV and syphilis, both and groups and with individuals before they get tested...I have some books on syphilis and HIV, but HHF doesn't give me any specific materials. Everything is in my head...I tell them that syphilis is a sexually transmitted disease that attacks the body of infected victim. It is a serious illness. If a pregnant woman is not treated, the mom and baby can have many *pwoblem* [health problems]. The mother needs to be treated to prevent consequences for the baby. Syphilis can attack many parts of the child's body.

The author asked HHF's HIV specialist and VCT Program Director what he told his patients about syphilis and if he had any educational materials:

I don't have any materials. The information is all in my head. I tell the patients that syphilis is an STI and that all of their partners need to be treated, or they will be re-infected. I tell them that syphilis has serious consequences for all of the body's organs and that the treatment can prevent this. I tell them about the symptoms of syphilis. Often syphilis can cause lesions on the genitals or mouth. The lesions are painless and don't contain any pus. Patients can lose their hair, although this only happens in tertiary syphilis. There are joint and bone effects, skin rashes and genital problems. Babies born with syphilis can have big problems.

The VCT nurse said that she started each visit with a physical exam, followed by pre-test education:

I ask the patient what he or she knows about syphilis and I describe what the plan will be if there is a positive test result. I talk about the consequences of syphilis for adults and for babies. I also talk about ways to prevent STIs, which is the same for syphilis and HIV. They shouldn't share needles or razors or touch anyone's blood. It is important to have only one sexual partner and to be honest with this person about one's STI status.

When asked if she ever mentioned condoms as a means of preventing STI spread, she said:

No. It is HHF policy not to talk about condoms.

An HHF rural nurse and county *responsab* [in charge of outreach for that region] contrasted public knowledge of AIDS with that of syphilis:

Pretty much everyone knows about AIDS. AIDS kills, and everyone is afraid of it. Not everyone knows about syphilis. Pregnant women know about it, and young people receive education about it. Health care workers know about it, but most men don't know what it is. It's not known to be a dangerous or deadly disease.

An HHF rural nurse who had been involved with the rural syphilis program since its inception said:

Men don't come for treatment because they don't understand the consequences of syphilis and why it's important to be treated. If they were better educated about such diseases, they would understand all this and be more motivated to come in for treatment...I think that what they need is education. The women come for prenatal care and are better about attending mothers' groups. They know better about this kind of thing and keep it in mind.

HHF's Behavior Change Coordinator said he viewed education as essential to encouraging men to present for syphilis treatment:

*First is education. Men must be made aware of risks for family when there is a lack of treatment. Men don't know about this. They don't feel sick and don't understand the need for injections.*

When asked if he thought education alone provided sufficient motivation for men to present for treatment, he said:

I do. I think that a major reason that men don't come for treatment is that they don't know its risks and benefits.

### *Motivation*

The author sought to understand what helped men decide to go for syphilis treatment so that these motivating factors might be incorporated into future male-centered interventions.

When asked about factors that motivated men to present for syphilis treatment, the infectious disease nurse in charge of the HIV and syphilis programs at the Center of Hope said:

Women who receive treatment do so to protect their own health and the health of their children. Men have the same mentality. The health of their families is important to them.

When asked what motivated men to seek VCT, HHF's HIV specialist and VCT Program Director said:

Some VCT patients come specifically for STI tests, but most come for other things. Most patients are asymptomatic, and those who are symptomatic usually have symptoms of HIV/AIDS, rather than symptoms of syphilis. Most men come for common acute issues like fever, respiratory illness and headache. When asked about patients presented with symptoms, he said: I've seen 4 symptomatic patients in past year. Two were young patients with chancres. One was an older patient, 70 or 75 years old, with a rash on his face.

The VCT nurse felt that education was an important means of encouraging STI testing and treatment:

It's important to tell people about the consequences of syphilis because this motivates them to come for testing and treatment. I hold education sessions at HHF every day. I talk about syphilis transmission, its consequences and partner treatment.

When asked if many of her patients presented with symptoms, she said:

I have many positive patients, but few of them have symptoms. I've seen symptomatic patients with rashes or bullae on the ears or back of the neck. Women may have sores on their bottoms, and men may have problems with the penis.

The medical technologist providing care through a mission group in Léon was asked if all of his syphilis patients had presented screening, or if some were symptomatic. He said:

Yes, I've seen all stages of venereal syphilis in adults. We had one patient with tertiary syphilis whom we treated for seven days in Léon with daily IM injections of benzathine penicillin. When we left, we referred him to Jérémie for the remaining treatments. However, most of the syphilis positive patients I see are asymptomatic.

He added:

I also see positive syphilis tests where I shouldn't be seeing them: for example, in young teens who deny any sexual activity. It makes me wonder how often endemic syphilis might be responsible for positive tests.

An HHF nurse who had been involved in the rural syphilis program since its inception advocated addressing men directly, rather than simply through their wives:

Men might hear about syphilis and its consequences from their wives, but they don't want to accept what they hear. They don't feel sick, and they don't want to accept that they have a sexually transmitted disease and that they need treatment. They need to be educated directly.

