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Elucidating the Current State of Tuberculosis through Maternal HIV/TB Coinfection Data

Abstract: *Though controlled in most developed nations, tuberculosis remains one of the World Health Organization's primary focuses. Their Millennium Development Goals reflect the need to combat tuberculosis incidence, particularly among regions like sub-Saharan Africa, whose lack of resources and poor living conditions make it highly susceptible the disease. Before the World Health Organization takes further action in its fight against global tuberculosis, they must first re-evaluate the current state of the disease in the regions it affects most. Unfortunately, poor health care systems combined with a lack of proper data collection make it difficult to ascertain the effects of tuberculosis in developing nations. What is known, however, is that not only does tuberculosis affect women more than men, but also that women comprise 70% of HIV-infected adults in sub-Saharan Africa. Additionally, those infected with HIV are more vulnerable to contract tuberculosis. I argue that efforts to determine the incidence of tuberculosis should begin by focusing on the most vulnerable population: HIV-infected women in sub-Saharan Africa. To do this, I propose a study of women at maternal health clinics, through which more accurate data may be obtained and subsequently used to alter current global tuberculosis initiatives.*

With 1.77 million deaths in 2007 (Glaziou et al. 2009), tuberculosis (TB) remains one of the world's most troubling public health issues. As a result, the World Health Organization (WHO) has established a series of Millennium Development Goals (MDGs) that focus, in part, on combating diseases like HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome), malaria, and tuberculosis (as described in Glaziou et al. 2009). While these goals are an important motivator for the strategies of global health professionals, the likelihood of achieving the goal of complete TB eradication by 2050 is slim. Inaccurate data collection impedes global health professionals' abilities to accurately assess the state of TB which, in turn, affects their strategic allocation of resources. Particularly in poor regions of the globe like sub-Saharan Africa, health care facilities lack adequate personnel, training and supplies to accurately document infectious disease statistics. Therefore, WHO may not understand the true burden of disease within a region, as it is not supplied with sufficient information. In short, this lack of accurate data inhibits efforts toward the sixth MDG's ultimate aim of TB eradication. To address this issue, I propose a study at maternal health clinics that focuses solely on obtainment of quality data among one of the most vulnerable populations: HIV-positive women in sub-Saharan Africa.

Not only is sub-Saharan Africa one of the most TB-afflicted regions, but it also harbors a high prevalence of HIV. Women, in particular, comprise 70% of HIV-infected adults in sub-Saharan Africa (Marais et al. 2010) and thus face a greater

risk of also contracting TB (CDC 2010). Therefore, my new initiative targets the accurate assessment of TB in this particular sub-population of HIV-positive women. WHO can then use these data to better determine what measures to enact for all populations moving forward toward the goal's deadline of 2050. The relationship between TB and HIV in women may be representative of some broader trends of the disease in other developing nations. Therefore, by understanding this association between HIV and TB among women in sub-Saharan Africa via more accurate data, the results can be applied to other populations, helping tailor WHO's advance toward complete eradication by 2050.

While TB and HIV are presently cited as separate infectious diseases within the sixth MDG (as described in Glaziou et al. 2009), research has demonstrated a strong link between TB and HIV. Not only do individuals with HIV have a higher risk of developing TB (CDC 2010), but TB also serves as one of the most common causes of morbidity and the most common cause of death in HIV-positive adults in developing regions (Corbett et al. 2003). Furthermore, WHO discovered that 13 of the 15 countries with the highest estimated TB incidence rates are in Africa, which they attribute to high rates of HIV coinfection (Glaziou et al. 2009). These findings illustrate a strong association between HIV and TB for two main reasons: if a woman has HIV, she is more likely to contract TB (CDC 2010); and most people with HIV die because they are also infected with TB. Exploiting this relationship in my study will allow WHO to formulate conclusions for how to effectively direct its actions in pursuit of the sixth MDG. However, simply designing a study that tests all individuals in sub-Saharan Africa for HIV and TB is impractical and inefficient. As an alternative, since women account for 70% of HIV-infected adults in sub-Saharan Africa (Marais et al. 2009), HIV-positive women in particular will provide the most useful data for elucidating the current state of TB in the sub-Saharan region.

