Interview

WHO Global Malaria Program: the road ahead

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Robert D Newman became Head of the WHO Global Malaria Programme in 2009. Previously, Dr Newman was Deputy Chief for Science and Chief of the Program Implementation Unit in the Malaria Branch at the Centers for Disease Control and Prevention (CDC). Dr Newman also served as the CDC Team Lead for the President's Malaria Initiative. Dr Newman originally joined CDC as an Epidemic Intelligence Service Officer in 2000. During his 9 years at CDC, Dr Newman was dedicated to advancing the science of preventing malaria during pregnancy and infancy in sub-Saharan Africa, and served as the principal investigator for numerous epidemiological studies and clinical trials. Dr Newman has served as a founding member of two large international research consortia, and has published more than 50 peer-reviewed articles on malaria and other infectious diseases.

■ **What prompted you to focus your work on infectious diseases in resource-limited settings, and specifically on malaria?**

When I was 24 years old and a medical student at John Hopkins (MD, USA) I was offered an opportunity to work on a NIH-funded research project looking at *Cryptosporidium* in a favela (slum) in Brazil. I was oriented to the project and then spent a year there working on the project, doing door-to-door surveillance for diarrheal diseases. It was a pivotal life experience. I realized very quickly after starting the project that this was my calling. I very much enjoyed the field work and conducting research that had a population-level impact. That set my career path in motion.

I went on to do my residency in Pediatrics and my Masters in Public Health, working in Brazil on and off. After finishing my MPH I was offered the opportunity to be Mozambique Country Director for a small nongovernmental organization, Health Alliance International (WA, USA), working with local government ministries of health to strengthen maternal and child health. That job showed me what it means to take evidence and implement it as best practice, doing that with ministries rather than through parallel structures. It was very difficult and slow work, but very rewarding: it was satisfying to watch and be a part of the tremendous progress of Mozambique in rebuilding its health systems after the civil war. It was during that time that I recognised that there was much more that could be done in malaria control in the region. My ministry counterparts agreed, and we began to try to scale-up the distribution of mosquito nets and other prevention activities. That really set me on the path to focus on malaria.

In 2000, I moved to the Centers for Disease Control and Prevention (CDC), where I stayed for 9 years in the malaria branch, eventually becoming Deputy Branch Chief for Science and the CDC team lead for the US President's Malaria Initiative. My years at CDC were very satisfying, allowing me to work on the whole of the research to program cycle. I was involved with developing evidence through field research, working with ministries to translate that to policy, giving development aid dollars to scale those policies up and implement them, and monitoring the efficacy, leading us to the next research question. It was an honor and privilege to work on that whole cycle at CDC.

■ **In July 2009 you were appointed Head of the Global Malaria Programme (GMP). What attracted you to this position?**

I think right now is a time of unprecedented opportunity in malaria control. We have resources at our disposal that were unimaginable even a few years ago. While we do not have a single 'magic bullet', we have a number of excellent tools that, when combined, can have a tremendous impact. I see the role of the WHO as a multilateral institution that ministries of health rely on for its neutrality, to be

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an honest broker in reviewing evidence and making recommendations as to how to proceed technically, and I think this is critical in the drive to combat and ultimately defeat malaria, I saw this as an opportunity to be part of something very important. The WHO has a huge role to play at the global level in its normative processes and its convening power, bringing together the world's experts to consider specific policy recommendations, and then packaging those recommendations and turning them into guidelines and operational manuals that countries can use to scale-up the best malaria control tools we have available. I saw that as a tremendous challenge and opportunity.

■ What are the main priorities for the GMP in 2010?

We have three main medium-term priorities for 2010 and beyond. First and foremost is the scale-up of malaria diagnostics along with appropriate antimalarial treatment using artemisinin-based combination therapies (ACTs). Up until now, in many parts of the world, especially in Africa, malaria has been diagnosed clinically. It is seen as 'fever equals malaria', and all patients with a fever have been treated with an antimalarial. We now know how fast drug resistance can spread and how many of those fevers are due to something other than malaria. Not only do we waste antimalarials and increase the risk of drug resistance, but we also fail to correctly treat all the other etiologies of fever. The scale-up of diagnostics, using microscopy where available or rapid diagnostic tests in more peripheral settings where microscopy is not feasible, is vital. This is not going to be easy: it is a paradigm change. It is essential that we not only work with healthcare providers to change their behavior and their reflexive treatment of all fevers as malaria, but also to rebuild their differential diagnostic skills. We have to make sure that they have the resources they need to treat other causes of fever, such as pneumonia and diarrheal disease. We also need to work with communities. For the last 100 years the message has been that fever equals malaria, and we are now telling people that malaria is diagnosable and that they need to go for a test. This is a change in algorithm and we need to make communities part of that. In some places where access to the formal healthcare system is difficult or impossible, the use of community health workers and community case management of fever is going to be critical if we are going to reach everyone with diagnostic and treatment services.

