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## The Failure of Western Biomedicine: Treatment of Tuberculosis in the United States

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**Abstract:** The traditional Western model of biomedicine has been found to be inadequate when dealing with the escalating problems of tuberculosis (TB) and multi-drug resistant TB (MDR-TB) in North America. Biomedicine has failed to appropriately control this disease and is unable to deal effectively with social problems that cause the spread of TB, prevent adequate utilization of health care facilities, and discourage the appropriate use of medications. An anthropological approach which considers social and cultural issues in TB care and prevention may be useful in understanding why people may not use health care facilities, as well as aid in understanding the reasons behind non-compliance in finishing appropriate courses of medication. The Primary Health Care Model (PHC) may be a valuable option for providing accessible medical care which is acceptable to more individuals. Directly Observed Therapy Programs (DOT) have also been shown to be effective ways of enhancing patient compliance in completion of therapy, regardless of socio-economic circumstances or cultural diversity. The reliance on treatments which use standard Biomedical paradigms will continue to fail unless local and individual responses to these programs are given consideration.

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### Introduction

Biomedicine, the prevailing ethnomedicine within Western culture, has long sought to control and contain infectious disease through the use of drugs, and institutions such as hospitals, and clinics. While it has often been successful, for instance in the eradication of smallpox, the failures of this system are becoming increasingly apparent when diseases such as Tuberculosis (TB) not only reverse their declining trend of incidence, but reappear with more virulence than ever before. By examining the emerging problem of TB/HIV (Human Immunodeficiency Virus) co-infection and how it is commonly treated in hospitals and other formal health care institutions, it becomes clear that the biomedical model is inadequate.

### Biomedicine

Biomedicine is an explanatory model and system of treatments and perceptions of disease from a certain standpoint, that of Western society. Biomedical research is often thought of as objective, scientific and, for the most part, "right", by those who practice and are treated by it; it is "fact", and "reality". Biomedical practice focuses on the prevention and cure of illnesses of the body, and as such does not tend to explore the social context within which diseases occur. Disease treatment is grounded in scientific research for appropriate therapies and vaccines (Hahn 1995:134). Disease are understood to be based on the malfunctioning of the biological or physiological processes, and as such are seen to be problems of the body. They are also seen to be problems of individuals, for the most part, rather than of groups of persons in certain social positions. Biomedicine focuses on a curative orientation, an eradication of the pathogen, and on control strategies. Its practitioners discuss the risks and health factors associated with the

disease patterns, but seem to have little to say about their social implications (Mosley 1983:5). Diseases are not distinct and independent of social forces in spite of their special scientific status, they are still social constructions of Western society. In Biomedicine the most elementary unit of disease, for example *Mycobacterium tuberculosis*, which causes TB, is seen as an 'entity', an independent "thing", forming a complete whole apart from the person it affects (Keck 1993:295).

### History of TB and of TB/HIV Co-infections

The re-emergence of TB, after a long decline and virtual elimination in the United States, and many other affluent countries, was a foreseeable event. Tuberculosis, also known as the "White Plague", "Gallopung Consumption", and "Consumption of the lungs", has been with us for many thousands of years. Archaeological evidence shows it to be present in the New World prior to European contact, and in the Old World in Egyptian mummies and ancient Chinese and Hindu writings. Clear evidence for TB in 8000 BC has also been found in skeletal remains in Germany (Dutt and Stead 1988:1). In 1900, 80-90% of the population of the United States had been infected with TB by adulthood, dropping to less than 50% by 1950, and to slightly less than 9% by 1956 (Glassroth 1992:278). Tuberculosis presently infects over one-third of the world's population, of which 20 million develop the active disease every year, and 3 million die (Troy 1994: 63).

Tuberculosis is most often contracted through the lungs as the bacilli are inhaled, though it can be caught in other ways, such as from drinking unpasteurized milk from an infected cow. As few as ten organisms are sufficient to create an infection (Hinshaw and Murray 1980:300), but only bacilli smaller than 5 microns in diameter are able to penetrate the lungs. The rest are ingested and are rendered harmless (Canadian Lung Association 1988:17). The tubercle bacilli are aerobic, thus accounting for their prevalence in the lungs of hosts, though the disease is also common extrapulmonary. Once having infected an individual, the bacilli may remain dormant for a number of years, with a 10% chance of causing disease in that individual throughout the course of his or her life (Troy 1994:69).

