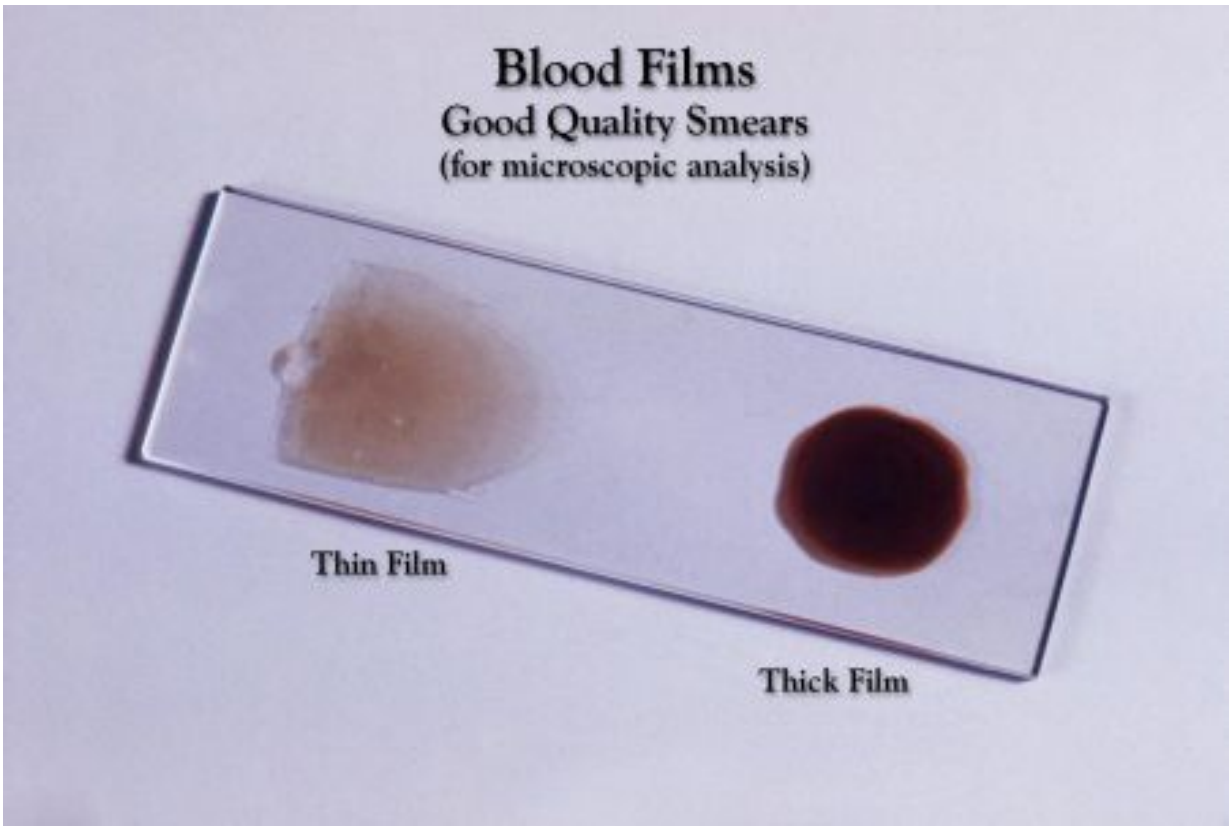
STANDARD DEVIATIONS: Losing Ground

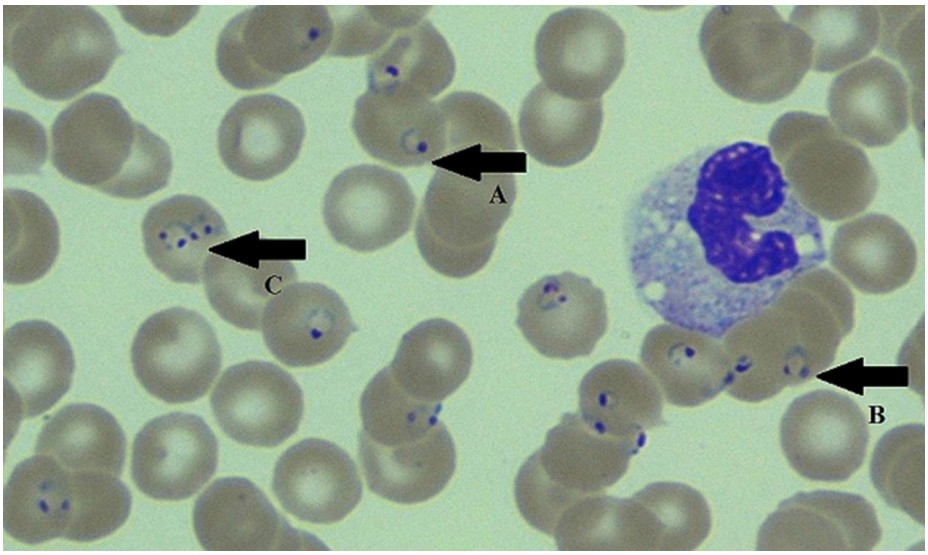
Greetings,



{Malarial smears, thick and thin}

Ever made one (or five!) of these?