An HHF nurse responsible for urban outreach was asked why male partners of syphilis positive women were reluctant to present for treatment and if they might be afraid of the injections:

It's possible that men are afraid of the injections. They certainly lack motivation and desire to be treated. The problem is especially bad among people in the poorer sections of Jérémie. These people are not well educated. They come from *an deyo* [the mountains], settle on the edge of town and continue to live in poverty. However, they do not have the advantage of a health agent providing community cohesiveness and education. Attitudes and utilization of health care are better in HHF's rural areas thanks to the health agents, who provide motivation and health education.

### ***Multiple Partners***

The overall consensus among health care workers was that approximately half of men and perhaps half of women had multiple partners. They observed that this complicated the treatment process and talked about how they addressed the issue.

The infectious disease nurse in charge of the HIV and syphilis programs at the Center of Hope said:

The husbands are a huge problem. They think that they are not sick and they don't come for treatment. I educate the men who do come. I tell them that they will re-infect their wives if they aren't treated and that all of their other partners are at risk. The men who come for treatment will sometimes bring their girlfriends... I would say that about 40-50% of male partners of syphilis positive women come for treatment. This number is a lot lower for partners of HIV positive women, more like 10%. Many women don't want to tell their husbands that they are HIV positive, and notification letters are not sent to men

for HIV. A positive HIV test in a pregnant woman can lead to an argument about which partner gave HIV to the other. This is less of a problem for syphilis.

When asked how many of his patients brought their partners for treatment, HHF's HIV specialist and VCT Program Director said:

Only 5% or so. The women are afraid that their male partners will get angry and leave them. The men have multiple female partners. Often they have gotten syphilis from a girlfriend and it is not an open relationship; they don't want to put that relationship out in the open.

The author asked the VCT Program Director how many men and women he thought had multiple partners, and he said:

Approximately half of men. It's probably about the same for women.

An HHF rural nurse and county *responsab* [responsible for, in charge of operations] asserted:

We don't have a genuinely polygamous society here, but about half of men have more than one female partner.

An HHF rural nurse who had been involved with the rural syphilis program since its inception said:

It's important that the men come in for treatment. Usually they are the ones who have multiple partners, and they are the source of infection.

HHF's Behavior Change Coordinator said:

Syphilis is a difficult illness to address because there is an associated stigma. The men are usually responsible for transmission within the couple because they are the ones who are unfaithful, and they are ashamed and embarrassed.

One health agent expressed awareness of this issue:

Men often have multiple female partners, and I always encourage them to bring or send their girlfriends for treatment.

Another health agent described her strategy for encouraging universal treatment in cases where men had multiple sexual partners:

If the man has other *madanm* [wife, girlfriend], I encourage him to bring them for treatment. A lot of men do bring their partners. Even if they don't bring them here, the women go to the dispensary that is convenient for them. I talk to the woman on the phone and tell her to go to a dispensary.

One health agent said that in certain, cases, she recommended condom use:



I tell the man that his other girlfriends need treatment and that if they don't get it, he should *pwoteje tèt li* [literally, 'protect his head,' a euphemism for using a condom].

### ***Traditional Gender Roles***

Health care workers said that men were reticent to seek health care of any kind. If they did fall ill, they were more likely to trust a *medsen fey* [traditional healer/herbalist] than a doctor or nurse at a formal clinic.

The VCT nurse talked about *Dr. Denis*, a local healer who had recently passed away:

Dr. Denis gave everyone penicillin injections: not to treat syphilis, but for everything. Many men and children, especially, went to him. People had confidence in his injections. Now that Dr. Denis is gone, more people go to HHF or the *medsen fey* [traditional healer, or witch doctor] especially people from *an deyo*. Few people go to the hospital because they lose a lot of time there. Penicillin can be bought in the street, and the *medsen fey* gives penicillin shots in addition to traditional treatments. Many people have more confidence in traditional healers like the *medsen fey* and *matwon* [traditional birth attendant] than in the western system

She cited men's enthusiasm for Dr. Denis and their reticence to attend her daily education sessions as evidence that they viewed the formal healthcare setting as part of the women's sphere:

The men always say that they are busy, that they are involved with work and other activities. They are not usually available to bring the children to the clinic. The woman works in the home and takes care of the house and children. She gets the children to study and brings children to the hospital when they are sick. Healthcare is usually, but not always, the mother's role. If it's not the mother, often an aunt or grandmother steps in before the father does. Women are used to going for medical care and to the hospital, so they come for appointments, while men don't...all in all, I think that the discrepancy between the number of women and number of men who come for treatment is a result of gender roles and not of education. Men know as much about syphilis as women do. They simply don't feel as comfortable in the formal health care setting.

An HHF rural nurse and county *responsab* [in charge of one county] said:

Men aren't involved with the family to the degree that women are involved. They go to work in order to provide for their families, and that is their main presence within the family. The women are the ones who go to the health posts. They go for regular preventive care during pregnancy and with their children when the children need to go. The men are disengaged...Another issue is that women tend to be "victims." What I mean is that they have a more passive role in sexual relationships and disease transmission than men do.

An HHF rural Nurse Supervisor said:

Men consider themselves the family authority, and they will not do something because wife tells them to.

