Florida High Schools Model United Nations

FHSMUN 35

WORLD HEALTH ORGANIZATION

GLOBAL MALARIA PROGRAMME

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Introduction

Malaria kills one child every minute and nearly two thirds of a million people each year; the World Health Organization (WHO) estimated approximately 219 million cases of malaria worldwide in 2010, causing some 660,000 deaths.[1] These estimates represent a significant decline of 17% in the number of cases reported and a 26% reduction in mortality when compared to the year 2000[2] but it is also clear that national and global efforts must be accelerated and expanded in order to save hundreds of thousands of lives each year. Over forty percent of the world's population lives in malaria endemic and at-risk areas, with the 14 countries experiencing the highest malaria burdens accounting for approximately 80% of all infections.[3] Most of the victims are under five years of age and an estimated 90% live in Africa. Malaria also interacts with other highly infectious diseases, including HIV/AIDS, creating the possibility of coinfection and making each disease more virulent. Fortunately, however, malaria can be both cured and prevented; the October 2013 announcement by British pharmaceutical giant GlaxoSmithKline that is prepared to request regulatory approval for a malaria vaccine by the end of 2014 has generated considerable interest and optimism.[4] A joint World Malaria Report, issued by The United Nations Children's Fund (UNICEF) and the World Health Organization (WHO), vividly illustrates the successful impact of many control measures including insecticide treated mosquito nets (ITNs) and more accurate disease detection kits, both of which are having a positive impact on many countries around the world. Much remains to be done, however, to meet the Millennium Development Goals (MDGs).

At UN Headquarters in 2000, world leaders gathered and adopted the United Nations Millennium Declaration which set targets to reduce extreme poverty, achieve universal primary,

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[1] World Health Organization (WHO), "World Malaria Report 2012" 2012 p. xiv. http://www.who.int/iris/bitstream/10665/78945/1/9789241564533_eng.pdf

[2] WHO, "World Malaria Report 2012" 2012 pp. 60-61.

[3] The 14 countries with the highest malaria burdens are: Burkina Faso, Cameroon, Chad, Cote d'Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, India, Indonesia, Mozambique, Nigeria, Sudan, Tanzania, and Uganda.

[4] *BBC News*, "UK firm seeks to market world's first malaria vaccine" October 8, 2013.

realize gender equity, promote sustainable development, and reduce the incidence of highly infectious diseases by 2015. The Millennium Declaration became known as the Millennium Development Goals (MDGs), and now, thirteen years later, there are legitimate concerns that the MDGs might not be achieved by 2015. Among the eight main goals, combating HIV/AIDS, malaria and other highly infectious diseases, including tuberculosis (TB), is number six. The 2015 target for malaria is "to have halted and begun to reverse…the scourge of malaria."

Combating Malaria and Current WHO Recommendations

Eliminating malaria involves a two-pronged approach. First, further infection must be prevented, and second there must be available treatments for current infection. In the 2008 World Malaria Report, the World Health Organization (WHO) set out objectives for anti-malaria treatment policy which included ensuring rapid treatments, reduction in morbidity and mortality, providing treatments to pregnant women to reduce the effect on the fetus, reducing the mosquito breeding areas and preventing drug-resistance in malaria strains.

Vector Control

A key method of preventing malaria infection is 'vector control'. Vectors, in this case, are the mosquitoes, the vehicles of malaria infection. If infected mosquitoes can be prevented from coming in contact with humans, then the instance of malaria can be greatly reduced, or even eliminated. The prevailing methods recommended by various international agencies, including the World Health Organization(WHO), UNICEF, Roll Back Malaria (RBM) and the Global Fund to Fight HIV/AIDS, Tuberculosis, and Malaria, are insecticide treated nets (ITNs) and indoor residual spraying (IRS).