I'm guessing that even if you've never encountered a Malaria positive specimen in your lab, you've made thick smears for training purposes and have probably seen CAP proficiencies that include slides with *Plasmodium*.



{Classic image: peripheral blood smear in a case of *Plasmodium falciparum*.}

The WHO has just released its annual World Malaria Report (2020) and it is a mixed bag of good news and dire prediction.

The good news is that overall Malaria is in decline over the last two decades. Between 2000 and 2015, global malaria case incidence decreased a whopping 27%.

In 2018, an estimated 228 million cases of malaria occurred worldwide (compared with 251 million cases in 2010). Nineteen countries in sub-Saharan Africa and India carried almost 85% of the global malaria burden. Six countries accounted for more than half of all malaria cases worldwide: Nigeria (25%), the Democratic Republic of the Congo (12%), Uganda (5%), and Côte d'Ivoire, Mozambique and Niger (4% each).

According to this report, **global malaria mortality fell by 60%** over the period 2000 to 2019. The African Region achieved impressive reductions in its annual malaria death toll (680,000 in 2000 to 384,000 in 2019).

South-East Asia made remarkable progress, with reductions in cases and deaths of ~75%.

India saw the largest drop in cases region-wide – from approximately 20 million to about 6 million.

Twenty-one countries have eliminated malaria over the last 2 decades and, of these, 10 countries were officially certified by WHO as malaria free. Countries of the Greater Mekong continue to make major gains, with a staggering 97% reduction in cases of *P. falciparum* malaria seen since 2000.

Pretty remarkable gains in a fight that has infected and killed **tens of millions**.

Since 2015, however, the rate of malaria decline is less than 2%.

There have been many obstacles in the path of malaria disease management. Our therapies have faltered, natural disasters hamper efforts, political upheaval contributed, vector range and habitat have changed, insecticide and drug resistance have accelerated and pipelines for new drugs have been slow to see progress.

Chloroquine (yes, that controversial compound) has seen a steady decline in efficacy over the years. It's still widely used but fewer species are still susceptible.

Sulfadoxine-pyrimethamine was supposed to be the miracle remedy when introduced in the 1990s but has seen rapid resistance emerge. That same resistance has reduced the efficacy of the touted pesticide-treated netting. Turns out that using pyrethoids for decades in agriculture had given the mosquito a head start.

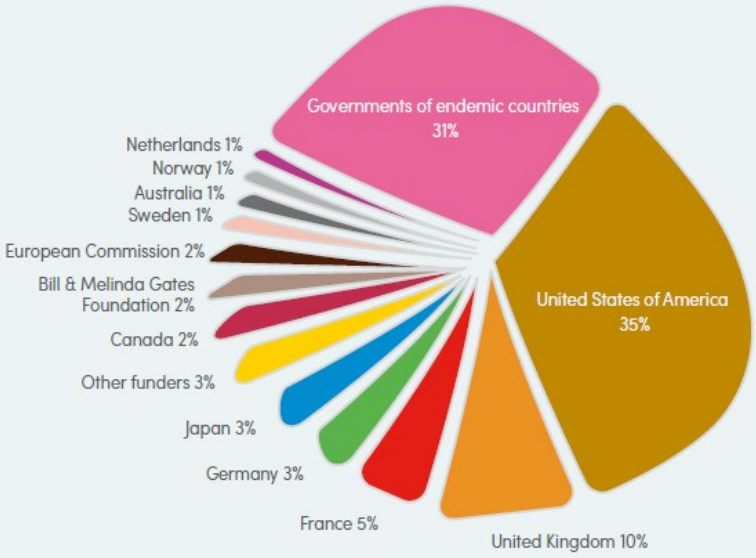
Currently artemisinin-based combination therapy (ACT) is recommended for the treatment of *P. falciparum* malaria. And, of course, resistance has become a big problem and a separate battle of its own ….. because there just aren't good drugs being developed.

Climate change is causing alteration in habitat. Mosquitoes and parasites, both, find new climates and populations to inhabit.

Political changes in endemic countries and world players affect response. Money fluctuates and the access to certain areas changes. These all factor in the ability to sustain control efforts.

FIG. 6.1.

Funding for malaria control and elimination, 2010–2019 (% of total funding), by source of funds (constant 2019 US$) *Sources: ForeignAssistance.gov, Global Fund, NMP reports, OECD CRS database, United Kingdom Department for International Development, WHO estimates and World Bank DataBank.*



{Here's where the $ comes from.}

Despite impressive past progress, morbidity and mortality goals have gone off track and, in some regions, have begun to reverse.

