

Tuberculosis: Making a Comeback

An Honors Thesis (HONRS 499)

by

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Abstract

The purpose of this research paper is to better understand the disease Tuberculosis. There are five main areas of interest: Global Statistics on Prevalence, Drug Resistance, Immigration, Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome, and Future Programs and Goals. These five areas will be discussed in this paper. The researcher will describe how these items hinder public health officials from eradicating Tuberculosis. The paper begins with a general overview of Tuberculosis and then progresses to an in-depth explanation of each topic.

Description of Tuberculosis

Tuberculosis is an infectious disease caused by the bacteria *Mycobacterium tuberculosis*, a bacterial organism. It is transmitted to others primarily through means of the air by things such as coughing, sneezing, or even breathing. The majority of people who are infected with Tuberculosis do not have any symptoms. Many people have what is called latent Tuberculosis. Latent Tuberculosis occurs when a person is infected with the disease but there are no symptoms and the disease is not contagious. Some people may never develop active Tuberculosis while others may progress from latent Tuberculosis to active Tuberculosis within two years of the time of infection. Active Tuberculosis occurs when the individual develops symptoms and becomes contagious (MMWR). Most people are not diagnosed with Tuberculosis until it becomes active. Active Tuberculosis can be identified by the following symptoms: malaise, easy fatigue, anorexia, weight loss, slight fever, chronic cough, and in extreme cases pulmonary bleeding. Most cases will not have all symptoms (Harris).

Doctors can diagnose Tuberculosis using a Tuberculosis skin test. A small amount of the Tuberculosis bacteria is injected under the skin. The nurse or doctor will then check the point of injection 72 hours after the test. If the patient is positive for Tuberculosis there will be a raised portion of the skin. The doctor may then have an X-ray of the patient's lungs as well as a sputum smear. A sputum smear consists of liquid that has been excreted from

the lungs. The doctor may do a culture on this excretion to test for Tuberculosis (Harris).

Once Tuberculosis has been diagnosed a patient must begin treatment immediately. The treatment consists of a form of chemotherapy administered daily in the form of a capsule or pill. The treatment lasts from 6 months to one year. Therapy must continue for the full period in order to be effective.

Global Statistics and Prevalence

In the year 1990 there were an estimated 7.5 million cases of tuberculosis reported. Although the majority of the cases occurred in third world countries, the largest increase has occurred in developed nations. Ninety-five percent of Tuberculosis cases were found in developing nations where tuberculosis was the number one cause of morbidity. Mortality resulting from Tuberculosis was as high as 60% worldwide at one time, but is declining due to various types of treatments. In 1990 there were 2.5 million deaths caused by tuberculosis. Ninety-eight percent of these deaths occurred in developing nations. It is projected that from 1990 to 1999, 90 million new cases of Tuberculosis will occur worldwide. Tuberculosis is the world's foremost cause of death from a single infectious agent (Raviglione, et al).

The statistics seem overwhelming. There is an enormous number of tuberculosis cases in the world and the rate continues to rise. It is easy to see that Tuberculosis is not only a problem for the United States but for the rest of the world as well. Researchers have developed a scale called the Average Annual Risk of Tuberculosis Infection (ARTI). This scale uses current prevalence to predict the probability that an individual will become infected with Tuberculosis within one year. The ARTI was found to be high in sub-Saharan Africa, South and East Asia, North Africa, the Middle East, and Central and Latin America (Raviglione et al).

In the United States tuberculosis cases decreased approximately 5.3% per year from 1953 to 1984. After 1984, however, Tuberculosis began to rise. From 1984 to 1993 the number of cases in the U.S. increased by 14%. All age groups with the exception of those 65 and older experienced an increase in Tuberculosis. The group with the largest increase was the 25-44 year old age group. More than 70% of the new cases in the United States were reported in ethnic minority groups. The United States has experienced Tuberculosis outbreaks in hospitals, prisons, residential care facilities for AIDS patients, nursing homes, and homeless shelters. Clearly, Tuberculosis is a serious problem for the U.S. (Raviglione et al).

In Europe, however, cases of Tuberculosis declined until 1992. In some European areas the number of cases has leveled off and a small number of countries has recently experienced a rise. Switzerland has experienced a 40% increase between 1986 and 1990 but from 1990 to 1992 a decrease was found. The highest rate of Tuberculosis in Europe was found in Portugal and the lowest European rates were found in Denmark and Sweden. Overall, European countries have reported less than 25 cases per 100,000 people.