HHF's Administrator for over twenty years observed:

In general, men encourage their children to receive vaccines and proper health care, however, they don't get those things themselves. The government doesn't give vaccines to men, first of all, even men who didn't receive them as children. The vaccination programs only cover children below a certain age. Men don't go to the doctor. It's not just that they aren't used to it because they don't go to prenatal visits like women or for vaccinations like children. Health isn't a priority for them. A lot of people have been poor their whole lives, and for most of their lives, there haven't been any doctors around. They can go to the hospital and wait, or they can come here to HHF and wait. Either way, it hurts their chances at any job they might have. The men treat themselves if they're sick. They can walk into any pharmacy here and buy whatever they need: a course of amoxicillin, four chloroquine [tablets]...anything. Many of these men have lots of health problems. They almost all have reflux, acid in the stomach. But they are used to working hard and they are used to being in pain.

### ***Additional Barriers to Male Treatment***

The VCT nurse added:

Also, a man might not want to leave his wife to go for treatment if he's been infected by a girlfriend. The men are often afraid of shots.

HHF's Administrator for over twenty years described her experience with a family affected by syphilis:

This was a very poor family. They belonged to both the Save a Family and Cross programs [HHF economic support for the region's most impoverished families]. The woman sells charcoal when she can find it. The man pulls a wooden cart designed to pull heavy loads. They live in a tiny two room house with a dirt floor. It's awful. The woman went for her medical visit and had a syphilis test done. She might have been pregnant, too, but I can't remember. The woman had a positive syphilis test, and received treatment, but the man just wouldn't come. He's a short, solid, manly guy. He works so hard that he's used to being in pain, but he just wouldn't come for those injections. He was afraid. He insisted that his children receive their vaccinations, but when it came to shots for himself, he was terrified. I finally threatened to withhold the family's aid, which would mean no more school for the children, no more medical care...I actually held off on their aid until the man came in for syphilis treatment. He received the first injections and then came back for the second round. When I ran into him in the street after that and asked him about the injections, he just beamed. He was like the Cheshire Cat. He was so proud of himself. The man had been renting his cart at a fee of forty Haitian dollars or something like that each day. If he didn't find a job that day, he lost the money. After the man went for his treatment, I bought him his own cart so that he would never have to rent one again.

One health agent summarized her perception of the issues at hand:

Men don't want to come in for treatment. They think they can't get sick, especially men from *an deyo* [the mountains, far away]. They lack education. When men do understand

this illness, they are sometimes ashamed. Men don't see the *medsen fey* [traditional healer] either. In general, they seek and receive far less health care than women.

When asked if she thought men felt uncomfortable presenting for syphilis treatment, another health agent said:

No, I don't think that there is any shame associated with syphilis. I don't think that has anything to do with why men don't come in for treatment.

### ***Improving Male Treatment Rates***

Health care workers provided valuable insight into the types of interventions that might be feasible to improve male partner treatment rates.

The infectious disease nurse in charge of the HIV and syphilis programs at the Center of Hope made the following recommendations:

I think we need to educate the women more so that they understand the consequences of their partners not being treated. If the man is not treated, the woman will stay sick. We should encourage the woman to talk to her husband about syphilis. Syphilis causes problems in many parts of the body: the brain, the heart, the skin...if the woman explains this well, the husband will ideally come in for treatment. But, the husbands are sometimes difficult.

The HIV specialist and VCT Program Director viewed male treatment as a public health issue which required a systemic solution:

All of the local hospitals have this problem. This is really a problem of the state, the Public Health Ministry, and not a problem of the clinician or clinic. In Cuba, where I went to medical school, there is mandated reporting for STIs. Patients know that if they don't bring their partners for treatment that the doctor, who is a dermatologist, will come to their homes to do treatment. As a result, people are much more motivated to bring their partners. We need this kind of force to make our program work. In Cuba, the government backs physicians up. If HHF were to do this, people wouldn't come to HHF anymore. They would go someplace else for their care. You know, in Cuba, if a known HIV positive person has unprotected sex with a new partner and the partner becomes infected with HIV, that person goes to prison for five years.

HHF's Administrator proposed radio advertisements as a vehicle for male education and outreach:

I hear a lot of radio spots about health, especially since the electricity was started up again in Jérémie this week. There are messages about women's health, women's rights and vaccinations. Now that it's gotten so hot they talk about dehydration and how to keep food from spoiling.

When asked if she thought radio spots would be an effective way to communicate with men about syphilis, she said:

Absolutely. Everyone listens to the radio, especially an deyo. They listen to the radio there even more than in Jérémie. I can't stand it myself—a few words and then ten minutes of that terrible music—but people listen.

HHF's Behavior Change Coordinator suggested fathers' groups as an educational outlet:

*We need to identify channels for male education: who, where, the curriculum. One way to convey information to men is through fathers' groups.*

The Behavior Change Coordinator also commented on the logistics of male treatment:

We need to set up a system in which men come to a health post or clinic for a private consultation so that others don't know that the man has syphilis and has come to the clinic in order to be treated... We need the infrastructure to make these services available. A lot of men, for example, can't get around easily, so it is difficult for them to come to clinics. We need to provide transportation for them, such as cars that will take them to the clinics. We need to think about logistics.

