Launch of the Global Plan for Insecticide Resistance Management in malaria vectors

GENEVA, 15 MAY 2012
Insecticide resistance is a significant challenge that we need to address. We must stand united and make sure that our existing vector control tools, including the current insecticides, remain effective until new active ingredients and compounds come to the market.

Dr Hiroki Nakatani, WHO Assistant Director-General, HIV/AIDS, TB, Malaria and Neglected Tropical Diseases

Worldwide work to combat malaria is a key priority for the World Health Organization (WHO) and its partners within the Roll Back Malaria Partnership (RBM). While unprecedented progress has been achieved in malaria control during the past decade, reports of mosquito resistance to insecticides around the world place these fragile gains at risk. The global nature of the threat demands an urgent and coordinated international response.

The launch in May 2012 of a global plan to tackle insecticide resistance has provided the international community with a clear and cohesive strategy that prioritises early action. The Global Plan for Insecticide Resistance Management in malaria vectors (GPIRM) was developed through consultation with over 130 stakeholders representing all constituencies of the malaria community.

The GPIRM describes a five-pillar strategy based on shared public, private and civil society responsibility that safeguards past achievements in malaria control while addressing insecticide resistance and associated future challenges. The plan was developed following requests from the World Health Assembly and the RBM Board for a global strategy to serve as the foundation of a coordinated multi-stakeholder response.

The work was led by the WHO Global Malaria Programme, with funding from the Bill & Melinda Gates Foundation and with the support of The Boston Consulting Group.

Held at WHO Headquarters in Geneva, Switzerland, the GPIRM launch event brought together high-level representatives of all key partners within the global malaria community. Speakers urged affected countries and stakeholders to take immediate action to preserve the effectiveness of current vector control tools, and to ensure that new public health insecticides are made available soon.
A call to action

In the opening session of the event, high-level representatives from WHO and RBM emphasised the need for immediate and dedicated implementation of the GPIRM.

Dr Hiroki Nakatani, WHO Assistant Director-General for HIV/AIDS, Tuberculosis, Malaria and Neglected Tropical Diseases, told participants that malaria is a key priority for WHO. While significant progress has been made in the fight against the disease in the last decade, the challenge of insecticide resistance must be addressed in order to preserve the effectiveness of current vector control tools until new active ingredients and compounds became available.

Dr Nakatani said that while the global health community was ahead of the curve in the fight against insecticide resistance, experience in other disease areas had illustrated the need for pre-emptive action on issues of resistance. “Once resistance has fully developed, our tools can suddenly become useless. Or even if they do not become totally ineffective, we suddenly see the costs of disease control go up – a lesson we learned in the case of TB,” he said.

But despite the major challenges ahead, the Assistant Director-General said, the solutions were at hand. “The GPIRM is a very comprehensive global plan of action, based on five pillars, and assigning clear roles to all stakeholders,” he said. “But, pillars themselves are not sufficient to build a house. We will work together to bring malaria deaths to near-zero and this should not be prevented by emerging insecticide resistance.”

Dr Ala Alwan, Regional Director of the WHO Regional Office for the Eastern Mediterranean (EMRO), said he was pleased to see that a number of countries from the EMRO Region have contributed to the development of the plan.

There have been reports of insecticide resistance in many malaria-endemic countries in the EMRO Region. In some of these countries to pyrethroids as well - including in Sudan, Afghanistan, Somalia, and the Islamic Republic of Iran, Dr Alwan said. But the problem of resistance does not only affect these and other endemic countries but also those that have been certified malaria-free and are now at risk of re-introduction. “If we have a malaria epidemic, we really need to know which insecticides will work.”

Dr Alwan explained that the EMRO Region is affected by a number of other vector-borne diseases – including dengue, rift valley fever, and leishmaniasis – which also require vector control interventions and the use of insecticides.

“Monitoring insecticide resistance is key. But we also know that this requires capacity at all levels and, in particular, at the country level. We need capacities not only to routinely collect the data on resistance, but also to analyse it, interpret it, share it, and to use it to take action at the country level. I am pleased to note that this point is very well addressed and articulated in the global plan,” Dr Alwan said.

The EMRO Regional Director expressed firm commitment to supporting the implementation of the GPIRM.

