

THIS WEEK

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Pay people to fight malaria

Workers on the front line of the battle against the disease are too often overlooked as scientists and funders plot how to defeat malaria.

Nature sent a reporter to Myanmar, Cambodia and Thailand in May to see how researchers are helping countries in the Greater Mekong region reach their goal of eliminating malaria by 2030. Her News Feature on page 458 highlights how political, financial and geographical obstacles allow the disease to persist. The broader malaria community, including researchers and funders, must do more to address these challenges. It is a race against time. The disease must be stamped out in the region now, while it remains relatively rare. Allow it to increase, and the chance will be lost. Worse, drug-resistant parasites there will multiply and spread.

It's no secret that the best way to beat malaria is to ensure that every infected person can quickly reach a health worker and be given artemisinin-based combination therapies (ACTs) — pills that swiftly kill the parasites that cause malaria before they spread to other people. The importance of health workers is highlighted by what happens in their absence. Hundreds of thousands of African children die every year because they do not get the pills in time. And in Venezuela — once declared malaria-free — the disease has come back with a vengeance as political instability has fractured health services.

A review of 75 malaria resurgences around the world from 1930 to 2011 found that 90% were caused by lapses in basic malaria-control measures — mosquito control (mainly through insecticides) and health systems (J. M. Cohen *et al. Malaria J.* 11, 122; 2012). Insecticides are potent tools for reducing malaria, but resistance is on the rise. Bed nets also reduce risk, but can't always prevent the disease. A strong public-health system is necessary because there is no powerful vaccine for malaria, unlike other illnesses subject to elimination campaigns, such as polio.

Yet health systems in many malaria-endemic nations are riddled with holes. Malaria health workers are often unsalaried, so many leave for other jobs. Networks of researchers, technicians and administrators support health workers, provide surveillance and inform policy. But health budgets in low-income nations are often too small to attract enough of these skilled workers.

At present, too many of these crucial positions are unpaid. The Bill & Melinda Gates Foundation in Seattle, Washington, the US government and many other donors do not pay salaries for health workers and other staff in national health systems. The Global Fund to Fight AIDS, Tuberculosis and Malaria is a rare exception in supplementing pay for national health workers — but even it does not allocate funds to researchers and officials at higher levels in ministries of health. It says that national governments should do this, but many can't or don't.

The problem is complex, but there are a few ways in which the scientific community could help. Researchers can analyse the costs and value of health-system components and compare them with those of other projects, such as genetically modifying mosquitoes to wipe them out, or conducting vaccine studies. This would help donors and governments re-evaluate their priorities when funds are limited. Researchers can also help by developing simple tools and treatments

for other diseases, thus allowing local malaria health workers to be more versatile. In this way, their services remain crucial even as malaria infections drop — as they have across southeast Asia. This added value means that governments might be more willing to pay workers.

Furthermore, top-tier scientists in Western countries can work to boost the status of their colleagues in malaria-endemic regions. After all, local researchers working in government agencies are best placed to lobby their leaders for bigger health budgets. At the moment, these local researchers often provide a supporting role to those from the United States and Europe who are the lead investigators on large grants. The international scientific community should put more emphasis on providing long-term mentorship, building laboratories and helping colleagues to boost their careers.

And — despite strong disincentives for doing so — experts should push back against funders and journals that favour 'outside the box' ideas over routine support for health workers in remote villages. For example, drones have been touted as a new means of delivering malaria drugs to remote areas. Researchers should ask for evidence that such expenditures are more valuable than improving the basic health system.

Last month, the World Health Organization declared Paraguay to be malaria-free, even as cases were rising in Venezuela, Panama, Peru and Nicaragua. Public-health officials attributed the nation's victory to its health system's ability to quickly detect, treat and track cases. Sometimes, the classic recipes are the best. ■

Inspiring women

Awards highlight impressive efforts that reach the next generation.

In April, *Nature* announced two annual prizes: one recognizes excellent early-career female scientists, and the other acknowledges individuals or organizations that have led grass-roots initiatives to support increased access to, or interest in, science, technology, engineering and mathematics (STEM) for girls and young women around the world. This week, we announce the candidates who have made the longlist of ten for each Nature Research award, and congratulate all of them. The impressive breadth and quality of all the entries deserve wide recognition, too.

There are many reasons for which women are discouraged from entering STEM professions or from staying in them. They include

unequal access to education; conscious and unconscious discrimination in promotion, funding, peer review, citation and more; unequal pay; and, often, a disproportionate burden of domestic responsibilities. All of that can help to explain why women still make up only around 30% of professional researchers. It is encouraging to see the many entries from women who are successful researchers and who are also determined to help others and to inspire the next generation. One route towards equality in science is to offer positive role models to young people.

Some of the most impressive prize entrants focus on countries and locations in the global south, working with particularly impoverished and underprivileged communities. This often comes with additional challenges — sometimes, just reaching remote locations to mentor girls and encourage them to pursue science requires serious commitment. For example, one project, Cielo y Tierra, organizes outreach efforts in rural South America and Africa.

