Journal Assignment #3

The Global Impact of Tuberculosis

In this assignment, you will explore the impact of tuberculosis throughout the global community and research its devastating effects on local communities, economies, and understand what obstacles have been faced by healthcare workers in eradicating the disease. This assignment will involve research skills, oral and written communication skills, and technology skills and will help you, the student, become more aware of the global challenges encountered in battling such an ominous disease. Please make sure that you submit the journal assignment in a three-ring binder.

Part 1: Summary

In this part of the assignment, you will provide a short summary of tuberculosis and the disease process. You will need to address several questions in your summary that relate to tuberculosis and its impact on the respiratory system. The summary should be no longer than one page in length. Please make sure that if you use direct quotations in your summary that you use document these sources directly in your summary. These questions will include:

1. What is the name of the bacterium that causes tuberculosis, what organs does it affect, and what characteristics about this particular bacterium make it especially resistant to efforts to eradicate it?
2. How do humans become infected with tuberculosis and how is it transmitted from person to person?
3. What are the differences between the primary and secondary forms of tuberculosis?
4. What are the signs and symptoms of tuberculosis, who does it more commonly affect, and how common is tuberculosis infection in third world countries?
5. What types of treatments are available for tuberculosis in first world countries and in third world countries? What is the success rate of treating tuberculosis in places such as African countries?
6. What would cause certain forms of the tuberculosis bacterium to become drug-resistant? How prevalent are drug-resistant strains of tuberculosis around the world?

Part 2: Questions

In this part of the assignment, you will answer a few questions related to the topic of tuberculosis outbreaks around the world. You will have to perform external research using internet, book, and journal resources to answer these questions. Please provide the answers to the questions in the blanks provided.
(1) One of the biggest and most complicated obstacles that global healthcare workers have met in combating tuberculosis has been the emergence of drug-resistant strains of the bacterium. Just recently, Bill Gates met with Vice Premier Li Keqiang at the opening ceremony of a three-day meeting about drug-resistant forms of tuberculosis in Beijing. In conjunction with the WHO, Gates and Kquiang believe that the worst-affected countries have to begin implementing more advanced strategies in targeting these newly evolved forms of TB. Read the following link http://www.google.com/hostednews/ap/article/ALeqM5hd05HvBybrAN-y7t9o7WU4ftLr2QD979KEEO0 and answer the questions that follow it below.

(a) Although tuberculosis is a very ancient disease and has been treatable in the past, countries around the world are now facing a global healthcare crisis with the new resistant strains threatening the very core of their societies. What two “stronger” forms of tuberculosis have evolved and what characteristics about them have hindered efforts to destroy them?
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(b) What challenges have been faced in eradicating the drug-resistant forms of TB in each of the following countries: China, India, Russia, and South Africa?
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(c) The Bill and Melinda Gates Foundation plans to fund the TB China project which they hope will alleviate some of the problems faced in fighting drug-resistant TB. How many people will this TB China project cover and how many provinces will it affect? Also, how much money does it usually cost to treat traditional TB versus the drug-resistant form?
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(2) Global communities have faced devastating mortality rates with tuberculosis. The following link contains a pie chart that indicates the percentage of histologically and bacteriologically confirmed cases of tuberculosis in individual countries around the world. http://www.nationmaster.com/red/pie/mor_res_tub_bac_and_his_con-respiratory-tuberculosis-bacteriologically-histologically-confirmed.
(a) Which country has the highest mortality rate of tuberculosis that has been confirmed with histological and bacteriological techniques? ________________
What is the sum of the percentages contributed by Brazil, Egypt, Poland, and South Korea? _________________________________

(b) The following link contains a map of the countries around the world that have been affected by tuberculosis outbreaks.
http://www.nationmaster.com/red/graph/hea_tub_cas_per_100-tuberculosis-cases-per-100-000&b_map=1 Which country has the highest rank for number of tuberculosis cases per 100,000 and why do you think this country has a high incidence of TB?
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(c) Immunization against TB has proven to be effective; however, in recent years multiple-drug resistant (MDR) strains of TB have weakened the ability to immunize the public against the disease. Take a look at the following link.
http://www.nationmaster.com/graph/hea_tub_imm-health-tuberculosis-immunisation How many of the countries that have 99% immunization rates are located in Europe?
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Of the total number of countries with a 98% immunization rate, what percentage of those countries would be located in Africa?
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Of the total number of countries reported and ranked, how many have an 84% immunization rate? _____________ What percentage is this of all the countries reported?
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(3) In the global fight to control the spread of tuberculosis worldwide, the Working Group on New TB Diagnostics has developed and implemented into practice a wide array of accessible diagnostic tools to quickly diagnose TB and maintain control over the epidemic. Take a look at the following link:
http://www.stoptb.org/globalplan/assets/documents/SSP_DIAGWG.pdf and answer the following questions.

