

Controlling Malaria

Malaria is a not so uncommon infectious disease carried by female mosquitos. One man David Bowen, CEO of the Malaria No More organization dedicated to the eradication of Malaria in Africa by year 2015 stated “A child dies every minute of malaria, every single minute of every single hour of every single day.” This disease enters the circulatory system as a micro-organism in the saliva of the mosquito, which is transmitted into the body when the female mosquitos take the blood from other mammal’s bodies. It cause symptoms such as fever and headaches, and when left untreated it will eventually lead to death. In 2010 alone, malaria claimed 655,000 lives over the course of that year. However, the statistics are not all negative, since 2,000 malaria infection rates have dropped by 25%. Currently the fight against malaria is at a critical point, and one significant threat to the positive trend of the statistics is that misquotes have become resistant to different pesticides. Pesticide types can be put into a rotation to ensure that mosquitos that are currently genetically resistant are eliminated by different pesticides each year. New research also provides new methods and opportunities to control the spread of malaria by mosquitos. If new strategies like rotating pesticides, the genetic research of mosquitos and the development of environmentally safe methods are not soon implemented, the number of malaria related deaths will begin to climb at an alarming rate.

Seeing that mosquitoes reproduce quickly and multiple times a season, it is very easy for them to become resistant to new pesticides in little time, in some years documentation has shown it can take as little as three years. Pyrethroids are currently the only insecticides approved by the World Health Organization (WHO) for treating mosquito nets (nets people sleep under at night to keep away mosquitoes while they sleep). One solution to this problem is to change insecticides periodically to ensure the disease carrying mosquitos are under control. The other

benefit to this method is that after several years the old insecticide can be re-introduced and be more effective than if it were to be constantly used. In Columbia it has been documented that mosquitos regained susceptibility to pyrethroids after just five years of treatment with organophosphate (another pesticide) instead. The rotation of pesticides requires monitoring of data and a coordinated effort by public health officials to be successfully and to be carried out accurately. Maureen Coetzee, a medical entomologist at the University of Witwatersand in Johannesburg, South Africa was quoted saying, "In Africa malaria control means one person sitting in a room, and if he's lucky he's got a chair.": It does appear that insecticide rotation can be effective method of controlling malaria, however, to make this a reality a government would need organization and funds to make it a reality.

In the United States, the economy and University system allows for advanced research in many fields, which can help to develop new ideas and technology to help with many of the world's problems and help with other issues of lesser importance as well. Dr. Anthony James, a molecular biologist at the University of California, Irvine, has a goal to alter the behavior of malaria transmitting characteristics for the mosquito in order to prevent the spread of malaria and ultimately put an end to it and the lives it claims. When the mosquito eggs are laid and hatch, the new breed of mosquitos is resistant to disease, and when those mosquitos breed, their offspring are also resistant to disease. The plan is to someday release a colony of disease resistant mosquitos into the wild which will continue to breed and thrive with other wild mosquitos and therefore create a generation of disease free mosquitos. However, not everyone is in favor of the creation of genetically modified mosquitos, for various reasons including ethical considerations and otherwise. In Florida, the public health department had shown interest in purchasing genetically modified mosquitos from Great Britain to combat the West Nile Virus. Those who

oppose feel that genetic research is “dangerous” and tampering with original structure and the natural course of things is wrong. These people in opposition have obtained over 100,000 signatures to prevent the implementation of this project. There does appear to be potential for genetic research to eradicate malaria in the future however. Until the debate is settled over whether or not this kind of solution is ethical and moral or not, the research will continue with or without the execution of such program.

Research on new methods to kill mosquitos and stop the spread of malaria continues at pharmaceutical companies and universities all around the world. The original chemical used to stop the spread of malaria carrying mosquitos was kerosene. Kerosene was famously used to control the spread of the disease during the construction of the Panama Cana. Kerosene sits on top of stagnant water, thus cutting off the oxygen supply to the mosquito larva. Unfortunately, kerosene is both harmful to the mosquitos and to humans if ingested, meaning it is effective in controlling the mosquitos but also harmful to the environment. Any pesticide that will be sprayed to control mosquitos has to have no, or very minimal effects on human health to be able to be used frequently. Today research at Universities in our state of Michigan are helping to safely control the mosquito population. Michigan Tech, for example, the tracking of the little brown bat are helping to control the spread of white nose syndrome in the species. Stabilization of the population of the bat will ensure their contribution to controlling the mosquito population will continue, seeing as bats are one animal at ingested mosquitos. At Michigan State, Dr. Edward Walked has been researching microbial mediation of mosquito reproduction in aquatic habitats. This research involves controlling, studying, or selecting the microorganisms present in a larval growth area to give the larvae a lower chance at survival and achieving adulthood. Research such as this could lead to new larvacide formulas that could be used to treat standing water areas

without affecting the quality of water. At Wayne State University Associate Professor Dr. Ann Sojda is researching how mosquitos use different sense to seek out and find their victims. Dr. Sojda has begun studying the function of the mosquito's olfactory and auditory systems to determine how the used these parts of the brain to locate their potential host. If the mosquitos hearing and sense of smell can be tricked into not biting humans this would certainly reduce the number of malaria cases in the world affecting humans. It is through projects such as these that as a society we will come to solutions needed to control the mosquito population without harming the environment.

If the mosquito population is not controlled by environmentally safe methods being, rotation of pesticides, or genetic research, malaria will continue to spread and cause death in all over the world. In poorer parts of the world, if the same pesticides are used several years from now that are used today, malaria carrying mosquitos will eventually become resistant and once this occurs, the mosquitos will not be allowed to breed without anything to keep them from doing so and infection more people with malaria causing large amounts of people to die. When large numbers of people die due to geographical disease outbreaks, other problems will follow. Some of these being possible starvation, refugees, mass exodus, racial unrest, disease, rioting and war among with other possible other problems are all possible outcomes of malaria becoming a public heath disaster, like a plaque.

Situations such as those previously listed as possible outcomes are not limited to areas like Africa where the disease is currently prominent, the whole world is at risk of a malaria outbreak, everywhere there are mosquitos carrying malaria. In Greece, for example, malaria was eliminated in 1974, but the warm summer accompanied by five years of recession in Greece has combined to create a situation in which malaria has returned to Greece. 59 cases were reported in

2012, 48 of those being tourists. Therefore, roughly 11 cases are hypothesized to have occurred in Greece itself. It is alarming that a country which is part of the EU could be in such a situation to have 11 cases of malaria. If it can happen in Greece, then can the other economically ravaged countries in the EU be far behind Greece? Potentially, all countries with mosquitos and poor economic states are at risk for malaria outbreaks. But with research and action malaria may also one day be wiped off the planet entirely.

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