WHO-EM/MAL/353/E

Report on the

Third malaria border coordination meeting between Afghanistan, Islamic Republic of Iran and Pakistan

Shiraz, Islamic Republic of Iran
20–22 October 2008

World Health Organization
Regional Office for the Eastern Mediterranean

WHO-EM/MAL/353/E

Report on the

Third malaria border coordination meeting between Afghanistan, Islamic Republic of Iran and Pakistan

Shiraz, Islamic Republic of Iran
20–22 October 2008

World Health Organization
Regional Office for the Eastern Mediterranean

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The World Health Organization does not warrant that the information contained in this publication is complete and correct and shall not be liable for any damages incurred as a result of its use.

Publications of the World Health Organization can be obtained from Distribution and Sales, World Health Organization, Regional Office for the Eastern Mediterranean, PO Box 7608, Nasr City, Cairo 11371, Egypt (tel: +202 2670 2535, fax: +202 2670 2492; email: DSA@emro.who.int). Requests for permission to reproduce WHO EMRO publications, in part or in whole, or to translate them – whether for sale or for noncommercial distribution – should be addressed to the Coordinator, Knowledge and Management and Sharing, at the above address; email HIT@emro.who.int).

Document WHO-EM/MAL/353/E/07.09/65

CONTENTS

1. INTRODUCTION

A third malaria border coordination meeting between Afghanistan, Islamic Republic of Iran and Pakistan was organized by the World Health Organization (WHO) Regional Office for the Eastern Mediterranean from 20 to 22 June 2008 in Shiraz, Islamic Republic of Iran. The objectives of the meeting were to:

- review the progress made and problems encountered in the implementation of malaria control and elimination strategies;
- update countries with new developments on malaria risk-mapping, prevention and case management;
- present the results of the joint (TDR) project on *vivax* malaria;
- review results of antimalarial medicine efficacy studies and discuss the establishment of a network for the monitoring of antimalarial medicine resistance and develop a plan of action;
- review implementation of the previous border meeting recommendations, and discuss achievements, challenges and the way forward for coming years;
- plan for the development of joint intercountry projects.

Dr Ambrogio Manenti, WHO Representative, Islamic Republic of Iran, delivered the opening remarks of Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean. Dr Gezairy said that malaria was still a global public health problem and that recent estimates by WHO (*World malaria report 2008*) had shown that nearly 50% of the world's population lived in areas at risk. Approximately 247 million cases and 881 000 deaths occurred annually; 91% of these deaths occurred in Africa, south of the Sahara; and 85% were among children under-5 years of age.

Dr Gezairy reminded participants that 54% of the total population resided in areas at varying risk of malaria transmission. The intensity of transmission was generally low in most areas. A comprehensive review of the community surveys conducted in malaria-endemic countries in the Region during 1985–2007 showed that, in 87% of the surveys, falciparum prevalence was below 10%, which meant malaria was hypo-endemic and elimination was feasible. Reported malaria cases had been gradually decreasing from 6.1 million in 2000 to 3.6 million in 2006. However, the reported figures represented only a fraction of the true incidence due to weaknesses in the health information systems. In 2008, WHO estimated 8.1 million malaria episodes and 38 000 malaria-related deaths annually in the Eastern Mediterranean Region.

The 2008 slogan of World Malaria Day was "Malaria—a disease without borders", which showed the important role of border malaria in view of the increasing population movement by all routes, often unregulated and illegal. He emphasized that addressing this

challenge required strong political commitment, an open and transparent line of communication, better understanding of local eco-epidemiology, and joint coordination and cooperation in the border areas. He urged participants to seriously re-evaluate the achievement of the first and second border meetings, study the challenges carefully and propose a clear strategy and plan of action for establishing a functional border coordination mechanism.

He reiterated the urgent need for reliable data on the burden of malaria morbidity and mortality, to monitor progress towards the stated goals. Noting the weakness of the malaria surveillance and information system in most high-burden malaria countries, it was important to develop reliable estimates. In 2007, WHO started the process of malaria burden estimation using reported data from malaria-endemic countries. The result of this activity was published recently as the *World malaria report 2008*.

Recent data from the countries of the Region showed almost 100% efficacy of ACTs. This effective tool needed to be used rationally, together with appropriate vector control and preventative interventions, until the fight against malaria was ended. Significant progress had been achieved in terms of establishing sentinel sites for monitoring, availability of recent medicine efficacy data and updating treatment policies using ACTs. He requested participants to plan for establishment of a network for better understanding of *vivax* malaria, monitoring of malaria parasite biology and antimalarial medicine resistance in these three neighbouring countries.

The Chair was shared on a rotating basis. The programme and list of participants are included as Annex 1 and 2, respectively. Annex 3 provides details of current/planned medicine monitoring for Afghanistan, Islamic Republic of Iran and Pakistan.

2. GLOBAL MALARIA PROGRAMME IN 2007

2.1 Malaria elimination in the Eastern Mediterranean Region: vision, requirements and strategic outlines

Dr Hoda Atta

Malaria is endemic in nine countries of the WHO Eastern Mediterranean Region, with low intensity of transmission in most areas. High and stable transmission is limited to the southern zone of Somalia and southern Sudan, which represented only 5% of the population at risk for malaria in the Region. Since the launch of the Roll Back Malaria (RBM) Initiative in the Region in 1999, and particularly in the past few years, malaria control has intensified in endemic countries and resulted in a reduction of the malaria burden. In 2008, WHO estimated 8.1 million annual malaria episodes in the Region compared to an estimated 15 million in 2000.

The last 5 years have seen a substantial increase in international funding for malaria control through major international financing mechanisms, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). Total cumulative approved grants from the GFATM represented US$ 383 million until the end of 2007. Resources were mobilized from

other partners, such as the Islamic Development Bank (IDB) and the United States Agency for International Development (USAID). National expenditure is still very low in high-burden countries and a substantial increase of funding is needed to achieve the set targets. With the availability of new tools for case management and prevention, improvements in communication technology, and the global interest in elimination, it was considered feasible to accelerate efforts to eliminate malaria in low transmission areas by 2020. In high transmission areas in the southern zone of Somalia and southern Sudan, substantial reduction of transmission could be achieved with full-scale deployment of the available tools.

A technical discussion paper on "Malaria elimination in the Eastern Mediterranean Region: vision, requirements and strategic outline" was presented to the Fifty-fifth Session of the Regional Committee, which was held in the Regional Office, Cairo, from 11 to 14 October 2008. The committee adopted a resolution (EM/RC55/R.9) supporting the way forward for malaria elimination. Moving toward elimination requires targeted, custom-tailored mosquito control interventions to reduce the vectorial capacity and human-vector contact in the active foci with the aim of halting transmission nationwide. Interventions in pre-elimination programme should include geographical reconnaissance, establishing GIS database on foci, vectors, cases, full coverage by quality diagnosis and treatment, effective vector control tools (mostly IRS and may be complemented by insecticide-treated bednets (ITNs) in the focal areas of transmission).

