Journal Assignment #2
Malaria Epidemics throughout the World

In this assignment, you will study malaria and how it has impacted several world regions and how its global impact has had devastating effects on the people and economies of the regions affected. 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 disease process itself and its ravaging effects throughout the world. Please make sure 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 the malaria and the disease process. You will need to address several questions in your summary that relate to malaria, its symptoms, its treatments, and its impact on world regions. The summary should be no more than a page to a page and a half long in length. Please make sure that if you use direct quotes in your summary that you provide the proper documentation of your sources. The questions that you need to address include:

1. What are the four types of protozoan parasites that cause malaria, what genus do they belong to, and what is the vector that carries these parasites?
2. How do humans become affected by the malaria virus and how is it transmitted? How long is the incubation period?
3. What is the main target for the malaria virus in the body and how does it alter the normal physiology of that target?
4. What are the signs and symptoms of malaria? What systems are in place in world regions to properly diagnose malaria?
5. What are some current medications that are used to treat malaria and how effective are they? Are there any non-medicinal treatments for malaria?
6. What regions of the world would be considered “at risk” areas for malaria? What characteristics would a particular region have that would classify it as an “at risk” area for the disease?
Part 2: Questions

In this part of the assignment, you will answer a few questions related to the topic of malaria epidemics 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) What are three advantages of using insecticide-treated mosquito nets in treating malaria and how successful have they been in preventing new cases in world regions where the disease is endemic?

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(2) In fighting the spread of malaria, many endemic countries have adopted combination therapies where several medications are used simultaneously. Below is a list of the combination therapies that the WHO recommends as treatment options.

WHO currently recommends the following combination therapies (in alphabetical order):

1. artemether/lumefantrine
2. artesunate plus amodiaquine (in areas where the cure rate of amodiaquine monotherapy is greater than 80%)
3. artesunate plus mefloquine (insufficient safety data to recommend its use in Africa)
4. artesunate plus sulfadoxine/pyrimethamine (in areas where the cure rate of sulfadoxine/pyrimethamine is greater than 80%)  
(\[http://www.rbm.who.int/cmc_upload/0/000/015/364/RBMInfosheet_9.htm\])

The following chart contains information regarding countries of the world where malaria is prevalent and the various combination therapies that they have utilized in combating malaria.

<table>
<thead>
<tr>
<th>Continent</th>
<th>Countries</th>
<th>Options</th>
<th>Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFRICA</td>
<td>Burundi, Cameroon, Côte d’Ivoire, Democratic Republic of the Congo,</td>
<td>AS + AQ</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Equatorial Guinea, Gabon, Ghana, Guinea, Liberia, Madagascar, Senegal,</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Sao Tome and Principe, Sierra Leone, Sudan (S), Zanzibar</td>
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<tr>
<td></td>
<td>Angola, Benin, Burkina Faso, Comoros, Ethiopia, Gambia, Guinea Bissau,</td>
<td>AL</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Kenya, Mali, Namibia, Niger, Nigeria, Rwanda, Uganda, South Africa (Kwa</td>
<td></td>
<td></td>
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<td></td>
<td>Zulu Natal), Tanzania, Togo, Zambia</td>
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<tr>
<td></td>
<td>Côte d’Ivoire, Gabon, Mozambique, Sudan (N), Sao Tome and Principe,</td>
<td>AL</td>
<td>2nd</td>
</tr>
<tr>
<td></td>
<td>Zanzibar</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mozambique, Sudan (N), South Africa (Mpumalanga)</td>
<td>AS + SP</td>
<td>1st</td>
</tr>
<tr>
<td>ASIA</td>
<td>Cambodia, Thailand</td>
<td>AS + MQ</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Bangladesh, Bhutan, Laos, Myanmar</td>
<td>AL</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Indonesia</td>
<td>AS + AQ</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Afghanistan, India (5 Provinces), Iran, Tajikistan, Yemen, Viet Nam</td>
<td>AS + SP</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Papua New Guinea</td>
<td>DP</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Philippines, Iran</td>
<td>AS + SP</td>
<td>2nd</td>
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<td></td>
<td></td>
<td>AL</td>
<td>2nd</td>
</tr>
<tr>
<td>SOUTH</td>
<td>Ecuador, Peru</td>
<td>AS + SP</td>
<td>1st</td>
</tr>
<tr>
<td>AMERICA</td>
<td>Bolivia, Peru, Venezuela</td>
<td>AS + MQ</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>Brazil, Guyana, Suriname</td>
<td>AL</td>
<td>1s</td>
</tr>
</tbody>
</table>