The other critical part of accurately diagnosing malaria is that it enables surveillance. As transmission of malaria drops as a result of our successful campaigns, it is important that we know where the cases are. Transmission does not drop homogenously; there are hotspots that remain. We need to know where those hotspots are so that we can bring additional resources to bear. When malaria resurgences recur, we can mount a response.

The second mid-term priority revolves around the role of the WHO in mitigating threats to successful malaria control. The biggest threats at the moment are drug resistance, insecticide resistance, poor-quality or counterfeit medicines and diagnostics, and poor-quality health services. These are not malaria-specific issues, and we will need to work with a whole range of partners. We need to stay ahead of the curve and be vigilant about these threats.

The third priority is building the peripheral-level capacity and community-level ownership of malaria control. In the push to scale-up malaria control, it has been a very top-down endeavour; it has had to be. But as malaria transmission drops again, we are going to need to work with district health teams to be able to look at their own malaria data and respond appropriately. That capacity takes time to build, and it is not something that the malaria program is going to build itself. But it will be critical if we are to sustain our success to date and move on to the next level.

■ How does the GMP coordinate with the various other malaria organizations? How could cooperation between organizations be improved?

There is no one organization or entity that can tackle a problem like malaria alone, so these partnerships are absolutely essential.

I see the center of the wheel as national malaria control programs. All other organizations, including the WHO, should be in

orbit around the national programs, They need to be setting the strategic vision and tapping WHO and other partners for the fiscal and technical resources required. That said, I do see WHO as having a key role. First, WHO needs to work closely with the ministries of health of member states and national programs. Civil societies and nongovernmental organizations are a critical part of the puzzle, particularly in community mobilization and getting the message of malaria control out to communities. For instance, it is critical to get mosquito nets out there, but it is no use if the nets stay under the bed – we need to make sure people are sleeping under them!

We also collaborate with academic institutions in operations research and evaluation. What we have today is an unprecedented scale-up effort, and hence an unprecedented opportunity to learn. That is something we need to do in partnership with academic institutions and other bodies.

The other entity that brings all of these bodies together is Roll Back Malaria. It is hosted here at the WHO, but brings together all the major players who are working towards the goal of dramatically dropping the burden of malaria, with a view to eventual elimination. I have nearly daily contact with the Executive Director of Roll Back Malaria, and I see our collaboration and communication as critical in making sure that we are all headed in the same direction.

■ **Is eradication of malaria a feasible goal?**

It is the only acceptable goal. Eradication will take more tools than we have available today, but we can make amazing preparatory progress towards that ultimate goal with today's tools. If we fully scale-up today's tools we can dramatically reduce the burden of malaria so that when the new tools come along, we will be poised to take malaria control that last mile towards eradication. That will not be in 10 years and I doubt it will be in 20 years, but in those intervening years we can make huge progress in dropping the burden of malaria both in terms of cases and deaths, and in the process learn what will be required to achieve eradication. There are people working across the spectrum on upstream development of new tools, whether that is a vaccine or an as yet unimagined tool. What is key is that we do not sit back and say that we cannot do anything until those tools are available. I firmly believe that we can make amazing progress with today's tools.

■ **What has changed since the last eradication effort in the 1960s?**

We are now less reliant on any one tool. We have learned that it takes an integrated package of tools, and I hope we have learned that it is going to take sustained commitment, that this is not something that will be achieved in a couple of years. The development of long-lasting insecticide-treated mosquito nets is a tool that we did not have in previous eras. This will allow a sustained effort at vector control in rural settings where indoor residual spraying is neither practical nor affordable. That gives us a sustainability that I do not feel that we had in previous eras. I also believe that the advent of rapid diagnostic tests and the ability to confirm malaria in areas where no such confirmation was once possible will lead to a paradigm shift.

The resources at our disposal today are unprecedented and if we can continue to convince the world that those resources are well spent, which I firmly believe they are, I think those resources will continue to flow. In addition, the drugs that we have available for treatment today, the ACTs, are highly effective in individuals, and there is evidence that they also have an effect in reducing transmission. They provide not only the individual effect, but a public health effect. If you bring all these tools together you have a picture of the tremendous forward progress possible with sustained commitment.