Proposed regional objectives by 2020 are to:

- eliminate *falciparum malaria* in countries in Asia;
- limit *vivax* transmission to a few foci in Afghanistan and Pakistan (incidence <1 per 10 000 population at risk);
- limit malaria transmission in Djibouti, north and central zones of Somalia and northern Sudan to a few foci in the hard-to-reach and border areas (incidence <1 per 10 000 population at risk); and
- control malaria as a public health problem, in southern Sudan and southern zone of Somalia (no mortality and malaria prevalence among fever cases <5%, and from malaria).

Resolution (EM/RC55/ R.9) urged all Member States in which malaria is endemic to:

- strengthen and sustain their commitment and support to malaria prevention, control and elimination, and include malaria elimination in the national development plan;
- develop a national multi-year strategic plan to eliminate malaria in areas where it is feasible;
- ensure universal coverage of all populations at risk with effective diagnostic, treatment and prevention tools free of charge and exempt from all taxes and tariffs;

- strengthen collaboration with research agencies to address programme needs for elimination;

- ensure that the malaria control and elimination programme has the necessary resources and make use of the resources available from donors for health system strengthening;

- strengthen collaboration with neighbouring countries in malaria control, with particular attention to the surveillance network.

Member States that have achieved or are close to malaria elimination were requested to: maintain vigilance and strong surveillance systems to identify and control imported malaria and prevent re-establishment of malaria transmission as a result of importation; and establish/strengthen functional collaborative mechanisms to support malaria elimination efforts in countries of the Region where the burden of malaria is still high, including provision of financial and human resources.

Malaria elimination is expected to bring substantial benefits in terms of socioeconomic development, improvement of the living standards of the population and increase in local and international tourism. Investment in malaria elimination would help other public health programmes to achieve their goals, including prevention and control of neglected tropical diseases.

2.2 Progress on IVM implementation and vector control updates

Dr Abraham Mnzava

Progress on the implementation of the integrated vector management (IVM) approach—the endorsed regional strategy for the control and prevention of vector-borne diseases in countries of the Eastern Mediterranean has been reported. Nine of the 12 disease-endemic countries have IVM plans, have established national intersectoral coordination mechanisms and four have a vector control unit responsible for all vector-borne diseases. A regional initiative to strengthen capacity in medical entomology and vector control has been established to ensure that countries have the appropriate capacity to implement IVM. In view of this, a Master of Science course was launched in August 2008 in Sudan. Two other courses, in collaboration with WHO, will be launched in the Islamic Republic of Iran and in Pakistan in January 2009. The latter case is the result of national efforts to ensure that each district in Pakistan has a well-trained entomologist/vector control expert. The course in the Islamic Republic of Iran would also serve Afghanistan.

Where LLINs are a strategy for malaria control and prevention, countries have made good progress in scaling up this intervention. Of the three countries participating in this border meeting, Afghanistan has scaled up this strategy despite struggling with health system issues in general. It is worth noting that, over the last three years, the number of people accessing this intervention in the Region has increased from 3.6 million in 2005 to approximately 18 million people in 2007. The projection for 2008 is 30 million people given the availability of resources and access to five WHOPES-approved LLIN products. As this is the main vector control intervention, especially in Afghanistan and Pakistan, it is important

that the programmes aim at universal coverage with LLINs. Given that it may not be possible to achieve in one step, a phased approach to implement this may be needed based on epidemiological stratification.

Recent reports of pyrethroid resistance in parts of central Sudan have not only reduced the number of available arsenals to fight malaria and other vector-borne diseases, but also pointed to the need to strengthen the capacity to monitor and manage vector resistance. There is a need to assess the potential epidemiological impact of the resistance, as well as the identification of resistance mechanisms, in the framework of the current TDR network. Based on studies elsewhere, pyrethroid resistance reduces the impact of insecticides on transmission control, as well as for personal protection. In other words, vectors are not killed on contact and also succeed in taking a blood meal increasing the probability of transmitting malaria. Capacity to monitor insecticide resistance is weak in Pakistan and Afghanistan, unlike in the Islamic Republic of Iran. It is expected that through an established network on monitoring insecticide resistance, the Islamic Republic of Iran can coordinate and support the two countries in this important area of surveillance.

2.3 Malaria elimination progress in the EURO Region

Dr Elkhan Gasimov

The malaria situation in the European Region of WHO started to deteriorate at the beginning of the 1990s. During that time the residual reservoir of malaria infection, aggravated by political and socioeconomic conditions, mass population migration, extensive development projects, and almost discontinued activities on malaria prevention and control constituted conditions favourable for malaria transmission. As a result, large-scale epidemics happened in Central Asia and the Trans-Caucasian countries, and a total of 90 712 malaria cases were officially reported in the Region in 1995. In those years, Azerbaijan, Tajikistan and Turkey suffered explosive and extensive epidemics, while Armenia, Turkmenistan and Kyrgyzstan faced outbreaks on a smaller scale. From 1995–2007, the reported number of malaria cases in the Region declined from 90 712 to 1226. For the seven months of 2008 the number of cases reported in the Region was less than 500.

In Central Asia and Kazakhstan, where malaria was almost a forgotten disease in the 1980s, nearly 13 million people, or 30% of the total population, live in areas at risk of malaria at present. The situation in Central Asia is illustrative of the rapid evolution of the malaria problem over the past 12 years. Tajikistan was the most affected country of this subregion. The number of malaria cases reported in Tajikistan peaked in 1997, when nearly 30 000 cases were registered. Tajikistan is suffering both from *P.vivax* and *P.falciparum* malaria. The highest number of *P.falciparum* was registered in 2000 (831 cases). As a result of large-scale malaria control activities considerable progress was achieved in Tajikistan. For the eight months of 2008, 153 *P.vivax* cases have been registered in the country. By the end of September no *P.falciparum* cases were registered. In Kazakhstan an, increase in the number of imported malaria cases was recorded from 1990–1997, and the first malaria cases due to local transmission were reported in 1992. During 1999–2001, 10 cases of autochthonous malaria were registered within the area of southern Kazakhstan and Almaty. There have, however, been no reported cases of autochthonous malaria in recent years (2002–2008). In 2002, the

explosive resumption of malaria transmission produced an epidemic situation in Kyrgyzstan, and a total of 2267 autochthonous *P.vivax* cases were reported in the south-western regions. In 2004–2008, as a result of the application of epidemic control measures, there was a significant decrease in the reported number of autochthonous malaria cases (less than 50 for seven months of 2008).

In 1999 in Uzbekistan, due to a steady increase in imported malaria and the presence of conditions favourable for malaria transmission, the first autochthonous cases of malaria, seven in all, were registered. A more than fivefold increase in the number of autochthonous malaria cases was witnessed during 1999–2000. In 2007, 46 autochthonous cases of *P. vivax* malaria were reported in the country.

By 1998, the malaria situation in Turkmenistan had taken a drastic turn for the worse and 108 malaria cases were detected. To prevent further spread of malaria, programme personnel carried out seasonal chemoprophylaxis with chloroquine and indoor residual spraying. Since 2006 no local malaria cases have been reported in the country. It is very probable that the country will initiate the process of certification of malaria elimination in 2008–2009.

