Regional Strategy:

WORLD HEALTH ORGANIZATION
EUROPE

From Malaria Control to Elimination in the WHO European Region 2006-2015

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World Health Organization
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Copenhagen, 2006

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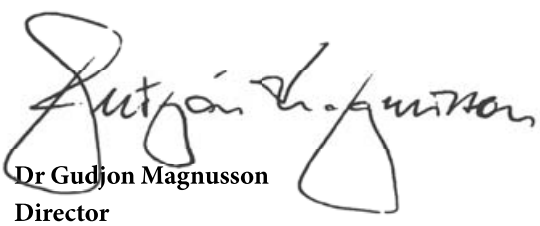
Preface

The development of the new regional strategy entitled "The Move from Malaria Control to Elimination" takes place seven years following the implementation of the regional strategy to roll back malaria, which successfully curbed a regional epidemic of malaria and brought down the incidence of malaria within malaria-affected countries to such levels that interruption of transmission may become a feasible objective. In 2002, after the endorsement by all Member States of the regional resolution entitled "Scaling up the Response to Malaria in the WHO European Region", which urged countries of the Region confronting the resurgence of malaria to reduce further the burden of malaria, the fight against malaria has been intensified. By 2005 the objectives of the regional strategy aimed at the prevention of deaths due to malaria, the containment of malaria epidemics, a further reduction of the incidence of malaria, the prevention of a re-establishment of malaria transmission, and the maintenance of the malaria-free status in countries and territories, where malaria had been eliminated, have been successfully reached.

In order to achieve this, the regional malaria programme focused on addressing malaria-related issues through expansion and intensification of sub-regional and country-level partnership actions, enhancing national capacities for decision-making, investing in human development and capacity building, improving capacities for disease management, strengthening capacities for containment and prevention of epidemics, promoting cost-effective preventive measures, strengthening surveillance and operational research capabilities, ensuring community mobilization and enhancing intersectoral collaboration. Strong international commitment, serious political attention to tackle the disease at national level, and a high level of advocacy for action against malaria have been translated into the collective actions by countries, international agencies, bilateral organizations and NGOs to increase the amount of overall resources available for malaria in the WHO European Region. During the last years, all malaria-affected countries supported by WHO and partners, have managed to take all possible epidemic containment measures. The Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) has provided grants to Georgia, Kyrgyzstan, Tajikistan, and Uzbekistan to support their national response to malaria in 2004-2010. As a result, a substantial reduction by a seven-fold in the reported number of malaria cases has been recorded over the past seven years (1999-2005).

Each successful milestone in the reduction of a disease allows for the establishment of new and more demanding objectives along the path to achieving these goals. The demonstrated feasibility of malaria elimination in the past, the visible impact of malaria control interventions at present, the strong political commitment to achieve a greater impact on malaria situations at national level, and the availability of efficacious tools to control and eliminate malaria in the regional context, have created a unique opportunity to move further from malaria control to elimination. The above is reinforced by solid evidence of some countries in other WHO regions attaining malaria-free status. In order to undertake the new elimination effort within malaria-affected countries of the WHO European Region, the Tashkent Declaration, entitled "The Move from Malaria Control to Elimination", has recently been endorsed by all malaria-affected countries in the WHO European Region. In the years ahead the impact of malaria

could be reduced to levels low enough to no longer represent a public health problem in the Region. The ultimate goal of the new regional strategy on malaria is to interrupt *P. falciparum* malaria transmission in Central Asia by 2010 and, finally, to eliminate the disease in the WHO European Region by 2015.



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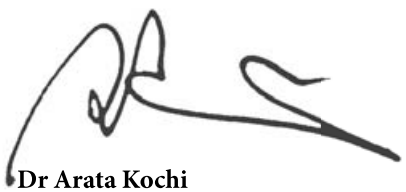

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Acronyms and abbreviations

ACD	Active case detection
ACT	Artemisinin-based combination therapy
ACTED	Agency for Technical Cooperation and Development
API	Annual parasite incidence
CISID	Computerized Information System for Infectious Diseases
CQ	Chloroquine
DDT	Dichlorodiphenyltrichloroethane
ECHO	European Commission's Humanitarian Aid Office
ENI	Italian oil company
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GIS	Geographical information system
IEC	Information, education, communication
IRS	Indoor residual spraying
ITN	Insecticide treated net
KAP	Knowledge, attitude, practice
M&E	Monitoring and evaluation
MDA	Mass drug administration
MERLIN	Medical Emergency Relief International
MPTP	Mass prophylactic treatment with primaquine
NIS	Newly independent states
PCD	Passive case detection
PCR	Polymerase chain reaction
PQ	Primaquine
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
S-P	Sulfadoxine-pyrimethamine
USAID	United States Agency for International Development
WHO	World Health Organization

1. Malaria eradication: lessons learnt from the past

The global programme for malaria eradication, coordinated and supported by the World Health Organization (WHO) since 1957, has been successful in most of the countries in the temperate zone of the globe, but has failed to achieve this goal in tropical regions (*1*). In 1959, the WHO Regional Committee for Europe urged Member States where indigenous malaria was a public health problem to reach the consolidation phase in their respective eradication programmes within the next three years. By 1963, the desired objective had been achieved, and, over the next ten years or so, an increasing number of countries in the Region fulfilled the criteria of malaria eradication. By 1975, it became apparent that the continent of Europe was free of indigenous malaria. For the first time in history, endemic malaria disappeared from Europe, although the achievement of this aim has not been as easy as one might have assumed it would be some twenty years ago (*2*).

> The malaria eradication success in Europe has demonstrated that large-scale application of vector control measures, in particular indoor residual spraying with insecticides combined with adequate coverage and quality of disease management and surveillance activities could bring the transmission of malaria down sharply and even completely in areas with a relatively low intensity of transmission.

In Europe, sustained control activities and modern agricultural techniques decreased the mosquito densities in most of the countries to very low levels. However, as pointed out by L.J. Bruce-Chwatt and J. de Zulueta (*2*) "… any deterioration of organized services by a major catastrophe or war may bring back to Europe a series of communicable diseases among which malaria would not be the last." This happened in the early 1990's, when the incidence of malaria began to rise in some countries of the WHO European Region.

2. Recent history and current trends

The perception that countries of the WHO European Region are free from malaria has changed rapidly over the past decades. Since the early 1980s and throughout the decades to follow, the number of countries affected by malaria has increased from 3 to 10. At the beginning of the 1990s, the residual reservoir of malaria infection, aggravated by political and socio–economic situations, 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 broke out 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 1995–2005, the reported number of malaria cases in the Region declined from 90 712 to 5 072. Although this represents an overall decrease in the reported number of cases in comparison with 1995 figures, the magnitude of the malaria problem in the Region is thought to be greater than that which statistics indicate and cannot be reliably assessed on the basis of official data available. Out of a total population in the Region of 873 457 500, it is estimated that between 35 and 40 million currently live in areas at varying degrees of risk of malaria. At present, malaria continues to pose a challenge in 8 out of the 52 Member States of the Region, namely Armenia, Azerbaijan, Georgia, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan and Uzbekistan.

The geographical distribution of malaria parasite species is far from uniform; it is clearly seen that *P. falciparum* malaria thrives in Tajikistan, where it is focal, primarily affecting the remote areas, and it is linked to rural populations. In 2004, the first autochthonous case of *P. falciparum* was reported in the district of the southern part of Kyrgyzstan bordering Uzbekistan. In other counties of Central Asia, the Trans-Caucasian sub-region and Turkey *P. falciparum* retains its imported character. In contrast to this, however, *P. vivax* is widely distributed in Central Asia, Caucasian countries and Turkey: from endemic settings in the southern part of Tajikistan, the south-eastern part of Turkey and possibly in the southern part of Azerbaijan, an epidemic type in the south-western part of Kyrgyzstan and the eastern part of Georgia, to sporadic distribution in other affected countries.

Autochthonous malaria

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 ten years. In recent years, endemic malaria has returned to the area, and is now established in the southern part of Tajikistan. There is chloroquine (CQ) and sulfadoxine-pyrimethamine (S-P) resistant *P. falciparum* in Tajikistan. An epidemic situa-

tion, which produced a high incidence of clinical disease, has been reported in Kyrgyzstan. Cases of autochthonous malaria are reported annually in Uzbekistan and Turkmenistan, and these countries remain highly receptive to a resumption of malaria transmission, which could lead to outbreak situations.

In Kazakhstan an increase in the number of imported malaria cases was registered 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 (2002–2005). The ecological and climatic conditions within most regions of the country could lead towards a resurgence of malaria transmission following importation. The differences in eco–climatic settings, types of landscape, vector species distribution, and occupational and migration population patterns define the heterogeneity of malariogenic potential of the country. The highest risk of resumption of malaria transmission is in some parts of the Almaty, Jambyl, South-, West- and East-Kazakhstan regions, as well as in the cities of Almaty, Astana and Karaganda. *An. messeae*, the most common malaria vector in Kazakhstan, is found throughout most of the county. Studies on this vector's resistance to different insecticides have shown that resistance to DDT was highest (up to 77%) in the western part and nearly absent in the eastern part of the country. Resistance to malathion and fenitrothion was virtually absent in all areas under study, as was resistance detected to synthetic pyrethroids, including deltamethrin and cyfluthrin.

As a result of the importation of malaria by ex-military personnel upon their return from Afghanistan, autochthonous malaria was reported in Kyrgyzstan from 1986 onwards. In 1986-1987, 24 cases of autochthonous malaria were detected. In 1988, there were 21 cases due to local transmission, with 11 reported in the Batken district bordering Tajikistan and Uzbekistan. In the years to follow, only imported cases were reported in the country. In 1996, after a long break in local transmission, the first case of autochthonous malaria was registered in the Panfilov district. From then on, there has been a rise in the number of cases due to local transmission. In 2001, 15 autochthonous cases of malaria were reported in the country. In 2002, the explosive resumption of malaria transmission produced an epidemic situation with an incidence much greater than that reported in the past years in Kyrgyzstan, and a total of 2 267 autochthonous *P. vivax* cases were reported in the south-western regions of the country, including Batken, Osh and Jalal–Abad. The explosive resumption of malaria transmission in Kyrgyzstan was a result of immigration of a number of infected people from Tajikistan into the Batken region where the *Anopheles* vector exists and where conditions for malaria transmission are very favourable. In 2004-2005, as a result of the application of epidemic control measures, there was a significant decrease in the reported number of autochthonous malaria cases (42 in 2005). However, in 2004 the first autochthonous case of *P. falciparum* malaria was reported in the Aravan district of the southern part of Kyrgyzstan, an area bordering Uzbekistan, and in 2005 the number of autochthonous cases of *P. vivax* malaria increased in the outskirts of Bishkek. Malaria vectors

in the country include *An. pulcherimus*, *An. superpictus*, *An. hyrcanus*, *An. martinius*, *An. claviger* and *An. messeae*. Studies on vector resistance to different insecticides have revealed that all the above–mentioned species are susceptible to DDT, fenitrothion, cyfluthrin, deltamethrin, malathion, lamba–cyhalothrine and propoxur.

