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**Progress report on
Integrated vector management (EM/RC52/R.6)**

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1. Introduction

Vector-borne diseases continue to be a major public health problem in the Eastern Mediterranean Region. In the past two years alone, countries of the Region have been affected by a number of emerging/re-emerging vector-borne diseases – including dengue and dengue haemorrhagic fever, Rift Valley fever, Chikungunya fever and sandfly fever. In 2005, the Regional Committee for the Eastern Mediterranean issued resolution EM/RC52/R.6, in which it endorsed integrated vector management (IVM) as the strategy for the implementation of vector control in the Region.

In the resolution, the Regional Committee requested Member States to: establish and strengthen national units for integrated vector management with adequate financial and human resources; establish a functional of intersectoral mechanism for the collaboration and coordination of all related sectors and identify needs, gaps and opportunities for vector control and develop national integrated vector management strategies and plans for all vector-borne diseases. The Regional Director was requested, *inter alia*, to establishment of a regional diploma course in entomology; and to report regularly to the Regional Committee on the progress of the implementation of integrated vector management.

This report provides an update to on the progress of implementation of integrated vector management in countries of the Eastern Mediterranean Region, including implementation of the recommendations of resolution EM/RC52/R.6. It also reviews the challenges and constraints countries are facing as they implement integrated vector management, and proposes a way forward to overcome these challenges.

2. Implementation of resolution EM/RC52/R.6 at national level

2.1 Development of tools for vector control needs assessment

The vector control needs assessment is prerequisite to the development of national integrated vector management strategies and plans. Led by WHO, Member States and partners embarked on a rigorous process to develop, test and finalize tools to conduct such assessments, including translation of the tools into French. The tools were administered in 9 countries of the Region, 8 of which had the support of the United Nations Environment Programme/Global Environment Facility (Djibouti, Egypt, Islamic Republic of Iran, Jordan, Morocco, Sudan, Syrian Arab Republic and Yemen) while one used its own resources (Afghanistan). For each country, the tools were used to assess the situation of vector-borne diseases, relevant policy framework for vector control, place and structure of the vector control programme/unit in the ministry of health in relation to the other programmes, planning and implementation of vector control, intersectoral coordination mechanisms for vector control at country level and relevant community mobilization strategies for vector control.

The gaps and opportunities identified through this process were used to develop national integrated vector management plans in the 9 countries, which constitute 80% of the high-risk countries for vector-borne diseases in the Region. However, these plans of action were not fully implemented in 2007. As well, comprehensive vector control needs assessment has not yet been initiated in other priority countries of the Region, in particular Pakistan and Somalia.

2.2 Results of comprehensive vector control needs assessment

None of the 9 countries assessed had a specific national policy for vector control of vector-borne diseases. This implied that no adequate resources were set aside for vector control. Except in Morocco and Egypt, there was also no unit for vector-borne disease control in the ministry of health, resulting in the absence of coordination of control efforts. It was apparent that such a unit needed to be established in the ministry of health with clear responsibilities and terms of reference for staff, coupled with appropriate incentives. The need to strengthen national capacity development through training and infrastructure (insectaries, entomology laboratories and equipment) was also evident.

In terms of planning and scaling up of vector control interventions, results showed a need to: update the distribution of vector-borne diseases and their vector species so that interventions could be targeted; develop and strengthen an integrated information system for vector control; determine

opportunities for synergistic use of interventions based on vector behaviour and ecology; strengthen capacity to manage insecticides (including insecticide resistance monitoring and management); and strengthen coordination with ministry of agriculture and environment for adaptation and enforcement of relevant policies.

Moreover, implementation of integrated vector management is based on the strength of intersectoral coordination and collaboration, due to interdependency of different sectors with health as well as meagre resources and the need to avoid duplication of efforts. It was clear from this assessment that the coordinating bodies for integrated vector management, when established in each country, would need legal recognition and incentives to sustain them. As well, to maximize the impact of interventions, community perceptions need to be identified, accompanied by development and promotion of awareness messages for behavioural impact. There is also a need to identify appropriate sources of information and local networks to allow empowerment of communities for vector control.

2.3 Strengthening of national intersectoral coordination mechanisms

One of the outcomes of the national vector control needs assessment was the establishment of a functional national intersectoral steering committee for integrated vector management in each of the 9 countries. Representatives of this committee were drawn from different line ministries, academic institutions, the private sector and civil society. Box 1 shows the detailed composition of the committee members in each of the 9 countries assessed. These committees have clear terms of reference and well defined responsibilities. The chairperson of this committee is the undersecretary of the ministry of health or his/her representative. The committee is responsible for the implementation of the integrated vector management strategy, and its sustainability depends on the support of all key partners.

