**Using Cultural Competence to Improve Tuberculosis
Case Detection in Dabat, Ethiopia**
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Synopsis
This practicum experience consisted of work to develop a culturally sensitive framework for improving case detection and treatment adherence for tuberculosis in Ethiopia. My preceptor, Takele Tadesse, was working on a prevalence study of TB in the Dabat region (NW Ethiopia). As a supplement to his pending (now published) research findings, he tasked me with a rigorous evaluation of a culturally appropriate intervention that would work for the Dabat region. This report provides that analysis, using materials and methods taught in the HSCGH coursework offered at Ohio State.

Dabat Research Center at University of Gondar (left). Takele Tadesse, the Dabat Research Center director and my preceptor (right).

In Ethiopia, tuberculosis (TB) is an endemic problem. The country ranks seventh out of the 22 highest-burden TB countries (WHO, 2005). Unfortunately, the World Health Organization's initiative of directly observed treatment short course (DOTS) has not helped the country in terms of its case detection rates, which are the lowest in sub-Saharan Africa (around 35% today) (see Figure 1), as compared to its southern neighbor, Kenya, with case detection rates above 70% (Datiko and Lindtjorn, 2009). In response to this, the Ethiopian government has begun a tuberculosis health service program, known as the health extension package. This package involves highly qualified public health workers being brought in to control epidemics like tuberculosis through the use of community-based health promotion activities.

Despite the good intentions of the program, Shargie et al. (2006) found somewhat disappointing results in their clinical trials assessment of two rural districts in the Hadiya zone (see Figure 2) of Ethiopia: Lemo and Misha. In their analysis, although these community-based activities helped to reduce the time delay of treatment after presenting with symptoms, the initiative did not improve the extent of case finding of those infected with TB. Unfortunately, this finding has been replicated (Yimer, Holm-Hansen, Yimaldu, and Bjune, 2009). After these two significant attempts to improve TB case detection failed in southern Ethiopia, new ways to detect cases are needed to reduce the heavy burden of TB. In my time in Gondar, Ethiopia, I was able to develop a culturally appropriate concept model to improve TB case detection in a northwestern town, Dabat, where TB burden is significant, particularly with respect to undiagnosed cases which only reinforces the burden (Tadesse et al., 2011).

To understand the method of community intervention needed to improve the dismal case detection rates, it is important to address four principal objectives: (1) summarize and critically analyze some of the community integration methods used by Shargie et al. (2006) to elicit reporting of TB cases, (2) describe the culture and elements of social behavior that might mitigate reporting of TB, (3) explore several community assessment models with which to describe the rural districts in Dabat, and finally (4) identify a cultural competency model that has the potential to in fact yield better case detection of TB.

Before beginning their intervention on case-finding of tuberculosis in the Hadiya zone, the authors had health workers trained in, among other things, outreach coordination and interview techniques. Workers also received awareness of the societal perceptions of the disease and how best to communicate with the locales that tuberculosis is a treatable and very often curable condition. The method for case detection in the region was given by the authors:

> "...community promoters held discussions with community leaders to establish a suitable monthly date for the diagnostic outreach clinic in each kebele [district]. Every month, before the outreach day, the promoters went around the villages for 3-4 consecutive days visiting houses, distributing TB leaflets, and discussing the possible symptoms of TB with individuals, households, and community groups. They also promoted messages about TB in schools and popular gatherings in the intervention areas. They encouraged symptomatic TB suspects to visit the outreach team or a nearby health facility if preferred."
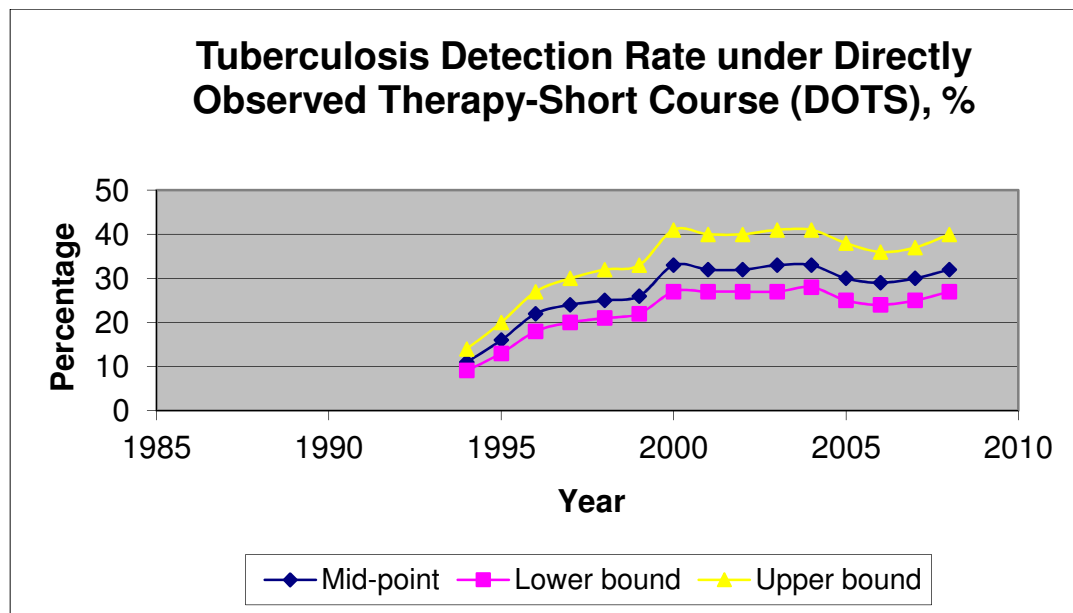
Figure 1. Case detection rates in Ethiopia from 1994 through 2008.