The number of malaria cases reported in Tajikistan peaked 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 intense transmission of malaria in Afghanistan, where malaria is endemic, and the disruption of public health care services and vector control activities. Noticeable changes in agricultural practices, particularly the increase in the cultivation of rice, have led to an increase in vector breeding grounds. Despite an 80% reduction in the reported cases since that time the malaria situation remains serious in the country. The remaining problem of *P. falciparum* malaria in the southern part of the country is a matter of particular concern. A total of 2 309 cases of malaria were reported in the country in 2005. Prevalence and PCR surveys recently conducted in the southern part of Tajikistan bordering Afghanistan have shown that the burden of malaria in the Khatlon Region, with its total population of nearly 2.2 million people, may be estimated at 50 000–100 000 malaria-infected carriers, with the proportions of *P. falciparum* malaria at less than 3%. However, the proportion of asymptomatic *P. vivax* and *P. falciparum* carriers remains high. Malaria vectors in Tajikistan include *An. superpictus*, *An. pulcherimus*, *An. macullipennis, An. hyrcanus* and *An. martinius*. The results of studies on vector resistance to insecticides (DDT, fenitrotion, cyfluthrin and deltamethrin) showed that all vectors were susceptible to the above–mentioned insecticides.

Although malaria was eliminated in Turkmenistan in 1960, sporadic cases have occasionally been reported from the country. By 1998, the malaria situation had taken a drastic turn for the worse and 108 malaria cases were detected within the Gushgin etrap of Maryi veloyat. To prevent further spread of malaria throughout the etrap area, malaria programme personnel carried out seasonal chemoprophylaxis with chloroquine and indoor residual spraying. These interventions allowed for a significant decrease in malaria morbidity within the focus area. Presumably, local malaria transmission appeared as a result of malaria importation by mosquitoes flying in from bordering Afghanistan. Sporadic cases of autochthonous malaria are reported every year, and 44 cases of local malaria cases were registered in the country during 2000-2003. In 2004-2005 only 4 autochthonous cases of *P. vivax* malaria were reported in the country. Three principal malaria vectors are found in Turkmenistan: *An. superpictus*, *An. pulcherimus* and *An. maculipennis*. Monitoring of *An. superpictus*' susceptibility to cyfluthrin, lamba–cyhalothrine, DDT and propoxur in Lebap, Maryi, Ahal, Dashogus and Balkan veloyats has revealed that all the above-named insecticides remain highly effective for indoor residual spraying.

Taking into account the grave malaria situation in neighbouring Tajikistan and Afghanistan, along with the present day exacerbation of the situation in Kyrgyzstan, there is a very real threat that malaria may assume larger proportions in Uzbekistan. In this regard, the Ministry

of Health of Uzbekistan initiated and carried out a number of activities aimed at the intensification of malaria surveillance. The number of imported malaria cases has continued to increase from 21 cases in 1994 to 80 cases in 2000. In 1999, due to a steady increase in imported malaria and the presence of conditions favourable for malaria transmission, the first autochthonous cases of malaria, 7 in all, were registered. A more than five-fold increase in the number of autochthonous malaria cases was witnessed during 1999–2000. In 2001–2004, 84 cases due to local transmission were registered. In 2005 64 autochthonous cases of *P. vivax* malaria were reported in the country. All reported cases occurred in the Surkhandarinskaya region which borders Tajikistan and Afghanistan. To intensify anti-malarial interventions in these border areas, malaria control services were reinforced and made operational within the framework of the malaria project funded by the GFATM. There are seven *Anopheles* species registered within the territory of Uzbekistan: *An. pulcherimus, An. superpictus, An. maculipennis, An. hyrcanus, An. martinius, An. claviger,* and *An. algeriensis*. The monitoring of vector susceptibility to insecticides has revealed that only *An. superpictus* populations in Fergana were resistant to malathion, fenitrothion, bendiokarb and propoxur. All other vectors remain susceptible to nearly all commonly used insecticides.

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 2005 (from 84 594 in 1995 to 2 435 in 2005), almost 25 million people, or about 30% of the total population, still live in areas at varying degrees of risk of malaria. Despite the profound decrease in malaria morbidity over the past years, the malaria problem remained unresolved in the south-eastern part of Turkey and Azerbaijan. A substantial number of autochthonous malaria cases reported in Georgia, areas bordering with Azerbaijan and insufficient resources available to initiate a malaria elimination campaign in Armenia, along with the aforementioned, are major causes for concern within this sub-region.

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 1 156 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. Although numbers have been on the decline since then, the situation must be monitored closely, due to the existence of favourable conditions for malaria transmission. *An. maculipennis* serves as the main malaria vector in the country. In addition to *An. maculipennis*, other malaria vectors in the country include *An. sacharovi* and *An. claviger*. The appearance of *An. sacharovi* (the main vector in Transcaucasia) in the Ararat

valley has created conditions more favourable for malaria transmission in the country. All *An. maculipennis* populations that were tested for resistance to cyfluthrin were found susceptible to this insecticide.

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, with the majority of cases registered in the districts of the Kura-Araksin and Lenkoran lowlands, areas which were also highly malaria-endemic in the past. In 1997, the situation was aggravated as a result of mudslides throughout the Kura-Araksin and Lenkoran lowlands when mosquito-breeding sites increased dramatically. The highest morbidity rates were reported in several districts of Azerbaijan bordering Iran, Georgia and the Russian Federation. Over the course of 1997–2003, as a result of large-scale epidemic control interventions, the malaria situation in the country continued to improve, with only 242 cases reported in 2005. Malaria vectors in Azerbaijan comprise *An. maculipennis* (the area of the Big and Small Caucasus*), An. sacharovi* (Kura-Araksin and Lenkoran lowlands) and *An. melanoon* (Lenkoran lowland).

In Georgia the malaria situation began to deteriorate in the mid-1990s as a result of a drastic reduction in the 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. Between 1998 and 2002, the number of reported malaria cases increased by more than 30-fold. During this period the first cases of autochthonous malaria were reported in the western part of Georgia. In 2005 the country reported 154 autochthonous cases, a 40% reduction compared to the previous year. Conditions favourable for malaria transmission exist in an area covering nearly 52% of the country, and where 93% of the total population lives. At present, the highest risk of resurgence of malaria transmission and its spread concern the areas bordering Azerbaijan and Armenia in eastern Georgia, the Black Sea coastal areas, and the Kolhid lowlands in the western part of the country, where more than 68% of the total population resides and the transmission season may last more than 150 days. The main and secondary vectors there include *An. maculipennis*, *An. superpictus*, *An. sacharovi*, *An. atroparvus, An. hyrcanus, An. claviger* and *An. melanoon*. Other territories, which are home to 18% of the total population, face a malaria season from 90 to 120 days, and have a lower degree of risk of resurgence of malaria. The vectors there include *An. maculipennis, An. superpictus, An. claviger* and *An. plumbeus*.

In Turkey the malaria situation remains serious in terms of its impact on the health of the population and the socio-economic development. Within the country, over 15 million people, or 23% of the total population, reside in areas where malaria remains endemic. Moreover, a large proportion of the total population reside in areas where the risk of an explosive resumption of malaria transmission, leading to outbreak situations, remains high. Despite the fact that only

2 036 autochthonous cases were reported in 2005, it is generally accepted that the actual magnitude of the malaria problem in Turkey is greater than that reported, especially in south-eastern Anatolia, where the incidence of malaria is the highest in the country. Endemic malaria with a parasite index of above 10% was found there. Thus, despite the significant decrease in malaria morbidity over the past years, the malaria situation, as we have learned by experience, may be subject to sudden and very negative changes. In light of the country's overall malaria potential, it is vitally important to consider the intensification of malaria surveillance activities at the periphery, especially in south-eastern Anatolia, where the malaria situation remains serious. There are thirteen *Anopheles* species recorded in Turkey. *An. sacharovi* and *An. superpictus* are the principal malaria vectors, while *An. maculipennis, An. pulcherimus, An. algeriensis, An. claviger, An hyrcanus, An. marteri, An. multicolour, An. plumbeus* and *An. sergenti* may be considered secondary or possible vectors of malaria in the country.

The possibility of re-introduction of malaria was demonstrated by a recent outbreak of malaria in Bulgaria and the occurrence of autochthonous (introduced or indigenous) cases of malaria in the Russian Federation, the Republic of Moldova, Belarus, Germany, Greece, Spain and Italy, where malaria had previously been eliminated, and it has shown that the risk of the re-establishment of focal malaria transmission exists in these countries.

Imported malaria

In the WHO European Region most of the malaria cases are imported into the western part of Europe, especially into countries of the European Union. Since the early 1970s there has been a ten-fold increase in the number of imported cases. The largest numbers of imported cases have been recorded in continental France, the United Kingdom, Germany and Italy. The largest number of imported cases (8 056) was recorded in France in 2000. The United Kingdom and France accounted for almost 70% of all imported cases in 2003. At present, between 10 000 and 12 000 cases of imported malaria are notified in the European Union each year, but significant underreporting is assumed. It is estimated that almost 300000 cases of imported malaria were reported during the last 35 years. The ratio between *P. falciparum* malaria and other plasmodium species changed significantly during 1971-2003. From the 1970s until the early 1980s the proportion of *P. falciparum* cases constituted less than 30% in average. By 1984, however, the ratio of imported *P. falciparum* infection compared with other plasmodia has begun to increase reaching more than 70% at present. Between 1990 and 2003, almost 900 people died from imported *P. falciparum* malaria in the WHO European Region. The number of deaths due to malaria increased concurrently with the steep rise in the number of imported *P. falciparum* cases at the beginning of the 1980s.