Developing nations have extremely high rates of Tuberculosis infection. Tanzania reported 3,369 Tuberculosis cases per 100,000 people from 1990 to 1992. Tuberculosis accounts for 25% of the avoidable adult deaths

in developing countries. Ninety-eight percent of all tuberculosis related deaths occurred in developing nations. Without proper action tuberculosis will continue to progress and the number of deaths will continue to rise.

Learning about Tuberculosis globally can open the eyes of both health care providers and health educators in the United States. It is possible that such individuals may one day work in some way with the World Health Organization or even the Department of Health and Human Services. It is important that the United States make a commitment to eradicating tuberculosis not only in this country but in the rest of the world as well. We have resources and technology that developing nations do not have access to and often cannot afford. Many developing nations also lack the proper knowledge needed to fight this disease. By helping other nations in the world the United States will help itself. We must remember that we are not enclosed in a bubble; everything that happens in the world affects us as a nation. Tuberculosis rates in other countries play an important role in the health of the U.S. because of the vast number of legal and illegal immigrants entering the U.S. and the millions of Americans who travel to other nations each year.

Drug Resistance

Tuberculosis has recently donned a new image. Doctors are now discovering cases of Tuberculosis that are resistant to one or more treatment medications. This type of Tuberculosis is referred to as drug resistant tuberculosis. Many health professionals are wondering how drug resistant tuberculosis came into being.

Two main ways that a person can develop drug resistant tuberculosis are primary resistance and acquired resistance. Acquired resistance occurs when a person has received treatment for Tuberculosis in the past. If a patient did not follow the doctors orders when taking medication or if the doctor prescribed an incorrect treatment regimen, a patient may develop drug resistant Tuberculosis (Raviglione et al). It is helpful to compare drug resistant Tuberculosis to immunizations. When a child receives an immunization he receives a small dose of the disease so that his body will build up a defense system against that disease. When the child is exposed to the disease later in life his immune system will be capable of defending him. In a similar way, if the disease causing organism has already been exposed to a medication it is able to build up a tolerance for that particular drug. When the Tuberculosis is treated a second time it will not react to the original medication. Acquired drug resistant Tuberculosis is common among developing nations where it is difficult to afford medication and also difficult to monitor patients over the

long period of treatment (ranging from 3 months to 1 year). It may also occur when a physician does not prescribe the medication in accurate doses or for the correct length of time (Raviglione et al)..

Primary resistance to medication occurs in patients who have never received prior treatment. If a person who has acquired resistance transmits the disease to a person who does not have Tuberculosis, the new case will be resistant to the same medication that the acquired person was resistant to. In other words, when a Tuberculosis case becomes immune to a certain medication, each person who contracts the disease from the immune individual will also be immune (Raviglione et al). Therefore, it is extremely important to prevent transmission of acquired drug resistant Tuberculosis.

If a person has drug resistant Tuberculosis, he/she does not have to throw in the towel yet. It is possible to treat Tuberculosis with several types of medications. Once the health care worker learns that a patient is resistant to one drug he can change the treatment regimen. Some third world countries have high rates of death resulting from drug resistant Tuberculosis because they do not have the tests used to identify drug resistant Tuberculosis cases (Raviglione et al).

Drug resistant Tuberculosis needs to be addressed immediately because the longer it is put off the larger the problem becomes. One complication of drug resistant

tuberculosis is multi-drug resistant Tuberculosis, or MDR-TB. This condition occurs when a patient is resistant to two of the medications used to treat Tuberculosis. If a Tuberculosis case is found that resists isoniazid and rifampin then it is classified as MDR-TB. In November of 1992 the Centers for Disease Control and Prevention identified 297 cases of MDR-TB within a total of 9 tuberculosis outbreaks in the U.S. Most, but not all, of the MDR-TB outbreaks were found among HIV positive populations. The mortality rate among individuals with MDR-TB is 70%. The median interval between diagnosis and death is 4 to 16 weeks (Raviglione et al). While this investigator could not find research defining why MDR-TB was found among HIV positive individuals, it may be possible that the high mortality rates are due in part to the weakened immune system of HIV positive patients. In addition, MDR-TB is likely to be difficult to treat because, while doctors are trying to find a treatment regimen, the Tuberculosis is worsening.