An HHF Nurse Supervisor also said he thought logistics were important:

I would like to propose a new strategy. We should go to men's homes. We can educate and talk to the men in their own environment, where they feel comfortable.

One health agent advocated direct education of affected men:

I have them to my house and sit them down and explain about syphilis and its consequences.

Another health agent said that when men were reticent:

I continue to call them and send messages until they come. I explain that syphilis is serious for the man and for women.

As HHF's Behavior Health Coordinator cited fathers' groups as a potential forum for male-centered education on syphilis, health agents were asked about these groups.

One health agent provided this description:

All health agents run groups for mothers and fathers. I run mothers' groups once a week and fathers' groups once a month. The fathers' groups take place less often because they tend to be busy with work and are more difficult to get together. Virtually all of the mothers and fathers in my zone come to these group meetings. We talk about everything, from nutrition to vaccinations to STIs.

Another health agent suggested STI screening at group meetings:

I hold multiple mothers' and fathers' groups at different locations in my zone at different times during the month. There are fathers' groups twice per month at two different locations. Attendance ranges from twelve, thirteen, fourteen men to twenty or twenty-five. Mothers' groups also meet each month, and attendance rates are on the order of sixty, seventy or eighty women. I also run a youth group for adolescents every Friday. We talk about the same subjects in all groups: vaccinations, STIs, morals, prenatal care, vaccination for adults and for children. I encourage all men who show an interest in health and the health of their families. When fathers come to health posts, I let them weigh their babies first. In terms of syphilis, I am wondering if HHF could supply tests and penicillin to be used at mothers', fathers' and youth groups. I think this would be a great way to reach people.

### **CLINICAL OBSERVATIONS (2010)**

Syphilis testing and treatment supply shortages occurred at three of seven observed rural posts. At two posts, there were shortages of rapid syphilis tests. At another, there was a shortage of syringes. Nurses said that they are required to request supplies prior to each post and that overestimating the necessary number of tests and penicillin vials was discouraged.

A list of *mesaj sou sifilis* [key messages on syphilis] have been printed and displayed in examination rooms in the Center of Hope, as per 2008 recommendations.

### **QUANTITATIVE RESULTS (2010)**

Table V-1 depicts characteristics of the forty-eight men in the study sample. All men were HHF members.

#### **Variables (Characteristics of Male Partners)**

- **Notification:** Whether the man reported (directly to the author or through a health information sheet) that he had been told to present for syphilis treatment
- **Male Treatment:** Whether the man was treated with at least one injection of benzathine penicillin
- **Treatment Given By:** Whether the man received injection(s) from a health agent or a nurse

- **Cohabitation:** Whether a man lived with the woman who tested positive for syphilis. Some of the man cohabited part time because of remote employment, part time cohabitation with another female partner or both
- **Multiple Partners:** Whether the man admitted he had more than one partner (or in some cases, the health agent volunteered the information)
- **Female Treatment:** Whether the man's syphilis positive female partner had received at least one penicillin injection (per the man, health agent, or both)

<b>Table V-1: Characteristics of Male Partners</b>			
<b>Notification</b>	69% yes		31% no
<b>Male Treatment</b>	56% yes		44% no
<b>Treatment Given By*</b>	65% health agent		34% nurse
<b>Cohabitation</b>	60% full time	33% part time	6% not at all
<b>Multiple Partners</b>	29% yes		71% no
<b>Female Treatment</b>	83% yes		17% no

\* The percentages sum to 101% for this variable because there was overlap in the case of one man who received one injection from a health agent and another from a nurse.

Table V-2 displays the sources used to compile the data in table V-1. Both sources were used to obtain information on all of the variables in Table V-1.

<b>Health Agent Info</b>	77% yes		23% no
<b>Interview</b>	25% man or couple	17% woman only	58% none

**Male Treatment** was associated with **Female Treatment** ( $X^2=7.70$ ,  $p=0.006$ ) and **Notification** ( $X^2=16.3$ ,  $p<0.0001$ ). Male treatment was not significantly associated with **Cohabitation** (full time versus part time or not at all) or **Multiple Partners**.

## **LIMITATIONS OF DATA (2010)**

Much of the quantitative data, including male treatment and notification rates, were obtained retrospectively. Many of the parameters studied, including male treatment, male notification, male admission of multiple partners and remote employment were not recorded in PHACT or prenatal charts. Therefore, the accuracy of data relied on memory of past events by men, their female partners, and health agents, rendering it subject to a greater degree of human error than data recorded during prenatal visits or census data gathering.

## **DISCUSSION (2010)**

### **Men and Syphilis**

Overall, men's knowledge about syphilis was low. Those who had heard of the disease referred to it as a *mikwob*, *maladi* or *maladi san*, as women did in the 2008 research phase. It was rare that men expressed a clear understanding of causative relationships sexual intercourse, syphilis and adverse health outcomes. This may have been due, in part, to the fact that men reported less attendance at fathers' groups than women did at mother's groups. Women who belonged to mothers' groups were more able to discuss the health topics they discussed there than were men who belonged to fathers' groups. One man said his father's group did not discuss health issues at all. He said he talked about his job while he was there.