Insecticide treated nets (ITNs) are chemically treated bed nets which are highly effective when widely distributed. When used by many people in a community, even those without ITN's are far less likely to contract malaria. The use and distribution of ITNs, however, is varies widely between regions and countries. Within the African WHO region (the region with the largest high-risk population), the use of ITNs in urban areas varies from 0.8% in Swaziland (2007) to 79.2% in Madagascar (2011) , and no country has consistently met the World Health Assembly's 2005 goal of 80 percent distribution and use.[5] The production and distribution of ITNs now presents a cause for concern as the distribution of ITNs is projected to fall by over 60% from the high of 145 million ITNs in 2010 to 66 million ITNS for 2012.[6] Further complicating the production and distribution of ITNs was the announcement in November 2013 that the Global Fund had suspended future contracts with the two leading producers, Vestergaard Frandsen of Switzerland and Sumitomo Chemical Singapore, after both companies admitted to bribing Cambodian health officials.[7] It is a general consensus that young children and pregnant women comprise the immediate priorities for protection; in 2006, however, National Malaria Control

[5] WHO, "Global Health Observatory Data Repository" 2013.
Found at: http://apps.who.int/gho/data/node.main.583?lang=en
[6] WHO, "World Malaria Report 2012" 2012 p. 25.
[7] Donald G. McNeil, Jr., "Global Fund Suspends 2 Mosquito Net Makers" *New York Times* November 20, 2013.

Programs (NCMPs) reported that, on average, only 23 percent of children under the age of 5 slept under ITNs and 27% of pregnant women.

Another form of vector control is indoor residual spraying (IRS). After feeding, mosquitoes prefer to rest in dark cool places, usually indoors. There is a wide variety of IRS formulas which makes it highly adaptable to different countries which exhibit strains of malaria that are resistant to some insecticides. DDT is the most effective, lasting as long as 6 months and playing an important role in managing and avoiding vector resistance. There are guidelines and recommendations on the use of DDT by WHO and the Stockholm Convention, but generally DDT can be used for as long as necessary. Due to its high cost, IRS is usually used in targeted areas where there is high risk, due to larger gatherings of populations, or epidemics. Other vector control methods include dumping standing water (mosquito breeding habitat) and filling in marsh lands near high population areas. The World Health Organization, the UN Environment Programme (UNEP), and many national environmental regulatory agencies have warned about the need to prevent DDT from leaking into agricultural sectors and into groundwater tables.

Both ITNs and IRS are used in a wide range of areas, from low to high transmission. A problem exists with the costs of these measures and the distribution to those in need. ITNs are bulky and thus special attention needs to be paid to procurement, storage and transport. Mosquitoes breed and the highest rates of infection are during the rainy seasons, therefore ITNs need to be transported and prepositioned in areas which are hard to access during that season. WHO recommends a ratio of one ITN per two people at risk, but the current ratios are far lower. In addition, timing for IRS is important as several years of spraying is needed to be effective. IRS should not be implemented if a continuous supply cannot be maintained, there is not a monitoring system to confirm the effectiveness of the formula being used or spraying campaigns cannot be completed before the onset of the rainy season. Because it is so costly, it is usually not feasible to continuously spray for long periods of time and is more effective in areas of high transmission for purposes of immediate reduction of infection. They are also highly effective as a first line of defense against epidemics and in areas where transportation of ITNs is not feasible such as emergency situations like refugee camps and displaced populations.

Access to Medicines

The second phase of eliminating malaria is the treatment of infected persons and the prevention of infection through artemisinin-based combination therapy (ACT) and intermittent preventive treatment during pregnancy (IPT). The 2008 Millennium Development Goals Report states that “There has been less progress in treating malaria than preventing it.” No malaria endemic country has adequate access to malaria treatments; many do not have the capabilities to accurately diagnose malaria cases, especially in rural or isolated areas. Though National Malaria Control Programs (NCMPs) underestimate distribution numbers, due to missing data and non-uniform recording systems, they reported large increases of anti-malaria drugs in the period between 2001 and 2006. Of the 49 million doses procured in 2006, however, 45 million were for

African countries; the remainder was primarily reserved for other regions, especially the Eastern Mediterranean and Western Pacific regions.