Earlier, the methods of treatment for patients with both Tuberculosis and HIV/AIDS were discussed. The treatment often will require many different medications at the same time. That may be one reason that AIDS patients are susceptible to MDR-TB.

Drug resistant tuberculosis is a major obstacle to eradicating Tuberculosis. The spread of Tuberculosis is already on the rise and the last thing that health care

workers need to face is drug resistant Tuberculosis. The problem, however, is already present and without education and proper actions this form of tuberculosis will spread. Accurate follow up and testing of all tuberculosis patients is a must in order to prevent and identify all drug resistant cases of Tuberculosis. If a patient has MDR-TB and cannot be treated, then he/she must be isolated for the health of the community. Reaching out to third world countries who are lacking in appropriate testing measures and treatment follow-ups is an urgent priority.

Immigration

Global statistics are important because the health of other nations affects the health of the United States in various ways. The author will now focus on the impact that immigration is having on the tuberculosis infection rates in the U.S. Immigrants to the United States have been found to play a role in the recent increase in Tuberculosis cases. From 1980 to 1990 the foreign born population in the United States increased 40%. The top five countries on the immigration list were Mexico, the Philippines, Vietnam, China, and Korea. These five countries have a rate of Tuberculosis that ranges from 10 to 30 times the rate of Tuberculosis in the U.S. Other immigrants may come from countries where the risk of infection is 100 to 200 times the risk found in the United States (Mckenna et al).

The U.S. requires that all immigrants applying for permanent legal residency pass a sputum smear test before entering the U.S. If the test result is positive the person must begin treatment and acquire a negative test result. This individual is allowed into the United States while still positive for Tuberculosis but is required to receive a check-up from a health care worker in the U.S. Only with approval of a negative test result in the United States is the immigrant allowed to remain. However, it should be noted that individuals who are visiting and students from other countries are not required to take any test at all (Mckenna et al).

Furthermore, it is possible for immigrants to take enough medication to achieve a negative test result for Tuberculosis and then stop taking the medication before the treatment regimen is complete. This may result in drug resistant Tuberculosis which was discussed earlier in this paper. If an immigrant has a positive chest x-ray it is possible for him/her to purchase a healthy x-ray and present it as his/her own in the United States. One must also remember that not all immigrants meet the follow-up requirements when they reach the U.S. Some cases get "lost in the paperwork." and health care workers never track down the immigrants who were supposed to receive a follow-up exam in the U.S. To add to the confusion, it must be noted that not all countries test accurately for Tuberculosis when they screen individuals who are applying for admission into the U.S. Finally, the reader should not overlook the illegal immigrants who sneak into the U.S. without any testing at all (Iseman and Starke.)

The rates of Tuberculosis in the United States are directly related to the rates of immigration. From 1977 to 1979 foreign born people accounted for only 15% of the Tuberculosis cases in the U.S. In 1993, however, 30% of all Tuberculosis cases in the U.S. were reported by foreign born individuals. The rate of foreign born cases in 1993 was 33.6 per 100,000 and rising while the U.S. born population had a steady rate of 8.1 per 100,000. The incidence of Tuberculosis among foreign born people was 2 times higher on

the west side of the U.S. than in the rest of the country. The majority of foreign born cases are contracted in the country of origin. This is known because 55% of the cases are diagnosed within the first 5 years after immigration and 29.6% of the cases are diagnosed within one year after immigration. It is most likely that these cases are a result of the activation of a latent Tuberculosis infection (one that is present but shows no symptoms and is not contagious) as opposed to new cases of Tuberculosis that were acquired in the U.S. after immigration (Mckenna et al).

In California illegal immigration has caused quite a dilemma for health care workers. California has large numbers of illegal immigrants from the southern border of the United States. Many of the immigrants come to the United States with health problems, including Tuberculosis. In order to control the large numbers of immigrants the state of California has developed something called Proposition 187 (Iseman and Starkes).

This is a proposed law which would require all health professionals in the state of California to deny medical treatment, with the exception of emergency situations, to all illegal immigrants. In addition health care workers must report all suspected immigrants to the government officials. The law has been proposed with the hope that it will hinder new immigrants from coming to the U.S. The individuals in favor of the law feel that some immigrants come to the U.S. specifically for health care reasons.