“We will work very closely with WHO Headquarters, with other countries and with other partners, to translate this plan into concrete action at the regional level and also at the country level. We will also make use of our existing sub-regional networks as well as our own governing body, the Regional Committee for the Eastern Mediterranean, to advocate for political commitment and resource mobilization. This will definitely be an issue that we will address at forthcoming sessions of the Regional Committee,” Dr Alwan added.

Dr Robert Newman, Director of the WHO Global Malaria Programme, said the GPIRM launch was about “building enthusiasm for a very important challenge that we face collectively.”

Managing insecticide resistance was a shared responsibility, and the development of the GPIRM had been a partnership effort, as witnessed by the contribution of stakeholders from all sectors of the malaria community, he said.

Dr Newman reiterated the need for immediate action to implement the global plan, and underlined the fact that while insecticide resistance can be a long, slow burn, remaining undetected for many years, once it reaches a tipping point it can spread very rapidly and be very difficult to reverse.

“While not wishing to scaremonger, the stakes are actually quite high here,” he said. “If we don’t act now and the pyrethroids
were to lose most of their efficacy, more than 55% of the vector control benefits accrued to date could be lost – potentially leading to an additional 120,000 under-five deaths in Africa.”

The immediate next step, Dr Newman said, was the launch itself: a collective commitment to take urgent and concerted action and maintain the issue of insecticide resistance high on the political agenda. Ministers of health, high-level WHO representatives, and partners all have a key role to play in this, mobilising both technical and financial resources.

“We must fight complacency on this issue while providing reassurance that our current tools work”, he said. “We don’t want people wandering around saying ‘all is lost’ – because that is not the case. If we take action now, we can stay ahead of the curve and maintain the fabulous gains we have made.”

Dr Thomas Teuscher, Executive Director a.i. of the Roll Back Malaria Partnership, congratulated WHO’s Global Malaria Programme on the speed with which it had developed the GPIRM. The RBM resource mobilization sub-committee is already considering the costs of putting this plan into work – the 200 million USD that will be required for full implementation.

Given the costs involved, there is a need to target interventions carefully, Dr Teuscher said. This would involve building capacity in many countries so that they could clearly identify where best to focus their efforts. “So investing in creating and maintaining that capacity to help us target our containment interventions is a key step that has to happen quickly,” he said.

Dr Teuscher also emphasised the need to renew dialogue with sectors outside of health. “We need dialogue with partners who work in the field of agricultural development […] we have a challenge to go beyond our traditional health partner dialogues in order to address the threat of insecticide resistance,” he said.

The GPIRM, Dr Teuscher said, gave him confidence that the 2015 targets of near-zero deaths and a 75% reduction of the burden of disease were reachable with current vector control tools. But in order to achieve them, “we must start addressing some of the new frontiers that the GPIRM clearly outlines.”
Introducing the GPIRM

Dr Robert Newman provided a detailed overview of the GPIRM, speaking also on behalf of Dr Abraham Mnzava, Coordinator of the Global Malaria Programme’s vector control unit.

The overall goal of the GPIRM is to maintain the effectiveness of the current package of vector control interventions, Dr Newman said. Developing the plan had been a collaborative effort led by WHO, with funding from the Bill & Melinda Gates Foundation and involving more than 130 stakeholders from across the RBM Partnership.

“Vector control is going to remain a central pillar for all our efforts in malaria control and elimination. That is why implementing the GPIRM will be so important. [...] Mosquito resistance to at least one class of insecticides has been reported, or confirmed through independent studies, in 64 countries with ongoing malaria transmission.”

Urgent action is needed to prevent the further development of insecticide resistance and to maintain the remarkable gains that have been made in recent years. Given that the GPIRM was developed to address a global problem, its implementation will require a partnership effort, he said.

Of the four classes of insecticides that are being used in malaria vector control, the pyrethroids make up the bulk of the insecticides that are used. “We have a lot of eggs in the pyrethroid basket,” Dr Newman said.

The GPIRM had been developed to coordinate action with the objectives of: creating a definitive baseline understanding of our collective knowledge of insecticide resistance and of what remains unknown; understanding the impact of inaction and how to change that; estimating the potential impact of insecticide resistance on malaria control efforts, as well as the financial costs; and using these elements as the foundation to develop an effective plan.