Obviously, not all of the girls and young women reached in this way will end up pursuing science in their studies or careers. But awakening their curiosity and nurturing their ambitions is still worthwhile.

It turns out that mentorship and support over long distances can be highly effective. One scheme has successfully matched researchers with young girls from low-income communities as penfriends. Working with US schools and with scientists around the world, 'Letters to a Pre-Scientist' fosters a love for science, offers support and provides personal experiences. Scientists are encouraged to write at least once every few months, and to give instances of how science has, for example, taught them to persevere or to learn from

failure. It's a simple and effective way to demystify science by creating personal connections. Perhaps you should try it.

For students already in the university environment, gaining access to female scientists might still be difficult. Therefore, many award applicants have set up visiting female researchers' programmes, lecture series focused on female speakers, or social events that enable networking with prominent female researchers.

“One route towards equality in science is to offer positive role models to young people.”

In the global north, many of the efforts focus on girls and young women from minority ethnic groups. Others target communities of refugees, the children of female prison inmates and those who live in orphanages.

Many of these projects, the prize entrants told us, are driven by the entrants' own experiences as women in science. For example, some scientists who are also mothers are working to improve childcare provision at scientific conferences. Others have overcome particularly strong local cultural constraints, under which women are rarely seen in public, let alone in science and education.

All of the entrants believe that women should have the opportunity, agency and support to become researchers. We agree. (And we appreciate that gender is neither binary nor necessarily fixed.) Together, these examples show the enormous range of ways to inspire girls and young women, and they offer lessons for all. The full longlists for the two prizes — the Inspiring Science Award and the Innovating Science Award — are available at go.nature.com/2jmri9z. The winners will be announced in October. ■

Publish not perish

Conservationists have a new tool for weighing up the risks and benefits of open data.

From 2013 to 2017, listening to the gentle 'ding ding' of the night parrot was forbidden. Long feared extinct, when the bird (*Pezoporus occidentalis*) was rediscovered, officials in Australia decided to restrict both location data and recordings of its signature call for fear that poachers and enthusiasts might use the information to track and disturb the creatures. Yet when the recordings were declassified and shared last year, conservationists were delighted by what followed: at least three new populations have since been discovered by people using the call to recognize the birds.

Since the bird's rediscovery in 2013, the Australian government has put in place proper conservation safeguards, such as making it illegal to approach the creature's habitat. It's a good example of authorities weighing up the risks and benefits of publicizing the discovery of a rare species and then reaching a sensible compromise. That kind of decision process is increasingly in demand, as data sources and sharing proliferate beyond conventional academic audiences in ways that risk, for example, helping hunters and illegal wildlife traders to track down target species.

In a Perspective published this week in *Nature Ecology & Evolution* (A. I. T. Tulloch *et al.* *Nature Ecol. Evol.* **2**, 1209–1217; 2018), conservation experts offer a way to help scientists and officials to decide when to publish such sensitive information — and when not to. It's the latest development in an ongoing debate that pits advocates of open data against those who take a harder line and want more restrictions. The authors warn that a default position in which location data are withheld if a species is identified as being of high biological significance and under high threat — as recommended by the Global Biodiversity Information Facility — risks missing out on the benefits of data sharing.

To aim for a more balanced approach, the scientists drew up a decision tree to help people judge what to do with information gained from

wildlife monitoring and surveys. A series of steps asks questions such as “Could data be used to mitigate threats to species?” and “Would sharing location data increase risk of species decline through increased visitation?” In some cases — fish spawning locations for one, because the fishing industry would love to target them — the recommendation is to keep everything from the name of a species to its location under wraps. But in other cases, the need for secrecy is trumped by the possible benefits of transparency. Open data could help local communities fight to protect a habitat when development is threatening a species.

Ayesha Tulloch, an environmental scientist at the University of Sydney in Australia who led the analysis, says her team was surprised by the low number of examples they tried that produced a 'don't publish' decision. That, she adds, could help scientists to get funding for projects that might otherwise be rejected because of the restrictions expected to be placed on the eventual results. Several government departments in Australia and New Zealand — including those who have historically kept data from the public — have already said that they are interested in using the decision framework to help set policy.

Such discussions are timely. Scientists are poised to launch a satellite-tracking project that will massively increase the number of species worldwide whose locations can be traced in near-real time. Earlier this year, a satellite antenna called ICARUS — International Cooperation for Animal Research Using Space — was attached to the International Space Station. Combined with lightweight animal tags, it will allow researchers to follow the long-range movements of much smaller species than has previously been possible. For some species, that information could place them at greater risk. There are already concerns that unethical safari guides and hunters have hacked into the biotagging systems used to keep tabs on endangered animals such as lions (S. J. Cooke *et al.* *Conserv. Biol.* **31**, 1205–1207; 2017).

About one in six of the threatened species listed by the International Union for Conservation of Nature are classed as data-deficient, which means conservationists and scientists face a struggle to perform basic analyses such as population modelling and to work out which habitats must be preserved. Data bring power. But they also bring responsibility. This new decision-making tool could help to generate the former while respecting the latter. ■