Those opposed to Proposition 187 feel that the immigrants will come to the U.S. regardless of this proposition because they come to the U.S. to improve their overall quality of life. not for health care itself (Iseman and Starke).

Illegal immigration is a problem without Proposition 187 but there are other laws which prohibit immigration. If these laws are not working, then some critics ask why this proposal would make any difference.

Health care workers will be in a tough situation if this proposal becomes law. Health care workers will be forced to deny care to individuals in need or go against government regulations. If health care professionals choose to obey government regulations Tuberculosis could get out of hand in immigrant populations. These small outbreaks will eventually reach the general population of the U.S. and Tuberculosis will become even worse.

The state of California, along with the rest of the country, needs to set priorities. Is it more important to control illegal immigration in the United States or control Tuberculosis worldwide? By denying health care to illegal immigrants we violate confidentiality and only hurt ourselves. Illegal immigration is a problem but controlling Tuberculosis deserves top priority in the author's opinion.

Tuberculosis and Human Immunodeficiency Virus/Acquired
Immune Deficiency Syndrome

Globally there were an estimated 5.6 million patients infected with Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome and Tuberculosis in the middle of 1994. It has been said that "HIV has emerged as the most important risk factor for progression of dormant tuberculosis infection to clinical disease" (Raviglione et al). HIV has spread rapidly in developing nations along with tuberculosis. The incidence of Tuberculosis cases that was directly related to HIV worldwide was 4.2%. In sub-Saharan Africa, 20% of the Tuberculosis cases are said to be caused by HIV infection alone. In many developing nations Tuberculosis has become the number one opportunistic disease associated with HIV/AIDS (Raviglione et al). The impact that HIV/AIDS and Tuberculosis are having upon one another seems to be enormous. But what exactly is that impact? How are the two diseases affecting one another? How can one define the relationship between HIV/AIDS and Tuberculosis?

The possible relationship between Tuberculosis and HIV/AIDS has received wide publicity from the mass media. It is commonly thought that HIV/AIDS is causing the rise in Tuberculosis cases. This is a misconception because in truth the influence that HIV/AIDS is having on Tuberculosis is still being investigated. While doing research the author found only two articles with substantial data on this subject. It is important for health educators as well as the general public to know the truth about what is being

learned so that misconceptions do not spread. HIV/AIDS patients already face discrimination and promoting false information about Tuberculosis could increase the negative feelings toward HIV/AIDS patients. If society were to be misled into believing that HIV/AIDS is an actual cause of the rise in Tuberculosis cases people might tend to blame the victims of one disease for the spread of another. It would be possible for people to blame victims of HIV/AIDS for the rise of tuberculosis. Therefore, proper knowledge about the relationship between HIV/AIDS and Tuberculosis is essential. Knowing the facts will enable health professionals and the public to prevent both Tuberculosis and HIV/AIDS as well as promote understanding of the diseases separately and together.

The first article on this particular subject focused on a study conducted in New York City. This city has experienced the largest rise in the country for both Tuberculosis cases and AIDS cases. Since both diseases began to increase at the same time and in the same area it was thought that a strong relationship between the two would be found (Journal of American Medical Association).

The researchers found two possible reasons to explain why HIV positive patients might have an increased chance of developing Tuberculosis. The first possibility is that as HIV infection progresses to AIDS, the immune systems become weaker. A weaker immune system is not able to defend itself against a variety of new infections, including Tuberculosis.

Therefore, a person who is HIV positive might be more susceptible to contracting Tuberculosis. The second reason that Tuberculosis cases are high may be due to latent Tuberculosis infections. People may have latent Tuberculosis infection for a long period of time before the disease becomes active. An individual who has a compromised immune system, such as a person with AIDS, will not be able to maintain Tuberculosis at a latent level and the Tuberculosis infection then become clinically active. This seems to be the most likely cause for the high number of patients with both Tuberculosis and HIV/AIDS. The annual risk of infection (chance of an individual becoming infected with Tuberculosis in a year's time) in the United States is too low to account for the high number of cases of active Tuberculosis found in this population. In other words, not enough new infections are occurring to account for the number of new Tuberculosis cases found among in HIV positive individuals. In addition, 65% of the patients who are diagnosed with AIDS and Tuberculosis are diagnosed with both diseases within 6 months of each other. Tuberculosis is usually diagnosed within 6 months before or after the diagnosis of AIDS. This evidence suggests that as HIV progresses to AIDS latent Tuberculosis becomes active (Journal of American Medical Association).