The strategy, explained Dr Newman, rested on five pillars with three phases of actions envisaged.

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Dr Robert Newman, Director of the WHO Global Malaria Programme
The five pillars are:

- plan and implement insecticide resistance management strategies in malaria-endemic countries;
- ensure proper, timely entomological and resistance monitoring and effective data management;
- develop new, innovative vector control tools;
- fill gaps in our knowledge base about the mechanisms of insecticide resistance, the impact of resistance on malaria control, and how our strategies for prevention are working; and
- ensure that enabling mechanisms (advocacy, human and financial resources) are in place.

Dr Newman illustrated how the primary responsibility for carrying out many of the actions contained in the global plan lay with national malaria control programmes and vector-borne disease programmes. “Our job collectively, all of us who sit outside those programmes, is to figure out how we support you, in your efforts at country level, to achieve the goals that you have set for yourselves. That is our job as a partnership and as WHO,” he said.

At country level, Dr Newman explained, a parallel effort was needed: firstly, to assess what information was already available to design immediate responses; and secondly, to design a monitoring plan to fill information gaps. Importantly, the design of an action-oriented plan should not wait until the full set of information was available. “Take the information you have today and design an action plan around it; part of your action plan is to figure out what information you don’t have and that you need to go out and gather.

Capacity building was also essential to the implementation of the GPIRM. Many countries have large gaps in their monitoring or had no monitoring at all, and have to take the essential step of building and maintaining capacity.

“I can’t stress this enough [...] You cannot run a large, complicated vector control programme that may become more complex as the years pass, with one entomologist as your entire national resource. And we need to figure out how to support countries in training more entomologists and in maintaining that capacity,” he said.

As well as a critical need for better data interpretation, Dr Newman said there was “an increasingly strong call for WHO to develop a single, global database and repository” into which all the information that was gathered could be put. “This would give us a global view in real time of how this challenge is evolving,” he said.

Dr Newman went on to stress the need for greater investment in the pipeline for reformulations of existing insecticides and new active ingredients. The director cited the importance of product development partnerships such as the Innovative Vector Control Consortium to ensure a robust pipeline of new and effective insecticides.

Dr Jo Lines from the London School of Hygiene and Tropical Medicine gave participants a brief overview of the technical recommendations contained in the GPIRM.

“One of the key points is to divide the world into places where resistance is already present – and some response is needed – and where no resistance has been spotted yet.”

Early warning of resistance remained critical, he said, adding that metabolic resistance mechanisms pose a greater threat than kdr resistance. In places where the resistance mechanism is not known, the task is to find out what that mechanism is. In a situation where LLINs were the main control intervention and metabolic resistance was detected, the use of IRS with a non-pyrethroid insecticide could be an effective response, while also ensuring that bed nets did not get too old.

“In terms of responses at the moment, the best thing we can do is pre-emptive rotations between different insecticide classes. Eventually we will probably want to move to mixtures of formulations and combinations of two different insecticide classes,” he said. “But we don’t have those products yet.”

Dr Lines also said that existing LLINs should continue to be promoted, given that non-pyrethroid LLINs have not come on the market yet, he said. “We know that LLINs still protect, partly because they still represent a physical barrier, and partly because when the mosquitoes are resistant, the excito-repellent effect of the insecticide will still help maintain the effectiveness of the nets.”
Dr Lines also noted that the ongoing research agenda is broad, with new challenges emerging. “The metabolic mechanisms of resistance are probably more difficult to deal with, certainly more difficult to track at the DNA level, than any resistances that were dealt with during the global eradication programme 40 or 50 years ago,” he said. “This is a new level of enemy that we are dealing with.”

In terms of new tools for malaria control, Dr Lines said one of the tasks was to be clear about what sort of tools were needed. “The manufacturers are ready to respond if we are clear,” he said, adding that it would also be necessary to clarify how the relative effectiveness of those new tools would be measured. Dr Lines said there was a need to develop indicators on the impact of resistance on transmission, as well as standard tests for resistance management products.