It is likely that traditional gender roles were a factor in men's disinterest about health issues. Several health care workers noted that in Haiti, it is the woman's role to take care of the home and the children. One nurse observed that it is always the mother who takes responsibility for children's healthcare. If the mother is not available, she added, an aunt or grandmother will usually take on this role before the father will. Haitian men saw themselves as breadwinners. Those who did not attend father's groups almost universally said that they did not have time because they had to work.

Health care workers disagreed as to the impact of health literacy on male treatment rates. Some maintained that men did not come for treatment because they did not understand the implications of non-treatment for themselves and their families. They said education was essential to encouraging men to be treated. Several men said they were asymptomatic and therefore did not believe that they were sick. In such cases, additional education may have helped men understand why syphilis treatment was important.

However, men's lack of knowledge was certainly not the whole story, and it was not always a barrier to treatment. Several men reported having received injections when their *madamn* [wives] were pregnant and when asked what the injections were for, said they did not know. Men who received injections reported that they presented for treatment because they were encouraged by their *madamn*, health agents and nurses, which was consistent with 2008 findings.

Mbizvo and Bassett observed that women tend to act as liaisons between the family and health care system and are most often the direct beneficiaries of health education. As a result, health information is often disseminated to men through their wives. Paradoxically, despite potential lack of knowledge about these issues, men may consider themselves family decision makers. In certain cases, men may be reluctant to take their wives' advice about health care matters (such as presenting for syphilis treatment). An urban outreach nurse said he believed this issue may be worse on the outskirts of Jérémie. In these areas, he said, individuals lacked the social and economic resources and formal education available to those in the center of town. They also did not have the advantage of health agents, who provide community cohesiveness and positive attitudes toward the health care system in rural areas.

65% of men who received injections got them from a health agent, indicating that men were most often treated at a rural health post or at a health agent's home. This emphasized the importance of health agents' role in connecting men with the health care system. Men who were treated by a nurse could have been treated by a rural nurse at a health post or at the Center of



Hope. Interviews indicated that men went to the Center of Hope and when they did, it was to accompany their *madanm* [wife] rather than to receive care.

Men cited a variety of reasons that they did not present for treatment of syphilis. 31% percent reported they were never told to seek care. The strong relationship between male treatment and notification to report for treatment ( $X^2=16.3$ ,  $p<0.0001$ ) shows that a key reason male partners did not present for syphilis was that they were not told to do so (or that they did not remember being told to do so). This may indicate a deficit in HHF's sexual partner treatment protocol. Alternatively it is possible that at the time of the interview, men did not recall being referred for treatment. Similarly, several men said that they did not know why they were being referred to a health agent, health post or the Center of Hope, so they assumed the issue was unimportant. This highlighted a potential need to use more explicit messages for male partner notification. However, it would be important not to inform men that they had an STI before providing proper counseling, as this may increase the risk of domestic violence.

Men also cited work responsibilities as a barrier to presenting for treatment. This appeared to be a particularly important reason for men who *ale vini* [work and live part time elsewhere, returning home to their families for intermittent visits]. Health care workers pointed out that presenting for health care could directly interfere with a man's ability to provide for his family. A nurse at the Center of Hope observed that men who sought care at the *Hôpital Saint-Antoine* or one of the HHF clinics often for the better part of a day to be seen. In doing so, men could lose a day of income, which would be unacceptable for many families. The HHF Administrator explained that men would only seek care for acute illness or injury that interfered with their ability to work. For lesser complaints, she said, men preferred to treat themselves with over the counter medications or to simply endure the discomfort.

The woman's traditional role as guardian of the family's health may also have played a role in deterring men from presenting for treatment. Health care workers observed that women were accustomed to going to health posts and clinics for prenatal care and children's visits. Most

men were not directly acquainted the health care setting , As a result, they may have been distrustful of the health care system and fearful of unfamiliar treatments such as injections. This lack of familiarity may have engendered fear of injections or other treatments. The man described in the HHF Administrator's story was a case in point.

Multiple health care workers cited shame as a major reason that men did not report for treatment of syphilis. They said men were embarrassed to have a sexually transmitted disease and feared that if they went to the clinic for treatment, everyone would know they had an infection. Men did not report this during interviews. However it is possible they were embarrassed to express this sentiment and instead gave other reasons for avoiding treatment.

The general consensus among health care workers was that approximately fifty percent of men and women have more than one sexual partner. Some said that men more often have multiple partners and implicated males in the spread of STIs such as syphilis. Nearly 30% of men admitted to having more than one sexual partner. This figure is undoubtedly higher, as men may have been reluctant to disclose such information, particularly when interviewed in the presence of a female partner or other community members. Health agents and nurses say that they address this issue with patients, although it is unclear how many multi-partner couples are notified for treatment. Partner notification of additional *madanm* and *mari* does occur, but whether this is the exception or the rule remains to be studied.