In the Trans-Caucasian countries and Turkey, past and recent large-scale epidemics of *P. vivax* malaria have underlined the fact that all these countries are situated within epidemic-prone areas in which the explosive resumption of malaria transmission could follow the weakening or discontinuation of malaria control and preventive activities, and/or it may be greatly influenced by agricultural and development efforts. Despite a significant decrease in the reported number of malaria cases in the Trans-Caucasian countries and Turkey from 1995 to 2007 (from 84 594 in 1995 to 132 in 2007), almost 25 million people, or about 30% of the total population, still live in areas at varying degrees of risk of malaria.

In Armenia, the malaria situation remained stable until 1994. In subsequent years a downgrading of malaria preventive services and a weakening of the malaria surveillance system resulted in a steady increase in the number of malaria cases, reaching 1156 by 1998. Over 98% of these cases were detected in the Masis district of the Ararat valley, an area bordering Turkey. In recent years, owing to epidemic control interventions, the number of autochthonous malaria cases has continued to decrease, dropping to 3 in 2005. Since 2006 no local malaria cases are registered in the country. Armenia is targeting elimination of malaria by 2010.

In Azerbaijan, the malaria situation began to deteriorate rapidly after 1990, as a result of an almost complete cessation of malaria preventive interventions, hydro-engineering and melioration activities, as well as intense population movements. In 1996, the number of malaria cases reached 13 135. Over the course of 1997–2007, as a result of large-scale epidemic control interventions, the malaria situation in the country continued to improve, with only 110 cases reported in 2007. For nine months of 2008 only 66 cases of *P.vivax* malaria were reported.

In Georgia, the malaria situation began to deteriorate in the mid-1990s as a result of a drastic reduction of activities aimed at the prevention of malaria transmission and the intensification of population movements. The first three cases of local malaria transmission were detected in 1996 among residents of a district bordering Azerbaijan. In subsequent years the number of malaria cases continued to increase, reaching 473 in 2002. For eight months of 2008 the country reported about 12 autochthonous cases.

Great progress with malaria control was achieved also in Turkey. Compared to 1994 when almost 90 000 cases were reported in 2008 for seven months only 64 cases were registered in the country. Since 2008 all malaria-affected countries of the Region have moved to the elimination phase.

The malaria elimination initiative in the WHO Regional Office for Europe was first announced in 2005 during a meeting held in Tashkent, Uzbekistan, 18–20 October 2005 on the malaria elimination initiative in the WHO European Region. The Tashkent Declaration "The move from malaria control to elimination" called on all Member States to support the Regional Office for Europe in its efforts towards the elimination of malaria in the Region by 2015 and was endorsed by all malaria-affected countries of the Region. In 2006 the regional strategy "The move from malaria control to elimination in WHO European Region 2006–2015" was developed and endorsed. The regional goals are to interrupt by 2010 the transmission of *P. falciparum* in Tajikistan and the European region as a whole and P. *vivax* in Armenia and Turkmenistan; and to interrupt by 2015 the transmission of malaria and eliminate the disease within all affected countries of the Region.

2.4 Progress report of the 2007 activities of the WHO Regional Office for the Eastern Mediterranean

Dr Ghasem Zamani

The Regional Office supported the first and second regional training courses on malaria microscopy, conducted at the regional centre of excellence in Oman. All malaria falciparum-endemic countries, except Yemen, are now implementing an updated treatment policy using ACTs. Some malaria-free countries have updated their treatment guidelines for treating imported falciparum cases with ACTs, which are provided as required from the small stock in the Regional Office. To increase community access to reliable diagnosis and treatment, the Regional Office supported two pilot projects on the home management of malaria in Afghanistan and Sudan. National malaria control programmes will use the results of these studies to roll out a strategy to cover those without access to health services and the population in difficult-to-reach areas. The Regional Office supported Pakistan in its efforts to ban manufacturing of oral artemisinin monotherapy and to produce ACT instead.

Implementation of the strategy of insecticide-treated nets is being scaled up in endemic countries with support provided by the GFATM. Collaboration with the IDB and the Iran Export Development Bank was established to provide financial support for expansion of the Khartoum and Gezira malaria-free initiative to two other states in Sudan.

In 2007–2008, the Regional Office supported nine operational research projects in the field of malaria. A multicountry project between Afghanistan, Islamic Republic of Iran and Pakistan on *P. vivax* molecular markers in collaboration with the Pasteur Institute of the Islamic Republic of Iran was started and preliminary results will be presented in this meeting. WHO is collaborating with UNICEF (and KEMRI) to conduct malaria operational research in Somalia. Activities for monitoring the efficacy of antimalarial medicines using the established sentinel surveillance sites were supported in Afghanistan, Pakistan, Somalia, Sudan and Yemen.

The Regional Office provided training and technical support to Afghanitan, Islamic Republic of Iran, Pakistan, Sudan and Yemen for submission of malaria proposals to the GFATM in round 7 and 8, all proposals of round 7 and the Afghanistan proposal for round 8 were approved and a proposal for malaria control through the basic development needs approach in Nangarhar Province, Afghanistan, was submitted to the International Islamic Relief Organization and implementation started. Collaboration with the IDB and the Iran Export Development Bank was established to provide financial support for expansion of the Khartoum and Gezira malaria-free initiative to two other States in Sudan. A proposal for training and laboratory strengthening as part of infectious disease control through the WHO Umbrella Grant was submitted to USAID/Afghanistan and approved and implementation started.

Some of the achievements for strengthening malaria monitoring and evaluation include: conducting a (MESST) workshop in Yemen, Somalia, Sudan (North and South) and Afghanistan; implementation of the malaria database in selected provinces/states in Afghanistan and Sudan; pilot implementation of new data collection tools for malaria case management: patient cards, stock management card register forms and a monthly report in Afghanistan and Sudan; data collection; and publication of the *World malaria report*.

3. MALARIA CONTROL AND ELIMINATION: PROGRESS, CHALLENGES AND LESSONS LEARNT

3.1 Afghanistan

Dr Najibullah Safi

The vision of the national malaria and leishmaniasis control programme is “Malaria-free Afghanistan”. The mission of the control programme is to develop itself into a technical department of the Ministry of Public Health, staffed by qualified and motivated health professionals who will lead and carry out malaria and leishmaniasis prevention, develop evidence-based national policies, quality control and timely detection and treatment of patients in an integrated system at the point of service delivery, with the purpose of reducing the burden of malaria and leishmaniasis as a public health problem in Afghanistan. The goal of the programme is to contribute to the improvement of the health status in Afghanistan through the reduction of morbidity and mortality associated with malaria to:

- reduce malaria morbidity by 60% by 2013 (baseline 19 cases per 1000 population, 2007 data);

- reduce malaria mortality by 90% by 2013;
- reduce the incidence of falciparum malaria to sporadic cases by 2013 with a vision to interrupt transmission of *P. falciparum*.

There has been a steady decline in the reported number of confirmed malaria cases. The number of *P. vivax* cases decreased from 330 083 in 2002 to 79 574. Reported *P.falciparum* cases during this time period decreased from 84 524 to 6098 cases. Comparison of data between the first two quarters of 2007 and 2008 shows that there is a 36% decline in the number of *P.falciparum* cases (1607 versus 1024).