Many populations suffering from malaria infections are difficult to reach during the rainy seasons while others do not have access to medical facilities that have the capacities to test for malaria. As a result anyone, especially children, who exhibits a fever is assumed to have malaria and is treated accordingly if treatment is even available. Field testing kits are available for the most common strains, though they are expensive and so are not commonly used. There is also, currently, a scale up in the distribution of rapid diagnostic tests (RDTs) which can diagnose malaria fairly accurately. RDTs are essential for recording the movements and changes of malaria parasites and their use provides essential information about which kinds of anti-malaria drugs are needed in different regions. The problem with RDTs, like ITNs, is distribution.

World Health Assembly resolution WHA60.18 (May 2007) discourages the use of artemisinin-based monotherapies, especially oral therapies, for malaria treatment for two reasons: 1)The use of a single drug to combat malaria created strains of the parasite that were resistant to the drug, thus rendering it useless; and 2)"Most patients do not complete the full course [7 day treatment]. On day three, the cure rates of all artemisinin derivatives are as low as 52%, leaving the parasite exposed to sub-therapeutic blood levels."[8] Instead, they recommend the use of Artemisinin-based Combination Therapies (ACT) as the first line of defense against the most common strain of malaria, *P. falciparum*. The combination of drugs effectively treats malaria in cases where the strain cannot be confirmed, and they also help prevent the development of drug resistance in the parasites. It is more expensive, but far more effective and has proven a great success in countries such as Vietnam, South Africa, and Eritrea where its use was closely monitored and well documented; malaria cases and deaths fell by more than 70 percent when combined with vector control measures. Due to strong funding from the Global Fund to Fight HIV/AIDS, Tuberculosis, and Malaria, and local governments, the use of ACT has accelerated and countries are more willing to adopt the strategy. Unfortunately, the use of ACT is still far below the target with only 3 percent of children exhibiting malaria symptoms receiving ACT.

Other anti-malarial drugs have been on the market longer, and there is a large problem with the distribution of fake drugs. Also, the lack of national infrastructures also impairs the effectiveness of the remedies as anti-malarial drugs must be taken regularly to eliminate the risk of infection. In addition, organizations such as Doctors without Borders (Médecins Sans Frontières (MSF)) are concerned about the availability of the raw plant material needed to scale up the production and distribution of ACT. MSF stated in a January 2009 letter to the Board of UNITAD that they believe not enough raw materials are being planted now to provide continuous future supplies and they fear that there will be a collapse of the ability to fight

[8] World Health Organization (WHO), "Malaria: Withdrawal of oral arteminsinin-based monontherapies" 2013. Found at:
http://www.who.int/malaria/areas/treatment/withdrawal_of_oral_artemisinin_based_monotherapies/en/index.html

malaria. To date, no program has been established to address this. In January 2011, the World Health Organization announced the development of the Global Plan for artemisinin resistance containment (GPARC), replete with WHO's recommendations for preventing the spread of artemisinin resistance; delegates to the WHO may wish to review this plan as well as the updates on artemisinin resistance that WHO published in September 2011 and April 2012.[9]

Special attention must also be paid to pregnant women as malaria has adverse effects on fetuses. WHO recommends the use of intermittent preventative treatments (IPTs) twice throughout the pregnancy, three times if the mother has HIV/AIDS. Currently only 33 countries, all located within the African WHO region, use IPT measures and, on average, only 18 percent of pregnant women receive IPT. The percentages vary widely across countries, but none have reached the WHA 80 percent coverage target.

An additional difficulty is knowing the amount of drugs to acquire for individual countries, especially since many treatments are not accounted for by NMCPs due to private treatments and lack of malaria testing materials. Because rapid diagnostic tests are not widely available, any child exhibiting a fever is treated for malaria resulting in wasted resources and inaccurate data on malaria trends. Also, the knowledge of the effects of treatments, while clear in small, well-managed areas, is inconclusive in areas where there are no reporting systems or malaria testing to determine the variety of parasite. This impairs the ability of international organizations to compile accurate data, and thus create and implement efficient and useful distribution programs. Efficient supply-chain management systems built on national levels are needed to ensure the steady flow of medications and testing equipment, and to promote the abandonment of the use of monotherapies. In addition, the surveillance of pregnant women, or the creation of a pregnancy registry, is necessary to study the effects of IPTs on pregnancy outcomes. These infrastructures are also needed to provide essential information on whether first-line drugs are still effective in combating severe cases and epidemics, to research and identify the gaps in knowledge, and to improve practices and delivery systems. All of these infrastructures and information accumulation are needed to assist countries in achieving the malaria reduction and elimination targets.