“What will be the indicators that the WHO Pesticide Evaluation Scheme (WHOPES) uses to set minimum standards for resistance management products? And how will buyers select from the WHOPES-recommended products based on observed insecticide resistance patterns?” he asked. “This is a technically and biologically complex issue [...] so there is a lot to do in developing standardised, accepted, shared ways to develop these technical recommendations as we go forward.”

The task of collecting, collating and interpreting resistance data is a supra-country process, requiring global coordination. “Resistance is an evolutionary process. It happens on a large scale across country borders. So this is an issue that is very relevant to WHO’s work in terms of coordinating how that interpretation happens at the inter-country and sub-regional level,” he said.

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Dr Richard Kamwi, the Minister of Health and Social Services for Namibia, said the launch of the GPIRM could not have come at a better time for his country.

Between 2001 and 2011, Namibia reduced its malaria incidence by 97%, while the number of malaria deaths dropped by 98%. This, the Minister said, was achieved through the extensive use of LLINs and indoor spraying with DDT.

The application of an effective mix of prevention and treatment strategies was also important to success, as well as the political commitment to this cause, and the availability of domestic and international resources.

The Minister said that Namibia was now moving towards malaria elimination, along with the other E8 countries. The heavy reliance on pyrethroids and DDT in Namibia – and in other member states of the South African Development Community (SADC) – meant that countries shared the responsibility to ensure adequate management of existing classes of insecticides.

Dr Kamwi echoed the call by earlier speakers for a global database on insecticide resistance and also for adequate human resource capacity, especially entomologists, to responsibly manage vector control programmes and conduct regular monitoring of insecticide resistance.

"We also have the responsibility to work with the industry, the research community and academia, for the urgent development of new, safe and effective insecticides. This will require heavy investments, but there is no quick fix solution for our ambitious goal of eradicating malaria in the long run. We need new, more and better tools and we need them now," he added.

Dr Bahar Idris Abu Garda, Federal Minister of Health for Sudan, said that Sudan began establishing a system for insecticide resistance monitoring in 2006.

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responsible for resistance monitoring across the country, as well as national capacity building.

The Minister also said that Sudan had established a central entomological and molecular laboratory, supported by the Liverpool School of Tropical Medicine, as well as a number of regional entomological laboratories and other partners. He added that the country is part of a Bill & Melinda Gates Foundation-backed project to study the impact of resistance on malaria transmission and is actively collaborating with partners. “Sudan is committed to implementing the Global Plan for Insecticide Resistance Management [...] and to do this we need the support of all partners,” the Minister concluded.

Country examples of insecticide resistance management

**Yemen** has established 9 sentinel sites for insecticide resistance monitoring at which data are collected once a year during the malaria transmission season. The government has established a National Steering Committee on Integrated Vector Management, bringing together experts from health, agriculture and the environment. The committee regularly revises vector control strategies and takes decisions on the management of insecticide resistance. So far, the main vector species, *Anopheles arabiensis*, has only shown resistance to DDT, but the country plans to take pre-emptive action to preserve the efficacy of pyrethroids by including a non-pyrethroid insecticide in its next IRS round.

**India** monitors for insecticide resistance through 72 sentinel sites across the country. Of the nine *Anopheles* species that carry malaria parasites in India, one of them, *Anopheles culicifacies*, is reported to be resistant to DDT, malathion and to pyrethroids. The government has established an Expert Group and Technical Advisory Committee, which regularly reviews the efficacy of vector control interventions across the country, including the state of insecticide resistance. Discussions are now underway to include rotation of insecticides in the approaching IRS round in areas where resistance has been found.

**Sudan** has established 74 sentinel sites across the country and collects data every year during the malaria transmission season. The main vector species, *Anopheles arabiensis*, has been reported resistant to all classes of insecticides, except to carbamates. The government has set up a *Anopheles* Steering Committee on Integrated Vector Management, a multi-sectoral body bringing together experts from health, agriculture, the environment, as well as research institutions. An insecticide resistance strategy has already been adopted, and the country has added insecticide rotation to its vector control strategy.