3. The need for a revised regional strategy on malaria

The WHO Regional Office for Europe has committed itself to an intensive response to the burden of malaria, and had by 1999 developed a regional strategy to Roll Back Malaria (RBM) in affected countries of the European Region. Its aim was to reduce the impact of the disease on the health of the population to the lowest possible level that can be achieved within the available financial and manpower resources, and existing control technologies and tools. The specific objectives were as follows: (1) to prevent mortality due to malaria, (2) to halve malaria incidence, (3) to contain epidemics of malaria, and (4) to maintain the malaria-free status in countries, where malaria had been eradicated (*3*).

In order to keep the malaria issue high on the WHO agenda throughout malaria-affected countries of the Region, the regional resolution EUR/RC52/R10 "Scaling up the response to malaria in the European Region of WHO" was endorsed by all Member States in 2002. The resolution urged countries of the Region confronting the resurgence of malaria to take all possible measures aimed at consolidating the results achieved and reducing further the burden of malaria (*4*).

The reduction in the number of malaria cases by more than seven-fold over the past seven years (1999-2005) is the most conspicuous achievement of the regional RBM programme to date. Presently the incidence of *P. falciparum* and *P. vivax* malaria in some countries of the Region has been brought down to such levels that interruption of their transmission may become a feasible objective in the near future.

> Before considering a malaria elimination programme it should be known whether it is feasible and whether the country is in a position to meet the requirements of the programme. Conditions to be met before initiating a malaria elimination programme are shown in *Annex 1* (*5*).

The rationale for development of the new malaria strategy aimed at moving from control to elimination is based on the following principles:

- The demonstrated feasibility of malaria elimination in Europe in the past.
- The visible impact of RBM interventions at present.
- The strong political commitment to achieve a greater impact on malaria situations at national level.
- The efficacious technologies and tools available to control and eliminate malaria in the regional context.

All the above mentioned, along with clear evidence of technical feasibility and operational applicability of malaria elimination may facilitate decisions towards undertaking the new elimination effort within malaria-affected countries of the WHO European Region.

Malaria-affected countries which participated in the Inception Meeting on the Malaria Elimination Initiative in the WHO European Region held in Tashkent, Uzbekistan, 18-20 October 2005 (*6*), consented to the Tashkent Declaration "The Move from Malaria Control to Elimination", which has recently been endorsed by the Ministers of Health of the respective countries (*Annex 2*).

4. Goals and objectives

The ultimate goal of the new regional strategy is to interrupt the transmission of malaria by 2015 and eliminate the disease within affected countries of the Region. In areas and countries where malaria had been eliminated, attention is given to maintaining the malaria-free status. Particular emphasis is also placed on tackling the growing problem associated with imported malaria.

The new strategy will target malaria by:

- ultimately interrupting transmission in countries where malaria is a focal problem and there is clear evidence of political support, technical feasibility and operational applicability of malaria elimination,
- further reducing the incidence and prevalence of malaria in countries where elimination does not appear to be feasible at present,
- preventing the re-establishment of malaria transmission in countries and territories where it had been eliminated, and
- reducing and preventing deaths due to imported malaria.

4.1. Malaria elimination

Taking into account a remarkable progress in the control of autochthonous *P. falciparum* malaria, which is presently limited to the southern part of Tajikistan, top priority is given to *P. falciparum* malaria in the new regional strategy. With adequate investment and political support, the chances of interrupting transmission of *P. falciparum* malaria in Tajikistan by 2010 and preventing the re-establishment of its transmission in other Central Asian countries (Kyrgyzstan, Uzbekistan and Turkmenistan) are high.

The results achieved in Armenia and Turkmenistan, where malaria transmission continues in a few minor foci and malaria incidence/risk is extremely low/minimal, need to be further consolidated with the goal of interrupting the transmission of *P. vivax* malaria by 2010.

The specific programme objectives in this epidemiological setting should be as follows:

1. To interrupt transmission of malaria;
2. To notify early on all suspected and confirmed cases;
3. To detect any possible continuation of malaria transmission;
4. To determine the underlying causes of residual transmission;
5. To apply rapid remedial actions;
6. To prevent re-introduction of malaria transmission;
7. To ascertain malaria elimination.

The timeframe for malaria elimination needs to be set up separately for *P. falciparum* and *P. vivax* malaria bearing in mind that the elimination of both malaria species will be certified at the same time.

The following timetable is proposed for implementation of the regional strategy aimed at moving from malaria control to elimination:

Between 2006 and 2007:

1. Development of a Revised Regional Strategy: from Malaria Control to Elimination, 2006–2015 completed and published.
2. Development of strategic plans of action for malaria elimination in pilot countries completed and endorsed:
   - Tajikistan to have prepared a national plan of action for *P. falciparum* malaria elimination and a campaign to have been launched.
   - Armenia and most probably Turkmenistan to have prepared national plans of action for *P. vivax* malaria elimination and the respective campaigns to have been launched.

Between 2008 and 2010:

1. The remaining malaria affected countries (Georgia, Azerbaijan, Turkey, Uzbekistan, Kyrgyzstan, Tajikistan) to have revised their national malaria strategies and have developed their national plans of action to eliminate *P. vivax* malaria.

By the end of 2010:

1. Transmission of *P. vivax* malaria to have been interrupted in Armenia and most probably in Turkmenistan.
2. Transmission of *P. falciparum* malaria to have been interrupted in Tajikistan.

Between 2011 and 2014:

1. The remaining malaria-affected countries (Georgia, Azerbaijan, Turkey, Kyrgyzstan, Uzbekistan, Tajikistan) to have launched their campaigns to eliminate *P. vivax* malaria.
2. Malaria elimination to have been certified in Armenia and Turkmenistan.

By the end of 2015:

1. Transmission of malaria to have been interrupted in Georgia, Azerbaijan, Turkey, Kyrgyzstan, Uzbekistan and Tajikistan.

Beyond 2015:

1. Malaria elimination to have been certified in Georgia, Azerbaijan, Turkey, Kyrgyzstan, Uzbekistan and Tajikistan.

4.2. Malaria control

In countries where elimination does not appear to be feasible at present, malaria control operations may form a transitional stage towards the future launching of an elimination programme. In the existing *P. vivax* malaria settings, where the number of active malaria foci remains large and its incidence is moderate or relatively high (Azerbaijan, Georgia, Kyrgyzstan, Turkey, Tajikistan), malaria control is still recommended in the years to come, and the move from malaria control to elimination may be recommended when it will be feasible. Wherever malaria elimination programmes have good prospects they should be pursued with vigour towards their defined goal.

Despite visible progress in controlling malaria in all affected countries, the goal of elimination may be more distant because the rapidity in achieving the declared goal is under the influence of ongoing socio-economic changes and unstable ecological conditions in the above-listed countries.

The specific programme objectives in this epidemiological setting should be as follows:

1. To contain and prevent outbreaks of malaria;
2. To reduce further the incidence and prevalence of malaria;
3. To reduce further the number of active foci of malaria.

4.3. Prevention of the re-establishment of malaria transmission

Today in most malaria-free industrialized countries of the Region the risk of sustained re-introduction of malaria transmission is minimal: either transmission has been eliminated and never occurred again or socio-economic development is so advanced that cases of imported malaria can be identified and re-introduction of malaria can be eliminated in a timely manner. However, when importation of malaria coincides with socio-economic degradation, the disintegration of health and social services and uncontrolled cross-border migration, the re-establishment of malaria transmission could take place.

The specific programme objectives in this epidemiological setting are as follows:

1. To notify early on all suspected and confirmed cases;
2. To detect any possible re-establishment of malaria transmission;
3. To determine the underlying causes of resumed transmission;
4. To apply rapid curative and preventive measures;
5. To maintain malaria-free status in areas and countries where it had been eliminated

4.4. Reduction and prevention of deaths caused by imported malaria

As a result of human migration and the current tidal wave of tourist travel to malaria-endemic countries, malaria continues to be imported into areas, which have been classified as "malaria free". Travel-

associated and imported malaria is becoming a growing medical and health issue in many developed countries of Europe where the disease had been successfully eliminated. This situation poses a hazard to the individuals who acquire malaria because the disease may remain undiagnosed or be incorrectly diagnosed, resulting in high case-fatality rates.

The specific programme objectives in this epidemiological setting are as follows:

1. To improve early diagnosis of all cases of imported malaria, and strengthen case notification systems;
2. To treat promptly and adequately all cases of imported malaria within the public and private health sectors, and reduce case-fatality rates of imported *P. falciparum* malaria;
3. To improve preventive practices among travellers through effective and evidence-based pre-travel health advice.

5. Strategy implementation

To succeed, the new regional malaria strategy needs to be translated into effective national malaria elimination and control programmes and plans.

5.1. Epidemiological patterns

Malaria is a complex disease and its distribution varies to a great extent from place to place, and is governed by a variety of factors related to vectors, parasites and human populations under different geographical, ecological and socio-economic conditions. Past experience in the field of malaria control and eradication has underlined the focal nature of this disease and the desperate need for constant adjustment of malaria programmes to epidemiological and ecological patterns, which may change over time, and to the technologies and resources available.

In all affected countries of the Region malaria shows a marked focal distribution and a mixture of new and persistent malaria situations and problems. The identification of epidemiological malaria settings in the Region is essential for establishing objectives and determining the most feasible strategies and approaches. At present, five types of these settings are identified within malaria-affected areas of Central Asia, the Trans-Caucasus and Turkey (*see Tables 1 and 2*). Qualitative and quantitative characteristics of malaria transmission as epidemiological indicators have been used to stratify malaria situations in the Region. Several countries or certain parts of a country may belong to the same setting or, on the contrary, there could be different malaria settings within one country. The gains obtained by past malaria eradication campaigns are still sustained in vast areas of the Region - all the developed countries of Europe, some of the Newly Independent States (NIS) and other countries of the Region – where the malaria-free status is being maintained. However, the large-scale resurgence of malaria transmission necessitated a reversion to malaria control in some territories of the Region. Malaria control programmes are being implemented in large areas of Tajikistan, Azerbaijan, Turkey, Kyrgyzstan and Georgia, including those where malaria transmission was never interrupted.

