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**DRUG RESISTANCE RELATED TO AIDS, TUBERCULOSIS AND MALARIA:  
ISSUES, CHALLENGES AND THE WAY FORWARD**

**Report of the Regional Director**

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**DRAFT RESOLUTION**

AFR/RC59/WP/1 Drug resistance related to AIDS, tuberculosis and malaria: issues, challenges and the way forward



## BACKGROUND

1. With just 10% of the world population, sub-Saharan Africa has the highest burden of HIV/AIDS, tuberculosis and malaria in the world. At its fifty-third session in 2003, the WHO Regional Committee for Africa adopted a resolution on scaling up AIDS, tuberculosis and malaria interventions.<sup>1</sup> The resolution recognized that both access to and adequate utilization of effective treatment with quality-assured medicines are crucial for reducing the disease burden.
2. However, efforts to improve access to treatment are hampered by development of HIV, TB and malaria drug resistance. Drug resistance is defined as the ability of an infectious agent to survive or multiply despite the administration and absorption of medicine given in doses equal to or higher than those usually recommended but within tolerance of the subject. This is due to genetic mutations and is a major threat to control of HIV/AIDS, TB and malaria.
3. The need for lifelong antiretroviral treatment (ART), coupled with the high HIV replication and mutation rates, means that resistance will emerge even among appropriately treated, compliant individuals. However, HIV drug resistance can be minimized by good ART programmes, removal of barriers to continuous access to ART and reduction of HIV transmission.<sup>2</sup>
4. HIV drug resistance assessment is primarily through monitoring of early warning indicators at ART sites.<sup>3</sup> HIV drug resistance surveys are also performed in geographic areas where ART has been widespread for more than 3 years. Recent surveys conducted at antenatal clinics in several countries in the African Region estimated that HIV resistance to all drug classes is less than 5%.<sup>4</sup> A global HIV drug resistance network established in 2001 supports countries in capacity building and guidance on standard procedures for monitoring HIV drug resistance.<sup>5</sup>
5. Multidrug-resistant TB (MDR-TB) is defined as tuberculosis caused by organisms that are resistant to at least isoniazid and rifampicin. Extensively drug-resistant TB (XDR-TB) is defined as MDR-TB that is also resistant to any one of the fluoroquinolones and to at least one of three injectable second-line medicines (amikacin, capreomycin or kanamycin).<sup>6</sup> MDR-TB and XDR-TB are principally a result of inadequate or poorly administered treatment regimens.

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<sup>1</sup> WHO, Resolution AFR/RC53/R6, Scaling up interventions against HIV/AIDS, tuberculosis and malaria in the African Region. In: *Fifty-third session of the WHO Regional Committee for Africa, Johannesburg, South Africa, 1–5 September 2003, Final report*, Brazzaville, World Health Organization, Regional Office for Africa, 2003 (AFR/RC53/18), pp. 20–22.

<sup>2</sup> Bennett DE et al, The World Health Organization strategy for prevention and assessment of HIV drug resistance, *Antiviral Therapy* 13 (Supplement 2): 1–13, 2008.

<sup>3</sup> Hedt BL et al, Early warning indicators for HIV drug resistance in Malawi, *Antiviral Therapy* 13 (Supplement 2): 69–75, 2008.

<sup>4</sup> Somi GR et al, Surveillance of transmitted HIV drug resistance among women attending antenatal clinics in Dar es Salaam, Tanzania, *Antiviral Therapy* 13 (Supplement 2): 77–82, 2008; Woldaregay EA et al, Threshold survey evaluating transmitted HIV drug resistance among public antenatal clinic clients in Addis Ababa, Ethiopia, *Antiviral Therapy* 13 (Supplement 2): 89–94, 2008; Maphalala G et al, Surveillance of transmitted HIV drug resistance in the Manzini-Mbabane corridor, Swaziland, in 2006, *Antiviral Therapy* 13 (Supplement 2): 95–100, 2008; Pillay V et al, Antiretroviral drug resistance surveillance among drug-naïve HIV-1-infected individuals in Gauteng Province, South Africa in 2002 and 2004, *Antiviral Therapy* 13 (Supplement 2): 101–107, 2008.

<sup>5</sup> Bennett DE et al, The World Health Organization strategy for prevention and assessment of HIV drug resistance, *Antiviral Therapy* 13 (Supplement 2): 1–13, 2008.

<sup>6</sup> WHO, *Guidelines for the management of drug-resistant tuberculosis: emergency update 2008*, Geneva World Health Organization, 2008.

6. The new WHO Stop TB Strategy launched in 2006 identifies management of MDR-TB as a core component of TB control. The magnitude of MDR-TB in the African Region is still unknown. In 2007, 27 countries notified MDR-TB cases, and six reported at least one case of XDR-TB.

7. Following widespread resistance to chloroquine and sulphadoxine-pyrimethamine all malaria-endemic countries except two in the Region have changed the treatment policy to artemisinin-based combination therapy (ACT). Since 1997, countries in the Region have established six subregional antimalarial drug resistance networks that have provided a forum for information sharing, capacity building and the development of new treatment policies (ACTs) across the Region.