**Zambia** monitors insecticide resistance annually at 15 sentinel sites across the country. Different levels of resistance have been detected to DDT, pyrethroids and carbamates. To ensure evidence-based choice of insecticides and to prolong their efficacy, the National Malaria Control Programme has established a technical working group, including national research and academic institutions and international partners, to build capacity and to consolidate and review resistance data. A second, broader committee – including the Ministries of Agriculture and Environment, donors and partners – uses this data to make procurement recommendations to enable a more targeted and judicious use of insecticides.
Representatives from partner organisations expressed wholehearted support for the GPIRM. Speakers emphasised the timely nature of its development, as well as the need to ensure that sufficient funding is made available to implement the plan, and that sufficient support is provided for capacity building.

Dr David Brandling-Bennett from the Bill & Melinda Gates Foundation said that the Foundation had resources at its disposal to award grants and contracts of about 170 million USD a year, and in the last ten years, much of that has gone into research and development for vaccines, into drugs and into vector control.

The Foundation has also worked with WHO on developing the Global Plan for Artemisinin Resistance Containment (GPARC). "Those of you who have worked on addressing artemisinin resistance in South East Asia, and have done work on insecticide resistance management, you know that the implementation of these plans is by no means going to be easy or inexpensive," he acknowledged.

"I think it is pertinent for us to take the words of Bill Gates in this case. Bill Gates describes himself as an 'impatient optimist' and we need to be impatient optimists with both of these plans."

"Impatient because we have to act now – we cannot afford to wait. Not because we have a catastrophe, but because if we don’t take action now, we will have one. And optimists because we believe we can slow the development and spread of resistance, and where it does develop – which is likely to be inevitable – we feel we can address it."

"I would also like to emphasize the need to develop new tools – or what we call new paradigms – that will move us away from our overwhelming reliance on two fairly limited sets of tools, bed nets and IRS. [...] We need to be committed and we need to find the resources to implement the GPIRM. I am sure that with all of your involvement, this will be possible."

Speaking on behalf of Mr Ray Chambers, the UN Secretary-General’s Special Envoy for Malaria, Mr Alan Court said the launch of the GPIRM was a “timely reminder that although the current tools for controlling malaria remain effective in almost all settings, it was wise to plan ahead.”

“We support the call for countries to strengthen their monitoring systems so that any early indication of emerging resistance will be detected quickly,” he said. “We also welcome the actions proposed, such as the rotation of insecticides used for IRS, as well as the call for greater cooperation between malaria control programmes and the agricultural sector.”

Mr Court said the unprecedented progress against malaria in recent years can and must be sustained. “We urge support for WHO and RBM to ensure such sustainability and a healthy pipeline of new and adapted products into the future.”

Speaking on behalf of the African Leaders Malaria Alliance (ALMA), Dr Melanie Renshaw also welcomed the launch of the plan.

"We need more tools. We need to be committed and we need to find the resources."

Dr David Brandling-Bennett
Bill & Melinda Gates Foundation
“The 42 African Heads of State and Government who are members of ALMA welcome the launch of the GPIRM, recognizing that we are documenting increased insecticide resistance in Africa,” she said. “Happily, our vector control tools, particularly LLINs and IRS, are still working effectively with demonstrated impact. But moving forward, we want to ensure that these tools continue to work, and we are ready to implement these important recommendations in Africa.”

“Our efforts will include enhanced tracking and monitoring of resistance, capacity building and where necessary – when and if resistance is detected – mosaic and rotational spraying to control it.”

“Moving forward we must work together to fill the overall funding gap to sustain universal coverage of malaria control in order to achieve the target of near-zero malaria deaths by 2015. And if achieved, these fundraising efforts will include covering the costs needed to fully implement the GPIRM,” she said.

Speaking on behalf of Admiral Tim Ziemer and the US President’s Malaria Initiative (PMI), Dr Bernard Nahlen said there was general recognition that the impressive progress against malaria was primarily based on the success of vector control interventions.

“In the PMI, we put about 50% of our resources into vector control interventions. So that means we obviously see the emergence of insecticide resistance as a highest priority,” he said. “Just to give an example, of the 15 countries where we supported IRS in 2009, only one country needed a non-pyrethroid insecticide at that point. But in 2012, 10 out of the 16 countries where we support IRS have actually had to look for alternatives to pyrethroids.”