5.2. Strategic approaches

In affected countries of the Region, where the malaria elimination programme is recommended, actions aimed at interrupting transmission should be swift and energetic. At the attack phase a two-pronged action is required aimed at: (1) disease prevention through vector control and (2) disease management. The attack operations consist of indoor residual spraying (IRS) with insecticides of houses and shelters of domestic animals, on a strict total coverage of all active foci of malaria, with a view to interrupting transmission as soon as possible all over the target area, and preventing transmission for the required number of years. The minimum duration of the phase based on IRS (excluding particular cases of previous intensive control or hypoendemic malaria) should be not less than three years. The planning of IRS operations and other vector control measures in the attack phase should

Table 1: Epidemiological settings in Central Asia and Kazakhstan

Epidemiological Setting	Geographical Area
• There is no local transmission of malaria at present • There is importation of malaria	• The entire territory of Kazakhstan • The entire territory of Kyrgyzstan except the south-western part • The entire territory of Uzbekistan except some areas bordering Tajikistan and Kyrgyzstan • The entire territory of Turkmenistan except some areas bordering Afghanistan
• *P. vivax* transmission is focal and localized to small areas • Incidence of *P. vivax* is very low (less than 5 per 100 000 population) • There is risk of outbreaks • There is importation of malaria	• Some areas of Turkmenistan bordering Afghanistan • Some areas of Uzbekistan bordering Tajikistan and Kyrgyzstan
• *P. vivax* transmission on a large scale, but not widespread • Incidence of *P. vivax* is moderate (from 5 to 50 per 100,000 population) • Outbreaks of *P. vivax* may take place	• Most districts in central, northern and western parts of Tajikistan • Most districts in south-western part of Kyrgyzstan
• *P. vivax* transmission is widespread • Incidence of *P. vivax* is high (more than 50 per 100 000 population, in some districts reaching 200 and more) • *P. falciparum* transmission is focal and localized to small areas • Incidence of *P. falciparum* malaria is very low (less than 5 per 100 000 on average) • Outbreaks of *P. vivax* may take place • Endemic malaria is present	• Most districts in southern part of Tajikistan, particularly those bordering Afghanistan
• There is imported malaria only	• Mountain and arid areas

be based on assessment and analysis of local malaria epidemiological situations including epidemiological investigation and classification of malaria cases and foci. In support of these operations, mass prophylactic treatment with PQ (MPTP) may be given to all those who reside in an affected area for a rapid depletion of the reservoir of *P. vivax* hypnozoites before the beginning of the following transmission season (e.g. after outbreaks in the attack phase or in residual foci in the consolidation phase). The anti-relapse treatment of all *P. vivax* positive cases of previous years along with seasonal chemoprophylaxis to the affected population during the season of *P. vivax* malaria transmission (e.g. in foci of malaria in which IRS does not fully interrupt transmission in the attack phase) could also be of particular interest. All steps should be taken to detect malaria cases as early as possible and to treat

Table 2: Epidemiological settings in the Trans-Caucasian countries and Turkey

Epidemiological Setting	Geographical Area
• There is no local transmission of malaria at present • There is importation of malaria	• The entire territory of Armenia except some areas bordering Turkey and Azerbaijan • The entire territory of Georgia except some areas bordering Azerbaijan • The entire territory of Turkey except its south-eastern areas
• *P. vivax* transmission is focal and localized to small areas • Incidence of *P. vivax* is low (less than 5 per 100 000 population) • There is risk of outbreaks • There is importation of malaria	• Some areas of Armenia bordering Turkey • Some districts in Azerbaijan
• *P. vivax* transmission is on a larger scale, but not widespread • Incidence of *P. vivax* is moderate (from 5 to 50 per 100 000 population) • Outbreaks of *P. vivax* may take place	• Most districts in eastern part of Georgia bordering Azerbaijan • Most districts in Lenkoran and Kura-Araksin lowlands and other parts of Azerbaijan • Some districts in south-eastern part of Turkey
• *P. vivax* transmission is widespread • Incidence of *P. vivax* is high (more than 50 per 100 000 population) • Outbreaks of *P. vivax* may take place • Endemic malaria is present	• Some districts in south-eastern part of Turkey
• There is imported malaria only	• Mountain and arid areas

them adequately with antimalarial drugs in accordance with national policies and guidelines for malaria treatment (*see Tab. 3*).

Malaria elimination is supposed to comprise four stages:

1. Preparatory phase (after the elimination plan has been signed by concerned parties) – *1 year;*
2. Attack phase (when the preparatory phase is over, and it consists of the attack and evaluation operations to determine whether malaria transmission has been interrupted or not, and to indicate when the attack phase can be terminated) – *3 years or less in case of previous intensive malaria control;*
3. Consolidation phase (when attack measures have been discontinued, and it consists in deploying all efforts to discover any possible continuation of transmission, to determine its causes and eliminate them, to prevent re-introduction of sources of infection and to ascertain if and when elimination has been achieved) – the fundamental criteria determining that malaria has been eliminated - *malaria may be assumed to have been eliminated when adequate surveillance operations have not revealed any*

evidence of local transmission and the absence of indigenous cases, in spite of continuous importation of cases from abroad, during at least the three last consecutive years prior to the request for certification;

4. Maintenance phase (after elimination has been achieved).

In cases where the malaria control programme is aimed at reducing the incidence of the disease to such levels where it no longer constitutes a major public health problem, the strategy should be focused on strengthening national capabilities and capacities to provide early diagnosis and adequate treatment; to plan and implement cost-effective and sustainable preventive measures; to detect early and contain or prevent epidemics; and to reassess regularly a country's malaria situation, in particular the ecological, social and economic determinants of the disease (*see Tab. 3*). This strategy, which duration is indefinite, does not propose a single solution but gives broad lines of approach to achieving a common goal. The approaches are to be adapted by the countries concerned according to the structures of their health systems and existing control operations, their resources, and a realistic assessment of the control needs and risk factors (*7,8*).

For the areas and countries, where malaria transmission has been interrupted, particular emphasis should be placed on maintenance of the results achieved by deploying all efforts to detect any possible continuation or new occurrence of malaria transmission, notifying as soon as possible all suspected and confirmed malaria cases and applying rapid remedial actions, in order to prevent re-introduction of malaria transmission (*see Tab. 3*). Prevention of re-introduction of malaria is a long-term policy that requires continuous investment of funds and personnel.

In countries of the Region, particularly in the western part of Europe where imported malaria is a growing medical and health issue and where imported malaria is associated with high case-fatality rates, special attention should be given to case notification systems and to sound national policies for early diagnosis and prompt treatment of imported cases, including the management of severe and complicated *P. falciparum* malaria. It is important for all physicians advising travellers to be cautious in their advice about antimalarial drugs recommended for treatment and chemoprophylaxis. The physician investigating and treating a febrile traveller must be aware of the difficulties that are now commonplace in diagnosing and treating cases of drug-resistant malaria. The danger of delayed treatment and inappropriate treatment should not be underestimated. Travellers need to be better informed about (1) the very real dangers of contracting malaria in endemic countries; (2) the appropriate types of prevention, including prevention of mosquito bites, chemoprophylaxis and/or stand-by emergency treatment; and (3) the early recognition of symptoms so that adequate treatment may be initiated early enough to be effective, both in saving the patient's life as well as to avoid complications.

5.3. Key interventions

5.3.1. Disease management

To detect malaria cases, blood slides should be taken for parasitological examination from febrile patients and clinically suspected malaria cases. Passive case detection (PCD), which consists of screening for malaria cases at a health facility, should be given priority over active case detection (ACD), which

consists of screening for malaria cases through mobile malaria teams/clinics and/or home visits by malaria or general health staff. However, ACD should be advocated during the transmission season in the elimination programmes (*see Tab. 3*). The principle of total coverage should be applied to ACD in the more advanced phase of the elimination programme – the consolidation phase. ACD should be based on the quality rather than the numbers of blood slides collected. This implies visits to every house at the time when most people are at home. Every attempt should be taken to visit the houses that have been missed or locked. ACD should be enhanced in residual active foci of malaria that show signs of refractoriness. The norms may be less rigid in foci that demonstrate a good response to the attack measures. All the inhabited houses need to be visited, even if their population is covered by autonomous health services, such as railways, military, factories etc. Special emphasis should be given to populations in remote areas.

Parasitological confirmation of the diagnosis of malaria is recommended before treatment is started. Indication to a blood examination should be based on results of detailed clinico-epidemiological investigation of each suspected case. Particular attention should be given to any febrile disease or recent history of fever with no features of other diseases. Blood slides should be promptly dispatched to a laboratory for examination. Simple light microscopic examination of Giemsa-stained blood films is the most widely practiced and useful method for definitive malaria diagnosis. Advantages compared to rapid diagnostic tests (RDTs) include differentiation between species, quantification of parasite density, and the ability to distinguish clinically important asexual parasite stages from gametocytes, which may persist without causing symptoms but can lead to continuation of malaria transmission. These advantages can also be critical for proper case management. The disadvantages are that slide collection, staining, and reading can be time consuming, and microscopists need to be trained and supervised to ensure consistent reliability. RDTs could be used in situations where microscopy is not available or in the private sector. Deployment of microscopy and RDTs should be accompanied by quality assurance.

In the European Region where malaria is unstable and there is no significant immunity, the objective of malaria treatment is to obtain a parasitological and radical cure, but in settings where malaria is widespread the course of radical treatment of *P. vivax* malaria, which lasts for 14 days, may be postponed and be administered under supervision after the transmission season. All parasitologically confirmed cases of *P. vivax* and *P. falciparum* malaria should be treated with antimalarial drugs in accordance with national policies and guidelines for malaria treatment. In case of *P. vivax* malaria, radical treatment with Chloroquine (CQ) and primaquine (PQ) is recommended, and both drugs may be given concurrently, i.e. CQ with PQ during the first three days and PQ alone for the remaining eleven days. It is quite problematic to ensure that all malaria patients complete the full course of anti-relapse treatment with PQ, if supervision is inadequate. Since the frequency of clinical and parasitological failures following CQ treatment has become unacceptably high in Tajikistan, this drug is no longer recommended for treatment of uncomplicated *P. falciparum* malaria in affected countries of the Region. The artemisinin-based combination therapy (ACT) is recommended for the treatment of uncomplicated autochthonous and imported *P. falciparum*. Malaria patients could be treated on an in-patient basis in settings where there is no risk of malaria or a minimal one. In areas where malaria is widespread, preference should be given to treatment of patients on an out-patient basis, and only patients with life-threatening disease conditions have to be admitted to the hospitals (*see Tab. 3*).