AS+AQ = artesunate + amodiaquine; AS+SP = artesunate + sulfadoxine/pyrimethamine; AS+MQ = artesunate + mefloquine; AL = artemether/lumefantrine; DP = dihydroartemisinin/piperaquine

http://www.rbm.who.int/cmc_upload/0/000/015/364/RBMInfosheet_9.htm
(a) How many countries are using artesunate + sulfadoxine/pyrimethemine as the combination therapy of choice? How many are using artemether/lumefantrine as the combination therapy of choice? Of the countries using artesunate + sulfadoxine/pyrimethemine as the therapy of choice, how many are using it as a 1st line of defense? 2nd line of defense?

(b) Included below is a graph indicating the number of cumulative countries using each of the combination therapies suggested by the WHO. Which of these therapies experienced the greatest exponential growth from 2003-2005? Which therapy has remained stagnant in the amount of countries utilizing it since 2000? In what year did the AS + MQ therapy peak and level out?

(c) What therapy seems to be the combination therapy of choice for all African countries documented in the table? What therapy is the second most popular combination therapy of choice for all Asian countries documented in the table? Which combination therapies employed by Asian countries are not in use at all for any South American countries listed in the table?

\[\text{Figure 1} \]

http://www.rbm.who.int/cmc_upload/0/000/015/364/RBMInfosheet_9.htm
(3) Included below is a map indicating the geographic distribution of malaria around the world taken from www.cdc.gov.

![Distribution of Malaria](image)

(a) Give four different reasons why malaria transmission will not occur even within subtropical and tropical regions.

(b) In warmer regions close to the equator, transmission of malaria tends to be stronger and more intense. Give an example of a country depicted on the map above located near the equator. Explain why malaria is spread year-round in these regions and why *Plasmodium falciparum* (the parasite that causes the most severe form of malaria) would predominate in these areas.

(c) In order for successful malaria transmission, the life cycles of the *Plasmodium* parasites and the *Anopheles* mosquito must be correlated in an environment that supports maximal growth of both parasite and host. What features of a tropical environment would encourage mosquito survival rate so as to allow proper time to for the parasites to complete their growth cycle?
(4) Name three factors that determine an individual person’s risk of contracting malaria if they plan to travel to a country that has previously been determined to be an “at risk” country. For each of them, indicate a way that the traveler could minimize the risk of developing malaria.
(a) __________________________________________________________________________
(b) __________________________________________________________________________
(c) __________________________________________________________________________

(5) Malaria has proven to affect multiple countries in multiple hemispheres around the world, including the Dominican Republic. The Carter Center, based on President Carter’s initiatives to eradicate diseases, recommended, as part of the International Task Force for Disease Eradication, that the two main parasitic diseases present on the island of Hispaniola, including malaria, become eradicated. Read the following article taken from http://www.haitiinnovation.org/en/2008/12/17/haiti-and-dominican-republic-urged-fight-mosquito-borne-diseases-together and answer the following questions.
(a) The Carter Center believes strongly that it may be possible to completely rid Hispaniola of malaria. What are four reasons why they think this is feasible?
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__________________________________________________________________________
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__________________________________________________________________________
(b) How much money did the Dominican Republic lose in tourism due to an outbreak of malaria in 2004?
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(c) What are three initiatives that the Carter Center plans to employ in targeting both malaria and lymphatic filariasis in Trou-du-Nord, Haiti?
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__________________________________________________________________________
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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=AGyUiQP1j2w](http://www.youtube.com/watch?v=AGyUiQP1j2w). After watching this video, please answer the following questions in complete sentences.

1. In addition to claiming lives, what other health problems have developed as consequences to malaria epidemics in these Central American countries?

2. The DDTGEF Project involves eight Central American countries that seek to promote malaria eradication and prevention. What are the eight participating countries?

3. What are the four components that must be present for successful malaria/parasite interactions?

4. What is the main idea and goal of the DDTGEF Project in vector control?

5. What is one of the main strategies employed in controlling malaria transmission?