Development/update of national strategic plan 2008–2013, national treatment protocol, epidemic preparedness and response guideline, malaria microscopy for laboratory technicians, diagnosis and treatment of severe complicated malaria, malaria treatment guidelines for community health workers, national IVM strategic plan are the main achievement in the field of policy and guidelines in recent years. The malaria control programme managed to add malaria to the school curriculum, establish 14 quality assurance centres and 30 microscopy centres in 30 basic health centres, improve malaria reporting system, and train Basic Package of Health Services (BPHS)-implementing nongovernmental organizations' laboratory technicians, physicians and pharmacists.

In 2008 more than 1 million LLINs were distributed in target provinces. ACT is available in the majority of comprehensive health centres and district hospitals. The malaria control programme has been successful in resource mobilization with US$ 14 million, round 5 phase 2 Global Fund, US$ 1.7 million USAID and €55 397 259 from Global Fund round 8. Monitoring of anti-malarial medicines since 2003, pilot implementation of home-based management of malaria supported by TDR and the role of the private sector in the control of malaria are some research activities conducted by the malaria programme.

Insecurity, scarcity of resources both financial or human, lack of motivation, a fragmented health care system, poor coordination among stakeholders, time-consuming bureaucracy, geographical, economical and cultural barriers affecting easy access to facilities with laboratory services, absence of laboratory facilities in health posts and basic health centres, an unregulated private sector, the wide practice of self-medication and sustainability of the programme are the main challenges that the malaria control programme is facing.

Considering financial support for malaria from GFATM round 5 phase 2 and round 8, and for the health system strengthening in round 8 linked to malaria, establishment of new health facilities (subcentres) under GAVI funds to strengthen the health care system, donors' interest in malaria control worldwide, political commitment, enhanced technical support and better cooperation with WHO and community participation, the future of malaria control is promising.

3.2 Islamic Republic of Iran

Dr Ahmad Raeisi

The total number of reported malaria cases in 2007 was 15 712. The figure for 2008 until the beginning of October 2008 was 6570, which was a 41% decrease in comparison to the same period in 2007; 95% of reported cases were from Sistan, Baluchestan and Hormozgan provinces. 14% of reported cases until the end of September 2008 were *P.falciparum*. In the same period, 12% and 10% of reported cases were from Pakistan and Afghanistan, respectively.

The goal of combating malaria changed from control to elimination in 2006 according to the plan prepared with WHO collaboration. The consists of a preparatory stage (1–2 years), and second stage for 2 years, elimination of *P. falciparum* and reduction of local transmission of *P. vivax*, and a third stage of 3 years, reduction of local transmission of *P.vivax* to approximately 500 –700 annual indigenous cases.

Hormozgan province and tropical areas of Kerman province are targeted by the malaria control programme selected as priority areas for malaria elimination strategy as these regions are less affected by the problems of border areas. Also it appears that in the near future, elimination of *P.falciparum* will be more feasible and cost effective. Strengthening the national capacity and reduction of local transmission of falciparum malaria and the number of falciparum foci during recent years are the main achievements of this strategy so far.

3.3 Pakistan

Dr Altaf Bosan

Of the country's population 48% are living in highly endemic areas, and in Punjab, where the malaria situation is under control, 52%. The current annual parasite incidence is 0.74 cases/1000 population, and is highest in Balochistan (6.33), followed by Federally-Administered Tribal Areas (6.19), North-West Frontier Province (0.8) and Sindh (0.7). The falciparum rate is 43% in Balochistan, 33% in Sindh, 19% in Punjab, 16% in the Federally Administrated Tribal Areas and 10% in North-West Frontier Province.

The main achievements of legislation include: a ban of monotherapy; development of a national plan of action for dengue control; the creation of a technical advisory committee at national level; the training of 3500 staff of different categories, the conducting of operational research on monitoring the efficacy of antimalarial medicines (artesunate and SP) in five sentinel sites country in 2007–2008; completion of sample collection from the selected site in Kurram as part of cross-border collaboration and a joint project with the Pasteur Institute of Islamic Republic of Iran on *vivax* malaria; procurement of LLIN and four heavy duty fog machines; the securing of 140 000 doses of ACT from the Government of China; media coverage of the problem and the distribution of printed material for behaviour change communication (BCC). In addition, support was provided to earthquake and flood-affected districts in 2007 and 2008.

GFATM round 7 support is only for the 19 highest risk districts, which are mainly located along borders with the Islamic Republic of Iran and Afghanistan. During limited time, the Directorate recruited 26 senior and other required staff for the project management unit of round 7; procured vehicles and motorcycles and handed over to all six sub-recipients and released disbursement to sub-recipients subsequently. Government support is also visible in the form of PC-1 and Pakistani Rupees. 658 million have been approved. It is hoped that the activities of the programme will start in December 2008.

Concerning cross-border coordination, the Directorate of Malaria Control has constituted border coordination committees in border districts, and directed focus to border areas during GFATM round proposal development; established sentinel sites for early detection of malaria outbreaks in border areas; established functioning sentinel sites for antimalarial medicine efficacy monitoring; selected districts for demonstration project on vector control through TDR support; and developed three country projects for determination of molecular epidemiology of *vivax* malaria.

There are challenges to the programme in meeting the time-line of PC-1 activities before June 2009 and achieve set performance and programmatic indicators. Provincial ownership and resource allocation require that a realistic approach is adopted by the provinces with the Directorate coordinating.

The Directorate has planned to go for GF round 9 for elimination of malaria from the Punjab and presented the concept paper in the Country Coordinating Mechanism (CCM) which was duly agreed upon. A situation analysis by a WHO Consultant was conducted in September 2008 as a first step towards round 9. There are two areas requiring technical assistance: gap analysis and proposal writing.

3.4 Iraq

Dr Muthana Ibrahim Abdul Kareem

In recent years, the incidence of malaria has decreased significantly from 1860 in 2000 to 47 cases in 2005; 40 of these cases were from Erbil, Duhok and Al Sulaymaniyeh. In 2007, only three malaria cases were reported from the Erbil governorate, only two of which were locally transmitted. All malaria cases in Iraq are confirmed cases. In this year, more than 844 000 blood slides were examined, of which 1.5% were detected through active case detection. Anti-malarial medicines are limited to the government health sector. Chloroquine and primaquine are used for the treatment of *P. vivax* while for *P. falciparum* the first line of treatment is artemether/lumifantrine. Quinine is used in case of treatment failure and for pregnant women.

Vector surveys are carried out routinely in 10 stations in each governorate where 10–20 visits are paid monthly for observation, collection and measurement of vector density. Indoor residual spraying (IRS) was carried out in targeted areas in two rounds. 34 978 house structures were targeted for spraying in each round more than 96% coverage. In the same period more than 6 million people were protected by space spraying and 250 000 breeding sites were treated by larviciding activities. Until now, and in collaboration with the

leishmaniasis control programme, a total of 520 000 LLINs were made available to the targeted population.