5.3.2. Disease prevention

The main aim of vector control is a reduction of (1) the longevity of female mosquitoes below the time required for development of sporozoites, which is often tantamount to a reduction of the densities of vectors (by IRS), (2) the larval density (by biological methods and larviciding), and (3) the man-vector contact (by insecticide-treated mosquito nets). The available methods of vector control are usually classified into chemical, biological and environmental, depending on whether the control of vectors is attempted through the use of chemical or biological agents, or by management of the environment.

IRS, as an effective tool for transmission control, may be applied in affected areas, when the following conditions are met:

- A high percentage of the structures in an operational area have adequate spray- able surfaces and can be well sprayed;
- The mosquito species are anthropophilic and endophilic;
- Malaria vector(s) are susceptible to the insecticide in use;
- Good public acceptance, which is often reduced when spraying programmes continue over many years.

In temperate regions, the first round of IRS should be completed before the temperature becomes favourable for completion of the first extrinsic phase of malaria parasites in mosquitoes. Entomological expertise is required for the decision whether or not to use IRS. IRS requires skilled management, reliable equipment, well trained staff and strong support. Because of the enormous resource implications, it is necessary for malaria control programmes to define the situations where IRS is justified (e.g. in areas where malaria incidence is high, outbreaks of malaria occur and in project development sites).

Particular emphasis should be given to IRS in malaria elimination programmes at the attack phase, with a view to interrupting transmission as soon as possible all over the target area. In addition to IRS, the attack operations may also be based on other methods. Mass drug administration (MDA) implies the distribution of antimalarial drugs to every individual in a given population. MDA may be considered in situations where the attack and consolidation phases of malaria elimination programmes are being implemented. It can be considered under the following circumstances in areas with a limited malaria transmission season – in addition to IRS and other measures: (1) when small foci of malaria continue to exist after transmission has been interrupted elsewhere in the consolidation phase; (2) when an outbreak is reported in the attack phase; and (3) when residual insecticide spraying does not fully interrupt transmission in the attack phase. There are, however, numerous difficulties connected with the use of mass drug administration. It is therefore not a procedure that should be adopted without very careful consideration (*see Tab. 3*).

Larval control is realistic only in restricted areas, where a high proportion of the breeding sites are well defined, accessible and of a manageable size. In urban and periurban areas, the use of chemical and biological larvicides may be a successful prevention measure, if it involves regular treatment of all breading sites and careful inspection at frequent intervals. The use of larvivorous fish is recommended in rice-

Table 3: Interventions recommended in different epidemiological settings of malaria of the Region

Epidemiological Setting	Disease Management	Disease Prevention
Malaria Elimination – Maintenance Phase • There is no local transmission of malaria at present	• PCD • ACD during the transmission season once every fortnight : (1) the occurrence of autochthonous malaria from cases with imported nature or (2) in case of massive importation of malaria by migrants • Malaria patients are treated on an in-patient basis if feasible • Epidemiological investigation and classification of all malaria cases • Treatment of all parasitologically confirmed cases: • In case of *P. vivax* – anti-relapse treatment with PQ is given simultaneously with schizontocidal drug (CQ) • In case of uncomplicated *P. falciparum* malaria - ACT is recommended for first-line treatment	• Environmental management (modification and manipulation) • Larvivorous fish in all water reservoirs where Anopheles species breed at present • Other larval control operations - only in water reservoirs where the effectiveness of larvivorous fish is reduced • IRS is recommended only in areas with mass importation of malaria by workers or refugees • Personal protective measures (ITNs, other insecticide-treated materials, home-use products)
Malaria Elimination – Consolidation Phase • Residual transmission of malaria • There is importation of malaria	PCD • ACD during the transmission season once every fortnight : (1) in residual active foci or (2) in case of massive importation of malaria by migrants • Malaria patients are treated on an in-patient basis if feasible • Epidemiological investigation and classification of all malaria cases • Categorization of every focus of malaria • Treatment of all parasitologically confirmed cases: • In case of *P. vivax* – anti-relapse treatment with PQ is given simultaneously with schizontocidal drug (CQ) • In case of uncomplicated *P. falciparum* malaria - ACT is recommended for first-line treatment • MPTP in residual foci of malaria is advisable	• IRS: • In all residual foci of malaria • In areas with mass importation of malaria by workers or refugees • Environmental management (modification and manipulation) • Larvivorous fish in all existing or potential water reservoirs where Anopheles species breed with particular attention to rice fields • Other larval control operations - only in water reservoirs where the effectiveness of larvivorous fish is reduced • Personal protective measures (ITNs, other insecticide-treated materials, home-use products)

continued on next page

Epidemiological Setting	Disease Management	Disease Prevention
Malaria Elimination – Attack Phase • Malaria transmission is localized to small areas • Outbreaks of malaria may take place • There is importation of malaria	• PCD • ACD during the transmission season once a week: (1) in active foci or (2) in case of massive importation of malaria by migrants • Malaria patients are treated on an in-patient (if required) or out-patient basis • Epidemiological investigation and classification of all malaria cases • Categorization of every focus of malaria • Treatment of all parasitologically confirmed cases: • In case of *P. vivax* – anti-relapse treatment with PQ is given simultaneously with schizontocidal drug (CQ) • In case of uncomplicated *P. falciparum* malaria - ACT is recommended for first-line treatment) • MPTP after outbreaks is advisable • Anti-relapse treatment of all *P. vivax* cases from the previous year and seasonal chemoprophylaxis in foci of *P. vivax* malaria in which IRS does not fully interrupt transmission in the attack phase could be of particular interest	• IRS: • It should be well planned and implemented before transmission begins • In all (new and residual) active foci of P. falciparum and P. vivax malaria • The repeated spraying cycles in areas where the duration of transmission is more than four months • Environmental management (modification and manipulation) • Larvivorous fish in all existing or potential water reservoirs where Anopheles species breed with particular attention to rice fields • Other larval control operations in water reservoirs only where the effectiveness of larvivorous fish is reduced • Personal protective measures (ITNs, other insecticide-treated materials, home-use products)
Malaria Control • Widespread transmission of malaria • Numerous foci of malaria • Outbreaks of malaria may take place • There is importation of malaria	• PCD • ACD during the transmission season once every fortnight in active foci with high morbidity if feasible • Malaria patients are, as a rule, treated on an out-patient basis, but some cases can be treated on an in-patient basis • Epidemiological investigation and classification of all *P. falciparum* cases, and other malaria cases if required • Treatment of all parasitologicaly confirmed cases: • In case of *P. vivax* – radical treatment with schizontocidal drug (CQ), but anti-relapse treatment with PQ may be postponed till the inter-season time	• Environmental management (modification and manipulation) • Larvivorous fish in all existing or potential water reservoirs where Anopheles species breed, with particular attention to rice fields • Other larval control operations in water reservoirs only where the effectiveness of larvivorous fish is reduced • IRS: • It should be planned and implemented before transmission begins • In all active foci of P. falciparum malaria, and active foci of P. vivax malaria where morbidity is high if feasible • The repeated spraying cycles in areas where the duration of transmission is more than four months

Table 3 *(continued)*

Epidemiological Setting	Disease Management	Disease Prevention
	• In case of uncomplicated *P. falciparum* malaria, ACT is recommended for first-line treatment • Anti-relapse treatment of all *P. vivax* cases from the previous year if feasible	• Space spraying, if feasible for epidemic control • Personal and community protective measures (ITNs, other insecticide-treated materials, home-use products)
• There is imported malaria only	• PCD • Malaria patients are treated on an in-patient (if required) or out-patient basis • Epidemiological investigation and classification of all malaria cases • Treatment of all imported cases confirmed by microscopy or RDTs: • In case of *P. vivax* – anti-relapse treatment with PQ is given simultaneously with schizontocidal drug (CQ) • In case of uncomplicated *P. falciparum* malaria, ACT is recommended for first-line treatment • In case of severe *P. falciparum* malaria: either (1) artemisinin derivatives or (2) quinine dihydrochloride, depending on the national treatment policy, but preference must be given to artemisinin derivatives	• As a part of routine vector control operations, if any

growing areas. The *Gambusia* fish is a voracious eater of mosquito larvae and, if introduced in sufficient numbers in water reservoirs, it can destroy large quantities of mosquito eggs, larvae and pupae. The fish are small and capable of penetrating vegetable protective cover, and they can survive in the absence of mosquito larvae as a source of food. They multiply rapidly and are resistant to considerable changes in water temperatures and quality.

Environmental management deserves to be used more often by the local community for collective protection from vectors, and incorporated into the planning of development projects. Environmental management of mosquito control covers a wide range of operations and can be classified as follows: (1) environmental modification consisting of any physical transformation of land, water and vegetation, aimed at preventing, reducing or eliminating the habits of vectors without causing unduly adverse effects on the quality of the human environment, and it includes drainage, filling, land levelling etc.; (2) environmental manipulation consisting of any planned recurrent activity aimed at producing temporary conditions unfavourable to the breeding of malaria vectors, and it includes water salinity changes, stream flushing, regulation of the water level in reservoirs, dewatering or flooding of swamps, vegetation removal, shad-

ing and exposure to sunlight etc.; and (3) modification/manipulation of human habitation/behaviour consisting of any activity that reduces man-vector contact, and it includes the sitting of settlements away from vector sources, zooprophylaxis etc. The disadvantages of environmental management operations are mainly their high costs and the length of time required for completion. However, small-scale operations are feasible and can be applied in combination with other vector control options.

Insecticide-treated materials, such as nets, curtains, and screens can be used for personal and community protection in malaria settings where their efficacy and effectiveness have ascertained or is anticipated. Mosquito nets impregnated with long-lasting synthetic pyrethroids have proven their efficacy for personal protection and have the potential for reducing transmission when used on a large scale. The protective effect of insecticide-treated mosquito nets could be influenced by behavioural characteristics of the vector involved, i.e. feeding habits (indoors/outdoors feeding preferences, peak biting periods) in relation to the people's sleeping patterns (indoors/outdoors); the preferences for feeding on humans or animals, and seasonal variations in net use patterns.