As with tuberculosis and a number of other diseases, increasing resistance to the most widely prescribed drugs is lessening the effectiveness of these anti-malarial drugs, especially artemisinin, and creating new strains of malaria that may be harder and more expensive to cure. While the increasing resistance to artemisinin is still in its relative infancy, the problem of parasitic resistance to anti-malaria drugs is not new. In the 1950s, parasites began developing resistance to chloroquine and now "chloroquine is now considered virtually useless against falciparum malaria in many parts of the world, including sub-Saharan Africa."[10] Adding to the

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[9] WHO, "Global plan for artemisinin resistance" January 2011.
Found at: http://www.who.int/entity/malaria/publications/atoz/artemisinin_resistance_containment_2011.pdf
[10] Thomas Fuller, "Spread of Malaria Feared as Drug Loses Potency" *New York Times* January 26, 2009.

difficulties faced by tens of millions of people in Africa is the fact that the vivax strain of malaria, already widespread in Asia, is now becoming far more common in Africa. Particularly alarming about this development is that approximately 95% of people in Africa lack the Duffy protein cells to which the vivax parasites attach; doctors and medical researchers previously believed that people who lack Duffy proteins were "nearly immune to vivax malaria."[11] Researchers believe that it may be decades before artemisinin would be ineffective against existing strains of malaria but the World Health Organization (WHO) and international community must not wait until such an eventuality comes true before developing newer anti-malarial medicines.

GlaxoSmithKline's October 2013 announcement that it had concluded clinical trials of its new vaccine with over 15,000 African children and that it would be petitioning the European Medicines Authority (EMA) for regulatory approval in 2014 and WHO approval by 2015 has generated considerable hope that millions of children will soon be protected from malaria. Developed over the past 30 years, and with funding assistance from the Bill and Melinda Gates Foundation, testing of the vaccine known as RTS,S "showed that 18 months after vaccination, children aged five to 17 months had a 46% reduction in the risk of clinical malaria compared to unvaccinated contemporaries. But in infants aged six to 12 weeks at the time of vaccination, there was only a 27% reduction in risk."[12] These results are certainly encouraging although there are understandably calls for a vaccine with an even greater efficacy.

Socio-Economic Effects of Malaria

Malaria is both a disease which afflicts the impoverished, and a cause of poverty. The treatment and prevention of malaria is highly costly, both to governments and private citizens. Families spend their incomes on insecticide treated nets, indoor residual spraying and anti-malaria drugs. Governments in Africa have large expenditures on maintaining health facilities and building new ones, public vector control, education and research. In malaria endemic countries, the disease accounts for up to 40 percent of public health care expenditures. Malaria affects both social and economic decisions of countries such as household decisions and travel which can deter economic growth. The WHO-sponsored Roll Back Malaria program was created in 1998 but it was not as effective as had been originally envisaged. In 2006, the WHO introduced the Global Malaria Programme[13] to provide greater technical leadership in combating malaria and to improve the financial effectiveness of WHO funds and outside contributions. Malaria not only debilitates and kills tens of thousands every year; furthermore, it slows economic growth in endemic countries by about 1.3 percent each year. Adding those effects over several years can account for some of the poor development in the African region. The WHO estimates that economic productivity lost to malaria in Africa alone amounts to approximately

[11] Donald G. McNeil, Jr., "A New Danger to Africans" *New York Times* November 18, 2013.
[12] *BBC News,* "UK firm seeks to market world's first malaria vaccine" October 8, 2013.
[13] Please see: http://www.who.int/malaria/

$12 billion annually.[14] This lost productivity is at least 5-6 times the estimated cost to African countries of the necessary resources to achieve international and WHO targets for malaria interventions and reductions.[15]

Malaria has other harmful economic impacts on endemic countries. For example, developing tourist industries falter due to the reluctance of travelers to visit malaria-endemic areas, undeveloped trade markets due to an unwillingness of others to travel or invest in malarious areas, and farmers and households only planting substance crops instead of revenue generating cash crops due to malaria's effect on the labor force during the harvest season.

