

The John M. Rezendes Ethics Essay Competition

THE ETHICS OF USING INDOOR RESIDUAL SPRAYING OF DDT TO CONTROL  
MALARIA IN UGANDA

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Malaria has been the greatest cause of human mortality since the Stone Age, with up to a half of all natural deaths since then attributed to the disease. (Guinness). Even today, malaria kills around 584,000 people a year, ninety percent of them in Africa (WHO). To state an oft cited and catchy statistic, every minute a child in Africa dies of malaria. (WHO) 3.2 billion people are at risk from malaria today, most of them in developing countries around the equator where the anopheles mosquito, the vector that carries malaria thrives.(WHO) Malaria parasites, scientific name plasmodia, are transmitted by the female anopheles mosquito, which feeds on human blood. It picks parasites from the blood of an infected person, and the plasmodia undergo further development in the salivary glands of the mosquito. It then bites a healthy person, and injects saliva along with the parasites into her blood vessel to stop the blood from clotting while the mosquito feeds. The plasmodia then infect the healthy person, and the cycle continues. (WHO)

The debilitating effects of malaria on developing countries such as Uganda are hard to overstate. Uganda loses 347 million dollars to malaria each year, and it is estimated to have knocked 1% off the country's annual economic growth (Musuuza). The economic cost of malaria to Africa's economy is estimated at 12 billion dollars in lost incomes per year, money the continent can ill afford to lose. (CDC) .This valuation ignores the social and human cost to Ugandan people which is harder to quantify but all the same very real.

Though malaria was once endemic over most of the globe, today it is confined to a tropical belt around the equator, encompassing some of the poorest countries in the world. This is not a coincidence: public health measures in developed countries have drastically reduced malaria in areas that were former hotspots, such as the Mediterranean and the Deep South of the United States (CDC). Draining swamps proved particularly effective: anopheles mosquitoes lay their eggs in stagnant water, and swamps are a great breeding ground (Malaria Site). Indeed, the

word “malaria” means “bad air” in Italian, from the time when it was associated with the bad air from swamps (CDC). But swamp draining was not enough to completely eradicate malaria, and the disease would still occur occasionally until another, extremely effective way to kill mosquitoes was invented.

Most measures taken to control malaria have focused on killing mosquitoes, and the insecticide DDT (Dichlorodiphenyltrichloroethane) has proven particularly well suited for this purpose. First recognized as an insecticide by Paul Heinrich Mueller in 1939, it was initially used to great effect during World War 2, to control ticks that spread typhus. After the war, it was adopted for use as an agricultural pesticide, and integrated into malaria eradication campaigns in areas with low to moderate transmission. This use was highly successful, and saw malaria eradicated in Taiwan, the Balkans and the American South, as well as dramatically reducing transmission rates in India and Sri Lanka. Unfortunately, DDT was never used on a large scale in Sub Saharan Africa, because it was judged that eradication was an unrealistic goal in tropical areas where the life cycle of the mosquito is unbroken by winter (CDC).

This essay shall make the ethical case for the use of Indoor Residual Spraying (IRS) of DDT in Uganda as an effective, cheap and safe way to protect the most vulnerable populations from malaria. I shall examine the pros and cons of using DDT for vector control, and I shall use the rights approach to ethics to demonstrate that DDT spraying is the best means to combat malaria in Uganda and while it has serious downsides, in the end it is the approach that is best able to preserve the inalienable rights of the most vulnerable people.

Considering all the potential advantages of using DDT to kill mosquitoes, why is there an ethical controversy about its use? Unfortunately, DDT is toxic to animals other than mosquitoes, including humans. DDT is fat-soluble and is not excreted from the body, accumulating in fatty

tissues instead (US Fish and Wildlife Service). Animals at the top of the food chain called apex predators are especially affected, as they accumulate the DDT from the flesh of animals they consume. Apex predators include species like pike, falcons, bald eagles – and humans. Famously, DDT causes eggshell thinning in birds, and almost led to the extinction of the bald eagle, America's national symbol. (US Fish and Wildlife Service). Less well known is the fact that in 1968, the average American was consuming 0.025mg of DDT in a day. DDT can potentially cause premature births in humans (Young). It must be noted though that DDT is rated as being only slightly to moderately toxic to mammals, and while it can cause cancer in mice, human instances of this happening are contentious at best. (Lopez-Cervantes et al).