Currently, many challenges are facing the malaria control programme in Iraq, including the instability of the political situation and insecurity, rehabilitation of marshes, irregular provision of resources, improper communication and population movement and the possibility of imported cases from endemic countries.

3.5 Tajikistan

Dr Narges Saparova

Until the late 1950s malaria was one of the most widespread diseases in Tajikistan. As the outcome of a large-scale malaria eradication campaign that started at the end 1940s, *P. falciparum* malaria was eradicated by 1957, whereas the local transmission of *P. vivax* continued. The number of malaria cases reported in Tajikistan reached its peak in 1997, when nearly 30 000 cases were registered. The deterioration of the malaria situation in the country in the 1990s was linked to armed conflict, mass population movement across zones of intensive transmission of malaria, particularly Afghanistan, where malaria is endemic, and the disruption of public health care services and vector control activities. Lack of maintenance of the irrigation system and marked changes in agricultural practices, particularly the increase in the cultivation of rice, have led to an increase in vector breeding grounds. However, in the last decade the number of reported malaria cases has significantly declined. In 2006, Tajikistan endorsed the “Tashkent Declaration” and committed itself to eliminate *P.falciparum* malaria transmission in the country by 2010 and *P.vivax* by 2015.

The Khatlon Oblast, bordering Afghanistan is the most affected area by malaria of the country with total population of 2.2 million and 75.1% of all malaria cases reported in the country. More than a threefold reduction of malaria cases and foci has been reported for the eight months of 2007 and 2008, 436 cases in 348 foci and 153 in 111 foci, respectively. In 2007, the number of *P.falciparum* cases dropped to a record low for the first time since 1990 and the country reported seven *P.falciparum* cases in four foci. No *P.falciparum* cases were reported for the eight months of 2008 throughout the country.

The national malaria control programme is being supported by GFATM in the fifth round. The overall budget of the GFATM malaria project is US$ 5 383 510. Project implementation started in April, 2006. Under the project, the programme is being conducted as a complex of antimalarial activities: capacity-building, strengthening of the surveillance system, improving early diagnosis and treatment, IRS, fish distribution, bednet distribution, in addition to community-based activities. The CCM of Tajikistan has a submitted a malaria elimination proposal to round 8 of GFATM and the proposal was approved.

4. NEW DEVELOPMENTS ON BURDEN ESTIMATION, MONITORING MEDICINE RESISTANCE AND *VIVAX* MALARIA

4.1 *World malaria report* and the malaria burden

Dr Richard Cibulskis

The procedure for making improved estimates of malaria case incidence using data from routine case reports involves: (i) estimating the total number of parasite-positive cases attending health facilities covered by the Ministry of Health's (HMIS); this is given by the confirmed malaria cases plus the probable cases multiplied by the slide positivity rate; (ii) the estimate of confirmed cases is adjusted to take account of missing HMIS reports; by dividing by the health facility reporting completeness fraction; (iii) the revised estimated number of confirmed cases attending health facilities in the HMIS is then adjusted to take into account for the propensity of fever cases using health facilities not covered by the HMIS (e.g. those going to the private sector) or not seeking treatment at all; information on treatment-seeking behaviour is derived from nationally representative household surveys, such as demographic and health surveys and multiple indicator cluster surveys. The number of deaths is estimated by applying a fixed case fatality rate of 0.3% to the estimated number of cases. The procedure was used in the *World malaria report 2008*, for all countries outside of Africa and selected countries in Africa. It yields an estimate of 8 million cases of malaria for the Eastern Mediterranean Region in 2006 (range 7 million to 8.4 million) and 38 000 deaths (range 20 000 to 60 000).

For most countries the estimates of disease incidence are more consistent with country and regional knowledge than previous estimates. The advantages of using routinely reporting information to provide information on malaria case incidence are several. Firstly, routine case reports are often available for all geographical units in a country. Secondly, incidence estimates can be obtained continuously over time and will be responsive to changes in climate and implementation of interventions. Thirdly, they can be readily incorporated into country managerial processes. There is still, nevertheless, a need for other methods of assessment based on community surveys, or mathematical modelling to help calibrate and validate estimates obtained from routine reporting systems.

WHO is preparing for the *World malaria report 2009*. Procedures will be similar to those used for the *World malaria report 2008* but there will be increased efforts to obtain better information on: (i) reporting rates in country surveillance systems; (ii) the incidence of malaria by district; (iii) the malaria burden in those countries that comprise a high proportion of a Region's burden.

4.2 Technical presentation on medicine efficacy studies

Dr Marian Warsame

Prompt and effective case management remains one of the major means of reducing malaria morbidity and mortality due to malaria. The success of this strategy relies on the ability of ministries of health in affected countries to provide access to antimalarial medicines with proven high efficacy. Malaria control programmes and institutions therefore need to be

able to evaluate antimalarial medicine efficacy in a way that provides timely, relevant, reliable and comparable information. With such information, ministries of health can better ensure efficacious management of clinical cases by detecting changing patterns of resistance early and modifying national malaria treatment policies accordingly.

From a programmatic point of view, data on the therapeutic efficacy and safety of an antimalarial medicine or medicine combination are the most useful in deciding whether or not the current first-line treatment in a country is still appropriate. Therapeutic efficacy testing (also known as in vivo testing) involves the repeated assessment of the clinical and parasitological status of patients treated with a particular medicine over a fixed period of time. Reappearance or persistence of malaria parasites, with or without accompanying symptoms and signs of clinical malaria, is used as an indicator of reduced parasite sensitivity with that medicine. When such evaluations are conducted consistently over time in a reasonable and representative selection of sites, national malaria control programmes should be able to monitor medicine efficacy in a way that will allow changes in treatment recommendations or policies to be made early enough to minimize the impact of a failing treatment regimen.

Standard guidelines for in vivo testing of antimalarials have been developed by WHO. These guidelines were later revised to make them relevant to areas of both high and low-to-moderate malaria transmission. In 2005, these guidelines were further modified to emphasize achievement of both "clinical" and "parasitological" cure (that is, elimination of both clinical symptoms and parasitaemia) among treated patients, rather than aiming for only a "clinical" cure, which until recently has been the standard in areas of high malaria transmission.

This is a new WHO document which has been developed on the assessment of antimalarial medicine efficacy for the treatment of uncomplicated falciparum malaria to assist national malaria control programmes in carrying out standardized medicine efficacy studies as simply and cost effectively as possible.

The fundamental design of this protocol is intended to evaluate the therapeutic efficacy of a wide range of registered antimalarial medicines used for treating uncomplicated *falciparum* malaria, providing the minimum information required for programmatic decision-making. Studies that follow this basic design, when conducted periodically in a number of appropriately selected sentinel sites, can form the basis of a surveillance system capable of monitoring change in medicine efficacy over time. Programmes will probably want to evaluate more than one medicine. For example, it is common for programmes to evaluate both the current first-line and second-line treatment, as well as one or more potential replacement treatments. However, the protocol is not designed for either the evaluation of new or experimental medicines or the direct comparison of the efficacy of one medicine to another. Such studies usually require design, ethical and statistical considerations that are beyond the scope of this protocol.