There are a number of weaknesses in the authors' approach to detecting active TB cases in the Hadiya zone. These weaknesses are a direct result of a lack of disease perception but also (more importantly, perhaps) disease treatment. For example, most Ethiopians in the rural districts of Lemo and Misha do not understand the practice of withholding treatment until diagnostic work is done, which is common for a tuberculosis diagnosis (Ministry of Health, 1996). Although the new GeneXpert diagnostic machine is designed to remove this delay, there is currently only one in the entire nation, in Addis Ababa (Bekele 2011). Moreover, many Ethiopians they feel that it is a waste of time to go to a doctor if no medication is ultimately given. Thus the authors' efforts at encouraging symptomatic TB suspects to visits health facilities to be evaluated without guarantee of any medication in the beginning is a weakness in their approach.

Figure 2. (a) University of Gondar teaching hospital TB clinic: Due to its minimal capacity for the burden they shoulder, TB patients are often released after partial treatment with the expectation they will come back to obtain their medications. Too often this does not happen. Many think this is leading to increased incidence of drug-resistant TB among those with a previous history of (partial) treatment for TB. (b) A road-side clinic in Gondar. The sign says that services performed include surgery, laboratory analysis, chiropractic work, X-rays, etc.

As part of the cultural system in Ethiopia in general, doctors and nurses in Ethiopia will never disclose a terminal diagnosis to a patient. As a further extension, if an individual with active tuberculosis disease takes no medication, their chances of survival are not good. Instead the doctor will tell a close relative, in the hopes that these relatives will provide a source of encouragement from which the patient receives hope that their illness can be cured. As strong as the family support may be, the social stigma is ultimately still present in two ways: (1) either constant visits to the clinic to obtain TB medications or (2) having a DOTS (Directly Observed Treatment Short course) (Raviglione, 2003) nurse come to their residence with medication over the nine month required duration of treatment might draw attention to the patient from community members, which might prevent continued treatment for fear of alienation of friends and family.

A major reason for Ethiopians not to seek treatment (and thus making case detection extremely difficult) is that represented by financial constraints. Those who cannot afford to pay are afraid to use the health care system, so they do not even try. Therefore, it is very important to make potential clients aware of the cost of testing and treatment for TB screening. This depends on adequate surveillance measures to better understand what people in these rural districts can afford.

Figure 2: Map of Ethiopia with the Hadiya study area highlighted. Ethiopia is administratively divided into nine regional states and two city administrations, and the Southern Nations, Nationalities and Peoples' Regional State (SNNPRS) accounts for one-fifth (13 million) of the total population of the country. Hadiya zone has got a population of 1.2 million. Source: Shargie and Lindtjorn (2005)

The cultural aspect to reporting possible TB symptoms is a monumental barrier for several reasons. First, and perhaps most importantly, the HIV co-infection among TB patients in the region is estimated at 19% (Yassin et al., 2004). This high prevalence of co-infection has created what community researchers have termed a "TB-HIV stigma" that has major consequences. According to Bond and Nyblade (2006), "In the presence of HIV, there is now confusion about what TB is, whether it is still curable and clear recognition that it is more deadly and damaging to society than it was before HIV/AIDS."

A peculiar new finding has been that those with active TB disease are reluctant to pursue treatment because, even in the presence of initially supportive friends and family, the fear of that

support waning over the long duration of necessary medication (nine months) is great (Sagbakken et al., 2008). Although this finding was attributable to an urban population, it has not been extended to the rural parts of the Hadiya zone or the Dabat region. As reviewed in Courtwright and Turner (2010), the initiation of so-called "TB clubs" in Ethiopia has reduced the burden of stigmatization, leading to better treatment adherence. As to whether that reduced stigma is merely perception or reality, however, could have a profound effect on those TB patients who actually make the decision to join a "TB club." Importantly, research into these practices has focused mainly on how the formation of a club changes the behavior of those in the club via treatment adherence through social support, and not necessarily on how beliefs change (or do not change) among those excluded from such a club.