The identification of *Mycobacterium tuberculosis* by Robert Koch in 1882 (Knapp 1989:146) was followed relatively quickly by the discovery of streptomycin and other anti-tuberculosis medications. This resulted in the belief that TB was no longer a problem, but rather, curable and controllable. Although extremely important for curing TB, streptomycin, isoniazid, rifampin, and other anti-tuberculosis drugs were recognized to have limits for treatment early on. Resistance develops easily in tubercle bacilli, and the appearance of resistant strains limits the use of many of the drugs. To stop the problems of resistance, several of these drugs must be used in combination, and taken for a period anywhere from 6 months to two years during therapy.

The recent outbreaks of multidrug-resistant (MDR) TB has once again brought this disease to the attention of health officials. Inadequate treatment of TB, usually occurring due to non-compliance, and the over-prescribing or improper prescribing of anti-TB drugs, has played a role in this increase. Problems with treatment also occur in

patients who are immunocompromised, such as those who are malnourished, especially chronic alcoholics, and those with acquired immune deficiency syndrome (AIDS) (Bailey and Harding 1988:39). In fact, the increase of TB closely mirrors the rise in cases of HIV/AIDS around the world. Individuals with immune disorders are not only more likely to contract and develop TB, they are also more likely to be in contact with other TB patients due to being placed in special wards and clinics, where the disease is easily spread to others. TB is now a sentinel disease for AIDS, with over 4.8 million people currently co-infected world-wide (Kochi 1994:2).

### **Biomedicine and TB**

The Biomedical approach has failed to look at disease as a consequence of social interactions. Because of the aerosol transmission of TB, the majority of the new cases are acquired in facilities such as nursing homes, shelters for the homeless, prisons, clinics, and hospitals. A majority of cases are correlated with social problems such as poverty, inadequate housing, intravenous drug use (IVDU), and among persons who are HIV seropositive. These are all social problems that cannot be solved by simply making the needed medications available at the nearest clinic.

The Biomedical approach is strongly supply oriented: medicines and facilities are supplied to care for people who become ill. As such, it tends to ignore the social constraints which may cause health services to be used ineffectively. It should be noted that the social factors which caused infection in the first place may be the ones that constrain people in the effective use of medications. These problems may not be solved in the absence of broader developmental efforts, which could educate people and supply work for those in impoverished circumstances (Mosley 1983:3).

Any community health benefit gained from clinics and medicines depends on the use of these facilities by those who are infected or who are at risk, yet these facilities are drastically underutilized. The impact of medical technology has been overestimated, for its use is dependent on many social factors. This overestimation often leads to a confusion between actual 'access' to facilities and the 'use' of these facilities. The distance between the health facility and the community is not only geographic, but economic, social and cultural as well (Mosley 1983:14). Illness, its causes, and the best treatments for it are culturally defined and depend on peoples' social and religious systems, as well as social values which are already present in their minds (Keck 1993:295-296).

Non-compliance to drug regimens has been noted as a significant problem in TB treatment. This was usually due to one or more of the following reasons: the patient's personality, social and economic constraints, their understanding of the illness, the patient-practitioner relationship, the practitioner's attitude, and the fact that certain patients will not take their medications without supervision (e.g., many alcoholics) (Bailey and Harding 1988:41). A 1988 study performed in Harlem Hospital, New York, found that of 178 patients discharged on a self-administration treatment schedule (with one quarter already having dropped out of a prior treatment program), nearly 90% failed to complete therapy and were eventually lost to follow-up.

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Within one year, 48 of these patients were readmitted with active TB, and many were subsequently readmitted with active TB in later years (Reichman 1994:86). These individuals were not adequately treated, and still posed the threat of infecting others within the community. Patients failing to take their medications, stopping treatment after their symptoms abate, and generally failing to follow through with out-patient care, run the risk of becoming infectious and transmitting the disease to others. They also run the risk of becoming reservoirs for TB, as well as becoming infected with multidrug-resistant strains of TB, thus decreasing their chances of survival.