While DDT was initially treated as a wonder insecticide and used liberally as a pesticide in agriculture, public opinion swung against it as its effects became better known. "The Silent Spring" by Rachel Carson, published in 1962 chronicled the detrimental effect DDT had on the North American ecosystem, including the widespread death of birds of prey. Despite intense lobbying by companies manufacturing the chemical, DDT was banned for agricultural use in the US in 1972. Most developed countries followed suit, culminating in the Stockholm Convention on Persistent Organic Pollutants, signed in 2001 and ratified by 174 countries, which bans the use of DDT in agriculture, and only allows public health use in accordance with the World Health Organization (WHO) regulations (UNIDO). The populations of bald eagles and peregrine falcons (two of the species most affected by DDT) made a dramatic comeback after use of DDT ceased in the US, largely justifying the ban in the eyes of environmentalists and the general public. (US Fisheries and Wildlife).

There was little moral dilemma in the ban of DDT for agricultural use in the US. After all, it was rightly perceived as a matter of big, faceless corporations trying to screw the little man

and the environment for a monetary profit. The situation in Uganda presents a different conundrum: DDT is to be used for Indoor Residual Spraying (IRS) to control mosquitoes, not as an agricultural pesticide. In Indoor Residual Spraying, insecticide is applied to the walls of people's dwellings where it stays effective for several months, killing mosquitoes (CDC). To be effective, DDT must be applied to more than 80% of households in an area. This use would put little DDT into the environment, as most of it would stay on the walls of the houses where it is sprayed, though some would inevitably find its way into people's bodies, in much lower concentrations than those that result from agricultural use (CDC). While the Stockholm Convention only bans the use of DDT in agriculture, and not for vector control, there are still regulatory barriers to IRS (Kron). A lot of people in Africa depend on agriculture (it accounts for 25.9% of Uganda's GDP) (World Bank), and several countries in the European Union refuse to import food crops that are contaminated with DDT (Food and Fairness Briefing). While in theory DDT used in IRS should not show up in agricultural products, in practice it often does. Crops are usually stored inside houses, where some contamination is inevitable and unscrupulous individuals are often tempted by easy availability of DDT to use some in agricultural pest control, rendering the whole country's produce unsafe by European standards. Traces of DDT also preclude the country's produce from receiving the organic label in Western supermarkets. (Kron). The case of Mr. Deo Acope, reported in the New York Times is an illustrative example of this. Mr. Acope, a successful organic farmer had his business ruined when organic food companies refused to buy his produce after the government began IRS in his village (Kron). The organic label is particularly important to developing countries because their agriculture is often inefficient, and sometimes the only way Ugandan farmers can compete on the world market is to deal in organic produce, produced without the use of man-made chemicals.

Opponents of DDT have often represented the contention over its use as one between people who care for the environment, and those who do not. This approach makes it easy for us to pick a side, but oversimplifies the issue at the expense of losing the full picture. I assert that this is actually a conflict between the interests of the (relatively) rich and the poor, and that the use of DDT actually helps the disadvantaged people in the poorest countries, and it is selfish to hinder its use, in the narrow interests of the rich. I shall also make the case that, in adherence to the principles of the rights and utilitarian theories of ethics, the use of DDT spraying should be promoted in developing countries as a valid means of controlling malaria.

It is important to realize that, even in tropical developing countries, malaria is overwhelmingly a disease of the poor. I am Ugandan myself and have lived there for eleven years, so I am fairly familiar malaria, having been sick with it about ten times, but never seriously. Why did I not become part of the statistic of the 2000 African children that die of malaria every day? Mostly because my family was fairly well off, and could easily afford the drugs to treat malaria with. These medicines are not terribly expensive: Artemisinin, which has always worked well for me costs around \$5 for a full dose. While this seems trivial to an American, in a country where half the people live on less than \$2 a day the cost is prohibitive. This leaves them the option of using less effective drugs such as chloroquine to which the mosquitoes have developed resistance (Rinaldi), or traditional herbal remedies like the *muluruza* shrub, which are little studied and may be dangerous to the health of the recipient. This non treatment of malaria predictably plunges the poor into a cycle of poverty: malaria reduces productivity, which reduces the money available to treat malaria or prevent it.

Currently, a lot of the opposition to DDT spraying in Uganda comes from the farmers whose crops are set to lose their organic certification should DDT spraying be carried out (Kron).