It is logical to assume that a combination of different vector control options may compensate for deficiencies of each individual method. The integrated vector control approach can suit local conditions and ensure the maximum cost-effectiveness and benefit. The application of vector control measures and their combinations should be guided by consideration of their technical feasibility, operational applicability, cost-effectiveness and sustainability.

5.3.3. Control and prevention of malaria epidemics

Explosive epidemics and outbreaks in malaria-affected countries of the Region have revealed that basic preparedness and rapid response mechanisms were not in place in epidemic-prone areas, and the countries were unable to detect malaria cases early and react quickly to emergencies. It is important to place heavy emphasis on the establishment of mechanisms to predict, detect at early onset, rapidly respond to epidemic situations and prevent any abnormal situation related to malaria. A distinction needs to be made between temporary outbreak situations (Armenia and Turkmenistan) and large-scale epidemics leading to the establishment of endemic malaria or an increase in its levels (Turkey, Tajikistan, Azerbaijan) as the interventions in each setting are different. At the initial stage, emergency action was critical for the control of both types of epidemics, however, the return of endemic malaria and a rise in its levels require a long-term commitment to tackling the disease.

IRS with pyrethroid-based insecticides combined with early detection and prompt treatment of malaria through the existing health services and/or mobile facilities have recently proven their effectiveness in containment of transmission and prevention of further spread of epidemics in the Region. The above-mentioned interventions applied together with other emergency measures (space insecticide spraying where human population density is high) and personal protective measures could also be used to reduce rapidly the level of transmission. In the case of *P. vivax* epidemics, it may be advisable to implement MPTP after outbreaks and anti-relapse treatment in the winter or early spring, treating all *P. vivax* malaria cases from the previous season with the full course of PQ treatment. The impact of interventions depends on the stage of the epidemic at which actions are taken. In accordance with the most likely

risk scenarios, national contingency plans should be worked out with an indication of the channels to be used in order to import any necessary supplies and an identification of resources to be rapidly mobilized. The effectiveness of preventive action is heavily dependent on the degree of preparedness of national health services to mobilize the necessary resources in the real time available for implementing an appropriate response upon recognition of an imminent risk.

5.3.4. Malaria surveillance

Development of reliable and sensitive surveillance is vital to the success of any public health programme. Malaria surveillance defined as the systematic collection, analysis and interpretation of malaria-related data essential to planning, implementation, and evaluation of malaria control or elimination, aims to provide timely dissemination of relevant information to decision makers. Establishing good surveillance takes a number of years, and it includes capacity building for case notification and investigation, and setting up relevant information and reporting systems. Physicians, laboratory staff and other field health personnel who are likely to see and report on cases of malaria have to be trained to the rationale and methods for malaria surveillance. Monitoring the quality of surveillance through the use of standard comparable performance indicators is key to success. Reporting and feedback should be complete and timely to permit effective actions. Supervisory visits to the field are necessary and often reveal problems and solutions that could not be appreciated from the central level. Laboratory performance should be periodically measured, and laboratories should regularly demonstrate their proficiency.

All countries of the Region have malaria surveillance systems in place, which to great extent rely on physician and laboratory reporting and manual off-line analysis of data. Existing malaria information and reporting systems considered as integral parts of the surveillance are practical tools which are used to collect, analyze and interpret malaria-related data and to provide feedback. The standardized case definitions for malaria developed by WHO are used by countries. Epidemiological data on malaria, including findings of prevalence and special surveys conducted in the pre-assigned areas along with operational information, should be used to monitor the progress and effectiveness of the anti-malaria campaigns. All confirmed *P. falciparum* cases and their foci should be carefully investigated and classified. During the attack stage, epidemiological surveillance can help find out why spraying campaigns failed in particular areas. The consolidation phase, when the spraying forces have withdrawn, and the epidemiological forces take authority and try to finish the battle against malaria, is unthinkable without an adequate epidemiological service. Malaria surveillance at this stage is designed to discover evidence of any continuation of transmission, to establish the underlying causes, to eliminate residual foci and to substantiate the fact that elimination has been achieved. At this stage an epidemiological investigation and classification of all confirmed cases should be carried out as soon as possible.

The new regional strategy, which includes epidemic preparedness as an essential component, recommends the strengthening of information and reporting systems in areas prone to epidemics. High-risk areas and periods, possible risk factors, and population at risk can be identified through clinico-parasitological, entomological, environmental and socio-demographic monitoring. The epidemiological identification of areas prone to epidemics could result in improved and timely targeting of those who

are at the highest risk. Within the epidemic-prone area, a simple framework for detecting outbreaks could be established to assess on a weekly or monthly basis the following data: (1) an unusually high number/incidence of parasitologically confirmed or clinically suspected malaria cases or fever cases revealed during the transmission season, (2) an increase in importation of malaria into malaria-free areas, primarily by labour force and displaced populations, (3) an increase in vector breeding due to excessive rainfall or poor maintenance of drainage, irrigation and water supply systems or agricultural malpractices, and (4) an increase in the ratio of people to cattle due to a sudden decrease of the latter. Although a considerable number of determinants may precipitate an epidemic in any particular situation, most of them are interrelated. Environmental risk factors (to detect when conditions suitable for an epidemic have appeared) and epidemiological data (to detect the actual occurrence of an epidemic) should be under constant monitoring by personnel from public health and entomological services, and epidemic-related information should be promptly communicated to those who are responsible for making decisions and initiating actions. The timely collection, analysis and delivery of relevant information from the most peripheral level to intermediate and central levels permit an early recognition of epidemics and emerging risks, and a rapid response as well.

Each malaria situation requires an appropriate response that has to be based on a realistic assessment of the local situation. In fact, without a continuous (in real or near real time) and comprehensive epidemiological surveillance system, the malaria programmes will never have advanced warning of epidemics or improving of vigilance. The computer-adapted geographic information system (GIS) can serve as a common platform for the convergence of such multisectoral information and is a powerful evidence-based tool for action by decision-makers. GIS offers the ability to process, display, and analyze data beyond the capacity of any manual system. Bringing together data leads to new insights for control or elimination strategies and new possibilities for monitoring. Until the introduction of GIS in some countries of the Region, national health authorities dealing with malaria have had no systematic approach to tracking the geographic spread of malaria, and no accurate environmental health maps of a scale that can be used for planning of malaria control. The GIS-based mapping has enabled the health authorities to trace the evolution of the malaria problem, identify affected areas and categorize foci of *P. falciparum* and *P. vivax* malaria, where targeted and site-specific anti-malaria measures should be applied. GIS has much more to offer than the mere production of simple digital maps, and it could potentially act as powerful evidence-based practice tools for early problem detection and solving. The ultimate goal is to develop and implement a comprehensive spatio-temporal malaria surveillance system functioning proactively in real time at national and sub-national levels.

5.4. Training

It has been said that the global malaria eradication programme did not eradicate malaria but malariologists, and as a result manpower resources became increasingly scare. In the mid-1990s, malaria-affected countries of the Region faced tremendous bottlenecks in the area of human resources and capacity development that seriously interferes with the ability to control malaria epidemics, and it was one of the leading constraints preventing the effective implementation of national malaria control programmes. Having faced this challenge, special attention has been paid to the training of professional and technical staff in the field of malaria control within the WHO European Region over the past seven years. To ad-

dress future needs and achieve the stated goal, a creative and innovative approach to capacity development should be promoted at regional, national and sub-national levels.

National training programmes should be supported and coordinated to ensure that all malaria-affected countries are able to:

- Make the inventory to assess various categories of health staff needed and relevant posts to be filled, and on this basis to decide on the number and categories of professional and auxiliary personnel to be trained or re-trained.
- Maintain a core technical group of adequately trained professionals with the necessary epidemiological expertise to understand the changing malaria situations and advise on what should be done in new situations.
- Update knowledge and enhance skills of specialized and general health staff in malaria epidemiology, programme management (the planning, implementation and evaluation of malaria control and elimination), disease management and prevention, malaria surveillance, epidemic control and community mobilization. Although training can take place in the country, some staff may require additional training abroad, and this may apply not only to malaria professional and technical staff, but also to selected managerial personnel of the general health services.
- Ensure that training programmes and their contents are constantly adapted to and appropriate for the existing strategy – control or elimination. Training should be "task-oriented" and "problem-solving", and basic training is supplemented by regular supervision and refresher training courses. It is essential to remember that although training must be appropriate to the functions to be assumed by the trainee (e.g. training for elimination should be definitely oriented toward the execution of the standardized programme tasks and operations), it should be broad enough to enable the trainee to adjust to situations arising from circumstances.
- Ensure that the training increases the motivation of health staff to maintain their skills and competence, and remain in service.

There is a desperate need for strengthening the entomological component of each national malaria programme in the Region. It is advisable that entomologists participate in decision-making and play a great part in the decision on malaria. In recent years, substantial effort has been directed by the regional RBM programme towards the development, publication and dissemination of a number of technical manuals on malaria and its control. Guidelines and instruction materials to address malaria elimination issues should be prepared, published and made available in the targeted countries. Neighbouring countries with similar training needs may consider organizing combined trainings of certain categories of staff.

5.5. Focused operational research

All malaria programmes need to strengthen their capabilities to undertake operational research on issues of direct relevance to malaria control and elimination. Malaria research capabilities are weak in most of the affected countries of the Region. In response to this, the Regional Office has initiated a regional operational research programme on malaria, which is being successfully carried out with the

assistance of research institutions and partners in affected countries of Central Asia and the Trans-Caucasian Region.

The objectives of the research should be closely tied to the particular situation and problems identified within a particular country or a number of neighbouring countries, and local strategies applied. In the European Region vector biology and control is research of particular interest, which has been neglected, but is presently reconsidered in order to make vector control more effective in producing the desired result. The following studies may be considered: species complexes; species identification and their distribution in different eco-epidemiological settings; prevalence of sibling species and their role in malaria transmission; vector incrimination; biology of vectors; vector resistance to insecticides; and application of integrated vector control strategies in different malaria settings. Research is also needed to develop a reliable, field-applicable and real-time PCR method that can serve as a useful differential diagnostic tool for detecting *P. falciparum* and *P. vivax* malaria, and could distinguish relapses from new infections of *P. vivax*. Laboratory sequencing of *P. vivax* malaria genome and a better knowledge of the genetic diversity of *P. vivax* populations can help to assess geographical differentiation and provide baseline information for surveillance aimed at identifying the origin of malaria isolates.

