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Malaria is a disease often overlooked from the perspective of wealthier industrialized countries. Living in one of these countries, it becomes increasingly easy to forget about and disregard malaria as a disease one should worry about. While such dismissive thoughts towards the modern relevance of malaria may be understandable, this dismissive mentality is hugely misinformed to the perennial nature of malaria. This essay will provide a brief history of malaria and its significance throughout history. More importantly, attention will be brought to the very real, often overlooked, reality in which a growing counterfeit antimalarial industry perpetuates the existence and lethality of malaria, a largely preventable disease. In doing so, various causes for the growth of this industry will be discussed, as well as a plethora of consequences this industry causes and amplifies. The continual growth of this industry leads to the perpetuation of malarias existence and a multitude of issues that can and will extend beyond the current regions most affected by malaria.

Malaria is a disease that has continually burdened society for thousands of years. In fact, according to the United States committee on the economics of antimalarial drugs, Malaria has been dated back so far as ancient Mesopotamia times (roughly 3500 BC) and has been infamously written about across the globe since then.[[1]](#footnote-1) While malaria has plagued society for thousands of years, it still continues to be a global issue. In 2020 alone, the CDC estimates there were “241 million clinical episodes, and 627,000 deaths”, in which 95% of the deaths occurred Africa.[[2]](#footnote-2) Further, malaria has claimed a staggering 150 million to 300 million lives ( 2-5% of all deaths) in the twentieth century alone.[[3]](#footnote-3) The CDC itself was created in 1946 in order to combat malaria, in which a “war” on mosquitoes was waged.[[4]](#footnote-4) The process by which malaria spreads is as follows: a parasite grows inside of a human and multiplies to the point of entering the blood; a mosquito then feeds on this human and picks up the parasite; this parasite grows inside the mosquito and creates a new parasite that enters the next humans the mosquito feeds on; this new human host becomes infected and the cycle continues.[[5]](#footnote-5) Climate is also a determining factor in the successful transmission of malaria. Mosquitoes can only survive in areas warm and plentiful with rain, hence part of the reason why African regions South of the Sahara continue to be most at risk.[[6]](#footnote-6) The most deadly strain of malaria, P. Falciparum, is predominant in this large geographic area South of the Sahara, and has even been speculated to be a contributing factor in the fall of Rome.[[7]](#footnote-7) Coupled with this regions climate and infrastructure, a geographic perfect storm is created in which Malaria flourishes and wreaks havoc upon those living there. Despite modern advances in medicine largely eliminating malarial threats in many infrastructurally developed and moderately temperate countries, malaria is a significant problem to nearly half of the global population. Malaria continues to be an issue due largely to the development of a counterfeit antimalarial industry.

Manufacturer greed is at the heart of the counterfeiting industry. Unquestionably, the notion to increase profit margins is omnipresent within all industries, and the profitability of counterfeiting is very high. Given the high demand of malarial treatments, it is no wonder opportunistic manufacturers exploit it. Dr. Elizabeth Pisani, author of, “WHO Global Surveillance and Monitoring System for Substandard and Falsified Medical Products,” mentions that low cost, high sales volume medicines are often overshadowed in coverage by falsified high-price medicines, despite the WHO surveillance database reports focusing on lower cost and high volume medicines, like antimalarials.[[8]](#footnote-8) One particularly revealing example is provided. There is a specific green leaf logo associated with quality antimalarial medications and this logo is widely recognized in Africa. Knowing this, those with the capacity to falsify, did. Fortunately enough, one batch of falsified medicine was seized after customs officials discovered them inside of speakers aboard a shipment of goods from southern China. 33 million doses in total, all of which were packaged with the green leaf logo, were lab tested and found to contain none of the expected ingredients. In other words, these ‘medications’ with lower relative costs, would have been useless to a patient suffering from malaria.[[9]](#footnote-9) Such a high quantity of falsified medications seized in this example is particularly revealing of the true potential scale of this industry. Importantly, this is not an isolated incident, as similar falsified products were found less than a year later about 1200 miles north of this bust and the same drug has been reported in eighteen other countries.[[10]](#footnote-10) Clearly, this issue is not an isolated incident and despite the 33 million illegitimate doses found, there were many other counterfeit products finding their way into circulation through different means. Part of this can be attributed to weak regulations.