The design is a simple, one-arm, prospective evaluation of the clinical and parasitological response to directly observed treatment for uncomplicated malaria. Modifications to the protocol that do not change its fundamental design or intended purpose (such as when measuring blood levels of the medicines, combining with assessments of in

vitro sensitivity and/or molecular markers for medicine resistance, or extending the period of follow-up) can be made, and when technically and logistically feasible, are even encouraged.

In all areas, regardless of the intensity of malaria transmission, the evaluation of antimalarials for uncomplicated malaria should emphasize treatment efficacy in children under 5 years of age with clinically apparent malaria. The rationale for this requirement is that, even in populations with a low level of acquired immunity (as it occurs in areas of low or highly seasonal malaria transmission), younger children often have a less favourable therapeutic response to antimalarial medicines than do older children and adults. In areas of low malaria transmission, exclusive enrolment of children under-5 years of age is likely to pose logistic difficulties because of the relative infrequency of malaria infection in this age group. In such cases, or in settings where young children are at substantially lower risk of infection than adults, for example, with occupational exposure in some south-east Asian countries, patients of all ages can be enrolled. Nonetheless, wherever possible, it is recommended that a sufficient number of patients be enrolled to allow for stratification of results based on age (under-5 years of age and older than 5 years of age).

To be able to interpret and compare efficacy results within and between regions, and to follow trends over time, efficacy tests must be conducted with similar procedures and standards. Therefore, WHO has placed emphasis on standardizing available methods. In spite of its limitations, the WHO therapeutic efficacy test remains the gold standard for determining antimalarial medicine efficacy from a programmatic point of view because it provides decision-makers with a straightforward, readily understandable indicator of the efficacy of an antimalarial medicine or combination treatment in a given population at risk. The therapeutic efficacy test, however, is not sufficient on its own to confirm true medicine resistance, why other methods, including measurement of antimalarial medicine levels in the blood, in vitro drug sensitivity assays and detection of molecular markers of resistance are therefore needed.

To facilitate entry and interpretation of data and results from therapeutic efficacy tests, WHO/Global Malaria Programme (GMP) has developed a programme running under Excel®, which can be downloaded free of charge from: http://www.who.int/malaria/toolsformonitoring.html. The programme supports double-entry of data, and enables users to be instantly informed of the evaluation criteria for the study of a patient.

Reported local cases of treatment failure with a given medicine regimen are important early indicators of growing rates of resistance. From a policy perspective, however, summary estimates of the general level of treatment failure in a given geographical area and population over time is required to adequately update national malaria treatment policy, and such estimate needs to be based on comparable and standardized data from different sentinel sites. To facilitate the use of such standardized assessments, a comprehensive database of published and unpublished efficacy studies has been established by WHO. The aim of this database is to assess the situation of antimalarial medicine efficacy and medicine resistance, and to compile all relevant information to assist countries in deciding if and how best to revise their antimalarial treatment policy. The first estimates on the global levels of medicine resistance in

the period from 1996 to 2004, taking advantage of coherent analyses of the results in the WHO database were published.

4.3 Genetic characterization of *Plasmodium vivax* populations in Baluchistan province of the Islamic Republic of Iran, Afghanistan and Pakistan: implication for malaria control

Dr Sadigheh Zakeri

Plasmodium vivax imposes a serious burden of morbidity in malaria-endemic areas outside of Africa and represents a serious threat to travellers and military personnel. *Vivax* malaria is an exhausting, debilitating disease, which impairs quality of life and economic productivity. In addition, resistance of this parasite to chloroquine is reported in some countries and may spread widely. Therefore, a study of parasite population structure is essential for providing applied data on geographical variations and the distribution of existing parasite strains for medicines and vaccines development in a malaria-endemic region. The current study was undertaken to evaluate and compare genetic diversity and population structure of *P. vivax* in natural isolates from the main endemic areas in the Islamic Republic of Iran, Afghanistan and Pakistan.

Blood samples from 140 Afghani, 100 Iranian and 199 Pakistani patients infected with *P. vivax* were collected between April and September 2008. The *P. vivax* isolates were genotyped at three polymorphic loci, pvmsp-1 (variable block 5), pvmsp-3α and pvcsp genes by using nested-PCR/RFLP and sequencing analysis.

The results showed that *P. vivax* populations in the three countries are highly diverse and different distinct allelic forms were found among them. Among *P. vivax* isolates of three countries the most prevalent type of pvmsp-1 was Sal-I, for pvcsp the VK210 variant and for pvmsp-3α type A. The overall mixed genotype infections was 6.7%, 18% and 25.5% for Afghani, Iranian and Pakistani isolates, respectively.

The results clearly demonstrated marked polymorphism among Afghani, Iranian and Pakistani *P. vivax* parasite populations, which will provide baseline information for epidemiological studies in the Eastern Mediterranean Region. Furthermore, the presence of extensive allelic variation among samples in such a low endemic malaria region may be explained by the fact that this contact zone between the Indian subcontinent and Islamic Republic of Iran, Afghanistan and Pakistan is acting as a rich gene pool for different species of parasite. Therefore, movement of people within and between Islamic Republic of Iran, Afghanistan and Pakistan may introduce different alleles of *P. vivax* populations in this part, resulting in an extensive sequence variation in the above mentioned genes and co-infection with different alleles of *P. vivax*. Having such information on local malaria parasites is an important factor and prerequisite in understanding the epidemiology of malaria and as well as implications for the development of acquired immunity and for local anti-malarial and vaccine research.

4.4 Experience of Bti production and implementation

Dr Nasrin Moazami

Biological vector control methods consist of the utilization of natural enemies of targeted vectors and of biological toxins to achieve effective vector management. *B. thuringiensis* (commonly known as 'Bti') is an insecticidal bacterium, marketed worldwide for control of many important plant pests, mainly caterpillars of the *Lepidoptera* (butterflies and moths) but also mosquito larvae, and simuliid black flies that vector river blindness in Africa. *B. thuringiensis* was first discovered in 1911 in the province of Thuringia, Germany. It was first used as a commercial insecticide in France (1938), and then in the United States of America (USA) in the 1950s. However, these early products were replaced by more effective ones in the 1960s, when various highly pathogenic strains were discovered with particular activity against different types of insects.

Toxin binds to specific receptors on the surface of an insect's mid-gut epithelial cells, specifically to the p-lipids in the brush border membranes of the columnar cells. A pore forms through the cell membrane resulting in the loss of an insect's ability for osmotic regulation. The insect dies due to massive water uptake and cell bursting. Bti has four major toxins at work, namely Cry4A, Cry4B, Cry11A and Cyt1A. It needs only between 60–130 ng/ml of these toxins to kill 95% of the larva exposed. This is a very small amount compared to other pesticides, such as DDT.

Knowledge and technology of Bti production and formulation was transfered to an Iranian company. The product has been used by Ministry of Health and Medical Education to cover breeding sites of mosquitoes in the southern part of the country and border of Pakistan and Afghanistan. The laboratory tests of the product were conducted in France in 2006. Field evaluation of the product has been conducted in Islamic Republic of Iran, Thailand and India from 2005 to 2008. The results were submitted to WHOPES for approval and a final decision.