5.6. Community mobilization

The involvement of communities and their partnership with health sectors to empower them in their own health development is crucial. Malaria prevention must go hand in hand with community participation. Unless individuals in communities see the merits of preventing the illness, even the best-designed prevention strategies might not be used. It is necessary to understand how a community perceives febrile illness and why it is important for them, and what existing behaviours are practiced that may either complement or hinder preventive measures. Knowledge, attitude & practice (KAP) assessments should be conducted on ways to promote compatibility of practices, customs and beliefs of various social groups and minorities with existing strategies and approaches, and to develop effective information, education and communication (IEC) strategies and targeted materials. Community and family care and preventive practices should be strengthened through the provision of IEC materials, capacity building, the mass media and community support.

Experience has shown that IRS programmes cannot be forced upon the public. Local communities need to be shown that they will benefit from protecting themselves from malaria and other vectors including household insects. Health education and community participation can greatly facilitate the work, reduce the cost and ensure the success. The involvement of local people can be fostered by community awareness sessions to explain the procedures and benefits of the IRS programme in order to avoid refusal problems and uncooperative attitudes of households when preparing their houses for spraying.

5.7. Cross-border cooperation

In recent years the malaria situation has deteriorated in some border areas of countries in the Region. All necessary steps should be taken to improve coordination and enhance cooperation among neighbouring countries to solve common malaria-related problems.

Particular emphasis should be placed on analysis of the current malaria situations and identification of problems and constraints encountered in border areas, and development of a strategy for increased coordination of malaria control in border areas and practical modalities for regular exchange of relevant information, and, finally, development and implementation of joint action plans in order to synchronize malaria control activities in border areas. Countries belonging to the WHO European and Mediterranean Regions share many commonalities in relation of eco-epidemiological malaria settings and malaria-related problems encountered, and therefore a closer coordination could be promoted through the exchange of technical reports and documents of mutual interest (e.g. malaria elimination issues), notification on malaria situations in border areas, organization of border meetings between countries belonging to the two Regions, attendance in international training courses organized by the other Region, visits of senior malaria programme personnel, and participation of the regional malaria advisers in events organized by the other Region.

5.8. Financing and resource mobilization

Successful malaria elimination campaigns require adequate planning and budgeting (permitting programme staff to focus on implementation issues rather than fundraising), and campaigns should be conducted with sufficient lead time and the necessary resource mobilization.

The RBM movement has successfully mobilized the collective efforts of international agencies, bilateral organizations, the NGO community and others to create a greater awareness of the malaria problem and to increase the amount of overall resources available for malaria in the WHO European Region. The financing provided by WHO coupled with increases in resources provided by governments, partners (USAID, MERLIN, ACTED, ECHO, ENI) and the GFATM represented an increase in funding for malaria control in all malaria-affected countries. Some countries also invested some of their own resources in malaria control. As a rule, the investments provided by governments went to support for salaries and minor operating expenses.

However, the advocacy actions which were enthusiastically undertaken by the WHO Regional Office for Europe to promote better cooperation among partners and freeing up of additional resources for use in malaria control, found a positive response from the international community only after malaria epidemics had occurred in the Region, and it was never sustained longer than 2-3 years. In other situations, such as small-scale outbreaks, occurrence of sporadic cases and high risks of malaria resurgence, partner response has been traditionally weak. At present, despite the widespread recognition of the results achieved and the obvious need for additional resources to move forward from malaria control to elimination, resources to tackle the residual malaria problem in the WHO European Region remain constrained and all national programmes are chronically dependent on external support.

The main obstacle for all elimination programmes is their cost, which is much higher than the resources available. To attract the donor interest in malaria elimination, new possibilities and approaches for resource mobilization should be widely explored at global, regional and national levels. A strong participatory approach with clear roles and responsibilities of all partners concerned, regular exchange of information and consultations between WHO, partners and national programmes should be encour-

aged and promoted, in order to enable the regional partnership to function more effectively and better coordinate malaria elimination efforts.

Clearly, the success of the regional malaria elimination initiative is dependent upon the confluence of a number of factors. A sound technical strategy, skilled human resources and good infrastructure at national and sub-national levels, consistent and pro-active strategic and technical guidance by WHO, and sufficient funds provided by WHO and partners are all essential for the regional elimination initiative. In order to consolidate the results achieved within malaria-affected countries of the Region and to move further from malaria control to elimination, the regional malaria programme would require an annual contribution between USD 7 and 8 million in 2006-2012, and USD 5 and 6 million in 2013-2015. A shortfall in funding would limit the scope of national control and elimination programmes and cause delays in their implementation.

6. Monitoring and evaluation

A reliable system for monitoring and evaluation (M&E) is critical for the success of any public health programme. M&E of anti-malaria activities aims to provide a systematic way of determining the extent to which control or elimination programmes are successful in achieving the operational targets and stated objectives.

Progress with malaria M&E has been encouraging over the past years in the Region. Effective malaria M&E systems have been set up at regional and national levels to measure programme progress and assess achievements, and malaria-related data are collected. Each year, the WHO Regional Office for Europe requests countries to report on the number of deaths due to malaria, microscopically confirmed cases by malaria species and their epidemiological classification (autochthonous: introduced, indigenous and relapsing cases or imported or induced cases), which are sorely needed for international comparative purposes. All autochthonous and imported cases are classified by gender and age groups. Member States are also requested to report on the total number of imported malaria cases by species of malaria parasite, by continent and country where malaria was acquired and by population groups: immigrants, refugees, temporary employed professionals and laborers, students, military personnel, tourists, and sea and air crew. The received information is categorized according to five impact indicators: (1) autochthonous malaria cases, (2) deaths due to malaria, (3) imported malaria cases, (4) imported *P. falciparum* cases and (5) total malaria cases, and is incorporated into the regional Computerized Information System for Infectious Diseases (CISID). In addition, data related to the disease burden and its patterns, epidemiological and entomological risk factors, local strategies and policies, disease management and prevention, capacity building, human and financial resources available, supervision and financing of programme activities are collected and analyzed at country and lower levels to guide health authorities on decision-making. Although reporting on the above-listed indicators is not fully standardized across the Region, this information is useful for understanding changes in programme performance and for measuring the impact of anti-malaria activities.

In order to reflect the new realities of moving from control to elimination there is a need to strengthen national malaria M&E systems. The malaria M&E systems should be upgraded to be more result-oriented and to provide timely, relevant and reliable information. In order to establish a viable M&E system for malaria elimination a number of key steps need to be taken:

- Establishment of baseline data on indicators, including the collection of data and documentation of sources;
- Selection of key performance indicators to monitor outcomes;
- Qualification of operational targets;
- Definition of modes and frequency of data collection, analysis, and reporting for each input, output, and income indicator, and the instruments for analysing and reporting;
- Definition of the types, timing, and levels of evaluation;

- Definition of how the findings will be disseminated and utilized in decision making and incorporated into improved performance

At the attack and consolidation phases when the number of malaria cases becomes low, as observed in a number of affected countries of the Region, the use of the conventional malariometric indicators, like Annual Parasite Incidence (API) often becomes meaningless, and the main question is then to ascertain whether malaria transmission is still taking place in a given area. At this stage all the cases that are reported should be subject to epidemiological investigation. This procedure is not mandatory in areas where the interruption of malaria transmission is not envisaged. The result of the investigation is an epidemiological diagnosis of each malaria case in terms of its place, time and source. The presence of particular categories of cases is the basis for classification of malaria foci. A malaria focus is defined as "a defined and circumscribed locality situated in a currently or formerly malarious area and containing the continuous or intermittent epidemiological factors necessary for malaria transmission" *(9)*. This concept is crucial for those malaria control programmes that aim at a limitation or interruption of malaria transmission (all malaria affected countries in the WHO European Region), since the focus as a minimum entity is the object of malaria action. The identification and monitoring of the functional status of malaria foci is a cornerstone for success in interruption of malaria transmission or prevention of its reintroduction. A WHO classification of malaria foci classifies foci depending on (1) their age – residual versus new, and (2) the presence of malaria transmission – non-active versus active versus potential. As a result, it distinguishes the following types of foci:

1. residual:
   - non-active (transmission interrupted; no indigenous cases, but possible occurrence of relapsing ones);
   - active (transmission not interrupted);

2. new:
   - potential (presence of imported cases; no evidence of transmission, but its renewal possible);
   - active (renewed transmission), which can be sub-divided into two categories in which (a) only introduced cases are present or where malaria has already been established, and (b) indigenous cases are present.

Status of every focus should be periodically reviewed and re-categorized when necessary.

Programme managers should lead this process and ensure that M&E activities produce the desirable results in measuring progress, assessing achievements, detecting and solving problems, assessing programme effectiveness and guiding the allocation of resources.

7. Certification of malaria elimination

The certification of malaria elimination is to provide beyond reasonable doubt that local malaria transmission has been interrupted in a given place and time. The idea of the certification of malaria eradication was introduced by WHO at the onset of the malaria eradication campaign. Since 1956, when the WHO Expert Committee on Malaria first dealt with malaria eradication (*10*) the condition for terminating consolidation was "that an adequate surveillance system should have been operating and that so far as could be determined by it, transmission have been prevented through the whole area and the indigenous reservoir had disappeared". Malaria eradication could therefore "be assumed when an adequate surveillance system has not discovered any evidence of transmission or residual endemicity despite careful search for three consecutive years, in the last two of which, at least, no specific general measures or anopheline control have been practised". This functional definition of malaria eradication was slightly modified and enlarged by later sessions of the WHO Expert Committee on Malaria (*11, 12*).

The past experience of eradication programmes has shown, however, that in the advanced consolidation phase, and even later during maintenance, isolated malaria cases are sometimes found which should be considered indigenous, owing to lack of evidence for classifying them as relapsing, imported, induced, or introduced, although no evidence of local transmission could be assumed. If an exhaustive epidemiological investigation confirms this assumption such cases should be classified as "cryptic" and their exceptional presence would be compatible with eradication and should not forbid termination of the consolidation phase. Two more points should be added, before deciding on terminating this phase. One is to be sure that surveillance has been adequate, i.e. that it has been and is of high quality, based on ACD and PCD, appropriately supervised, and that the laboratory work was reliable, timely, and efficient. The other point is that the preparation of the maintenance phase has been completed.