We now examine four community assessment models with a cultural competency focus and take stock of their relevance for our goals to improve the case detection of TB in areas with significant TB burden, including Dabat: the Needs Assessment Model, the PEN-3 model, PRECEDE-PROCEED Model, and the Purnell Model for Cultural Competence.

The Needs Assessment Model involves three phases: the first is an exploratory stage to identify the needs of the specified community; the second involves collection of epidemiological data; and the third uses the information gathered in the previous two phases to prioritize goals (Ivanov and Blue, 2008). These phases provide a general framework upon which to base further community inquiry. In the case of improving a tuberculosis detection program, it is apparent that the first phase of this model is particularly vital to the success of the implementation, given that a good deal of epidemiological data (phase 2) has already been collected by previous authors. However, this model has a significant drawback with its use. While the first phase calls for identification of the community's needs, it inadequately specifies the manner and perspective from which these needs are to be assessed. In the case of the TB outreach initiative evaluated in this report, it is apparent that this assessment was completed and determined the need for better TB case-finding in the rural Ethiopian region; however, this was surmised from the analysis of the researchers' perspective of the targeted district's needs, and not necessarily from a thorough evaluation of the community's perspective of its needs. The model's lack of emphasis on eliciting project directives from the community's perspective thus creates the risk to implement another project that does not adequately incorporate the population's perspective of its needs and interests. It creates the potential for a weak project foundation because it permits the researcher to develop project objectives without the collaboration of the targeted community, a tactic which has been shown previously to lead to less-than-optimal health care improvement outcomes (Ashwell and Barclay, 2009).

The PEN-3 Model improves upon the Needs Assessment Model by better defining the parameters upon which to base the community assessment. It includes three phases. The first centers around health education targeted at the person, extended family, and neighborhood. The second phase, which was developed based upon objectives of other models like the PRECEDE-PROCEED and health belief models, evaluates the health behavior of the community, including its perceptions, the enabling factors existing within the society that promote health behavior, and

nurturing factors within the family that encourage such behavior. The final phase of the PEN-3 Model assesses cultural appropriateness of health beliefs, including positive factors that encourage a behavior and the negative ones that do not (Atri and Sharma, 2010).

In the context of planning for a TB case-finding project in Dabat, the second and third dimensions are appropriate and well-defined in scope. The second forms a structure of assessment that recognizes the factors of both the society and the family units that influence the practice of a health behavior; meanwhile, the positive factors elicited by the third phase may be especially useful, since these offer potential starting points from which to promote the interest and consequent involvement of Dabat community members in the project. In particular, the search for the factors which promote TB case-reporting within the community may lead to a more intensive evaluation of the perceptions and attributes of TB clubs that have led to the reported success of these organizations. In turn, these positive factors may be analyzed and utilized to increase future program success.

Nevertheless, there are two key drawbacks to using this model in the context of this report's focus. The first is the linearity with which the assessment is meant to be conducted. Particularly problematic for the population and project of this report is that the health education component is prescribed as the initial phase of the assessment (Atri and Sharma, 2010). There could certainly be a place for further health education in reducing the current stigma and misunderstanding many in the population currently associate with TB, and the targets of this education prescribed by PEN-3 are appropriate. However, the TB outreach project implemented by previous authors has already conducted such an education initiative directed at each of the levels designated by the model (the individual, the family, and the community), and the results of this campaign have not indicated a significant impact on increasing the TB case-reporting seen in the region. It would thus be fruitless to conduct another education phase without first using the other two phases to gain a better understanding of how this education component may be more effectively implemented (e.g. via increased community cooperation and involvement). Moreover, given that a moderately culture-cognizant, intensive educational dimension has already been attempted with limited success, it is uncertain whether a community education component itself would ultimately lead to change in behavior in case-reporting.

Another more general weakness of the PEN-3 model is that it does not create a strong framework upon which to transfer the information gathered in the community assessment to an effective implementation. While the focus on cultural understanding prescribed by the second and third phases of the model call for interaction with community to elicit the data of interest, they stop short of guiding this interview-style interaction into a meaningful collaboration with community members during the implementation phase of the project. In developing a cancer-screening intervention for Latinas, Erwin et al. (2010) describe using the PEN-3 Model to analyze data in order to subsequently develop an intervention for the targeted population. This seems a reasonable approach at face-value. However, the process of the researcher abstracting and analyzing the gathered data to prescribe what he believes is a necessary intervention for the community in isolation of further community member collaboration during the development and

implementation phases creates the risk of misinterpreting the needs of the community because of his own biases. The structure of the PEN-3 Model seems to encourage an approach that necessitates community input for initial cultural analysis, but neglects this important collaboration during implementation development and execution. It thus creates a risk for developing a project that is imposed upon the community from the outside instead of one that is developed within the community.