The arrival of COVID-19 will challenge the response effort moving forward. Pandemic disruption of antimalarial treatment and prevention is predicted to result in tens of thousands of additional deaths. The emergence of COVID-19 and its subsequent pandemic spread means that much of the progress against malaria is under enormous risk, with the potential to **wipe out 20 years of malaria gains.**

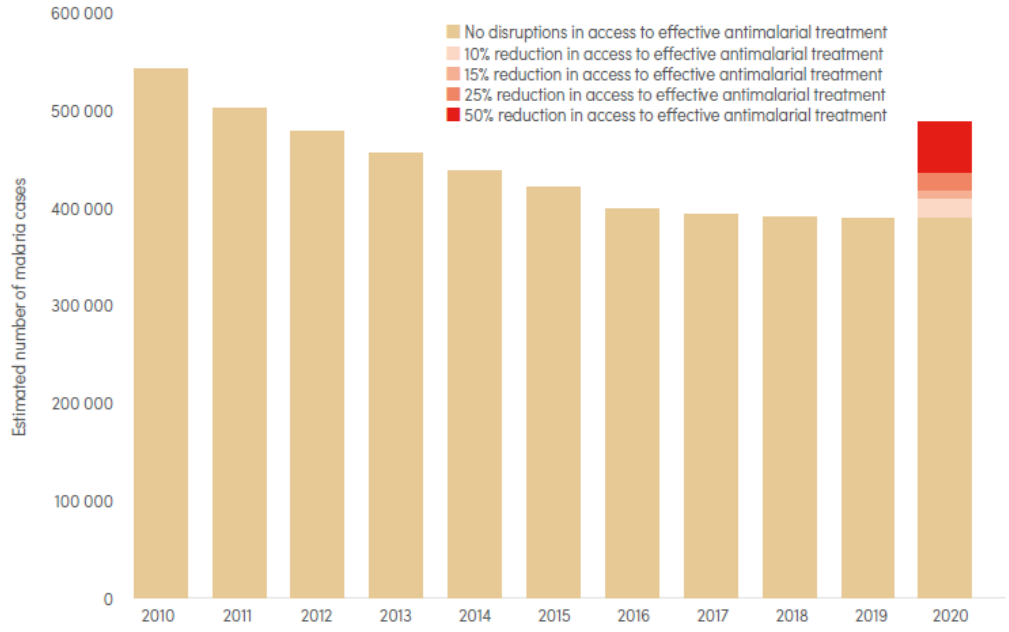
We've seen interruptions to healthcare access, clinical trials, surveillance, supply chains, communications and partner coordination.

Countries where malaria is endemic have seen high casualties from COVID-19. Brazil and India account for 65% of the COVID-19 cases in the endemic countries.

Although sub-Saharan Africa has reported relatively fewer cases of COVID-19, they have the added burden of a plethora of other diseases (e.g. TB, measles, HIV, dengue, etc.). And still, epidemiology models of the pandemic suggest a worst-case 770,000 sub-Saharan deaths from malaria by the end of 2020 as a result of the pandemic's impact.

FIG. 10.7.

Estimated potential increase in malaria deaths in sub-Saharan Africa (excluding Botswana, Eswatini, Namibia and South Africa) corresponding to varying levels of disruptions of access to effective antimalarial treatment *Source: WHO estimates.*



WHO: World Health Organization.

{COVID-19 effect on African malaria. A step backwards.}

The malaria smear is no longer the standard. Rapid diagnostics tests for malaria-specific proteins are the most common test used world-wide (and evolving gene deletions are making some test platforms obsolete). PCR is used for identification and speciation but is not practical or feasible for most areas. A loss in testing means more undiagnosed cases going untreated and more deaths.

The need for rapid diagnostics for coronavirus have altered the test production of malarial tests leading to an estimate of a devastating 100 million test shortfall.

Here's the kicker: most deaths from malaria happen in children under 5 years. The group least affected by the SARS-CoV2 virus are the ones most affected by pandemic side-effects. Tens of millions of pregnancies are at risk of undetected malaria exposures.

Malaria presents an example of pandemic consequence that is going unheralded. The coronavirus burden will be felt in myriad ways we can only begin to understand. Our testing will continue to detect diseases and deaths that we've fought hard for decades, but the challenges of laboratories to provide accurate and quality testing are worrisome.

Have a great week and be safe,

Bryan

p.s. *Plasmodium falciparum* is the most prevalent malaria parasite in the WHO African Region, accounting for 99.7% of estimated malaria cases in 2018, as well as in the WHO South-East Asia Region (50%), the WHO Eastern Mediterranean Region (71%) and the WHO Western Pacific Region (65%).

Globally, 53% of the *P. vivax* burden is in the WHO South-East Asia Region, with the majority being in India (47%). *P. vivax* is the predominant parasite in the WHO Region of the Americas, representing 75% of malaria cases.