Indeed, a number have joined together to sue the government over DDT use (Kron). The attitude of Western consumers is partly to blame for this: they can safely ignore the effects of malaria in the far off developing countries, while demanding that their organic food should not have the slightest trace of DDT in it. From a purely self-serving perspective this makes sense: I had rather experience the minor inconvenience of malaria than risk the unknown effects of DDT. After all, malaria only cost me fifty dollars during my time in Uganda, with maybe twenty days spent sick in bed, all over a period of eleven years. But is this course of action morally and ethically right? Would we be so quick to oppose DDT spraying if we were at risk from malaria? Can we continue to ignore the deaths of hundreds of thousands of people, just to remove the slightest sliver of risk from our lives?

The purpose of this essay is to establish the basic tenet that the most fortunate members of society have a duty to respect the rights of the most disadvantaged. I shall draw from the rights theory of ethics to make my case that even the poorest of people have certain rights by the simple virtue of being human and the right to life is the most fundamental among them. It would be irresponsible to insist that the use of DDT is completely risk free, for science does not back that assertion beyond all doubt (Cohn et al). Instead, I shall strive to prove that with proper application of Indoor Residual Spraying, the risk to people and the environment can be reduced to the bare minimum, which is perfectly manageable. And what of that slightest danger, that will inevitably remain, despite our best efforts? I believe that this is worthwhile risk that we can afford to take, the same way we take a risk with the use of cars or nuclear power plants.

The rights approach states that the correct decision to take in an ethical dilemma is the one that respects the moral rights of the people affected. But what, exactly are rights? According to the Stanford Encyclopedia of Philosophy, rights are entitlements to (not) perform certain

actions or (not) be in certain states, or entitlements that others (not) perform certain actions or (not) be in certain states. It is also widely recognized that there are some rights that people possess by the sole virtue of being human. Although governments and international bodies can specify certain rights as being universal human rights that it is our duty to protect, I feel that morality must be grounded in something less fickle than human opinion at the time: the slave trade, the Holocaust and the crusades were all perfectly legal under contemporary governments' jurisdiction, but definitely not moral. A spectacular change in moral perception that I have witnessed in my lifetime is the growing acceptance of same sex marriage: according to Gallup, a polling agency, public support for same sex marriage in the United States grew from 27% in 1996 to 55% in 2014 (Gallup). It would be preposterous to believe that the morality of an action can change within eighteen years, or any other time period for that matter, so an immutable system of natural morals makes sense. John Locke, a 17<sup>th</sup> century English political philosopher talked of a concept of natural law that I find particularly compelling. According to Locke, all men regardless of wealth or power have the right to life, liberty and property, by the law of nature (Locke).

The concept of human rights is especially important in dealings between societies or classes within a society where power is unevenly distributed. This is because in the absence of inherent human rights which are universally respected, there is nothing to stop the more powerful party exploiting the less powerful one. Is this morally right? Surprisingly, several thinkers and societies throughout history have held the view that it is, calling this the right of conquest or right of superior power. In the Melian Dialogue the Athenian envoys famously say that "The strong do what they can, and the weak endure what they must." (Thucydides). Friedrich Nietzsche, a 19<sup>th</sup> century German philosopher dismissed sentiments like kindness and sympathy as a symptom of

“a slave morality”, to be ignored by the *ubermensch* (Nietzsche). I disagree with this world view, and believe that a moral decision should treat both parties involved impartially, regardless of their relative power or influence. This stems from my belief in an innate equality of worth of all human beings, a belief shared by John Locke and the French thinker Jean-Jacques Rousseau. In the *Second Treatise of Government*, Locke says that all people are equal in a state of nature, and should continue to be so under any government. (Locke). According to Rousseau, all laws should pursue the dual principles of liberty and equality, regardless of the relative wealth of their subjects (Rousseau). These views definitely make a case for the recognition of universal rights independent of wealth or power.

Having determined that even the most disadvantaged people have a right to life, it is evident that Indoor Residual Spraying of DDT would go a long way in protecting that right, even if it only stops a fraction of malarial deaths. But the benefits of using DDT will go much further than that: freed from the burden of malaria, farmers will be more productive, children will spend less time out of school and women will spend less of their limited time caring for the sick. It would clearly be immoral to deny these benefits to the most disadvantaged among us.

My invocation of the writings of Locke automatically provokes a question about a right that would be violated by the spraying of DDT, the right to liberty. After all, don't people have the right to be free of DDT based solely on their preference, regardless of whether its good effects outweigh the bad? It is a serious moral quandary, but I believe that in this particular case the right to liberty can and should be curtailed. Indeed, Locke having said that man's natural state is one of liberty qualifies his statement by saying:

*“But though this be a state of liberty, it is not a state of license. Though man in that state have an uncontrollable liberty to dispose of his person and possessions, yet he has no*

*liberty to destroy himself or any creature in his possession, but where some nobler use than its preservation calls for it.”*

I feel that Indoor Residual Spraying meets the criterion of nobler use, and is worth infringing on the right to personal liberty. To use a famous example of the limitations of a right, the right to free speech enshrined in the American Constitution does not mean you can shout “Fire!” in a crowded theatre, as this exercise of free speech could endanger other people. There are several precedents for people being exposed to chemicals against their will, with the public good in mind and backed by sound scientific research: a well-publicized example is the fluoridation of public water supplies in the US. While this violation of the people’s right to be free of DDT would be regrettable, upholding it would violate a more important right in this scenario.