The PRECEDE-PROCEED Model improves upon the previous two models in minimizing the imposition of project-developer bias and structuring community collaboration throughout not only community assessment but also project development and implementation. Its initial Social Assessment Phase bases the foundation of the community assessment and project implementation upon the community perception of its needs instead of upon the perspective of the developer. In the case of the rural Ethiopian population in Dabat, this phase mandates a preliminary understanding of societal views of TB burden and the disease's consequences, as well as the usefulness of case identification. Perhaps more importantly, it may identify factors that, in the minds of community members, take precedence over reporting cases of tuberculosis cases, and thus point to areas that need to be addressed in the project implementation before TB case-finding itself may be approached. Also particularly strong in this phase is the model's recommended use of asset mapping and social reconnaissance (Atri and Sharma, 2010). Both of these methods identify individuals within the targeted community to involve in the remainder of the assessment, development, and implementation phases of the model, thus establishing a strong framework for community member collaboration. Finally, the Social Assessment Phase provides an appropriate context with which to apply the epidemiological factors (considered in the second phase of the model) that have already been established by previous authors.

The structure of factor classification seen in the third Educational and Ecological Assessment Phase may be useful in establishing a framework through which to further understand those social and epidemiological elements that are currently leading to lack of case identification. This holds especially true in evaluating the category of reinforcing factors, or factors that reward and propagate the repetition of health behaviors like avoidance of TB case-reporting. These community reinforcing factors have not been thoroughly addressed in previous literature, and may indicate causes of case non-identification within the Dabat community that may be considered in the development phase of the project. However, despite the utility of the PRECEDE-PROCEED Models focus on community perspective and ecological factor categorization, this approach has a heavy focus on the society as a whole without an equal emphasis on the individual, and provides a limited framework with which to evaluate factors that contribute to individuals with the disease choosing to present themselves for case-reporting. Specifically, unlike the PEN-3 Model, the ecological assessment does not directly address positive factors that may contribute to case-finding; thus, it seems to divert focus from entities where these positive factors exist, such as TB clubs. In distracting focus from such organizations and the individuals that comprise them, the model may guide the community assessment away from discerning valuable information needed for the success of future projects in this area of

health care.

The final model that is assessed in this report is the Purnell Model for Cultural competence. As applied to the population in the rural districts of Dabat, there are two assumptions among others in this model that make its application particularly appealing (Purnell and Paulanka, 2005). First is the assumption that differences exist within cultures. Certainly in our assessment, there is a culture clash once someone is infected with TB versus someone who is not; the former prefers compassion and understanding whereas the latter individual continues to believe that the infected person is to feel shameful and someone to be avoided. Differences such as these (and a myriad of others) implicate the urgent need to focus not on the community, but the individuals that comprise a community, which was a significant weakness of the PRECEDE-PROCEED model. Second is the assumption that cultures inevitably change over time. Although this is a virtual necessity to improving case detection of TB in Dabat, this assumption is vague and leaves open-ended the answer to the question "How do they change?" Although the vagueness in the Purnell model does leave some uncertainty as to how cultures may change (thus including negative change induced by health care workers and not the community), there is the possibility of including community-initiated change and / or reflection in this assumption, which was mostly excluded from the PEN-3 and Needs Assessment models.

Proceeding to analysis of the most appropriate community assessment model, we desired to set up a "community self-reflection" framework and felt the Purnell model has the most value when initiating a health assessment / change model. The traditional thinking in Ethiopia broadly is to get people to join the TB clubs if in fact they are infected and seek and continue treatment. However, Shargie et al. looked at that (indirectly) as the end goal. Our approach was to think outside the box and ultimately resulted in asking the question: what if we start with the end goal instead? In other words, go right to the TB clubs' members and find out what their concerns were in joining and if they know others who share the same concerns. In this way, we are assessing the "hidden" cultural aspect (i.e., the feelings of shame and embarrassment), not necessarily the community cultural aspect. Instead of going from the community down to the individual (which is the traditional approach to case detection), we are going from the individual (with focus on better understanding the twelve domains including health-care practices and family roles and organization) and informing the community of the implications of their cultural beliefs. Furthermore, the individual does not need to be a TB patient, but could be someone who knew or knows a TB patient or someone with TB-like symptoms. Most importantly, we are not imposing any of our knowledge or judgments on the society, but rather listening and understanding their culture. Although no model is or ever can be perfect, the Purnell model allows emphasis on going from the individual to the community to propagate a reflective process that may in fact lead to an endogenous (not exogenous) culture shift, with health-care workers being merely messengers in effectuating that change.

