DDT is back: let us spray!

No book, including The Protocols of the Elders of Zion, has killed more people than Silent Spring. It has done far more damage than DDT ever did. We hope its pernicious influence is finally at an end. (1)

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We must take a position based on the science and the data. One of the best tools we have against malaria is indoor residual house spraying. Of the dozen insecticides WHO has approved as safe for house spraying, the most effective is DDT. (2)

Arata Kochi, WHO

Yes, DDT is back. In September, The World Health Organization held a press conference to promote the widespread use of DDT in Africa. Dr. Arata Kochi, head of the WHO malaria program, assured the world that DDT is not only the most effective insecticide against malaria but also posed no health risk when properly used. “Expanding its use is essential to reviving the flagging international campaign to control the disease,” he said (3).

The WHO announcement marked the end of a tough campaign by public health officials and malaria experts who had argued for years that DDT was a necessary public-health weapon in poor tropical countries. The arguments were formulated in 1996 by Amir Attaran of Harvard University’s Center for International Development (4). After hundreds of physicians the world over had signed a petition urging resumption of DDT spraying, Attaran concluded that indoor residual house-spraying with DDT was “an inexpensive, highly effective, practice against malaria. . .the quantities involved are minimal (2g/m²) unlike agricultural uses which inject tons of DDT into the outdoors.” For the amount of DDT used on a cotton field (levels referred to by Rachel Carson in Silent Spring) “all the high risk residents of a small country can be protected from malaria (4).” And DDT is not only effective against the mosquito vectors of malaria, it is equally robust at stopping other arthropod-borne killers such as dengue, yellow fever, sleeping sickness, and typhus. It has played a major role in 20th century history.

DDT was first introduced to the world by Swiss chemist Paul Hermann Müller (1899–1965) of Geigy AG. Müller passed its secret to the Allies towards the end of World War II and wherever they employed the pesticide, arthropod-borne diseases were eradicated. Lacking the pesticide, German soldiers died of typhus by the thousands, their prisoners in flea-ridden concentration camps by the hundreds of thousands: typhus was the second leading cause of death in the camps (5).

Müller was awarded the Nobel prize in Physiology or Medicine in 1948 for his “discovery of the high efficiency of DDT as a contact poison against several arthropods.” The full citation gives him proper credit: “DDT has been used in large quantities in the evacuation of concentration camps, of prisoners and deportees. Without any doubt, the material has already preserved the life and health of hundreds of thousands (6).” Shortly thereafter, DDT became available worldwide and was successfully employed against other arthropod-borne diseases, most notably, malaria. DDT helped to eradicate malaria from the developed regions of the world (the United States, Europe) and to lower its incidence by over 99% in others (Sri Lanka, India). In South Africa’s KwaZulu-Natal province, malaria epidemics before DDT killed more than 22,000. By 1973 after DDT, South Africa recorded only 331 malaria cases in the entire country; in 1977, only a single death was reported (7). Malaria was on its way out in Sub-Saharan Africa.
And then came the political fallout from Rachel Carson’s 1962 best-seller, Silent Spring, a passionate plea for a clean earth (8). Rachel Carson (1907–1964), a fine naturalist and long-time marine biologist at Woods Hole, called popular attention to the effects of DDT on the eggs of raptor birds and seashore life. She won public acclaim for her splendid prose and even greater public sympathy for her poignant situation. Carson’s cri du coeur for an end to chemical pollutants was written as she was dying of breast cancer:

...chemicals have the power to kill every insect, the good and the bad, to still the song of birds and the leaping of fish in the streams, to coat the leaves with a deadly film, and to linger on in the soil. Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life? They should not be called “insecticides” but “biocides.” (8)

She was correct, of course, and her indictment of the agricultural/industrial complex was the beginning of modern ecological wisdom. By the mid 70s, the WHO dropped its DDT program worldwide, having been convinced by Carson’s followers that indiscriminate agricultural use of DDT, especially in developed countries, had polluted soil and stream and ocean. By then, millions of tons of DDT had been spread over farmland and forest, suburb and seashore. A generation after DDT was banned, legitimate questions remain as to whether low levels of environmental DDT can stunt the fertility, growth, and development of creatures great and small (9).