The second study reviewed was conducted on the homeless population in San Francisco, California. This study focused on the influence of HIV/AIDS and Tuberculosis among the

homeless because in recent years both Tuberculosis and HIV/AIDS have grown rapidly among this population subgroup in San Francisco. The researchers wanted to find out if the two diseases were related to one another or if it was merely a coincidence that both diseases were on the rise in the same sub-population group at the same point in time (Zolopo et al).

The researchers discovered that while there was some overlap between the two diseases (some individuals were found to have both), there was little evidence that HIV positive persons were actually causing the rise of Tuberculosis. The study showed that it is possible for HIV positive individuals to be more susceptible to new Tuberculosis infection. It was also found that it is also possible that patients with AIDS are more susceptible to activation of latent Tuberculosis infection. However, although evidence pointed in this direction, researchers concluded that there is no solid proof for either suspicion (Zolopo et al).

The main conclusion from this study was that HIV and Tuberculosis share some common risk factors. One risk factor is IV drug use. IV drug use leads to HIV/AIDS when needles are shared. It is possible that IV drug use may cause poor health in general which could inhibit one's immune system and make a person more susceptible to new or reactivated Tuberculosis. An IV drug user is susceptible to HIV and Tuberculosis infection, but there is no relationship

between HIV and Tuberculosis when the initial infection occurs. The second common risk factor for Tuberculosis and HIV/AIDS is length of homelessness. Those who were homeless for one month or less had a 39% prevalence rate for IV drug use while those who reported to be homeless for one year or longer were found to have a 49% prevalence of IV drug use. The longer a person was homeless the more likely he was to use IV drugs. The more a person used IV drugs the greater his/her risk was of developing tuberculosis and HIV/AIDS. In addition, the longer a person is homeless the more likely he is to stay in a shelter. Homeless people who had stayed in shelters were more likely to develop Tuberculosis. The longer one remained in the crowded facilities the greater risk one had for developing Tuberculosis. Women who had lived in shelters were found to have 3 times greater risk for developing Tuberculosis than those who had not lived in a shelter (Zolopo et al).

The HIV prevalence in the target population was similar to the prevalence in other populations with similar risk factors whereas Tuberculosis was much higher than the general population, especially in crowded areas. Crowded living areas and IV drug use were found to be common risk factors for both HIV/AIDS and Tuberculosis. This find, in addition to the compromised immune system found in patients with AIDS, could explain why people with AIDS often develop Tuberculosis. Therefore it has not been proven that HIV/AIDS and Tuberculosis are directly related to one

another. It is possible that both diseases share multiple risk factors and individuals with those risk factors are prone to both diseases simultaneously (Zolopo et al).

The problem of HIV/AIDS combined with tuberculosis does not end here. Once Tuberculosis cases are identified the next step is to treat the tuberculosis infection. Patients with AIDS, however, are difficult to treat. Some patients do not respond to normal treatment while others may have adverse reactions to the medication. The Centers for Disease Control and Prevention and the American Thoracic Society have recommended that treatment of individuals with HIV/AIDS and Tuberculosis include a minimum of 3 medications. The treatment should always last at least 9 months. Once an HIV/AIDS patient tests negative for Tuberculosis the treatment should continue for 6 full months afterwards. At the end of the 6 months when treatment has been completed, all patients must be monitored for possible relapse (Journal of American Medical Association).

All health professionals need to be fully aware of the problems associated with Tuberculosis patients and HIV/AIDS patients. It is important to understand how each disease influences the other. Knowing the facts and the myths surrounding HIV/AIDS and tuberculosis will benefit health professionals and the general public. In order to fight the disease one must know what he/she is up against. All health professionals need to keep updated on further studies and findings in this area. No one knows the precise

relationship between HIV/AIDS and Tuberculosis and no one knows what the future holds for these diseases. When two diseases that are difficult to fight are combined, the eventual outcome will likely involve both trouble and hardship.