Health care workers observed that the attitudes toward HIV in the community are distinctly different than attitudes toward syphilis. They said that awareness and concern about syphilis were low, but men and women were acutely aware and terrified of HIV. A nurse at the Center of Hope observed that some women with positive prenatal HIV screening chose to hide their test results from their *mari*. The nurse noted that disclosing this information may lead to domestic conflict. Community awareness about HIV may have indicated a specific deficit in syphilis education. It was also possible that men, in particular, saw HIV as a greater personal threat than syphilis.

This underscored a need for specifically male-targeted educational interventions. Radio advertisements were proposed as a potential channel for this, as they are frequently used in the Grand' Anse region to convey public service messages on other health issues. According to one HHF administrator, listening to the radio is almost universal in the Grand' Anse, particularly in rural regions.

Another proposed means of male-directed STI education was fathers' groups. Frequency of meetings varied by health agent and ranged from weekly to monthly. According to health agent reports, attendance also seemed to vary, from almost all mothers and fathers in a given area, to seemingly none. For groups with high turnout rates, one health agent proposed syphilis screening and testing at group meetings, which would facilitate convenience and related health education opportunities. This could be done at mothers' group and youth group meetings, as well.

Several health care workers proposed home visits to male partners of syphilis positive women as a means of improving treatment rates. A physician pointed out that this method had been successful in other countries, such as Cuba. Providing treatment for men at home could surmount the barriers to men reporting for care in the traditionally "female" atmosphere of the health posts and Center of Hope. However, HHF staff availability for this type of intervention would need to be evaluated. Also, this would not be a feasible solution for men who *ale vini* [come and go, usually because they are employed elsewhere].

### **Protocol Updates**

As stated by the HHF Public Health Director, "a constellation of unfortunate events" halted full implementation of 2008 recommendations, namely of the infant treatment protocol and recommendations for documentation. RPR testing, which had previously been used to assess infants for congenital syphilis, had become of low availability and additional cost to HHF. Rapid treponemal tests, which were supplied to HHF by the Haitian government and were used to test adults for syphilis, were unreliable in infants due to the persistence of maternal IgG. (WHO, 2007)

It is important to note that the RPR's sensitivity for detecting congenital syphilis is only 30%. (WHO, 2007) Furthermore, presumptive treatment of infants born to syphilis positive mothers with one injection of benzathine penicillin was recommended by the CDC in similar health care settings. (WHO, 2007 and CDC, 2006) The author recommended that testing of asymptomatic infants be discontinued and all such babies born to syphilis positive mothers receive a single intramuscular injection of 50,000 units benzathine penicillin G per kg of body weight.

According to CDC and WHO guidelines, a single intramuscular injection of benzathine penicillin was inadequate for infants with clinical evidence of congenital syphilis. These children required treatment with one of the following regimens: Aqueous crystalline penicillin G 100,000–150,000 units/kg/day, administered as 50,000 units/kg/dose IV every 12 hours during the first seven days of life and every eight hours thereafter for a total of ten days, or Procaine penicillin G 50,000 units/kg/dose IM in a single daily dose for ten days. Neither of these regimens could be administered by HHF staff on an outpatient basis. Thus, it was concluded that infants displaying physical signs of congenital syphilis must be referred to the Hôpital Saint-Antoine for adequate treatment.

The infant treatment protocol was modified to include common clinical manifestations of congenital syphilis infection to facilitate identification of these cases by HHF nursing staff. The author provided a powerpoint presentation on this topic for rural staff on June 16, 2010. The presentation was made available on the HHF server for future reference and for presentation to the nursing staff at the Center of Hope.

In 2008, health care workers expressed concern about the possibility of anaphylactic reaction to penicillin in infants. In response to this, a protocol for such cases, including weight-based dosing of epinephrine, were included directly in the 2010 protocol for infant treatment.

(see Appendices 7 and 8 for updated infant treatment protocol)

## **Documentation**

Clinical observation showed that documentation procedures for syphilis treatment of pregnant women were inconsistent. Treatment of male partners was not documented at all. The author proposed supplemental syphilis forms for prenatal charts to ensure that pregnant women, sexual partners and infants would be treated, and to facilitate documentation in a newly created database. (see Appendices 9, 10 and 11) The structure of these forms reflected the perspective of syphilis as a family disease. Separate forms were created for the rural health posts, Center of Hope and VCT clinic.

### **Supplies**

Female partners of twenty-eight of the forty-eight men in the sample had positive syphilis tests during Haiti's national penicillin shortage. Thus, it is likely that some of the men who said they were not treated because HHF "ran out" of penicillin did not receive injections because there was no medication available. During the study period, clinical observations revealed that supplies for syphilis screening and treatment were not universally available at health posts. The shortages appeared to be due to miscalculation by nurses as to supply need and reluctance of administrators to allow for distribution of extra supplies. To address this issue, *twous sifilis* [syphilis kits] were assembled for each Nurse Supervisor. Each *twous* contained the following items:

- Vials of benzathine penicillin G
- Sterile water (to be used as a solvent for penicillin)
- Vials of lidocaine (to be added to adult penicillin injections for pain control, per protocol)
- Syringes (5 or 10 cc)
- Needles (18-20 gauge for adult treatment and 27 gauge or insulin needles for infant treatment)
- Epinephrine (to be administered in the case of allergic reaction)
- Alcohol swabs (to clean the skin prior to syphilis testing or penicillin administration)
- Lancets (to obtain a serum samples for rapid syphilis tests)