Agreeing with previous speakers, Dr Nahlen also emphasised the importance of capacity building, and in particular the training of entomologists and epidemiologists, as well as collaborating closely with other sectors, such as agriculture and the environment. He also said there needs to be streamlined testing and approvals by the necessary governing bodies, such as the WHOPES.

“We are committed to moving forward on this,” Dr Nahlen said and stressed the importance of the availability and transparency of information on this subject. “Often there is a lot of research going on but it doesn’t always filter up in a timely fashion in order to help everyone understand the extent of the problem and how we should be facing that.”

“We congratulate WHO, RBM and everybody else who has contributed to this crucial first step in moving forward on more effective programmes to address the problem of insecticide resistance,” he said.

Welcoming the launch of the GPIRM, Dr Nichola Cadge from the UK Department for International Development (DFID) said that most of the progress in the last decade was made after the launch of the Global Malaria Action Plan (GMAP). “This shows the importance of having a clear, evidence-based strategy that is owned and implemented by endemic countries and by all key stakeholders,” she said.

“The UK commends the WHO on the evidence-based and consultative process used to develop the GPIRM,” she said. “We will only maintain the effectiveness of vector control if this plan is implemented. With the launch of this plan, we now need to see strengthened international and endemic country action around this issue. As in the past, leadership, partnership, and innovation will remain crucial to success.”

“The launch doesn’t mark the end of our work, merely the beginning. The UK is committed to supporting this process and its implementation, along with the GMAP and the GPARC,” she added.
Dr Tom McLean from the Innovative Vector Control Consortium (IVCC) acknowledged the enormous work that had gone into the development of the GPIRM. “We now have a coherent and broadly accepted plan that really does reflect the views of the entire community [...] and will stand us in good stead in the long run,” he said.

Dr McLean reminded participants that there were five pillars to the plan and that no one organisation could take on all or any one of those parts on its own. The focus of IVCC, he said, was on the third pillar, that of new tools, something other groups were also working on.

The development of new insecticides, or active ingredients, for use in public health could not be done quickly, Dr McLean said. There was no way to shorten toxicity testing to ensure these new products would meet the highest human and environmental safety standards. “We cannot expect to see new active ingredients in the market until around 2020. In the meantime, IVCC is working with partners on the reformulation of existing insecticides, many from agriculture, that can be used for public health purposes. While a much quicker option, this is not as ideal as a completely new insecticide,” Dr McLean added.

In addition to the development of new active ingredients and the reformulation of existing insecticides, IVCC is working to develop new technologies, products and systems beyond the traditional use of IRS and LLINs. These new paradigms, said Dr McLean, would also take into consideration user acceptability or preference, to move beyond products people find difficult or discouraging to use, and move into products that people use because they are enthusiastic about them.

A second consideration in these new paradigms, he explained, was the challenge of outdoor transmission. LLINs and IRS are powerful tools where the vector is predominantly feeding or resting indoors. This now needs to be complemented with a new range of tools that can address transmission beyond the reach of LLINs, where for example the vector is feeding earlier in the evening, or beyond IRS where people are exposed outside the house, in the field, the plantation or the forest.

With the support of the Bill & Melinda Gates Foundation, IVCC has established strong collaborations with industry and other partners to answer the need for new tools and paradigms. He gave a number of examples of working with industry in the search for new insecticides and reformulation of existing insecticides.

“With these developments and with other work beyond the realm of IVCC, some remarkable, if interim, solutions will be available between now and 2016,” he said. “Continued leadership and financial support will be required to develop new insecticides and new paradigms. We are confident that with the partnerships that have been created and the leadership and commitment that has been shown, we will be successful.”

Dr Gunnar Riemann, speaking on behalf of Bayer CropScience, told participants that the industry shared a common objective in the control of malaria and its ultimate eradication. “But it is business as well,” he said. “Effective resistance management is fundamental to sustainable vector control, but also to sustainable business.”

Bayer had more than 50 years’ experience with agricultural and public health pesticides, and as such brought a lot of expertise to the table.

