

MALARIA

"Prevention is better than cure" - Desiderius Erasmus (1466-1536)

Over many centuries of human existence, one infectious disease has been responsible for more fatalities and misery than any other – malaria. It is still rife today, with 300 million cases a year, despite a cure (quinine from the bark of the cinchona tree) having been found in Peru in the 1600s and despite the discovery in 1897 that it was carried by mosquitos and not "bad air" (*mal aria* in Italian). Sonia Shah, a journalist with a lifelong interest in malaria, posits three main reasons for the continued existence and prevalence of malaria.

The first reason is scientific. The protozoan parasite plasmodium that causes malaria is not only complex, but also devious. The pathogen is unusual in that it spends half its life in the gut of a cold-blooded mosquito and the other half inside a warm-blooded person. It metamorphoses seven times during its life cycle, presenting a different physiology at each stage, so a drug designed to attack the parasite in one phase may be ineffective in the other six. It can also remain dormant in the human body from days to decades. The vector for plasmodium is the anopheles mosquito and, as it is known that mosquitos generally breed in wet habitats, it would seem logical to carry out an extermination campaign directed at these. The problem is that different species of anopheles prefer different environments. Dirty stagnant water is an obvious target, but some prefer saline water and others breed in fresh, flowing water. Different species

of anopheles mosquitos have different habits, too. Some remain exclusively outdoors, others are a menace indoors, while some species are not fussy at all. Although mosquitos are mostly associated with warm humid weather, some hibernate (with their parasites) through northern winters.

Malaria poses an enormous economic problem as it thrives in many of the world's poorest and most remote communities. There is a vicious but almost inescapable malaria-poverty cycle. Poor people do not have the resources to protect themselves from the mosquitos and malaria tends to hit hardest when farmers should be out harvesting their crops. Even if an affordable and effective vaccine were available, there is no infrastructure in these places to effect delivery – no roads, no electricity (for refrigeration), no clinics and no clinicians.

The third challenge is cultural. In malarious regions, this potentially lethal disease is 'normal' just as getting a cold or flu in winter is normal for people who live in temperate zones. As Sonia Shah points out: "if people think it's normal to have malaria, then how do you get them to run to the doctor to get diagnosed, to pick up their prescription, to get it filled, to take the drugs, to put on the repellents, to tuck in the bed nets?" assuming, of course, these recourses are available.

Taken together, the scientific, economic and cultural challenges generate a huge, paralysing political problem for the governors of malarious territories. Thus, the main assaults on malaria have been initiated by outside groups. The first large organised eradication campaign was begun in the 1950s by the U.S. State Department using DDT which they sprayed liberally everywhere, dousing human dwellings, mosquito breeding grounds and crops. Although the majority of mosquitos perished, those that survived the chemical bred new generations of mutated mosquitos until, by the mid-1960s, DDT-resistant mosquitos were everywhere. The World Health Organisation (WHO) renewed the chemical assault but targeted only the parasite this time. They had developed a synthetic antimalarial drug, chloroquine, which they distributed in parts of South America, Asia and Africa. The dissemination (as an addition to common table salt) was prolific and as it turned out reckless because, a few generations of plasmodium later, mutant parasites emerged and proliferated throughout the world.

Previously, many people living in societies plagued by malaria had developed partial immunity to the disease through being exposed to it and surviving. Now, however, owing to years of freedom from illness brought about by the DDT and chloroquine crusades, everyone was vulnerable and the death toll was huge. Since the late 1990s, a new fight has begun. This time, sidestepping the scientific and economic challenges by using a relatively inexpensive and practical instrument – insecticide-laced mosquito netting – the problem is overcoming the specific habitat whether it be fresh or brackish, stagnant or flowing water. Anything that reduces mosquito longevity by removing breeding facilities or exposing them to predators could effectively reduce malaria transmission because the plasmodium parasite does not become infective until the end of a 7–12 day cycle of development.

Complete the notes below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Write your answers in boxes 1–8 on your answer sheet.

The fight against Malaria

- Age-old disease still widespread today.
- 17th century – **1** discovered to effectively treat malaria
- 19th century – mosquitos revealed as the carrier (not *mal aria*)
- 3 problems to overcoming malaria:
 1. scientific
 - plasmodium pathogen: **2** and tricky; lives in both mosquito (cold-blooded) and human (warm-blooded)
 - 7-stage life cycle; alters its **3** during each phase
 - ability to stay **4** for a short or long time
 - anopheles mosquitos like watery places for reproduction – should be focus for **5**, but different species favour different kinds of water
 - different habits: most like it hot, but some can **6** in cold weather
- 2. economic
 - malaria often occurs in poor places without any **7** to allow distribution of treatment
- 3. cultural
 - malaria, although life-threatening, is considered **8** by those most likely to get it
- all these problems add up to a fourth, political challenge

TRUE
FALSE
NOT GIVEN

if the statement agrees with the information
if the statement contradicts the information
if there is no information on this

- 9 DDT failed to kill all the mosquitos that were sprayed.
- 10 The WHO tried to kill mosquitos using chloroquine.
- 11 After the use of DDT and chloroquine, some people became immune to the disease.
- 12 People in malarious areas refuse to use the bed nets.
- 13 One aim of the environmental approach is to shorten the lives of mosquitos.