■ **A number of potential vaccines for malaria are entering clinical trials. How effective would a vaccine need to be before it was rolled out for clinical use?**

It is not possible to prespecify an efficacy level for implementation, particularly in advance of the availability of data from the Phase III trial that is ongoing for one of the most important candidate vaccines, the RTS,S vaccine. If the efficacy in prevention of severe disease is greater than 50%, or in prevention of clinical malaria

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is greater than 50%, or all-cause mortality is reduced in a statistically significant way, it is possible that those would be the sort of data that would be sufficient to make a policy recommendation. But is it very hard to give an *a priori* number as to what would make or break the decision. We will need the world's experts to think about this; experts in vaccines, malaria and public health. That said, we are all hopeful and eagerly awaiting the results from RTS,S and other candidate vaccine trials. It would certainly be a tremendous benefit to have an additional malaria control tool at our disposal. I would very much like to see a vaccine with sufficient efficacy to add to the malaria control arsenal.

■ **Are there any provisional plans being put in place for how to achieve effective vaccine roll-out?**

The GMP works together with the vaccine group here at WHO in convening the experts who will make recommendations to us on vaccine policy. They will also be looking at the implications of roll out of a vaccine. That is something that is in discussion. There is not yet a formalized plan for roll out: that would be premature at this juncture. But there is already a point person within the GMP and one within the vaccine department who are working together to prepare us for a possible scenario of having a vaccine recommended for wide-scale deployment.

■ **You were a co-author on a recent study demonstrating the efficacy of intermittent preventive treatment (IPT) treatment in infants in Africa [1]. How significant was the protective effect and what are the benefits of this strategy?**

The recent paper performs a meta-analysis of six clinical trials carried out in Africa using an inexpensive antimalarial medicine for IPT in infancy (IPTi). It showed a reduction by 30% in the number of malaria cases in infants in the first year of life. While that is not a magic bullet, it is a major reduction for an intervention that is very easily deployable and very inexpensive. Not only did it reduce malaria cases in the first year of life, but it also prevented all-cause hospital admissions, malaria-specific hospital admissions and the risk of anemia in the first year of life. It is an intervention that holds great promise, especially in countries where the full deployment of other interventions is difficult. I see this as yet one more useful tool that is about to become available for countries to scale-up. One thing that is very interesting is that it is another example of where malaria control strategies are constructed so that they are integrated into other programs, and in the process of rolling-out those strategies we support the health programs that deliver those other interventions. In the case of IPTi, we are working together with the expanded program on immunization, and in the pilot work carried out by six ministries of health with support from UNICEF, there are preliminary data that suggest that in some settings the uptake of expanded programs of immunization vaccines is higher where IPTi has been implemented. This may be because mothers see IPTi as an additional benefit on top of the vaccines they are already receiving. It is that sort of win–win that of course we love to see in public health: roll-out a new intervention, build it into an existing structure and strengthen the existing program.

■ **Drug resistance is a growing problem in malaria treatment. How is the GMP working to monitor and prevent drug resistance?**

Drug resistance is certainly a threat to success in malaria control, and so is a priority for the GMP. There is evidence of resistance to artemisinin in Asia, and the GMP, in collaboration with our regional offices in the area, are working with the host countries and other partners to rigorously monitor drug resistance in the region and mount efforts that contain that resistance to the area where it has been identified in Western Cambodia.

The fight against drug resistance is very challenging, and requires enormous resources, attention and dedication. The stamping out of artemisinin monotherapy needs to be completed – that is the greatest risk in generation of drug resistance. In addition, we need to be working with member states to make sure that they have the capacity to carry out drug efficacy testing, and that it is being done regularly and in sufficient sites so that we spot any development of drug resistance in time to mount

a response. This needs to occur in Africa too. In recent years, with the introduction of ACTs, I have noted a reduction in the frequency of drug efficacy studies being carried out in Africa. That is something we need to work with countries to turn around, because if drug resistance to artemisinin occurs anywhere other than Asia, we need to know about it quickly. Long-term plans involve the development of other types of drugs, either related to existing drugs or entirely new classes. It is critical that the upstream development work continues. Medicines for Malaria Venture (MMV) is engaged in coordinating much of the drug development. We will require all of our resources to stay one step ahead of what has been a very successful parasite.

■ In a recent letter to *Lancet*, you discuss the problems of implementing malaria interventions on a large scale [2]. What are the main barriers to scaling-up interventions, particularly in Africa?