Future Programs and Goals

In 1989 the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, set a goal to eliminate tuberculosis by the year 2010. In order to achieve this goal the CDC designed a comprehensive program to fight tuberculosis (MMWR). In the United States it is mainly the responsibility of the state and local health departments to implement Tuberculosis eradication and prevention programs. There are three broad goals associated with eliminating Tuberculosis. The first goal is to identify and treat all patients with Tuberculosis. The second goal is to identify and screen people who have been in contact with infected people. The last goal is to screen high-risk populations for Tuberculosis. The CDC has identified 7 components to accomplish these three goals:

- conducting overall planning and development of policies to help eradicate Tuberculosis
- identifying persons who have clinically active Tuberculosis
- managing persons who have or who are suspected of having disease
- Identify and manage people with M. Tuberculosis
- providing laboratory and diagnostic services
- collecting and analyzing data, and
- providing training and education.

In the following paragraphs a brief description of each of the seven components and the major sub-components involved will be presented (MMWR).

Conducting overall planning and development of policy.

Tuberculosis programs should be made up of coalitions of health care providers, physicians, and a variety of health organizations in the community. The coalition should set up policies and strategies using the local Tuberculosis morbidity data. The coalition is responsible for all activities, funding, and providing guidance to health care workers in regards to Tuberculosis control and prevention. The coalition needs to review legislation and public policies to ensure that they are consistent with the goal of eliminating Tuberculosis. Examples of supportive legislation are:

- treating patients without considering their ability to pay
- protect the health of the public by isolating and treating patients with infectious Tuberculosis, and
- state and local laws that regulate and protect patient confidentiality.

The coalition is also responsible for maintaining a staff that is fully trained and large enough to implement an effective program. The size of the staff will vary depending on the size and the need of each community. The staff may include a manager or director, epidemiologists, physicians, nurses, and community outreach people. The community outreach individuals may be trained volunteers or paid health professionals. Their main job is to help undertake follow-up visits, educate patients, ensure completion of treatment, serve as interpreters, or even

provide transportation to patients in need. The final responsibility of the coalition is to ensure sufficient funding for the needed Tuberculosis programs. The funds may come from federal, state, or local monies as well as private organizations.

Identify people who have clinically active Tuberculosis.

This component requires that programs provide methods of testing for Tuberculosis. The program must have trained people to test for Tuberculosis and read the results of tests accurately. Identifying cases often occurs when a patient visits the doctor about symptoms of tuberculosis. At this time the Tuberculosis is active and contagious. When a person is identified in this manner the next step is to identify close contacts to the patient who may have contracted Tuberculosis. In addition to contact investigations, programs need to have mandatory testing sites, or routine screening sites for high risk populations.

Managing persons who have disease or who are suspected of having the disease.

This component of the Tuberculosis elimination program has 8 requirements. Below is an outline taken from the MMWP printed by the CDC. The first step assigns the staff members to specific tasks. The second part evaluates the patient and determines the proper treatment for a particular patient. Next comes the actual treatment. Once the therapy has begun the workers must monitor the patient to ensure that the medications are working properly without adverse

side effects. The health care worker must see to it that any barriers to effective treatment are removed or avoided. The health care worker may even need to provide incentives to encourage the patient's adherence to the treatment. Educating the patient and providing helpful social services to the patient are also part of the plan. Finally, a follow-up plan must be implemented to be sure the treatment cured the patient.

Identify and manage people with M. Tuberculosis.

This component is aimed at identifying individuals with latent Tuberculosis. This can be done by assessing the community and determining the prevalence of various groups. Once sub-populations at high risk for Tuberculosis infection are identified, the program should test them. After cases have been identified within the high risk groups it is essential to undertake a contact investigation. Contact investigations identify and test individuals who may have been exposed to Tuberculosis. Those who have come into contact with an infected individual may have become infected. A contact investigation is the best way to identify cases of Tuberculosis before symptoms appear. It should be noted that screening low risk groups should be avoided to save time, energy, and resources. In order to be effective in this component, it is necessary to work closely with as many local health agencies as possible. Health care workers of high risk populations should be educated and trained to screen for Tuberculosis.

Laboratory and diagnostic services.

All programs need to have equipment to test for Tuberculosis. Access to radiography equipment and trained workers to operate equipment and read the results are necessary. It would be best if results could be obtained within 24 hours of testing. Access to a mycobacterium laboratory is also a necessity. All programs also need services to assess drug toxicity and conduct monthly evaluations of all Tuberculosis patients. This component also strongly suggests that all Tuberculosis infected persons should be offered HIV counseling and testing. Staff members who work with Tuberculosis in populations at high risk for HIV should also receive HIV training.

Data collection and analysis.