Inadequate international regulations contribute to counterfeiting practices. Due to autonomous governing abilities, harmonized international standards are difficult to establish. In Quique Bassat et al. article, “Combating poor-quality anti-malarial medicines”, they describe one such challenge international regulators face. Due to the increased interconnectedness of global trade, medical products are able to be manufactured in one or multiple countries, packaged in others, and distributed to various countries with limited international oversight.[[11]](#footnote-11) In effect, medical products passing through a high number of hands present a plentitude of opportunities for “mistakes, bad practice and unethical activity”.[[12]](#footnote-12) Intuitively, this will also lead to considerable challenges in holding accountability for errors, whether intentional or not, and presents great difficulty at implementing any sort of harmonized regulatory standards. Further, in Kaliyaperumal Karunamoorthi’s article, “The counterfeit anti-malarial is a crime against humanity”, he describes an estimate from the WHO claiming that out of 193 member states, only 20% have well developed drug policies/law enforcement agencies, 50% have varying levels of regulations, and, “30% have no medical regulation in place” at all.[[13]](#footnote-13) Given this estimate, the fact that only 20% of 193 member states are said to have proper regulations, reveals the ease at which regulatory inadequacies are able to be exploited by counterfeiters. On a final note of inadequate regulations, a French company produced and distributed 8 million doses of subpotent antimalarial medications over the course of a single year. The counterfeiter’s punishment ended up only being a 110,000 euro fine and two pharmacists received a year or less of suspended prison time.[[14]](#footnote-14) Such a minuscule fine and prison sentence for only two members involved is undeniably incapable of being able to deter criminal activity, and this example shows that partaking in this industry can be relatively low risk. What is not low risk though, is the many consequences caused and amplified by this industry.

Poverty is perpetuated by the existence of the antimalarial counterfeiting industry. It is not coincidental that the areas most affected by malaria today are in regions with some of the highest levels of poverty. Because the majority of victims belong to lower socioeconomic backgrounds, they are more inclined to seek out cheaper treatments, even from unlicensed suppliers.[[15]](#footnote-15) While seeking out cheaper alternatives is not specific to only those in lower socioeconomic situations, their options for more expensive (likely more effective) treatments is much more limited than those not in their situation. As such, being in an impoverished situation predisposes individuals to lower quality healthcare options due to higher costs being associated with better treatment. Furthermore, counterfeit medications will ultimately cost individuals more in the long run. Since ineffective medicine was purchased, they will not be cured and they will have to end up seeking out proper, more expensive treatment.[[16]](#footnote-16) Potential adverse reactions to the counterfeit products, or malaria complications that occur due to prolonged infection, will also increase cost for an individual. In Awash Teklehaimanot and Paola Mejia’s article, “Malaria and Poverty”, they even suggest that there is a dual correlation between malaria and poverty. They claim poverty, “sustains the conditions where malaria thrives, and malaria impedes economic growth,” keeping communities in reinforcing cycles of poverty.[[17]](#footnote-17) Logically, this correlation is further accentuated when considering the aforementioned example of procuring cheaper (often counterfeit) treatments that can prolong infection and create adverse reactions to the fake medicine. Therefore, adding to their claim of dual correlation, the counterfeiting industry exacerbates the poverty levels in these malaria affected regions, leading to even more issues.

Childhood morbidity and mortality is significantly amplified by antimalarial counterfeiting. Despite malaria being preventable and curable, children are disproportionately at risk, often due to weaker immune systems and poverty. The WHO claims that of the 95% of malaria death occurring in Africa in 2020, children under the age of 5 accounted for 80% of all those deaths.[[18]](#footnote-18) Extrapolating this, one can calculate that this equates to around 475,000 deaths of children under five in 2020 in these regions. Similarly high child mortality can be assumed per year as well. One estimate puts this into even better context, estimating that in Africa, malaria kills one in every twenty children under the age of five.[[19]](#footnote-19) Such a high child mortality rate is somewhat unfathomable from the perspective of more industrialized nations, and those who have largely eliminated malaria. Further, this statistic becomes even more disconcerting when considering that malaria alone is attributable to causing this one in twenty statistic, without mentioning the multitude of other potential factors. Counterfeit antimalarials have been estimated to account for up to 450,000 preventable deaths per year.[[20]](#footnote-20) With such a large number of these deaths being preventable if proper treatment was administered, it could be assumed that for this industry to dissolve, malaria related deaths would trend downward substantially. This would ultimately lead to a reduction in malaria’s global burden and help increase child survivability in these malaria endemic regions. If, however, this industry is allowed to continue and thrive, dire consequences could ensue beyond that of those in malaria endemic regions.