The easy one is resources. Resources for malaria control, while they are enormous compared with what they were several years ago, are still not adequate to meet the demand that is out there to fully scale-up our tools. We have data that show that if we can fully scale-up those tools, the reductions in malaria cases, hospitalizations and deaths would be dramatic. It is very difficult to reach full scale-up in countries without sufficient resources. Even those who have the fiscal resources necessary to buy the commodities required still need the human resources. Countries need people at the central level to manage increasingly large and complex programs, at the district level to manage local programs, at the health facility level to treat and manage patients, and at the community level to deliver treatment and prevention to those who are beyond the reach of the formal healthcare structures. I see an urgent need to convince the world that those resources need to be mobilized and applied. I also see the need for thinking beyond malaria on many of these issues What will be required to sustain malaria control will be some of the same building blocks that will be required to sustain the control of diarrheal disease, TB, HIV and so on. We need strong health systems. Malaria control programs have done a lot to invest in existing programs and strengthen health systems. All investors in healthcare need to act wisely and use those resources not only to fight one disease, but more generally to strengthen healthcare systems. A major problem is how to maintain the excellence of healthcare workers in peripheral settings. This is going to require major thought and investment not only on the part of donors, but the countries themselves. We urgently need to find a way to pay peripheral healthcare workers a wage that motivates them to stay in the periphery and provide them with the non-monetary benefits that people need to work under difficult circumstances: mentoring, coaching and making people feel part of a wider team. These are very complex topics, but I believe that the human resource crisis in healthcare in the developing world is one we are going to have to solve at a global level if we are going to sustain the exciting gains we are starting to see in the Millennium Development Goals.

■ What are your views on the current level of funding that malaria research receives in comparison with other public health issues?

Because I have worked in malaria so long I know that the needs continue to be huge at every level, from upstream research to implementation, scaling-up programs and monitoring. I am also aware that there are many other healthcare priorities. That said, I see a couple of areas where I think more investment is needed. One is operations research: there has in recent years been an artificial divide between the field and the laboratory, and we need to remarry those areas. If we build the capacity for operations research at the country level, then countries will be able to evaluate what they are doing today, determine what works best and apply this to refining and improving their program for tomorrow. This cycle of learning and implementation is critical to achieve success in public health.

The other area is surveillance, monitoring and evaluation, which has to date been on the macro level, looking at commodities distributed and coverage of our interventions. It is imperative to invest in systems that will allow for the surveillance

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of malaria cases and the ability to respond to the resulting data at the local level.

I would also like to see research dollars spent on the best way to combine and sequence today's tools. How do we link prevention, treatment and surveillance to drive down the burden of malaria?

■ **The Roll Back Malaria campaign set a target to reduce malaria cases by 50% by 2010. How much progress has been made towards this goal?**

Tremendous progress is being made. I would state upfront that while 2010 is just around the corner, the investments that are going to give us the final surge are only just reaching the field now. The resources from the fiscal year 2008/2009 are just getting to countries, some of which are very significant increases on previous years, leading to a huge increase in commodities reaching national programs, particularly insecticide-treated mosquito nets, ACTs and diagnostic tools. So the early signs of success we are now seeing are just the tip of the iceberg. Evidence from some areas where scale-up has been completed or is near completion demonstrates dramatic drops (50% or more) in malaria cases, hospitalized cases and, in some countries, overall drops in all-cause childhood mortality. As we reach the end of 2010 and start to look back at how far we have come, we will find that where we have reached our coverage targets (80% of affected populations), we will also meet our impact targets. Where we fail to reach those impact targets are likely to be settings where, for one reason or another, the resources available to reach the coverage targets are not available. The message to the world is going to be that with today's tools, when you reach the scale-up targets as designed, the impact follows suit.

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■ **Do you think these types of targets are useful?**

I think that these goals have allowed people to have a shared vision, a common end point, clear marching orders. In a disease as complicated as malaria, in a global environment as diverse as today's, knowing where we are all trying to get to and how we are going to get there is critical.

■ **What trends do you expect to see over the next 10 years in malaria incidence and treatment?**

I see continued success as long as the investment continues. It is essential to understand that we are engaged in a long-term fight. It is not going to be over in 2010. What 2010 will show is that the investment made makes a world of difference and that we need to continue that. We need to remember, as we enter this next phase of the fight, that the reduced malaria transmission that we see translates into an enormous number of lives saved, particularly of women and children. Every year that we get closer to our goal, millions more lives will be saved. It will take longer to get there in Africa, but we will get there. I see 10 years of sustained forward progress and dramatic reductions in malaria deaths and cases, by 2015 getting those to very low levels, then entering a period where the challenge will be to sustain those goals, to ensure that national control programs stay adequately funded and staffed, and that global funding for commodities and technical assistance is there. We know what will happen if those resources dry up – malaria will resurge – history teaches us that. It is incumbent upon the world, having begun this fight, to stand beside malaria-endemic countries and see that fight through to the end.

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The author has no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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