“We need to look at the whole supply chain, the whole malaria chain, to make the best decisions and to bring the best products to the market,” he said. Through good collaboration, forward planning, and an open dialogue with implementing partners, the company had been able to reduce the cost of one insecticide by 10%.
Bayer’s vision of effective vector control management was built on the following premises: close collaboration with implementing partners for good and fast decision-making; timely monitoring and evaluation systems in order to introduce rotations as early as possible; the creation of sustainable vector control programmes covering longer periods of time to maximise cost-efficiency; as well as innovation and local capacity building.

“We are ready to make GPIRM a success and we are grateful for the work that has been done to produce it. The important point is that we need to execute it,” Dr Riemann concluded.

The Global Fund to Fight AIDS, Tuberculosis and Malaria, said Dr Scott Filler, remains one of the most significant donors in malaria control and elimination and is uniquely positioned to ensure that normative guidance put forth by WHO and its partners is operationalized.

Dr Filler said the Global Fund concurred that urgent action was required to prevent further development of insecticide resistance and to protect the remarkable gains that had been made. “We will use the financial muscle of the Global Fund to use the limited resources available to build capacity for entomological monitoring and to ensure that these strategies to manage insecticide resistance are in place,” he said.

The Global Fund is able to assist through ensuring that its resources were used to: plan and implement insecticide resistance management strategies; ensure that capacity for entomological monitoring is developed and; guarantee that key enabling mechanisms, including advocacy, human and financial resources, are in place, he said.

There were also some very tangible elements that the Global Fund could incorporate into malaria grants in the short term, said Dr Filler:

- overall, the Global Fund will ensure that appropriate planning and budgeting around the crucial elements of insecticide resistance management is in the grants;
- where LLINs are used in combination with IRS, the Global Fund will try to move countries towards using a non-pyrethroid insecticide in those settings;
- the Global Fund acknowledges that some of the non-pyrethroid insecticides are more expensive. Given this shifting cost landscape, the Global Fund will work to build flexibility into the grants to support these increased costs.

“Overall,” said Dr Filler, “the Global Fund celebrates the launch of the GPIRM and is a committed partner in ensuring the success of malaria programmes.”

Speaking on behalf of the US Centers for Disease Control and Prevention (CDC), Dr Robert Wirtz also welcomed the release of the GPIRM. “I think many of you know that CDC was created to control and eliminate malaria in the United States, with a very strong emphasis on vector control,” he said.

The biggest contribution CDC could make to the implementation of the GPIRM, said Dr Wirtz, was through their expertise and dedicated professionals. “We at CDC look forward to continuing on the mission of malaria control and elimination, collaborating with colleagues, many of whom are here, providing technical assistance, training and the essential capacity building that we have heard is needed for the implementation of the GPIRM,” he said.
Speakers and participants

The launch of the GPIRM brought together high-level representatives of all key stakeholder groups within the global malaria community. Speakers at the event were:

Dr Hiroki Nakatani, WHO Assistant Director-General for HIV/AIDS, Tuberculosis, Malaria and Neglected Tropical Diseases
Dr Ala Alwan, Regional Director, WHO Regional Office for the Eastern Mediterranean
Dr Robert Newman, Director, WHO Global Malaria Programme
Dr Thomas Teuscher, Executive Director (a.i.) Roll Back Malaria Partnership
Dr Jo Lines, Reader, London School of Hygiene and Tropical Medicine
Dr Richard Kamwi, Minister of Health and Social Services, Namibia
Dr Bahar Idris Abu Garda, Federal Minister of Health, Sudan
Dr David Brandling-Bennett, Senior Advisor for Infectious Diseases, Bill & Melinda Gates Foundation

Mr Alan Court, Senior Advisor, Office of the UN Secretary General’s Special Envoy for Malaria
Dr Melanie Renshaw, Chief Technical Advisor, African Leaders Malaria Alliance
Dr Bernard Nahlen, Deputy Coordinator, US President’s Malaria Initiative
Dr Nichola Cadge, Health Adviser, UK Department for International Development
Dr Tom McLean, Chief Operating Officer, Innovative Vector Control Consortium
Dr Gunnar Riemann, Head of Environmental Science, Bayer CropScience
Dr Scott Filler, Senior Malaria Specialist, The Global Fund to Fight AIDS, Tuberculosis and Malaria
Dr Robert Wirtz, Chief, Entomology Branch, US Centers for Disease Control and Prevention
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