Box 1. Different sectors involved in vector control in 9 countries of the Region

Afghanistan: Ministries of Health, Agriculture, Environment, Municipalities, Environmental Protection Agency, nongovernmental organizations, United Nations agencies

Djibouti: Ministries of Health, Agriculture, Water and Irrigation, Environment and Djibouti municipality

Egypt: Ministries of Health and Population, Agriculture, Irrigation, Environment, Municipalities, Academic and research institutions

Islamic Republic of Iran: Ministries of Health and Medical Education, Agriculture, Water and Irrigation, Environmental Protection Agency, Academic and research institutions

Jordan: Ministries of Health, Agriculture, Environment, Water and Irrigation, Jordan Valley and Greater Amman municipalities and Ministry of Defence

Morocco: Ministries of Health, Agriculture, Interior and Environment, and research and academic institutions

Sudan: Federal Ministry of Health (National Malaria Control Programme, Occupational Health Department and State Ministries of Health), Ministries of Agriculture, Environment and Tourism, Irrigation and Water Management, Nongovernmental organizations, Community-based organizations (Sudanese Women Union) and the private sector, e.g. ITNs; academic and research institutions

Syrian Arab Republic: Ministries of Health, Agriculture, Environment, Water and Irrigation, Municipalities, academic institutions

Yemen: Ministry of Health and Population, Environment, Agriculture, Municipalities, Academic institutions

3. Scaling up of vector control interventions in the context of integrated vector management

Prevention of vector-borne diseases is essential to the overall control strategy for these diseases. Indoor residual spraying of insecticides and the use of long-lasting insecticidal nets are the main interventions. As a result of resources provided mainly by the endemic countries themselves and the Global Fund to Fight AIDS, Tuberculosis and Malaria, coverage of long lasting insecticidal nets has increased over the past three years. Three programmes (Afghanistan, Somalia and southern Sudan) have made good progress in this respect despite health system weaknesses due to complex emergencies. Implementation of insecticide-treated nets is a key strategy in these countries. In the past

three years, a total of 6 889 027 treated nets have been distributed in the Region (Table 1). This means that up to the end of 2007, over 17 222 568 people were protected from vector-borne diseases – especially malaria. The nets distributed in 2007 alone (3 389 151, covering a population of 8 472 878) represented a 40% increase from those distributed in 2006 (2 064 620, covering a population of 5 161 550). This number represented a 30% increase over the number distributed in 2005 (1 435 256, able to cover a population of 3 588 140 people).

With this increasing trend, the availability of resources and WHOPEs-approved long-lasting insecticide-treated products and with the current promotion of free distribution of nets as a strategy, it is clear that access to this intervention will no longer be an issue. At current rates of increase, approximately 30 million people will have access to this intervention by the end of 2008. Resources and efforts should therefore be focused on the three countries (Afghanistan, Somalia and Sudan) that have made good progress with this intervention, and that contribute to more than 50% of the disease burden in Region. In light of the health system weaknesses, these countries were supported in developing phased distribution plans for long-lasting insecticidal nets with the target of achieving full coverage in less than 5 years. There is also a need to determine the actual population at risk from vector-borne diseases that could benefit from use of treated nets. More efforts are needed in Pakistan to scale up coverage of this intervention.

In the past two years, insecticide resistance monitoring continued in countries in order to guide the selection of insecticides and to facilitate the development of management strategies to delay and mitigate the consequences of resistance. In Morocco, the main malaria vector species *Anopheles labranchiae* was reported resistant to DDT and a national policy to switch to pyrethroids was advocated. In parts of Al-Dahira region, Oman, *An. stephensi* was reported resistant to temephos and suitable alternative insecticides for biological control are being applied. In Sudan, for the first time in the Region, the local malaria vector species *An. arabiensis* was reported resistant to pyrethroids, the insecticide of choice for indoor residual spraying and for treating bednets. In the same area the vector is also resistant to DDT (an organochlorine) and to malathion (an organophosphate). Switching to bendiocarb (a carbamate) is the remaining alternative; however, bendiocarb is not only expensive (it requires two cycles of spraying), it also cannot be used to treat bednets. The Vector Biology and Control unit in the Regional Office, which was established by the Regional Director in 2007, is part of a global network on insecticide resistance monitoring and management to ensure that affected countries of the Region are supported with the required resources.