- Rapid syphilis tests
- Assay diluent (for rapid syphilis tests)
- Capillary tubes (for rapid syphilis tests)
- Syphilis treatment protocols with attached protocol for cases of allergic reaction (see Appendices 7 and 8)
- Laminated syphilis education cards displaying the *Mesaj sou sifilis* [key educational messages on syphilis] (see Appendix 2)
- Syphilis documentation form (see Appendix 10)

### **Syphilis Nurse**

HHF's Public Health Director reported that designated staff supervisors for the HHF pneumonia and breastfeeding programs had succeeded in ensuring effective functioning of these programs. (Gebrian, 2010) It was agreed that designating a "syphilis nurse" who would coordinate all aspects of HHF's syphilis prevention and treatment programs would similarly encourage staff ownership. The responsibilities of the new syphilis nurse included:

- Maintenance of a syphilis database, which includes information on all syphilis positive patients, their sexual partners, and infants, if applicable (see Appendix 12 for instructions; database was formatted as Epi Info document and is not included). This database will be used to create reports that the syphilis nurse can use to update HHF staff on testing and treatment rates.
- Maintenance and inventory of syphilis kits for rural staff (see Appendix 13): the syphilis nurse attends monthly staff meetings and will sign off on each supervisor's box to ensure that each has sufficient supplies to treat all syphilis positive women, their partners, and their infants during the upcoming month.
- Involvement in continuing education and quality improvement related to the HHF syphilis program, as needed.

A new grant allowed the syphilis nurse to receive financial compensation commensurate with his additional responsibilities.

### **HIV Screening**

Since the January 2010 earthquake in Port-au-Prince, there migration from the capital into rural areas such as the Grand' Anse increased. As STI rates tend to be higher in urban centers, it is likely that HIV and syphilis rates will consequently increase in the Grand' Anse. It will become increasingly important to identify HIV positive individuals who require treatment. Furthermore, it is important to increase awareness of HIV among rural populations which previously had less exposure to the infection. Maximal screening for HIV is considered by the WHO to be the most effective method of disease control. Furthermore, HIV screening is recommended for all syphilis-positive women, given that syphilis infection increases the risk of contracting HIV. (WHO, 2007)

Inclusion of HIV testing in the rural prenatal testing panel would also further economic sustainability of the HHF rural syphilis program. A Hilton Foundation grant which had previously covered syphilis testing and treatment materials was discontinued in 2008, requiring all syphilis tests for the rural prenatal program to be purchased with HHF funds. However, syphilis tests used in conjunction with HIV testing were provided to HHF by PEPFAR at no charge. Thus, syphilis testing done at the same time as HIV testing in urban patients was done at no charge to HHF. If HIV testing was done in conjunction with syphilis testing for all pregnant women, syphilis tests could also be obtained for rural women at no cost.

Implementation of rapid HIV testing for all rural pregnant women would require the following:

- Training of rural nurses in pre- and post-test HIV counseling
- Consideration of stigma associated with HIV positivity and the psychological and social effects of diagnosis on patients living in small, close-knit communities

- Consideration of the additional time that will be spent by HHF rural nurses in consultation with HIV positive women

A qualitative interview with a medical technologist who had worked similar settings in Africa and in Haiti suggested that it would be feasible for HHF to fulfill these requirements. It would also be important to take into account the additional resources that would be necessary for HIV screening of male partners.

### **RECOMMENDATIONS AND CONSENSUS ACTIONS (2010)**

1) The HHF Protocol for the testing and treatment of children born to mothers with positive syphilis tests was modified and re-implemented. (see Appendices 7 and 8):

2) A new syphilis nurse was designated to coordinate all aspects of HHF's syphilis prevention and treatment programs. His responsibilities included:

- Maintenance of syphilis database (see Appendix V-5 for instructions; database was formatted as Epi Info document and is not included).
- Maintenance and inventory of syphilis kits for rural staff (see Appendix V-6)
- Involvement in continuing education and quality improvement

The syphilis nurse received commensurate financial compensation

3) New documentation forms were introduced to track treatments of syphilis positive patients, their sexual partners, and their infants. (see Appendices 8A, 8B and 8C for documentation forms).

6) Health agents were trained in the administration of benzathine penicillin G mixed with lidocaine per HHF's new treatment protocol.

4) *Future Recommendation: Creation of male-centered mesaj sou sifilis [key educational messages about syphilis] by HHF staff, with dissemination of these messages by radio and fathers' groups.*

5) *Future Recommendation: Addition of rapid HIV screening to the prenatal testing panel for rural women.*



## **PART VI: FINAL SUMMARY AND RECOMMENDATIONS**

### **LESSONS LEARNED**

The WHO's *The Global Elimination of Congenital Syphilis: Rationale and Strategy for Action* proved to be an effective roadmap for improving HHF's syphilis programs, and is recommended as a guide for other NGO's developing congenital syphilis programs in similar settings. In addition, the lessons learned through the process of improving HHF's congenital syphilis programs can be applied to programs in other developing nations with similarly high syphilis rates.