Once an elimination programme had been successfully implemented, the government would like to officially proclaim the elimination of malaria on the whole territory of the country. Any government can declare that malaria has been eliminated from its territory; but to give international recognition to the declaration it is expected that WHO will certify it by listing the country in an official register. In order to do that, the government would request WHO to undertake an inspection and review the accomplishments of the programme through a country visit by special certification team acting on behalf of WHO. The team subsequently submitted its report with recommendations to the Regional Director, and finally to the Director General of WHO. The final decision of the Director General is communicated to the Member State. The 10th Report of the WHO Expert Committee on Malaria (*12*) dealt exhaustively with the confirmation of malaria eradication and listed the various points to be explored and checked by a certification team.

Administrative procedures and criteria for certification of malaria elimination still need to be agreed upon by WHO and Member States to officially recognize the malaria-free status. The three general principles apply for certification:

1. Certification for a country as a whole, and for all four human malaria species;
2. Inspection and certification by a team led by WHO;
3. Registration of certification to be published in the *Weekly Epidemiological Record* as well as in an official register of Member States where malaria elimination has been achieved.

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Annex 1

Conditions to be met before initiating a malaria elimination programme

1. The government should be determined to undertake the malaria elimination programme and to support it from beginning to end. Before a malaria elimination programme is launched in a country, the government should accord it appropriately high financial priority in its development plan, or in its normal budgetary allocations.
2. There must be evidence that elimination of malaria is technically and operationally feasible.
3. The government should have a definite plan for developing its basic health services.
4. There should be an effective central and peripheral system of government administration, to enable the execution of the programme throughout the country.
5. There should be a system of communication that will permit the movement of staff and the transportation of supplies and equipment without excessive difficulties or delays throughout the malarious areas.

When the basic requirements have been met there should be a complete understanding of the commitments to be faced until malaria elimination is achieved. If the government recognizes the full implications of a malaria elimination programme and what it calls for in terms, not only of men, material and money, but also of administration, organization and management, this should be set out clearly in a plan of operation covering the entire duration of the programme, and agreed upon by all the participating agencies. This plan should cover the following points:

1. Sufficient background information should be available to provide an adequate basis for planning. It must include epidemiological data to permit the delimination of the malarious areas of the country, details of the vector species and their bionomics, as well as geographical, climatic, social, economic and demographic information.
2. The method or methods of attack should be specified in detail, and evidence should be provided that the interruption of transmission can be effected by the methods proposed. This evidence may have been obtained from the experience of pilot projects in the country concerned or from the experience in neighbouring countries with comparable epidemiological conditions.
3. Adequate administrative or legislative provisions should exist to cover the requirements of the programme, including right of entry by malaria service staff with the purpose of spraying or epidemiological investigation, compulsory reporting of malaria cases, and acceptance of treatment in case of malaria, etc.

4. The formation, authority, organization and responsibility of the malaria service should be specified and the administrative policy clearly defined. Provision should be included for the service to be given full control over its budgetary allocation, with authority to formulate financial procedures suitable for its efficient functioning. Moreover, the service should be delegated powers for formulating the terms of service of its personnel and for exercising full administrative and disciplinary control over them.
5. There should be an effective mechanism to ensure co-ordination and collaboration between relevant governmental and other agencies as well as co-ordination of malaria activities with neighbouring countries, particularly where movement across national boundaries occurs freely.
6. Adequate training should be provided to meet the progressive needs of the programme for new staff, and regular refresher courses for all staff in service.
7. The plans for attack measures and for surveillance operations should be complete and detailed.
8. There should be provision for appropriate health education activities.
9. The plan should cover the whole programme showing the progress expected from year to year.
10. Provision should be made for evaluating progress at all stages of the programme, in order to ensure that recognized epidemiological standards are met. Regular annual assessments by an independent team should form a normal and essential element of the programme.
11. The estimated budget for the whole programme should be correct and realistic, including adequate reserve provisions to meet problems that are liable to occur during the implementation of the programme, and the source or sources of funds should be clearly shown.
12. Adequate provision should be made for effective vigilance activities in order to prevent the re-establishment of malaria.

Annex 2

The Tashkent Declaration

"The Move from Malaria Control to Elimination" in the WHO European Region

A Commitment to Action

We, the Ministers of Health,

Recalling World Health Assembly resolutions WHA52.11 and WHA58.2 that identified Roll Back Malaria as a priority project for WHO and called for further support to malaria control, in order to achieve the internationally agreed targets and goals;

Reaffirming our previous commitments to malaria made through the regional resolution, EUR/RC52/R10, "Scaling up the response to malaria in the European Region of WHO" from September 2002;

Appreciating the momentum offered by the Roll Back Malaria (RBM) partnership movement to curb large-scale epidemics of malaria in Central Asia, the Trans-Caucasian region and Turkey in the mid-1990s;

Welcoming the substantial progress made with rolling back malaria in affected countries, particularly those where the incidence of malaria has been brought down to such levels that interruption of transmission may become a feasible objective;

Proving the demonstrated feasibility of malaria elimination in the WHO European Region in the recent past and the successful elimination of malaria in several Member States of the WHO Eastern Mediterranean Region at present;

Being mindful of the efficacious tools available to control and eliminate malaria in the regional context at present;

Emphasizing that a unique opportunity now exists to move further from malaria control to elimination;

Acknowledging that resources devoted to undertaking the new effort shall commensurate with the scope of the work to be done at national level;

Recognizing that the elimination of malaria requires additional efforts and an increase in resources;

1. **Remain** fully committed to the regional RBM movement, which has helped Member States to pursue successful partnership actions resulting in containment of malaria epidemics and burden reduction;

2. **Recognize** the need to consolidate the results achieved and to move further from malaria control to elimination at national level;

3. **Commit** ourselves to make all possible efforts required to achieve a greater impact on malaria situations in Member States;

4. **Call upon** the WHO Regional Office for Europe to assist countries in need of advocating, promoting and facilitating national efforts, in order to move from malaria control to elimination;

5. **Call upon** all Member States to support the WHO Regional Office for Europe in its efforts towards promoting the new regional initiative with the goal of eliminating malaria in the Region by 2015;

6. **Pledge** to develop, in collaboration with WHO, technically sound national malaria elimination strategies;

7. **Underline** the need to ensure that malaria-affected countries in the European Region are fully supported by organizations of the United Nations system, bilateral development agencies, development banks, nongovernmental organizations and the private sector in their endeavours to move forward with national malaria control and elimination campaigns;

8. **Urge** RBM partners to increase the level of financial assistance, in order to contribute to the attainment of the agreed objectives and goals;

9. **Stress** the need to strengthen cross-border collaboration for solving malaria-related problems. In the context of malaria elimination, particular emphasis should be given to situations, where there is a risk of spread of malaria between countries;

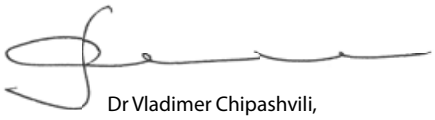
10. **Note** the importance of monitoring progress made with malaria control and elimination campaigns in accordance with WHO recommendations;

11. **Request** the 56th Regional Committee of the WHO European Region to take up the Tashkent Declaration, to follow up periodically on the implementation of this Declaration and to report on the progress achieved;

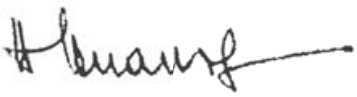
12. **Call upon** the WHO Regional Office for Europe to promote inter-regional collaboration and coordination with the WHO Eastern Mediterranean Region on issues related to malaria elimination.

Dr Norayr Davidyan,
Minister of Health,
Armenia

Dr Oktay Shiraliyev,
Minister of Health,
Azerbaijan



Dr Vladimer Chipashvili,
Minister of Health,
Georgia



Mr Erbolat A. Dosayev,
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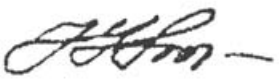
Kazakhstan

Dr Shailoobek Nyiazov,
Minister of Health,
Kyrgyzstan



Prof. Nusratullo Faizullaev,
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Dr G.M. Berdymukhammedov,
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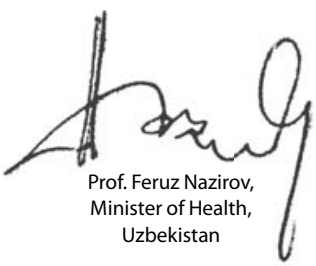

Prof. Feruz Nazirov,
Minister of Health,
Uzbekistan

The reduction in the number of malaria cases by more than seven-fold over the past seven years (1999-2005) is the most conspicuous achievement of the regional malaria programme to date. Presently the incidence of P. falciparum and P. vivax malaria in some countries of the WHO European Region has been brought down to such levels that interruption of their transmission may become a feasible objective in the near future.

The rationale for development of the new malaria strategy aimed at moving from control to elimination is based on the following principles:

- The demonstrated feasibility of malaria elimination in Europe in the past.
- The visible impact of malaria control interventions at present.
- The strong political commitment to achieve a greater impact on malaria situations at national level.
- The efficacious technologies and tools available to control and eliminate malaria in the regional context.

All the above mentioned, along with clear evidence of technical feasibility and operational applicability of malaria elimination may facilitate decisions towards undertaking the new elimination effort within malaria-affected countries of the WHO European Region.

Malaria-affected countries which participated in the Inception Meeting on the Malaria Elimination Initiative in the WHO European Region held in Tashkent, Uzbekistan, 18-20 October 2005, consented to the Tashkent Declaration "The Move from Malaria Control to Elimination", which has recently been endorsed by the Ministers of Health of the respective countries.

The ultimate goal of the new regional strategy is to interrupt the transmission of malaria by 2015 and eliminate the disease within affected countries of the Region. In areas and countries where malaria had been eliminated, attention is given to maintaining the malaria-free status. Particular emphasis is also placed on tackling the growing problem associated with imported malaria.

The new strategy will target malaria by:

- ultimately interrupting transmission in countries where malaria is a focal problem and there is clear evidence of political support, technical feasibility and operational applicability of malaria elimination,
- further reducing the incidence and prevalence of malaria in countries where elimination does not appear to be feasible at present,
- preventing the re-establishment of malaria transmission in countries and territories where it had been eliminated, and
- reducing and preventing deaths due to imported malaria.

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