From our reasoned community assessment model choice, the Purnell model of cultural competence, we now identify two main goals for our plan of implementation in the Dabat region of Ethiopia. As addressed in our assessment report, there were two phases of the directly

observed treatment short course (DOTS) program used. The first was initiated by the World Health Organization (WHO) and the second was an Ethiopian initiative called the health extension package, which used public health workers via community-based health promotion and awareness initiatives. In the end, however, case detection rates remained far below WHO recommended guidelines.

Our goals are the following: (1) to improve case detection rates[1] and (2) increase rates of TB treatment compliance and success (TSR). Although case detection has been the major concern in Ethiopia and a major criticism of the DOTS program, "non-compliant" patients will end up falling back into the target group of our primary aim of identifying TB cases. By making treatment adherence a second goal, we minimize the risk of the first goal becoming a goal of two tasks, which could be disastrous for the goal achievement. From these goals, we seek to establish one objective for each goal. For (1), the World Health Assembly set a target to detect by 2005 at least 70% of all new sputum smear-positive cases arising each year and to cure at least 85% of these cases (Dye, Hosseini and Watt, 2007). However, this target missed detection of smear-negative cases, which can be considered false negatives and represent much of the (less infectious) disease burden (Colebunders and Bastian, 2000). Therefore, our objective for the first goal is to detect at least 70% of all TB cases, both sputum smear-positive and sputum smear-negative. The objective for the second goal is similar: obtain a treatment success rate of at least 85%, again among both sputum smear-positive and sputum smear-negative cases. These objectives have a value added over previous recent research, where the same percentage markers were used in assessing CDR and TSR, except that the patients only included smear-positive cases (Datiko and Lindtjørn, 2009).

An assumption that we make in the implementation report, and the reason for including detection and treatment of smear-negative cases, is the availability and use of the accurate and highly sensitive GeneXpert machine, which can diagnose TB in a sputum sample, including drug resistant TB, in just two hours (Helb et al., 2010; Boehme et al., 2010). This dramatic improvement in TB diagnostics represents the first major breakthrough in TB research in nearly half a century. Although the technology is available only in the United States and actual dissemination throughout the most TB endemic areas, including Ethiopia, might be several years into the future, the technology is widely accepted and is being pushed to research TB endemic areas; thus we proceed with our implementation that this technology is available, although we will describe the logistics of getting the machine to the Dabat region, a rural area.

Table 1: Limitations in TB Control	
Limitations from Kochi (2001)	**Prerequisites to correct limitations**
1. Technical policies are largely concentrated on 'what should and could be done' in relatively well-developed health service systems or under special	1. By identifying TB clubs as our portal of entry in our assessment report, we have unburdened ourselves with that initial first step and actually used the most commonly perceived barrier of TB and/or HIV

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[1] The tuberculosis (TB) case detection rate (CDR) is the ratio of the number of notified TB cases to the number of incident TB cases in a given year (Mansoer et al., 2009).

research settings, and often lack the component of 'how to do it' under different settings.	stigma in these communities to our advantage.
2. Some of the intervention technologies, which are effective, simple and affordable in well-developed health service systems, are not necessarily effective, simple and affordable in poorly developed health service systems.	2. Here we address the dissemination of the GeneXpert machine in Dabat by examining the cost, transportation, and training health extension workers (HEWs) to be knowledgeable in the use and maintenance of the machine.
3. Some of the technical policies appear to have been taken as dogma (e.g., tuberculosis patients should not be hospitalized) so that there has been a tendency to discourage results-orientated and local innovative approaches.	3. This limitation is based on the decentralization of TB patients to avoid transmission and further disease burden. However, we plan to show how the use of information from TB clubs in Dabat and southern Ethiopia in general can be filtered in ways to improve case detection and treatment adherence in places where no such organized clubs exist (see Table 2).

As an outline to describe our implementation approach, we describe our process below. In describing strategies that might be used to apply the information gathered from the community assessment model to the development of a sustainable health project for that community, we have chosen to select five pertinent factors of the Purnell model and justify their selection by relating the reasons for choosing these factors back to the characteristics of the Ethiopian population in Dabat. Then we assess the utility of each factor in terms of its integrability to the TB clubs presented in the assessment paper. This addition allows for introduction of our model in the context of a pre-existing community-generated tradition, which gives a greater probability of our strategy being accepted and sustainable.