Resistance to antimalarial treatment is bound to occur if counterfeit products are allowed to continue circulating. Treatment resistance is an issue that extends beyond just the areas currently impacted by malaria, and is instead a global problem quietly brewing in the areas impacted by the counterfeiting of antimalarials. Pisani refers to a report estimating that in low and middle income countries in Africa and southeast Asia, “one medicine in 10” is below quality standards.[[21]](#footnote-21) This estimate is staggeringly high and indicative to the prevalence of the counterfeiting industry in these regions. Substandard antimalarial medication specifically, threatens to promote resistance to currently effective treatments, as the malaria parasite is able to evolve to develop resistance.[[22]](#footnote-22) Resistance has already been reported in some countries and if it becomes globally widespread, it can make malaria “impossible to treat” even in well regulated, non-endemic countries.[[23]](#footnote-23) Given the 1 in 10 estimate, it would be remiss to disregard the significance of such a high percentage of substandard medicines present in the large range of countries this estimate pertains to. Further, given the ease of global travel, the dissemination of mutated malaria could occur extremely rapidly, resulting in an impending global issue once more.[[24]](#footnote-24) Thus, it is imperative that strides be made in order to crack down on counterfeiting practices. Otherwise, malaria may become a global problem once again instead of being endemic and mostly isolated to locations rife with poverty.

Countries must see this industry as problematic to the world as a whole and not just to malaria endemic regions. This is an essential first step in the prevention of global ramifications from occurring. For malaria to not be controlled in its current endemic regions, the potential for a thriving counterfeiting industry will continue to be present. The greed of counterfeiters is largely supported by people’s inclination to procure cheaper medicines for treatments they need, where lower prices outweigh considerations of quality. This is often further escalated by the majority of malaria sufferers being impoverished and simply unable to afford proper treatment. Because poverty cannot be solved simply, other methods must be implemented to combat the counterfeit antimalarial industry. Unquestionably, stringent punishments and harmonized regulations that promote supply chain checks/accountability should be implemented. These would serve to deter counterfeiters by making it more difficult for their products to go successfully unnoticed, and would lead to higher risk of severe punishment. Unfortunately, harmonized regulations may be too idealistic or expensive to successfully implement, but it should be a goal so as to better healthcare for society as a whole. Left unchecked, the counterfeit antimalarial industry will perpetuate the existence of malaria indefinitely despite it currently being a preventable disease when coupled with proper infrastructural support that is often lacking in malaria endemic regions. Allowing malaria to continue to plague these regions will cause a plethora of problems that can end up affecting everyone. They can, however, be avoided and minimized if action is taken now and resources are dedicated to stopping it.

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5. Only a specific mosquito, female Anopheles, is capable of spreading malaria. Interestingly, the parasite does not harm the mosquito. The new parasite created is called “sporozoite”. Any new mosquitoes that feed on an infected person will get the parasite and spread it to other humans as well. It is not spread from people to people. “Malaria,” https://www.cdc.gov/parasites/malaria/index.html> (accessed 10 March 2022). [↑](#footnote-ref-5)
6. IBID [↑](#footnote-ref-6)
7. IBID; Institute of Medicine (US) Committee on the Economics of Antimalarial Drugs, “A Brief History of Malaria.” [↑](#footnote-ref-7)
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19. Kaliyaperumal Karunamoorthi, “The counterfeit anti-malarial is a crime against humanity,” 6. [↑](#footnote-ref-19)
20. IBID, 7. [↑](#footnote-ref-20)
21. Elizabeth Pisani, “WHO Global Surveillance and Monitoring System,” 15. [↑](#footnote-ref-21)
22. Substandard drugs are genuine drugs that either fail to meet quality specifications or degrade over time within the shelf life recommendation. This differs from falsified drugs, which are defined as defined as being deliberately and fraudulently mislabeled, which can theoretically contain “correct, wrong, insufficient” amounts of active ingredients. While both are individually problematic, for simplicity, and due to the difficulty at distinguishing between deliberation and error, these two categories have been grouped together when discussing “counterfeit” drugs throughout the essay; Quique Bassat, *et al.* “Combating poor-quality anti-malarial medicines,” 2. [↑](#footnote-ref-22)
23. Resistance develops because of treatments having a fraction of active ingredient which only destroys some pathogens. The surviving ones are then able to mutate to survive low doses of medicine and eventually develop full resistance. Elizabeth Pisani, “WHO Global Surveillance and Monitoring System,” 6. [↑](#footnote-ref-23)
24. IBID, 6. [↑](#footnote-ref-24)