The civil liberties objection to Indoor Residual Spraying of DDT is largely philosophical: a real and tangible effect of DDT is the harm it can potentially do to the environment. A combination of the rights and utilitarian approaches to ethics can be used to evaluate the morality of Indoor Residual Spraying despite the environmental risks. In the utilitarian approach, a course of action can be deemed to be moral if its positive effects outweigh the negative ones. Does Indoor Residual Spraying of DDT fulfill this condition? Clearly the lifting of the malarial burden from some of the world’s most vulnerable people is a huge argument in favor of the use of DDT. The eradication of malaria would save 660,000 lives and potentially result in a net economic benefit of 12 billion dollars a year (The Economist). On the flip side, damage could be done to the environment: it would be naïve to assume that Indoor Residual Spraying can completely prevent contamination, even though every effort can and should be made to minimize it. There is an inherent difficulty in using the utilitarian approach in an environmental issue: is the life of a man worth more than that of an eagle, or a mosquito for that matter? This is where the rights

approach can be used to supplement utilitarianism: the poor people in Africa have the right to life, and I believe that we have a duty to safeguard that right for our fellow human beings at any cost at which we would safeguard our own. Utmost precautions must be taken to minimize the environmental impact of DDT spraying, but saving lives is also a very important goal. While I condemn destruction of the environment to satisfy one's greed, could I judge a starving man who kills an endangered panda to survive?

There are alternatives to the use of DDT, which are unfortunately less practical. Currently, several other methods are being used to control malaria in Uganda, such as insecticide treated nets and provision of treatment to those affected. Some people and organizations, such as the Uganda Network on Toxic Free Malaria Control insist that these methods are sufficient without the use of DDT. While these methods are doubtless effective in fighting malaria, DDT has one very important advantage over them: cost. The cost of DDT spraying is much less than that of providing anti mosquito nets or malaria medicines to people (CDC). As might be expected, cost is a paramount factor in malaria control in cash strapped developing countries. There is another, less obvious advantage of DDT spraying: there is less room for people to get it wrong. A lot of the people in Uganda are illiterate, and the other methods can easily be misused. Medication is supposed to be taken for a set number of days, but many times people stop taking it after symptoms abate, but before the parasites are completely cleared from their bodies. Insecticide treated mosquito nets are, unbelievably, sometimes used for catching fish. I have seen this for myself. DDT, on the other hand only needs to be sprayed once, and stays effective on the walls of houses for up to a year (CDC).

Having made the case for DDT spraying in Uganda, we must ask ourselves what action can be taken. It is my belief that the foremost responsibility for combating malaria falls on the

people of Uganda, but the Western world can definitely play a part too. It would be a huge boon to farmers like Mr. Acope if the certification standards for organic foods were relaxed. This does not call for Western governments to lie to their people about the contents of their food. Rather, the regulatory authorities should explicitly state that trace amounts of DDT are present in the product with the caveat that small amounts are not particularly harmful, as attested by science. “I would say on the totality of the weight of the evidence, I could not conclude that DDT poses a significant risk of cancer,” says Len Ritter, chief executive of the Canadian Network of Toxicology Center (BBC). Organic food could then carry the extra label saying “No Africans were harmed in producing this food.” Humor aside, I am sure people would be willing to risk the miniscule risk of possible DDT related problems if they knew of all the lives the insecticide has the potential to save. Western aid agencies can play a role too: USAID and SIDA (the Swedish Aid Agency) have in the past been reluctant to fund DDT spraying, as this chemical is illegal in their countries (Bate and Tren). More funding would enable more homes to be sprayed, protecting more children from malaria.

On the sum of all evidence I believe that there is a clear moral case for the use of DDT in Indoor Residual Spraying in Uganda. Malaria is an easily preventable disease, and it would be a great injustice to let it continue killing people. It is imperative that we take a stand that respects the rights of everyone in society, especially the most vulnerable whose interests are often ignored. Only then can we say that an ethical choice has been made.

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