With a justified population of interest in place, the next component of my study requires the election of a specific sector of women that can consistently be evaluated for TB and HIV. Because the greatest burden of TB in women is during childbearing years (Marais et al. 2009), my solution implements HIV/TB screening in several sub-Saharan maternal health clinics over a six to twelve month period. Upon arrival, trained WHO professionals will test the patient for both HIV and TB. For this study's short amount of time, WHO will focus strictly on the accurate compilation of TB and HIV prevalence data among the women, and not immediate treatment following a positive diagnosis. These data, collected by trained WHO employees, will supply global health professionals with credible information to discuss how to better address the lack or presence of HIV/TB coinfection in these endemic areas.

Though TB occurs most frequently in developing regions of the world (WHO 2009), a lack of information impedes an accurate assessment of the true gravity of the situation. Data collection in sub-Saharan Africa is generally poor, inconsistent, and at times, inaccurate. Laboratory errors, lack of notification of cases by public and private providers, failure to identify patients as TB suspects, and lack of access to health care combine for inconsistent and inconclusive data collection in these regions (Glaziou et al. 2009). For instance, TB infection can exist in two

forms: latent and active TB disease (CDC 2010). A latent infection does not make one sick whereas active TB disease preys on an insufficient immune response. Both are characterized by TB pathogens living within the body, but only a person with active TB disease will display symptoms and be contagious (CDC 2010). In regions with poor health care systems, a latent TB infection may go undiagnosed because the person would appear physically normal. If WHO analyzes and addresses TB based on these inadequate data, health professionals' ability to effectively allocate funds, personnel, and energy with respect to the MDG of TB eradication is obstructed. Therefore, my study focuses solely on the obtainment of accurate TB data to later be used for planning and executing the next wave of WHO action.

Accurate data collection is crucial to any health response strategy, but with respect to infectious disease it bears even more importance. The inconsistency and inaccuracy in data collection pose significant handicaps for achieving complete eradication by 2050, as the combination contaminates WHO's perception of the actual current severity of tuberculosis. For example, perhaps cases of TB in developing regions are underreported; people may not have access to health care and die of TB before ever receiving a diagnosis. A useful data report, such as the one my proposed study will provide, contains the following: a carefully chosen, controlled group of people; diagnoses performed by trained health care professionals; and a designated period of time for data collection. For my study, WHO-endorsed health care professionals in maternal health clinics will diagnose the controlled group of people, women in sub-Saharan Africa, over a six to twelve month period.

While my study contains all the basic, necessary components for successful data collection, the results may indicate some surprising statistics regarding TB in these regions. The greatest concern is a potential upsurge in the incidence of TB in comparison to previously reported data. While this may appear to be because of a rise in TB, the most likely cause is an improvement in data collection and analysis. For example, WHO discovered that the death rates in HIV-positive people in years leading up to and including 2007 were substantially higher than their previously published estimates; they attribute this not to an increase in the number of cases, but to enhancements in analytical methods (WHO 2009). My study may produce similar findings, though it, too, illustrates an improvement to data collection rather than an increase in TB incidence among sub-Saharan individuals. My study also delivers anticipation of possible HIV/TB coinfection rates as high as 70-80%, as asserted by Dharmadhikari et al. (2009). In their study of sex-trafficked Nepalese girls and women, they discovered that 88% of TB cases were HIV coinfected, data which they assert "are not dissimilar to HIV coinfection among TB-infected persons in some sub-Saharan African countries" (Dharmadhikari et al. 2009:544). While this was a specific study of an isolated population, it certainly lends support for my proposal, given the aforementioned high rates of HIV in women of sub-Saharan Africa.

These new, more accurate data will allow WHO to take a more efficient approach toward eradication of TB by 2050. For example, perhaps high rates of coinfection will imply that more money and resources should be spent on HIV treatment

and prevention, which in turn may lower the risk of TB. Though my study exposes the current state of TB among women in the sub-Saharan region, WHO may use these data to infer information about TB/HIV rates in men as well. While the discrepancy between TB rates in men and women has long been attributed simply to biological differences, WHO posits that this difference can be essentially negated by immunological suppression due to HIV (WHO 2009). Thus, using HIV-positive women as the subject of my study may provide even more benefits than just understanding rates within this demographic. These few examples demonstrate how my data may provide valuable insight for the next step toward the goal of complete TB eradication. The most useful victory that can come from my suggested study, however, is an accurate snapshot of the current state of tuberculosis in this region, for the study focuses specifically on quality data collection. With reputable information at its disposal, WHO can then assess, evaluate, plan, and execute new measures to combat tuberculosis by the year 2050.

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Works Cited

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