As non-compliance was recognized to result from the treatment's imposition on patients' lives, efforts have been made to provide care that best suits their lifestyles. This includes providing convenient access to clinics, and bus tokens to help pay for transportation, convenient hours of operation of clinics, treatments on only a few days a week (which are just as effective as daily medications if the proper dosages are used), house and work calls, and attempts to find shorter treatment courses (Bailey 1983:83). It is important to understand how a given treatment will fit into an individual's life. If the patient is poor, living day to day, food and shelter may take precedence over medical treatment. A 1988 survey in New York showed that in one public hospital 82% of the patients were unemployed, 55% were alcoholic, 40% had AIDS, and 45% were homeless (Hahn 1995:280). All of these are serious circumstances, and may affect patients' primary concerns. Taking their medication regularly for over a year may be a low priority, and often difficult to do (Hahn 1995:281). Only in the past few years has it been recognized that social support systems are necessary to promote the proper use of medical treatments. Until recently, socio-economic problems related to diseases were seen as variables often considered beyond the scope of most health care programs. Traditionally many doctors felt that their role was to deal with their patients' 'medical' problems, and that as doctors they had insufficient time to deal with their patients' social and psychological problems, many which seemed to be beyond their capacity to solve (Hahn 1995:163, 166). These social variables were also often excluded from traditional Biomedical analyses through 'controlled' studies, where these factors would not come into effect (Mosley 1983:7).

Biomedicine is predominantly curative in approach, thus biomedical efforts are directed at the control or elimination of TB only once it has been diagnosed. Although there are physicians that are concerned with prevention as well as control, only 0.3% of physicians surveyed by the American Medical Association in 1989 reported that their practice was devoted to preventative medicine (Hahn 1995:136). Curative interventions are often valued over preventative ones, even though these approaches are often not the most effective or efficient means for promoting patient's health. Many cases of illness, and even death, could be prevented by the reduction or elimination of identified risk-factors. From the beginning, primary health TB control programs centred on the 'containment' of the disease with new drugs. Unfortunately, this curative approach is dependent upon the regular administration of therapeutic drug regimen, which is complicated by the problem of non-compliance, the poor prescription of medication, along with faulty diagnostic practices. The formal health system allocates government funds in order to provide services and medications to infected individuals and those at high risk. Cost-subsidies are often used as a way to help those who have acquired a disease pay for medications, hospitalization and other health related costs.

This again reveals a problem in Western Biomedicine, especially in the United States, as cost-subsidies are only provided to those diagnosed with the disease. Another related issue is that cost-subsidized medication is still medicine that is utilized voluntarily, and thus dependent upon people's health beliefs and treatment preferences (Mosley and Chen 1983:39).

The Biomedical focus in the U.S. is predominantly individualistic rather than communitarian. It tends to promote health in patients one at a time, and does not consider the distribution of resources for the well-being of society as a whole (Hahn 1995:142). Resources are available for those who can pay for them. With the focus on individual patients, physicians can do their best to help one individual, and not worry about the use of these resources and how it may affect others. This focus does not work for TB. TB requires contact tracing, isolation procedures and in many cases supervised therapy if treatment is to succeed. The majority of these isolation and control procedures are designed to insure that no one else becomes infected, thus they seem designed with other peoples' well-being in mind.

Western Biomedicine is often imposed upon patients. Individuals are not usually consulted about the medical regimen given to them, and are placed on a strict routine, one that may not coincide with their own routine, thus may lead to non-compliance. In some cases it may be mandated by law for the supposed "good of the community". In the past it was common for many countries to enforce isolation in sanatoriums, including Canada. Many countries in Africa still impose a mandatory confinement of several months upon individuals with TB.