5. CONCLUSIONS

The three countries agreed to establish a network for collaboration and coordination of malaria control interventions named PIAMNET (Pakistan, Islamic Republic of Iran, and Afghanistan Malaria Network). The objectives of this network are to.

- coordinate and share information on: monitoring therapeutic efficacy of the first-line and second-line anti-malarial medicines; conduct vector surveillance, including insecticide-resistance monitoring; identifying gaps in technical capacity and training needs of national programmes;
- develop institutional links within the three countries and harmonize medicine policy and vector control operations in line with the latest knowledge in the field;
- facilitate effective communication to country-level decision-makers, raise awareness and conduct advocacy for malaria for the community;
- identify and promote priority joint operational research responding to the needs of the malaria control programmes of the member countries; and
- mobilize and generate resources for the activities of the network.

To finalize the formation of the network and achieve its objectives, countries should establish a joint committee to identify the mandates, roles and responsibilities of member countries. A temporary steering committee should be constituted to perform a situation analysis and develop a strategy for joint activities. Members of this committee will be as follows.

- Core members: National malaria control programme managers of the three countries
- Chairperson: Dr Raeisi
- Secretary: The secretary will be responsible for the day-to-day work and will communicate with countries

The Steering Committee should:

- Establish a mechanism for communication to finalize the action plan in concordance with the objectives of the network in close coordination with WHO and other partners;
- Coordinate with individual national malaria control programmes to obtain the ratification of the network objectives from their own ministry of health;
- Establish an effective communication system between network members; and
- Facilitate network organization by defining an activity timeline and the basic operational documents (work plan, budget and project proposal document) which will define the network.

6. RECOMMENDATIONS

Existing recommendations to the three countries from previous meetings

1. Establish a border coordination committee comprising members from national level and from bordering districts/provinces, with assistance from WHO country offices (Table 1).

Table 1. Members of the border coordination committee

Country	National level	Provincial level	District level	WHO	Focal point
Afghanistan	National programme manager	PPM, Herat and Nangarhar		Technical Officer	NPM
Islamic Republic of Iran	National programme manager	PPM	Director Disease Control Chabhar, Sarbaz, Saravan	WHO National Officer	NMP
Pakistan	National programme manager, Epidemiologist	PPM/ Epidemiologist, North-West Frontier Province Federally-Administered Tribal Areas and Baluchistan	EDO Kech and Kurram	Technical Officer	Epidemiologist NMCP

2. Hold annual cross-border meetings of the border coordination committee, with assistance from WHO, to review the progress achieved and develop or update plans of action.

3. Nominate a focal point in each country to be responsible for follow-up of the implementation of the plans of action in the border areas and recommendations of the border meetings and for sharing information among the countries. Focal points should communicate with each other at least once a month.

4. Hold annual meetings of the district/provincial malaria managers of the bordering high-risk districts. The focal point for follow-up of this recommendation will rotate, starting with the Pakistan programme manager. The modality of district level communication will be discussed and finalized by 31 December 2008.

5. Develop a common protocol in the border coordination committee for early detection of epidemics in the border districts through weekly data collection tools, common training workshops in border districts and immediate sharing of epidemic information.

6. Develop a mechanism for common training workshops in border districts.

7. Conduct a vector control needs assessment in the border districts for implementation of national IVM plans of action. WHO will provide technical guidelines and support.

8. In Pakistan, identify vector control focal points at all administrative levels (national, provincial and district) to plan, implement, supervise, monitor and evaluate vector control activities.

New recommendations to the countries

9. Finalize the establishment of the agreed upon network (PIAMNET) and implement the stated objectives.

10. Continue to monitor medicne efficacy for first-line and second-line medicines, including artmether–lumefantrine.

11. Organize activities on the occasion of World Malaria Day, 25 April. Awareness and advocacy activities should be coordinated among countries, particularly in the border districts.

12. Develop a joint proposal for strengthening malaria control and prevention activities in the border areas, to be submitted to the 10th round of the Global Fund, with technical support from WHO.

    - Countries should share the idea of the joint proposal with the respective CCMs and communicate official agreement of the CCMs to WHO by the end of November 2009.
    - MCPs of the three countries should develop the framework of the joint proposal in consultation with WHO.
    - A meeting between the key members of the three CCMs should be conducted in early 2009 to discus and endorse the framework of the joint proposal.
    - An external consultant should be recruited to conduct a situation and gap analysis of malaria in the border areas and develop the proposal by mid February 2009.

To WHO

13. Continue to support cross-border coordination meetings, as well as the newly-established network.

14. Continue to provide technical assistance to the three countries for analysis of the malaria situation in the border areas.

Annex 1

PROGRAMME

Monday, 20 October 2008

08:30–09:00	Registration	
09:00–0:00	Opening session	
	• Welcome address by Deputy Minister for Health Affairs	*Dr Emami Razavi*
	• Opening remarks from Dr Hussein A. Gezairy, Regional Director, WHO/EMRO	*Dr A. Manenti*
	• UNDP Representative remarks	*Mr K. Ostby*
	• Nomination of Officers	
	• Objectives of the meeting and method of work	

To review the progress made and problems encountered in the implementation of malaria control strategies

10:30–10:45	Progress and way forward for malaria control and elimination at global level	*Dr H. Atta*
10:45–11:00	Regional vision for malaria elimination by 2020	*Dr H. Atta*
11:00–11:15	Progress of implementation of IVM for scaling up vector control interventions	*Dr A. Mnzava*
11:15–11:30	Malaria elimination progress in EURO	*Dr E. Gasmiov*
11:30–12:00	Discussions	

Progress, challenges and lessons learnt

12:00–13:00	• Afghanistan	*Country representative*s
	• Islamic Republic of Iran	
	• Pakistan	
14:00–14:30	• Iraq	
	• Tajikistan	
14:30–15:00	Discussions	
15:30–16:00	Progress report of 2007 activities and feedback on annual malaria surveillance	*Dr G. Zamani*

Tuesday, 21 October 2008

To update countries with new developments on burden estimation, monitoring medicine resistance; *vivax* malaria

08:30–09:00	World malaria report and burden estimation	*Dr R. Cibulskis*
09:00–09:30	Discussions	
09:30–10:00	Technical presentation on drug efficacy studies	*Dr M. Warsame*
10:30–11:00	Discussions	
11:00–11:30	Presentation of the results of the joint TDR project on *vivax* malaria	*Dr S. Zakeri*
11:30–12:00	Experience of BTI production and implementation	*Dr N. Moazemi*

To review results of antimalarial medicine efficacy studies and discuss establishment of a network for monitoring of antimalarial medicine resistance and develop a plan of action

12:00–12:30	Country presentation on results of medicine efficacy studies and experience of ACT implementation • Afghanistan • Islamic Republic of Iran • Pakistan	*Country representative*
12:30–13:00	Discussions	
14:00–15:30	Group work on establishment of a network for monitoring of malaria parasite biology and antimalarial medicine resistance—develop a plan of action for resistance monitoring and collaborative research	
16:00–17:00	Plenary: presentation of the group work	