The first recommendation in this component is effective communication among hospitals, physicians, health departments, and other health agencies in the community. All new Tuberculosis cases must be reported to the local health department. All programs need to keep a registry, or log, of all Tuberculosis cases in the community. This keeps track of check-ups, problems, and progress for individual cases. Even though this registry must be kept, all programs must maintain confidentiality of all patients, especially patients who are HIV positive. Programs must monitor and report all drug resistant and multi-drug resistant tuberculosis cases. A yearly report must be made to evaluate program effectiveness and determine program needs.

One important record that must be kept is a record of all of the deaths due to Tuberculosis. The program must evaluate each death and determine if it was preventable or not. All of the records and annual reports need to be forwarded to the CDC.

Training and education.

All staff members must be trained and their education must be continuously updated. It is the responsibility of the health department's program to monitor the knowledge levels of the physicians, nurses, workers, and other agencies in the community.

Conclusion

Conclusion

When I began researching this paper I had no idea what I would come across. I knew what Tuberculosis was and I was also aware that the number of Tuberculosis cases is rising. My goal was to understand why Tuberculosis was becoming a problem and what can be done about this problem.

I learned that Tuberculosis was slowly decreasing until the 1980's. During that time many health professionals and government officials felt that Tuberculosis was under control and it would eventually disappear. Attention and money switched from Tuberculosis to HIV/AIDS research. As a result of wide neglect, Tuberculosis is now making a comeback. This time, however, Tuberculosis is more complicated. Tuberculosis is complicated by drug resistant strains of Tuberculosis, HIV/AIDS, and migration. Developing nations that once may have received aid to control Tuberculosis are no longer receiving help. World leaders made the mistake of thinking that 'declining cases' meant 'we have fixed the problem.' Now developing nations have unnecessarily high morbidity and mortality rates resulting from Tuberculosis. Treatment programs all around the world are failing to maintain proper treatment regimens which has resulted in drug resistant Tuberculosis. Finally, patients infected with both HIV/AIDS and Tuberculosis are increasing. Doctors are still trying to define the connection between the two diseases.

If Tuberculosis had been eradicated years ago, or if public health professionals and worldwide leaders had persisted in their efforts to eliminate Tuberculosis, then the fight that the world is currently involved in would be non-existent. What is done is done. Now it is essential to attack Tuberculosis and all of the complications that go along with the disease. Treatment and education programs need to be implemented by every health department in the United States. Nations must bond together and fight Tuberculosis. Tuberculosis is something that can be controlled and even eliminated. Eradicating Tuberculosis is a realistic goal.

Bibliography

- Comstock, George W. "Tuberculosis: Is the Past Once Again Prologue?" American Journal of Public Health. 84 (1994): 1729-1731.
- "Estimates of Future Global Tuberculosis: Morbidity and Mortality." Journal of American Medical Association 271 (1994): 739-741.
- Frieden, Thomas P. "Tuberculosis Control and Social Change." American Journal of Public Health. 84 (1994): 1721-1722.
- Harris, H. William "Tuberculosis." Infectious Diseases, Fourth Edition. Philadelphia: J.B. Lippincott Company. 1989. 405-435.
- Iseman, Michael D. M.D. and Jeffrey Starke M.D. "Immigrants and Tuberculosis Control." The New England Journal of Medicine. 332 (1994): 1094-1095.
- McKenna, Matthew T. M.D., et al. "The Epidemiology of Tuberculosis Among Foreign-Born Persons in the United States, 1986 to 1993." The New England Journal of Medicine. 332 (1994): 1071-1075.
- Raviglione, Mario C. M.D., et al. "Global Epidemiology of Tuberculosis." Journal of American Medical Association" 271 (1995): 220-225.
- Small, Peter M. M.D., et al. "The Epidemiology of Tuberculosis in San Francisco." The New England Journal of Medicine. 330 (1994): 1703-1708.
- "Tuberculosis and Acquired Immunodeficiency Syndrome-New York City." Journal of American Medical Association. 259 (1988): 338-345.
- U.S. Department of Health and Human Services. Morbidity and Mortality Weekly Report (MMWR). Recommendations of the Advisory Council for the Elimination of Tuberculosis. Volume 44: Atlanta 1995.
- Zolopo, Andrew R. M.D., et al. "HIV and Tuberculosis Infection in San Francisco's Homeless Adults." Journal of American Medical Association. 272 (1994): 455-460.