The first aim of many doctors is not knowledge, but action. Many doctors assume that doing something is better than doing nothing at all (Hahn 1995:153). In the case of TB this may or may not be true. In many cases, immediate medication is needed in order to prevent the infection from spreading. However, MDR-TB may confound this course of action. If inappropriate drugs are given to a patient and the patient is drug-resistant to all or all but one of the drugs, the patient may worsen, or die before appropriate medication can be given. The delay in discovering the drugs to which *Mycobacterium tuberculosis* is susceptible is related to the amount of time it takes to create an adequate colony of the *Mycobacterium* in order to determine its presence, as well as the additional time it takes to discover its susceptibility to drugs. Both of these procedures can take many weeks. When HIV becomes a complication, as is frequently the case, MDR-TB has a fatality rate equivalent to un-treated TB, which is between 40 and 60% (Bloom and Murray 1992: 1057). Looking at the patient's social and medical background, including risk-factors such as HIV, IVDU, prior incidence of TB, or if he/she lives in an area with high-prevalence of the disease, helps to determine the possibility of the presence of MDR-TB. If MDR-TB is suspected, a four drug course of medication is considered the minimum to start the patient upon. By looking at the disease profiles of individuals from similar areas, it is often possible to predict whether an individual is likely to be resistant to certain drugs, and therefore which of those drugs should be avoided when initiating treatment.

With the cut-backs to funding health care and TB research in North America during the last few decades, a breakdown of the public health system occurred in the U.S., helping to lead to an explosion in the number of TB cases. Harlem, for example, now

has the highest rate of TB in the Western Hemisphere. MDR-TB is an increasing problem, occurring mainly in HIV patients. Inadequate infection controls in many U.S. hospitals where risk factors are high has resulted in TB patients spreading the disease at an alarming rate to HIV patients who are prone to developing primary cases of the disease following exposure to the pathogen (Canadian Public Health Association 1994: 3). Although TB and TB/HIV infections are not as common in Canada as they are in the U.S., the possibility that outbreaks may occur still exists. In contrast to the U.S., Canada's increase in TB cases is not directly related to the HIV epidemic, but rather to TB 'outbreaks' in Aboriginal people, immigrants, ethanol abusers and IVDU (Canadian Public Health Association 1994:4).

TB transmission within hospitals (nosocomial transmission), is a well established phenomenon, especially amongst those who are immuno-compromised, such as AIDS patients. Studies in many U.S. hospitals show that HIV/AIDS patients dying of TB were likely to have been admitted into the hospital up to seven months previously, most having been admitted to the HIV ward, and approximately 70% hospitalized at the same time as another patient known to have MDR-TB (Maloney *et al.* 1995:91). Edlin and colleagues (1992) investigated the exposure and development of TB within Roosevelt Hospital in New York City. The study revealed that of 18 patients, 13 placed on a ward with an individual with TB subsequently developed the disease. This emphasizes the need for many precautions when dealing with TB and HIV within hospitals. Every effort needs to be made to prevent the spread of infections within health care facilities. The need for negative pressure rooms to stop the air from circulating out of isolation rooms, as well as the need for frequent air changes within these rooms, has long been recognized as a way to decrease contagion within health care facilities. When a patient diagnosed with TB enters a health care facility, isolation is one of the first priorities.

Unfortunately these facilities are often used *after* TB has been diagnosed, therefore already potentially exposing many people. In hospitals studied, the majority did not have proper negative air-flow rooms that worked, and most did not have effective isolation procedures for administering such medicines as aerosolized pentamidine, which induces sputum production and coughing (Frieden 1994:893). Due to funding cuts many hospitals do not have the proper technology to deal with TB, such as isolation rooms, and many can not afford to install them. Most types of isolation facilities are expensive and are therefore not available in smaller clinics with out-patient treatment. In the event that technology was made available to most hospitals and clinics, the actual use of these facilities is dependent on the proper use of these facilities.

Further problems may result if the patient is non-compliant in taking the necessary medications. Even after being considered non-infectious, an inadequate treatment course can cause TB to be reactivated. This can cause problems in health care facilities if a patient is not recognized as contagious, especially if in contact with HIV or other immunosuppressed individuals. As TB is now a sentinel disease for HIV, the co-

infection of the two is now being recognized as an increasing hazard. For example, up to 59% of patients were diagnosed for TB prior to a diagnosis of AIDS in San Francisco between 1981 and 1988 (Small 1991:289). As patients with HIV are more likely to acquire TB either due to exposure, or the reactivation of latent TB once their immune system is compromised, patients on HIV/AIDS wards, or in special clinics, may be unknowingly infected with TB. Many AIDS patients have designated hospital wards which increases the potential for the spread of TB between and among immunosuppressed patients in the hospital.