(a) What are the three objectives of the Partnership between “The Global Plan to Stop TB” and “The Working Group on New TB Diagnostics”?
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(b) What types of technologies does the partnership feel would comprise the “ideal toolbox” that would make simultaneous detection of HIV possible?
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Which of these technologies do you feel would more efficiently target secondary tuberculosis which involves cavitation and why?
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(c) In Table 25, the research and development costs are documented by category, year, and amount of dollars (in millions of $) that were spent for each category and subcategory. Which category received the highest percentage of funding for all years included in the table? _______________________________________

Suppose that during clinical trials of a particular new drug for TB, the credentials of a particular industry that is making the medication(s) needs to be checked in order to insure that a quality product is made. Which of the subcategories under the category “Clinical Trials” would this fall under? ______________________

How many $ (in millions) was spent in this subcategory for the year 2008? _____

(4) The Aeras Global TB Vaccine Foundation is a non-profit organization that currently is experimenting with breakthrough vaccinations against TB that will prove to be more effective, more affordable, and more accessible to people of all groups around the world. Read the following dialogue that is taken from the website for the Aeras Global TB Vaccine Foundation’s website: http://www.voanews.com/english/Africa/2009-03-31-voa28.cfm and answer the following questions.

(a) When was the first vaccination created against TB, what was its official name, and what were the drawbacks faced in utilizing it as a first choice for vaccinations?
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(b) Give a reason for why you think incidence of TB is higher in patients with HIV and why this is a recurrent problem in areas such as sub-Saharan Africa.
(c) The article mentions that the existing vaccination that is used, BCG, is a recombinant vaccine that involves an initial inoculation followed by a “booster” shot. Also, the authors agree that a recombinant vaccine “when given induces a very strong cellular immunity in humans”.


What types of immune cells would be operating in a cellular immune response, why is this type of response more effective, and what characteristics about a recombinant vaccine would make it the “ideal” candidate for the vaccine? (Hint: you may need to look up recombinant vaccines in order to answer the question).

(5) In May of 2007, the CDC in Atlanta, GA ordered that a private citizen be isolated and quarantined for being infected with a highly dangerous form of TB. This was the second time (first time was four decades ago) that the CDC exercised this privilege and took steps to prevent further spread of the multi-drug resistant strain. Here is the associated press’s article:


(a) Trace the steps of this individual beginning with his trans-Atlantic flight from Atlanta and ending with his isolation and quarantine back in a hospital in the Atlanta area.

(b) Between 1993 and 2006, how many cases of this extremely rare multi-drug resistant form of TB were reported in the US? ____________________________

(c) What is the name of this extremely rare strain of TB and what characteristics does it have that makes it particularly difficult to treat and eradicate?
Part 3: Research Sources

In this part of the assignment, you will attach all of the internet sources or photocopied pages from book sources that you used to perform your research. You will use these sources to write the summary in Part 1 and answer the questions in Part 2. There is no set number of sources that you have to have but the more sources that are printed off and attached, the higher your score will be for this part of the journal (See Rubric).

Part 4: Video Analysis/Interpretation

In this part of the assignment, you will watch a video that can be accessed through the following link:  http://www.youtube.com/watch?v=149H13ocPqw. After watching this video, please answer the following questions in complete sentences.

(1) What two problems coupled together in a synergist relationship are creating the perfect environment for new, more potent forms of TB (e.g. MDR and XDR) to emerge as potential threats?

(2) So far, the responses from civil societies to address the HIV-TB co-infection problem have been grossly insufficient. What two programs in India does the video indicate should be integrated to tackle the problem and what would be the potential benefits?

(3) Why would it be necessary to insure that all patients finish the complete course of treatment for TB?

(4) With early detection, the lethal combination of TB and HIV can be treated. How much money (US $) does the standard TB treatment cost? The standard TB treatment regiment and ART for HIV can be combined together if needed but what primary precaution must be taken?

(5) The video mentions the promising efforts of an emerging international group based out of the UK that will seek to facilitate awareness of TB and HIV in third world countries while at the same time promoting its spread. What does Baroness Lindsay Northover feel should be done with both conditions (HIV and TB) to successfully combat them?