#### **Infant Treatment for Congenital Syphilis**

HHF's implementation of a treatment protocol for asymptomatic infants born to syphilis positive women demonstrates that it is feasible to create and implement such a protocol in a rural, low-resource setting. The WHO and CDC treatment protocols for infants who are asymptomatic or have serologic evidence of congenital syphilis are cumbersome. (WHO, 2007 and CDC, 2006) Ten days of intravenous aqueous crystalline penicillin G would necessitate hospitalization of the child for at least this length of time, and would not be feasible anywhere in the Grand' Anse. It is possible that a child like this living in Jérémie could report to the *Hôpital Saint-Antoine* each day for ten consecutive days of intramuscular procaine penicillin G injections. However, this would be impossible for most rural families. This treatment regimen would require the family to make daily trips to Jérémie (several hours on foot or by paying for a car or motorcycle taxi) or to find a place to stay for the duration of treatment.

A single intramuscular injection of benzathine penicillin G can prevent sequelae of congenital syphilis in infants who are born to women with gestational syphilis. However, penicillin treatment of infants does not address the issue of fetal demise. Miscarriage and stillbirth are important consequences of maternal syphilis and are addressed by maternal antenatal screening and treatment. This should continue to be the backbone of HHF's congenital syphilis prevention program.

## **Sexual Partner Notification and Treatment**

Both parts of this study highlighted the challenges associated with notification and treatment of sexual partners as well as the high prevalence of multiple sexual partners. These are common issues for any syphilis prevention program.

HHF is progressive among NGOs in the developing world in its attention to fathers' roles in promoting child health. Through its fathers' groups, HHF has long worked to improve men's involvement in the lives of their families and children and improving their health. Fathers' groups have been successful in engaging men to promote vaccination and health maintenance visits for the children, as well as the treatment of common childhood illnesses such as pneumonia. (Sloand, Gebrian, Astone, 2011) The groups are a well-established means of reaching men and involving them in promotion of family health. Men's involvement should be considered.

The 2010 research phase also underscored the importance of conveying the personal health consequences of syphilis to men. One of HHF's strengths is the organization's involvement with the local community. Health agents and local nurses provide valuable insight into community perceptions of disease. During the study, HHF created *mesaj sou sifilis* [key messages on syphilis] for general education purposes. HHF is in an excellent position to create additional, male-directed *mesaj sou sifilis* to be disseminated through existing fathers' groups.

## **Condoms**

Barrier methods are consistently recommended by organizations such as the WHO and CDC as a means of preventing STI spread. (WHO, 2007 and CDC, 2006) HHF does not officially promote condom use but other organizations do. Even if HHF policy was to promote condom use, health care workers might have difficulty convincing couples in committed relationships to use them. Individual, religious, and cultural perceptions of condoms should be considered in all cultural contexts when creating STI prevention program that advocates their use.

## UPDATES

As of November 2011, the syphilis program nurse continued to coordinate testing and treatment at rural posts. The documented treatment rate for male partners was improved to 40% for the period from October 2010 to September 2011. No infants were treated during this period due to a variety of factors, the major one being a shift in focus of HHF activities to the cholera epidemic which began in October 2010 and was a major focus of organizational and staff activities. The other was the penicillin shortage which lasted until April/May 2010. (Lewis, 2012)

In the past, all rapid tests were treponemal assays. As a result, it was impossible to differentiate pregnant women with active syphilis from those with treated infection at rural health posts. However, a promising new point-of-care immunochromatographic test for simultaneous detection of nontreponemal and treponemal antibodies could help HHF nurses distinguish between active and treated syphilis at rural posts in the future. (Castro et al., 2010)

A nurse at the Center of Hope was assigned to coordinate the syphilis programs there. Partner treatment rates were not improved at the Center of Hope, but a more forceful letter was created, encouraging men to seek treatment and expressing HHF's willingness to facilitate the process for men working in Port-au-Prince or other distant locations. (Gebrian, 2011)

HHF's continued progress toward its goal of eliminating congenital syphilis is particularly impressive considering that the organization has simultaneously been addressing natural disasters and disease outbreaks. In November 2010, Hurricane Tomas produced heavy rains across Haiti. The category 1 hurricane hit the Grand' Anse and the South hardest. While no one died, thousands were injured. As during the 2008 hurricane season, crop and livestock losses were substantial. Shortly after the hurricane, cholera arrived in the Grand Anse—it began in the Artibonite with the first case October 21, 2010. HHF focused most of its attention on cholera treatment and education. After the initial death rate of 45%, HHF mobilized to treat 6,344 cases

of cholera between November 1, 2010 and February 29, 2012. This shifted attention from many ongoing HHF programs, including syphilis.

Haiti's fragile economy and infrastructure has rendered the nation poorly equipped to respond to national disasters and disease outbreaks. Haiti's slow recovery following the January 2010 earthquake is a case in point. (Farmer, 2011) However, organizations like HHF continue to improve health in select regions of the country by maintaining their established health care systems in the face of frequent emergency situations.

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