Imposing isolation upon individuals is a tricky thing. For many people isolation is problematic, and the social conditions under which treatment is administered are often inhumane and unnatural. In many cases patients remove their masks when socializing outside of their rooms, leave their rooms to have a cigarette, or refuse to be isolated from their friends or family, obviously not always understanding the full implications of their acts (Dickinson 1994:41). In situations where patient compliance with isolation procedures cannot be guaranteed, it would seem a foolish act to place them on wards with HIV infected individuals, yet this occurs. Biomedicine fails to take into consideration patients' reactions to standard control procedures. A curative approach to Biomedicine also becomes inefficient in these cases, as you cannot 'cure' someone you do not know is ill. With preventative medicine you should not have these problems, as hopefully illness will not occur. Also, in identifying potential high-risk individuals, the needless exposure of others to TB will be less likely to happen.

The recent increase in TB, long thought to have been conquered in North America, was a foreseeable event. The fact that mutations could occur within the bacillus which caused drug-resistant and multidrug-resistant strains, was well established decades ago when streptomycin was first introduced. Within the first year of the introduction of streptomycin, drug resistant strains developed, showing that one-drug courses of treatment were not appropriate in the treatment of TB (Dickinson 1994:36). The problems of non-compliance, resulting in drug-resistant strains of TB come as no surprise, and neither should the co-evolution of TB and HIV/AIDS, which has long been recognized in other countries. In sub-Saharan Africa, TB had been epidemic long before immunodeficiency viruses were known/understood, thus the impact of HIV on TB pathogenesis was quickly recognized (Nardell 1994:42). These factors were barely acknowledged in more affluent countries, and they certainly were not given appropriate consideration when treatment and control strategies for TB were being implemented. With the addition of complicating factors such as multidrug-resistant TB (MDR-TB) and HIV, the number of cases and fatalities due to TB is gradually increasing. Western Biomedical practitioners have failed to take into consideration many pressing social issues when dealing with TB treatment. They are only now beginning to revise treatment programs, and the need for new guidelines for the treatment of TB has been recognized in many places. Public health officials, recognizing the failure of Biomedicine and case management, have attempted to identify individuals at high-risk, as well as those likely to be non-compliant, that is IVDU's, alcoholics, and many homeless individuals. Anthropological approaches and insights are useful in this endeavour, and help define what behaviours influence certain risk-factors, and what the motivating factors for these behaviours are.

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Research has indicated that beliefs and culture may influence the choice and use of health care. Cultural barriers alone can negate any useful impact of formal health care (Mosley and Chen 1983:39).

### **An Anthropological Approach**

As deficiencies in the biomedical health system have become apparent, changes in health care strategies have become more common. The adoption of anthropological perspectives has aided in many cases where biomedicine failed to be accepted or widely used. Health care professionals have begun to assess the benefits of many of the different approaches to health care for their social values, and not solely in terms of their scientific status. The Primary Health Care Model (PHC) was devised by the World Health Organization in 1978 (Reid 1983:xiv) in an attempt to provide accessible medical care which is acceptable to individuals, their families, and their community. PHC programs are designed not only to be an integral part of health care systems, but also to aid in overall social and economic development. Within these programs social contexts are stressed over the technical, or medical contexts, unlike Western Biomedicine (Denoon 1989:106). PHC's are considered by many to be one of the most viable options for improving health care for marginal groups as it attempts to provide health care to people on their own terms. Primary Health Care projects also encourage people to retain their own perspectives on sickness and healing, in order to explain these phenomenon in traditional, and more culturally sensitive ways. One of the aims is to adapt health care strategies to take advantage of Western medicine, while remaining distinct in the process (Reid 1983:195).

Primary Health Care projects have been successful in many countries, and with many peoples. In New Zealand, the first Maori-based health project was organized. The Waahi Community Health Center is an indigenous healthcare facility (Voyce 1989:98,99). This indigenous health care facility was built by the Maori in an attempt to regain control over their own health by using their medicine and cultural systems. The Maori people felt that Western Biomedicine was monocultural, and did not accurately reflect their needs. The need for a different medical approach was reinforced in the early 1980's when it became apparent that the Maori peoples' social and economic welfare was far below that of New Zealand's national level (van Meijl 1993:284).