When determining the necessary prerequisites for implementing a project in this community, it is important to remember strategies that have been pursued in the past and the reasons for their failures as described by Kochi (2001). In Table 1, we restate that author's perceived limitations of TB control in 1991, which unfortunately are appropriate even today as we struggle with the "toxic twins" that comprise TB-HIV co-infections in Dabat (Nunn, Reid and De Cock, 2007). In Table 1, we also highlight our recommendations of prerequisites needed for project implementation.

The second limitation will be addressed through fund raising through the Gates Foundation and/or USAID to get the new technology to Dabat and train the community outreach workers and focus group leaders (mentioned later) to be able to explain the new equipment and how results from the TB test can be disseminated to individuals during their visit, which has been a hindrance to case detection in the past (i.e., uncertainty in waiting for results which can be a barrier to testing). Furthermore, TB club leaders will be trained in the use of the new equipment. As addressed in Table 2, no interpretation is needed with this new technology, so no specially important skills are necessary to perform TB testing.

Courtwright and Turner (2010) showed that the stigma associated with tuberculosis infection negatively influences not only on the patient's willingness to present to a health center and comply with treatment, but also on the patient's socioeconomic status, familial and community relations, and self-image. With this in mind, we have focused on five aspects of the Purnell Model of Cultural Competence that hold the most potential for assessing the extent of social stigmatization on TB patients in the Dabat region: family roles and organization, spirituality, workforce issues, health care practice, and health care practitioner. The following describes the goals in exploring each of these aspects in greater detail.

The dimension of family roles and organization seeks to evaluate the functional positions, gender roles, and interrelationship dynamics of the members of the family unit, as well as the perceived value, importance, and origin of these roles (Purnell and Paulanka, 2005). It also seeks to assess views on alternative lifestyles, such as divorce and single parenthood. For our purposes, we will frame these areas in the context of how they influence the TB patient's willingness to present and comply with treatment. As such, we will assess the value that interviewees place on support they receive from, as well as support that they in turn provide to, their family. Loss of this support (or fear thereof) has been demonstrated in other regions to be one of the more detrimental effects of TB stigma (Sagbakken, Frich and Bjune, 2008). Additionally, we will assess a spouse, sibling, or parent's perception of participation in TB clubs (both of family members of TB club members and non-TB club members) via surveys translated into Amharic. Furthermore, we will monitor any changes in role or support perceived by TB patients after they become a club member as well as thoughts of perceived change in support among non-TB club members. Finally, Dodor and Kelly (2009) documented reluctance in family arrangement of marriages to TB-infected individuals, an effect particularly detrimental to women with the disease. This indicates a need to assess the impact of such views, as well as any role that TB clubs have in attenuating them (such assessment may be achieved by comparing the familial views of marriage involving TB patients in villages with and without active clubs).

Spirituality influences an individual's motivations, fears, world views, and self-view, all of which have been shown to factor into an individual's decision to seek treatment for tuberculosis. For instance, Courtwright and Turner (2010) indicate the negative influence of feelings of guilt or shame on the individual seeking TB treatment. The demonstrated association of such feelings with an individual's spiritual beliefs, as demonstrated by HR, Friedmanna and Schandac (2001), warrants an investigation of the interplay of these factors in the Dabat region. Furthermore, there is value in assessing the impact of spirituality, especially at the individual level, on sources of strength and life-meaning, the compatibility of the condition with local religious beliefs and practices, and the influence that TB clubs have on these perceptions.

As cited previously, fear of socioeconomic discrimination has been shown to be a significant inhibiting factor to CDR and TSR. This issue thus necessitates further evaluation of how workforce issues interact with the tuberculosis stigma and consequent case presentation and treatment compliance rates. Factors that fall under this realm of assessment include perceived and actual employment discrimination as a result of TB status, impact of TB status on marital

prospects for infected females, financial limitations to TB care, and the impact that TB clubs might have on these limitations. While the clubs offer no direct monetary assistance, their coordination of transportation to health centers, advice to members, and other unforeseen benefits may address this all-important aspect of tuberculosis treatment in Ethiopian rural society.

Walking the streets of Dabat (February 2004, ETH calendar) (left); University of Gondar teaching hospital entrance.

Finally, given that our project is a health care initiative, it is important to evaluate individual and community (both at the TB club and kebele levels) perceptions of health care practice and the health care practitioner. Topics in these categories may focus on factors that would promote or inhibit seeking medical care in general and for tuberculosis, factors that would promote or inhibit following a treatment regimen, views regarding the cause of disease and of TB in particular, and views of individual responsibility for health. A specific question that may be useful asking TB club leaders is how they successfully recruit and retain TB club members and promote community education, three all-important responsibilities that these individuals take on (Demissie, Getahun and Lindtjørn, 2003). Their answers may point to successful ways to promote self-reporting among TB-infected individuals. Given the indication by the Ministry of Health (1996) that patients are reluctant to present themselves if there is a possibility of treatment being withheld, it is also important to assess the patient's goals in seeking medical care. We would also assess perceptions of the health care practitioner and how these factor into TB treatment. Areas of interest may include qualities in the practitioner that elicit the patient's trust or distrust. As with the other dimensions studied in our assessment, these factors would be evaluated both at the individual and community levels, for TB clubs and the external Dabat community.