Table 1. Number of insecticide-treated nets distributed in the Region, 2005–2007

Countries	2005	2006	2007	Population covered to date ¹
Pakistan	140 000	240 000	90 000	1 175 000
Somalia	104 300	320 000	456 000	2 200 750
Afghanistan	201 306	53 820	394 843	1 624 923
Morocco ²	4 211	1 125	1 400	16 840
Yemen	48 439	156 925	381 138	1 466 255
Sudan (southern)	200 000	650 000	704 000	3 885 000
Islamic Republic of Iran	20 000	20 000	50 000	225 000
Sudan (northern)	712 600	604 000	1 310 570	6 567 925
Djibouti	4400	18 750	1 200	60 875
Total	1 435 256	2 064 620	3 389 151	17 222 568

¹ Based on assumptions that long lasting insecticidal nets have a residual lifespan of 3–5 years and that between 2 and 3 people use 1 net

² Nets distributed for the control of leishmaniasis

In terms of scaling up vector control interventions, the biggest challenge has been the lack of documentation on the appropriateness of vector control interventions in responding to emerging and re-emerging vector-borne diseases. Following outbreaks of dengue in Pakistan, sandfly fever in Lebanon and Rift Valley fever in Somalia and Sudan in the past two years, vector control interventions (mainly space spraying) were deployed late and therefore the impact was difficult to quantify. Since these interventions are expensive, it is important that their appropriateness be assessed through commissioned operational research. Moreover, the establishment of a vector control unit (as part of the national integrated vector management strategy) for all vector-borne diseases, instead of relying on the national malaria control programme which is ill equipped to deal with other disease vector control, would facilitate rapid response.

4. Establishment of a regional diploma course in entomology

In resolution EM/RC52/R.6, Member States committed themselves to scaling up appropriate vector control interventions in the context of the integrated vector management approach. They also recognized that countries lacked the capacity in entomology and vector control to implement integrated vector management effectively. In response to the resolution, the Regional Office, in consultation with other leading international institutions, developed a regional postgraduate training programme in medical entomology and vector control. The robust curriculum includes a field training component, a unique feature of this programme. This one-year course will be launched in June 2008 at the University of Gezira, Sudan in collaboration with WHO/EMRO and other international institutions. These institutions include: Pasteur Institute, Vector Research Unit, Tehran, Islamic Republic of Iran; London School of Hygiene and Tropical Medicine, London, United Kingdom; National Institute for Communicable Diseases, University of Witwatersrand, Johannesburg, South Africa; Vector Biology Research and Training Centre, Ain Shams University, Cairo, Egypt; Liverpool School of Tropical Medicine, Liverpool, United Kingdom; Istituto Superiori di Sanità, Rome, Italy; Institut de Recherche pour le Développement (IRD), France; and Centre for Research in Entomology, Cotonou (CREC), Cotonou, Benin; and the National Malaria and Leishmaniasis Control Programme, Federal Ministry of Health, Khartoum, Sudan

The same curriculum has been adapted in Pakistan (hosted by Health Services Academy and Quaid-i-Azam University) and the Islamic Republic of Iran (hosted by Tehran University of Medical Sciences) for implementation in September 2008 and January 2009, respectively. With this progress, the Region should witness vector control units at all administrative levels of ministries of health being led by qualified staff who are not only able to plan and implement vector control interventions in the context of IVM, but who are also able to monitor and evaluate the impact of interventions.

5. Challenges and constraints in the implementation of vector control

Most of the countries endemic for vector-borne diseases have integrated vector management strategies and plans and are currently implementing them; however, they still face a number of challenges and constraints. First is the lack of commitment to translate integrated vector management into a national health policy. Second, the institutional arrangement for vector control is inappropriate in the majority of countries. What some countries have done (with the exception of Egypt, Jordan and Morocco) is to extend the mandate of existing disease-specific programmes (e.g. malaria) to include other vector-borne diseases. This approach fails to appreciate the diversity and complexity of vector-borne diseases and their requirements for control and prevention and has not helped in generating additional national resources for vector control. Third, countries with a low vector-borne disease burden have not yet taken the opportunity to implement integrated vector management, despite the fact that vector-borne diseases are expanding to new areas and countries.

6. Future directions

Implementation of integrated vector management in the countries most endemic for vector-borne diseases has progressed well. The sustainability of the established national intersectoral coordination mechanisms, however, cannot be guaranteed without firm commitment from the different sectors

involved. Countries that have not initiated this process because vector-borne diseases are not currently a national public health problem should be encouraged to do so. Plans to strengthen capacity in vector control and entomology will begin to be realized in the 2008 and 2009. It is expected that at least each country will have a well trained entomologist/vector control person who through appropriate mentorship will guide the planning and implementation of vector control in the context of integrated vector management. It is also expected that the use of vector control tools that rely heavily on the use of insecticides will be based more on evidence, including vector susceptibility status. A network to monitor and manage insecticide resistance with the goal of strengthening this capacity in the Region is currently being supported.