African governments, in accordance with the Abuja Summit of 2000, have begun to make a stronger effort to combat malaria in an effort to decrease the drain malaria has on their economies. They have reduced or eliminated tariffs on insecticides, and made efforts to increase the efficiency of funding. In July 2008, the Republic of Congo announced that it would provide free anti-malarial medicines to children and to pregnant women but the Health Minister, Emilienne Raoul, "warned that the medicines were for the sick, and must not end up for re-sale on the streets or in other countries."[16] The private sector also has a large role to play in the reduction of malaria. Global Fund monies account for the primary funding of anti-malarial programs in the Eastern Mediterranean and Western Pacific, and though African countries have greatly funded their programs, the Global Fund accounts for 26 percent of funding. The African region has the most diverse donors but funding still falls well below target levels needed to provide continuous supplies and development. In the Americas, the European and the South-East Asian regions the governments are the main source of funds.

Private organizations and companies can also contribute vital resources for malaria control. Much-needed is capital, money, to scale up current programs and to create new ones in areas that have less access to proper medical care. Also, the role of research and development of new treatments may fall to private companies as the cost of research and development is very high, although it is clear that worldwide national governments either directly conduct or fund the majority of pharmaceutical research and development. If this research is primarily handled by private companies, it will be very expensive and therefore the resulting medicines may not be affordable in malaria endemic areas. Many companies have pre-existing distribution and networking channels going into and out of malaria ridden areas; these channels can be used for efficient transportation of life-saving medicines and preventative measures such as insecticide treated nets which are very bulky, and thus difficult to transport. Governments and private

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[14] World Health Organization (WHO), "Malaria, including proposal for establishment of Malaria Day: Report by the Secretariat" A60/12 March 29, 2007 p. 1. http://www.who.int/gb/ebwha/pdf_files/WHA60/A60_12-en.pdf

[15] The World Health Organization estimates that investments between $1.7 billion USD and $2.2 billion USD are needed annually to achieve the appropriate targets for Africa and between $3.8 billion USD and $4.5 billion USD are needed for global malaria reduction targets. WHO, "Estimated global resources needed to attain international malaria control goals" *Bulletin of the World Health Organization* Volume 85 Number 8 August 2007. Found at: http://www.who.int/bulletin/volumes/85/8/06-039529/en/

[16] *BBC News*, "Congo to give free malaria drugs" July 16, 2008.

pharmaceutical companies must also examine the possibilities of creating a successful vaccine to prevent people from becoming infected with malaria in the first place; national ministries of health and drug companies may wish to examine the initially promising results of the Bagamoyo study, named after the Tanzanian port city in which new malaria vaccination trials are currently taking place.[17] Researchers in the United States recently announced findings indicating that the human body naturally secretes certain chemical compounds that may potentially mask the mosquitoes' sense of smell, ultimately replacing commercial products, such as Deet, that may be losing their efficacy at repelling mosquitoes. Unfortunately, however, the researchers noted that "it would take many years before a new product would make it to market."[18] The World Health Organization and its international partners must also assist national governments, health professionals, and people suffering from malaria in ensuring that all drugs prescribed and sold to treat malaria are actually effective and properly regulated.[19]

Successful Malaria Interventions

Four notable malaria interventions occurred in Brazil, Eritrea, India and Vietnam. All four received significant funding and program assistance from the World Bank. Many factors contributed to the success of the programs, but they all had a few key factors in common; the tools used to fight malaria were diverse, they did not rely on only one or two methods of fighting the parasite, the decisions about medications and where to target were made with accurate and complete data which greatly improved the efficiency of the actions, all levels of government were involved in the process as well as communities, skilled persons were brought in from private organizations and the World Bank to assist with the management of programs on both national and sub-national levels, partner agencies were fully utilized and support was provided to them in the field, and the provision of sufficient financing from donors guaranteed the constant flow of resources to endemic areas.