As suggested previously, we plan to use the Purnell Model as a foundation upon which to conduct in-depth interviews with individual members of TB clubs, with the end-goal of eliciting the positive factors these organizations contribute to the improved presentation and treatment success rates of its members. These interviews will also serve as a basis for expanding our community assessment to the TB club as a unit by guiding the focus and formulation of moderating questions we will develop for the use of focus group discussions. In executing the focus group discussion portion of our community assessment, we will recruit the assistance of

two members from each of the TB clubs that serve as a focus group, one to moderate the discussion using the pre-formed sequence of question topics we have developed with district leaders in Dabat, as well as one to take notes. The note-taker's role will be of value not just in recording the discussion itself, but also in assessing and recording the non-verbal cues and signals conveyed by focus group members in relation to discussion comments. This process of combining in-depth interview and focus group discussion methods has been successfully implemented by previous authors to specifically assess the value of TB clubs in a northern rural region of Ethiopia, which portends promise in implementing these techniques into our community assessment (Demissie, Getahun and Lindtjørn, 2003).

Another important aspect of our community assessment, which goes a step further than the analysis of Demissie, Getahun and Lindtjørn (2003), is gathering sufficient data from the external family and community (i.e. that existing outside the TB club) levels, as indicated by the second and third rims in the Purnell Model. Data collected from community members would include several perceptions: (1) of TB in general, (2) of TB clubs and their utility, (3) of a relative who became diagnosed with TB, and (4) of themselves and their status in the community if they became infected with TB. In doing so we hope to support an assessment validity test of the degrees of TB patient internalization of community stereotypes regarding perceptions of their condition, since it is this self-reflection of negative community views that ultimately causes great reluctance to seek and comply with treatment. Since cultural practices can be dynamic, this would constitute our main sustainability plan.[2]

In turn, we seek to relate these findings to the influence of TB clubs in modifying this internalization, and thereby identify tools with which we may successfully implement our project. In this level of assessment, we plan to implement similar methodology. As suggested by Demissie, Getahun and Lindtjørn (2003), we will identify individuals representative of several social subunits potentially involved in the evolution and impact of the TB stigma, including each of the family roles in that structural unit; community, spiritual and educational leaders; health care workers; TB patients not participating in a TB club; and entrepreneurs. These individuals will be directed through the same interview format as previously described for TB club members, and will be randomly invited to participate in community-level focus-group discussions.

It must be made explicit that the success of the implementation plan, or sustainability, described above depends on the integration of community member involvement in designing and implementing the assessment. We plan on accomplishing this in a number of ways. Firstly, in the initial formulation of the in-depth interview questions, we plan to utilize the guidance and input of recent (less than one year) Ethiopian immigrants within the Columbus area with whom we have established connections through the Ethiopian Tewahedo Social Services organization. We hope to test the functionality of our interview structure with these individuals; in doing so, we

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[2] Focusing on only one group (i.e., members of TB clubs) is inevitably unsustainable since TB patients would show continued reluctance if their fears of stigma associated with the disease were never found to be justified or unjustified. The personal gradient interview approach among community members would be used to formulate evidence to judge the reality of the actual fears.

may also gain feedback valuable in addressing the "global rim" of the Purnell Model. The limitation (and hence barrier) of this step is that a majority of immigrants, if not all, have undergone mandatory testing and treatment for active TB before or while settling in the Columbus area. Thus the self-selection out of testing and treatment that happens in Ethiopia is removed among immigrants here since the surveillance system is much more structured.

Secondly, we plan to use a social reconnaissance to recruit TB club leaders and willing members to serve as points-of-entry into the TB club community (Atri and Sharma, 2010). As such, they will be the primary individuals conducting the in-depth interviews and focus group discussions within the TB club unit, as opposed to ourselves. This interview structure may potentially allow for greater trust and candor in response, given the reduction in cultural barriers that this format achieves (Kajubi, 1999). We will similarly conduct social reconnaissance in recruiting points-of-entry into the external Dabat community structure, utilizing the guidance of community leaders in this process. Finally, we will involve these same contacts in the analysis of the data so as to preclude any bias that we as outside observers may inadvertently encounter.