**DDT IS OUT**

Sadly, by the 70s, the baby of disease control had been thrown out with the (polluted) groundwater. DDT was banned in most corners of the earth, with unintended consequences falling on the poorest countries. Thanks to DDT, countries such as Zanzibar had reduced the percentage of populations infected with malaria from 70 percent in 1958 to under 5 percent in 1964. When DDT spraying was halted, the malaria rate rose back to over 50 percent by 1984 (10). Swaziland, which did not halt DDT spraying, maintained its malaria infection rates to between two to four percent, while just 40 miles away, South Africa, which had banned DDT in the 80s, watched malaria infection rates rise to 40 percent. In the mid-90s South Africa and a few other African countries resumed spraying with heartening results: wherever DDT has been used in a campaign of indoor residual house spraying, malarial rates fell (11). And yet, in response to the concerns of environmental activists, mainly in developed lands, malaria continues to exert its toll. Today, there are close to 3 billion people at risk for the disease, with 500 million cases each year, causing between 1 and 3 million deaths (12).

But that’s just the toll of malaria. Mosquito-borne dengue fever is estimated to afflict 50–100 million people each year and to kill 50,000 worldwide in Africa, South and Central America, and in Southeast Asia (13). The WHO estimates that fly-borne East and West-African trypanosomiasis is a risk for 50 million, with 20,000 newly reported patients a year, most of whom will die. The South American form of trypanosomiasis, Chagas disease, threatens 100 million, of whom 4.5 million will die from its chronic insults. Of the adult populations at risk for Chagas disease in South and Central America, 10% may die (14). More yet: each week there are newer outbreaks of diseases borne by mosquitoes, ticks, fleas, and lice. Two generations after Müller, epidemic typhus is making a comeback. A single outbreak of “jail fever” in Burundi sparked an extensive epidemic of louse-borne typhus in the refugee camps of Rwanda, Burundi, and Zaire—countries racked by ongoing civil war and genocide (15). The lice are also biting in the highlands of Algeria (16).

Lice require dirty humans, bad weather, and crowding—as in tents and barracks. That’s why typhus was the stuff of war and tragedy. Even before rickettsiae were identified, it was appreciated that epidemiology and public health might be better weapons against typhus than drugs or antisepsis. In 1848, a young Rudolph Virchow (1821–1903), the future father of cellular pathology and future leader of the Social Democrats in the Berlin parliament, was sent to Silesia to study an intractable typhus epidemic in Upper Silesia, at the eastern border of Germany and Poland. In this backward enclave, feudal landlords of large estates ruled a peasantry in dirty huts. Virchow reported to Berlin that “the Upper Silesian in general does not wash himself at all, but leaves it to celestial providence to free his body occasionally by a heavy shower...
of rain from the crusts of dirt accumulated on it. Vermin of all kinds, especially lice, are permanent guests on his body (17).” Virchow concluded that what the region needed was not more doctors; it required social medicine for a social disease. Typhus could only be eradicated, Virchow argued, by means of political reform: full employment, higher wages, the establishment of agricultural cooperatives, universal education, and the disestablishment of the Catholic Church (20). And slowly but surely, from Bismarck’s universal health insurance to the Weimar republic’s secular reforms, typhus abated.

Less than one hundred years later, the German Endarkenment had undone social democracy in its first home and, predictably, typhus returned. Its most poignant episode was played out between March 31 and April 15, 1945, at Bergen-Belsen. Anne Frank was one of eight Dutch Jews who had been in hiding for two years and thirty days when they were discovered and arrested by the Nazis and deported from Amsterdam to Auschwitz-Birkenau. As the Russian armies moved west, the Germans forced thousands of men, women, and children across war-torn Europe to Bergen-Belsen, a desolate concentration camp north of Hannover. Among them were Anne and her elder sister Margot who died of typhus at Bergen-Belsen, along with approximately 50,000 of their fellow prisoners (18). The last woman to see the sisters alive described the hut in which they were quartered:

The dead ones were always carried out and put in front of the barrack. . . on one of those trips to the latrine or barrack I passed the corpses of the Frank sisters, one or both, I know not. And those stacks of corpses were cleared away. There was a large pit dug in the camp and they must have been thrown into it (19). (Es wurde eine große Grube gegraben, da wurden sie hineingeschmissen, so kann man es wohl sagen.)

On April 15, 1945, when Bergen-Belsen was liberated by a combined British-Canadian unit, the camp had been without food or water for three to five days. Although the camp commandant, Josef Kramer, protested that there was no way to pipe water into the camp, the Allied unit quickly constructed a makeshift piping system from a nearby river to supplement the army’s water carts. Clean water flowed and DDT followed.

The stories of Anne Frank, of Burundi and Zaire, confirm that Virchow was right: typhus—not to speak of malaria—is a social disease bred in cruelty and based on misery. Control the vector (human or arthropod) and one controls the disease. Were plucky Rachel Carson alive, I’d bet that she would be among the first to support a WHO campaign to spray those camps in Rwanda, Burundi, and Darfur. Even with DDT.

Gerald Weissmann
Editor-in-Chief
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REFERENCES


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