Tuberculosis patients face many of the same problems, such as depressed social and economic status, and are being served by health care systems that may not reflect their needs. A person's perception of their illness and the treatments offered can drastically affect his/her decisions of whether or not to complete, or even begin, therapy for TB. TB is a problem that affects many people, from many different backgrounds, and no one health care program can be designed to suit the needs of all concerned. Perhaps the adoption of some aspects of the PHC model could aid TB patients in Western culture. Looking beyond Western Biomedicine, to different cultures and beliefs concerning health and medicine, aids in recognizing diversity, and the need for a variety of health care approaches.

Recent experiments with Directly Observed Therapy (DOT) programs have resulted in improvements in therapy for many inner-city TB patients, as well as many marginalized peoples, including Canadian Aboriginals. DOT programs have

been shown to be one of the most effective ways to get patients to take their medication, and to ensure the continuity of treatment. Programs of this sort have been shown to be effective, regardless of socio-economic circumstances or cultural diversity. Although many practitioners of Western Biomedicine regard DOT programs as time-consuming due to the need for specialized training and outreach staff, these programs have been effective when dealing with TB patients. Unfortunately, this type of public health approach is unfamiliar or unavailable to most clinicians (Frieden 1994:893).

The success of DOT treatments for TB on many First Nations reserves in Canada may be attributed to the fact that they have been developed in partnership with these communities, and are following community development models (Canadian Public Health Association 1994:8). These programs are similar to PHC models as they are concerned to provide services that will be accepted in marginal communities. These health services have been created due to a desire for greater native participation in on-reserve health education programs; almost 100% of these services have been endorsed by communities (Jenkins 1977:554). The impact of local input into health care has been shown to increase the effectiveness of these programs. Their acceptance and use have increased as local native peoples have been trained to serve as community health liaisons for the public health nurse. As in the Maori case, the elimination of traditional and Western medicine is shown to be more effective in treatment of TB. Most of the failures to complete treatment have stemmed from a lack of awareness of the importance of completing the prescribed medications, and has often been due to poor patient-doctor communication. The lack of understanding is most often due to language problems and cultural differences between patients and members of the health care community (Jenkins 1977:553). The success of TB treatment has increased when native community members have assumed the responsibility and control of local health care and acted as liaisons.

As hospitals are often far from reserves, the prolonged hospitalization which occurs with many TB treatments imposes a severe and prolonged personal and family disruption. Many people will refuse to go to hospital, or even avoid treatment altogether, to avoid these disruptions; often the purpose of these treatments and prolonged periods of isolation are not fully understood by infected individuals and their families.

With the recognition of these difficulties, as well as other cultural barriers that impede successful treatment of TB, the introduction of DOT therapy has allowed Native groups to have more say in their treatment regimens and practices, as well as establishing the possibility for shorter, intermittent and supervised treatments in their own homes (Canadian Public Health Association 1994:8).

Greater awareness and sensitivity to diverse elements of native culture is valuable when trying to solve the problems of communication, and treatment compliance. These practices may be applied within Western cities as well, in order to serve the great diversity of peoples who reside within them. By creating programs for multi-cultural, and varying socio-economic communities, targeting certain high-risk groups may become more feasible. In understanding

how people will react to TB and its treatment, as well as why they react in these ways, better services can be provided which will be deemed acceptable. The reliance on standard Biomedical techniques will continue to fail unless local responses to these programs are considered. Peoples' motives, ideas, interests and beliefs all need to be taken into consideration if a treatment regimen is going to succeed. Primary Health Care models, as well as DOT treatment therapies are tools which have been created to deal more effectively with these problems. These programs survive and succeed due to their ability to be flexible in situations with changing needs, as well as by consulting and amalgamating local beliefs and ideas into health care programs. By looking outside the traditional Biomedical Model, these programs are not constrained by narrow, scientific views, which impose their ideas and beliefs on others. Instead, working with others to develop these health care models has created many successful treatment programs which can perhaps be utilized to a greater extent in order to prevent and fully cure this disease.

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