When designing our evaluation criteria, we chose to build off of the pragmatic-explanatory continuum indicator summary (PRECIS) framework set forth by Thorpe et al. (2009). In their paper, the ten domains were identified and assessed for their practical yet effective and efficient use of resources to obtain a desired outcome among the DOTS programs for TB control. We apply a similar methodology for our intervention with the TB clubs present in Dabat. In Table 2, we give the domains used by Thorpe et al. (2009), their brief definition, the assessment/evaluation of that domain in the context of our intervention to improve CDR and TSR in Dabat. The goal of the evaluation is to be pragmatic instead of explanatory; in other words, we are seeking intervention with as few restrictions as possible. In a resource-limited setting such as Dabat, we see the pragmatic evaluation offered by the PRECIS model as a solid measure of success.

Table 2: A PRECIS assessment of the Dabat Intervention to improve CDR and TSR of TB		
Domain	**Definition**	**Assessment/Evaluation**
Participant eligibility criteria	applying few exclusion criteria to filter out participants thought least likely to respond to the intervention	The intervention admits all attendees at TB clinics in two districts in Hadiya: Lemo and Misha. Comparable districts would be chosen in Dabat.
Experimental intervention: flexibility	approach that leaves the details of how to implement the experimental intervention up to the practitioner	The manner of conducting interviews is ultimately decided by each interviewer group in each TB club of each district (i.e., interviewing at the club meetings or individually outside of club)
Experimental intervention: practitioner expertise	the experimental intervention is put into the hands of all practitioners, not one individual	We will not rely on ourselves to conduct interviews and focus groups; rather unbiased locals are used with a native feel for the culture and trust in the

		community
Comparison intervention(s): flexibility	intervention capable of being compared to "usual practice" or the best alternative management strategy available	TB clinics already had begun the intervention for people who attended them; we were merely facilitators in better understanding how that process worked initially and expand off of that in terms of the clubs' relationship with the community
Comparison intervention(s): practitioner expertise	Able to assess the benefits and harms of the intervention in comparison with usual practice in the settings of interest	TB clinics involve regular people with no systematic skills in medicine, except for the standard protocol for their TB treatment; since all treatment after diagnosis is the same for TB (only length of treatment may vary if drug resistance is a factor), this is very practical for case detection - there is no significant barrier to entry to find new cases
Follow-up intensity	limiting follow-up contact with the study participants in excess of the usual practice for the practitioner	It is not a requirement that those who seek to continue treatment must regularly attend TB clubs; while extremely pragmatic, follow-up and determining the TSR is important, thus we can rely on the TB club "leader" to facilitate unintrusive communication for members who have irregular attendance to indirectly assess treatment adherence
Primary trial outcome	measure outcomes only during the intervention period or up to a "reasonable" time after the intervention is complete	Our outcomes were case detection and treatment success rate; our efforts to engage the community in the awareness of TB clubs might hopefully get individuals in to be tested if they have TB-like symptoms. Ultimately we would want the proportion of those with TB versus those without TB to be greater to assess whether the community outreach is reducing the perceived stigma of being tested and treated for TB, which begins with more infected individuals attending TB club meetings.*
Participant compliance with "prescribed" intervention	limiting the measurement or use compliance information to TB treatment in any way, since "measurement of compliance may possibly alter subsequent compliance"	Clients were assessed for proper adherence to treatment; however, no incentives (other than the support of the TB clubs) were given to maintain treatment compliance

Practitioner adherence to study protocol	practitioners are allowed to vary a trial protocol to suit their setting	Leaders of TB clubs and community outreach workers will not be incentivized to improve treatment adherence or case detection, respectively
Analysis of primary outcome	answers the question "Did our intervention work under usual conditions?"	Recruitment will last for six months, after which we indirectly assess patients for the following year. At the end of that year, we will be able track the trend in the case detection proportion from the initial six months and later be able to assess how many patients successfully completed treatment and how many did not.

* Of particular note, the information on the numbers of individuals who come to the TB club meetings for the first time, but do NOT have TB are excellent sources of spreading the word to others outside of our intervention districts; we consider this extremely pragmatic and the very definition of sustainability.

Our intervention will be considered only for TB patients. However, a major weakness worth mentioning is that HIV/AIDS is prevalent in the Dabat region. Although the use of the PRECIS conditions does not exclude co-infected patients from seeking support and treatment at TB clubs, their willingness to do so might take a hit, since it is possible that those patients might even sense stigma from HIV-negative TB patients in the clubs. This is of concern and will be considered in our follow-up intervention in Dabat in the next year to come.

The main advantage of our intervention is two-fold: (1) results-oriented in terms of improving the CDR and TSR and (2) reducing the stigma associated with TB (by engaging community members in the Dabat districts to self-reflect on their feelings towards TB-infected individuals) that makes TB-symptomatic individuals feel less inclined to avoid testing and lack compliance with treatment.

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