Wednesday, 22 October 2008

To review implementation of the previous border meeting recommendations, and discuss achievements, challenges and the way forward

08:30–10:00	Plenary: Review recommendations of the previous meetings	

10:30–12:00	Group work to draft recommendations and develop a plan of action for joint intercountry projects and establishing regional country coordinating mechanisms
13:00–13:30	Conclusions, recommendations and closing session

Annex 2

LIST OF PARTICIPANTS

AFGHANISTAN
Dr Najibullah Safi, MD, MSc. HPM, DMPPM
National Malaria and
Leishmaniasis Control Programme Manager
Ministry of Public Health
Kabul

Dr Ahmad Walid Sediqi
Epidemiology Monitoring and Evaluation Officer
(National Malaria and Leishmaniasis Control Programme)
Ministry of Public Health
Kabul

Dr Zahir Shah Zahir
Head of Kunar Border Province (Malaria)
Ministry of Public Health
Kunar Province

ISLAMIC REPUBLIC OF IRAN
Dr Ahmad Raeisi
Assistant Professor of Epidemiology (DCD/MOH and ME)
National Programme Manager for Malaria Control
Ministry of Health and Medical Education
Tehran

Mr Mohamed Sakeni
Malaria Control Focal Point in Sistan
Ministry of Health and Medical Education
Baluchistan Province

Dr Mohammad Mehdi Vahedi
Deputy of Health
Zahedan Medical University
Baluchistan Province

Mrs Fatemeh Nikpour
Entomologist
National Programme for Malaria Control
Ministry of Health and Medical Education
Tehran

Mrs Leila Faraji
Malaria Control Officer
National Programme for Malaria Control
Ministry of Health and Medical Education
Tehran

IRAQ
Dr Muthana Ibrahim Abdul Kareem
Deputy National Manager for Malaria Programme
Department of Communicable Disease Control
Public Health Directorate
Ministry of Health
Baghdad

PAKISTAN
Dr Altaf Hussain Bosan
Director
Directorate of Malaria Control
Malaria Control Programme
Ministry of Health
Islamabad

Dr Muhammad Suleiman Memon
Epidemiologist
Directorate of Malaria Control Programme
Ministry of Health
Islamabad

Dr Shaista Illyas
Deputy Director
Roll Back Malaria, FATA
Ministry of Health
Peshawar

Other organizations

AFGHANISTAN
Dr Taufiqur Rahman
Programme Manager
BRAC Health Programme
Kabul

ISLAMIC REPUBLIC OF IRAN
Mr Knut Ostby
UN Resident Coordinator and UNDP Resident Representative
United Nations Development
Programme
Tehran

OBSERVERS

ISLAMIC REPUBLIC OF IRAN
Dr Mohammad Mehdi Gouya
Director General for Disease Control and
Management
Ministry of Health and Medical Education
Tehran

Dr Farshid Abedi
Chancellor of Bandar Abbas University
Of Medical Science
Bandar Abbas

Dr Salehi Masoud
Chancellor of Zahedan University of Medical Science
Zahedan
Dr Hossein Safizadeh
Deputy Chancellor of Kerman University of Medical Science
Kerman

Dr Mansour Ranjbar
Ministry of Health and Medical Science

Dr Mostafa Ebrahimi
CDC Physician and Expert
Faculty of Health
Shiraz Medical University
Shiraz

Dr Khodadad Sheikhzadeh
Responsible of Disease Control
Zahedan Medical University
Province Health Centre – Behdasht Blvd
Zahedan

Dr Bozorgzadeh
Social Health Executive Manager
Chabahar Free Zone

Dr Parvin Afsar Kazerooni
CDC Manager of Fars Province
Shiraz University
Shiraz

WHO Secretariat

Dr Ambrogio Manenti, WHO Representative, Tehran, Islamic Republic of Iran
Dr Hoda Atta, Regional Adviser, Roll Back Malaria, WHO/EMRO
Dr Abraham Mnzava, Regional Adviser, Vector Biology and Control, WHO/EMRO
Dr Ghasem Zamani, Medical Officer, Roll Back Malaria, WHO/EMRO
Dr Marian Warsame, Medical Officer, Global Malaria Programme, WHO/HQ
Dr Richard Cibulskis, Epidemiologist, Global Malaria Programme, WHO/HQ
Dr Waqar Butt, Malaria and Leishmaniasis Medical Officer, WHO Office, Kabul Afghanistan
Dr Mitra Motamedi, Medical Officer/HCD Unit, WHO Office, Tehran, Islamic Republic of Iran
Dr Elkhan Gasimov, Technical Officer Malaria, WHO Office, Azerbaijan
Dr Nargis Saparova, WHO Malaria Focal Point, WHO Office, Tajikistan
Dr Qutbuddin Kakar, WHO Technical Officer RBM, WHO Office, Islamabad
Pakistan
Dr Sedigheh Zakeri, Associate Professor, Pasteur Institute of Iran
Malaria and Vector Research Group (MVRG), Biotechnology Research Centre
Teheran, Islamic Republic of Iran
Dr Nasrin Moazami, Director Institute of Advanced Technology, Iranian Research Organization for Science and Technology, Tehran, Islamic Republic of Iran
Ms Zahra Sarabi Darian, Programme Assistant/HCD Unit WHO Office, Tehran, Islamic Republic of Iran
Ms Nahla Ibrahim, Secretary, Division of Communicable Disease Control
WHO/EMRO

Table 1. Current/planned medicine efficacy monitoring, 2008–2009

Country	Sentinel sites	Antimalarial medicines needed	Starting date	Funding available /source	Molecular laboratory/laboratory to be used	Other needs	Comments
Afghanistan	**Nangarhar**	Chloroquine	June 2009	Limited amount available from Global Fund that could cover two sites	Not specified yet		
	Kunar						
	Takhar						
	Badakhshn						
	Faryab						

Table 1. Current/planned medicine efficacy monitoring, 2008–2009 (continued)

Islamic Republic of Iran	**5 (*vivax*) In S and B, Kerman, and Hormozgan**	Standard Chloroquine	March 2009	National	School of Public Health and Pasteur Institute	NA	
	All over Sistan-Baluchestan	ACTs artesunate + SP and in case of need Coartem	In case of any *falciparum* cases detected	National	In the field laboratory and provincial reference laboratory	NA	
Pakistan	**Zhob**	Coartem	September, 2008	DOMC/GFATM	Pasteur Institute-Tehran	WHO/EMRO	
	Kech	Coartem	September, 2008	DOMC/GFATM	Pasteur Institute-Tehran	WHO/EMRO	
	Kurram	Chloroquine	March 2009	DOMC/WHO	Pasteur Institute Tehran	WHO/EMRO	
	Thatta	Chloroquine	March 2009	DOMC/WHO	Pasteur Institute-Tehran	WHO/EMRO	
	D.G. Khan	Chloroquine	March 2009	DOMC/WHO	Pasteur Institute-Tehran	WHO/EMRO	