Brazil had mostly eliminated malaria in urban areas by 1989 using aggressive indoor residual spraying campaigns, but in rural mines and new marshlands there was a sharp increase in malaria caused deaths. Brazil attempted a reorganization of its health sector which stalled. Brazil developed a new plan which would target high-risk areas. In doing so, they decentralized their public healthcare system and delegated responsibilities to local governments which generated local ownership and created a local capacity to fight malaria. The national government provided technical support and set the standards for treatment which remaining responsible for procuring supplies, but the local governments were able to efficiently distribute the materials and reduced malaria prevalence by 60 percent.

In Eritrea, the Ministry of Health established an aggressive new strategy after a large malaria epidemic in 1998. The World Bank invested 40 million dollars and provided technical

[17] *The Economist*, "A jab of hope" December 11, 2008.
[18] Melissa Hogenboom, "Mosquito 'invisibility cloak' discovered" *BBC News* September 9, 2013.
[19] Jill McGivering, "Tracking the fake malaria drug threat" *BBC News* June 7, 2007.

support through their Environmental Health Project. The support included providing expert staff for the Ministries program to develop it at sub-national levels. The program strategy was to reduce and better target IRS to the highest-risk areas and scale up rapid diagnosis and effective treatment of fever cases, environmental management activities, and ITN use. It also focused largely on disease surveillance. ITN use by children increased to 63 percent by 2003 and malaria incidence decreased by the same percent.

The strategy in India was to move from less effective eradication strategies to modern control methods. India already had local government programs in place, but they were highly ineffective. The restructuring of the malaria control program was slow at first, but with the targeted use of IRS and the introduction of ITNs malaria prevalence was reduced by 38 percent nationwide with higher success rates in many of the high-risk areas.

Vietnam had great success controlling malaria until about 1980, when there was a surge which reached 1.3 million cases nationally. This is attributed to decreased funding and the deterioration of the economy. The World Bank support provided major technical improvements and allowed for the replacement of old anti-malaria drugs with the new artemisinin-based formulas which the WHO regional office played a key role in distributing. The key to success in Vietnam was the use and involvement of all levels of government and communities. By 2003 Vietnam boasted a .06 percent mortality rate from malaria and outbreaks had ceased.

Conclusion

Combating the international scourge of malaria is absolutely critical for achieving the Millennium Development Goals (MDGs) and for ensuring that billions of vulnerable people are protected from a debilitating and far too frequently fatal disease. Improving the quality of life in malaria endemic areas is essential for improving global health outcomes and freeing millions of people to engage in sustainable development initiatives. The World Health Organization, in partnership with relevant international organizations, national governments, health professionals, and civil society representatives may realize critical gains in the fight against malaria if these same actors demonstrate the necessary political will, flexibility in funding, and commitment to optimal health outcomes for all potential victims.

Guiding Questions:

Is your country located in one of the malaria endemic zones of the world? If so, how has your government sought to prevent new infections and to treat patients already infected with malaria?

If your country is not in a malaria endemic zone, what forms of assistance has it offered countries that are suffering from persistent malaria outbreaks and/or pandemics?

How should the World Health Organization, partnering UN agencies, national governments, health professionals, and civil society representatives redirect current efforts to treat and/or eradicate malaria?

What medical breakthroughs or advances offer the most promise for eradicating malaria and possibly providing much needed vaccines to prevent new infections? What remaining clinical trials, regulatory processes, and/or production and distribution issues need to be concluded and/or resolved before an effective malaria vaccine can be introduced?

World Health Organization Documents:

World Health Organization, "World Malaria Report 2012" 2012.

World Health Assembly, Resolution WHA 64.17 May 24, 2011.

World Health Assembly, Resolution WHA 60.18 May 23, 2007.