8. The main method of monitoring antimalarial drug resistance is through therapeutic efficacy testing. To date there has been no confirmed resistance to ACTs in the African Region. However, since 2003, evidence has been accumulating that ACTs are less effective against *Plasmodium falciparum* on the Cambodia-Thailand border.<sup>7</sup>

9. Given the emergence and spread of resistance to HIV, TB and malaria drugs, the purpose of this document is to provide guidance to countries on the way forward with regard to the prevention and control of such resistance.

## ISSUES AND CHALLENGES

10. The use of combination therapy is recommended in the treatment of HIV, TB and malaria as one of the approaches to prevent the development of drug-resistant strains. ART regimens should include potent combinations of at least two classes of ARV drugs. Tuberculosis treatment regimens have always been based on a multiple combination of medicines. The first-line treatment for malaria is now artemisinin-based combination therapy (ACT) which is also a combination of medicines. However, off-the-counter sales, inappropriate prescription of medicines by inadequately trained or supervised health workers coupled with poor compliance by patients are still major challenges in the African Region.

11. Prolonging the useful therapeutic life of HIV, TB and malaria drugs through rational use of medicines while ensuring complete patient treatment (or, in the case of HIV, life-long treatment) is a major issue. Poor procurement and supply management systems leading to stock-outs and sometimes use of expired medicines increase the probability of developing drug-resistant strains of HIV, TB and malaria. Poor compliance with treatment regimens and limited availability of support systems for patients also contribute to the emergence of drug resistance. Similarly, there is concern about increased infiltration of markets by substandard and fake medications against life-threatening diseases in developing countries.<sup>8</sup>

12. Due to high cost and limited global supply, second-line medicines for the treatment of MDR-TB and XDR-TB are not readily available in countries. Second-line TB medicines are less effective and more toxic than first-line medicines and cost 3 to 20 times more — a huge financial burden that most countries cannot afford. Similarly, second-line antiretroviral medicines are more expensive. Of the 27 countries reporting any MDR-TB cases during 2007, only 17 were known to have an MDR-

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<sup>7</sup> WHO, *Global malaria control and elimination: report of a meeting on containment of artemisinin tolerance*, Geneva, World Health Organization, 2008; Wongrichamalai C, Meschnick SR, Declining artesunate-mefloquine efficacy against plasmodium falciparum malaria in the Cambodia-Thailand border, *Emergency Infections and Diseases* 14(5): 716–719, 2008.

<sup>8</sup> Müller O, Substandard antimalarial drugs in Burkina Faso, *Malaria Journal* 7: 95, 2008.

TB treatment programme. Even where treatment programmes exist, not all confirmed cases are accessing treatment.

13. Good laboratory services are essential for confirming diagnosis, monitoring treatment outcomes and guiding decisions to change to second-line treatment. Rapid diagnostic tests (RDTs) in general have increased opportunities for case confirmation and promotion of rational prescription. RDTs are now readily available for HIV and malaria. New technologies such as liquid culture media are being introduced for TB; many reduce the time required for drug susceptibility testing. Laboratory capacity is, however, still limited in the Region. For HIV, universal availability and use of appropriate, affordable CD4 testing and HIV viral-load testing are needed to monitor ART and to limit emergence of resistance. However, routine measurement of CD4 counts and HIV viral loads for patients on ART is still limited in many countries in the Region.<sup>9</sup>

14. For TB, most countries have limited national laboratory capacity for acid-fast bacilli (AFB) culture and drug susceptibility testing and have to send samples to laboratories in other countries or to supra-national laboratories. Transfer of samples across borders requires compliance with stringent regulations. Of the 25 global supra-national TB reference laboratories, only two are in the African Region, and these are already overloaded. HIV drug-resistance testing is not recommended for routine clinical ART management in the Region; the ResNet network of accredited genotyping laboratories in the Region, with additional support from specialist laboratories, is adequate for current surveillance needs.

15. In most TB control programmes, there is a general lack of infection control at community and health facility level that is necessary for reducing transmission of TB, MDR-TB and XDR-TB. This is a result of the introduction of short-course chemotherapy as the treatment of choice in 1993 which deviated from the previous policy of isolating TB patients during treatment. The recent upsurge of MDR-TB and XDR-TB has, however, raised awareness about the need to reintroduce stringent infection control measures to break transmission of all forms of TB in communities and health-care settings.

16. Although there has been an increase in financial resources for the control of HIV, TB and malaria, these resources cannot readily be used for the development of infrastructure that is necessary for drug resistance monitoring. Some equipment and reagents for drug resistance monitoring are expensive to purchase and maintain.

17. In summary, most of the issues related to the widespread development of drug resistance to HIV, TB and malaria are due to health system challenges related to access to health services, procurement and supply management, laboratory infrastructure, human resources and logistics that must be addressed before the situation worsens.

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<sup>9</sup> WHO, *HIV/AIDS laboratory capacity—An assessment report of the capacity of laboratories to support HIV/AIDS prevention and care programmes in the WHO African Region*, Brazzaville, World Health Organization, Regional Office for Africa, 2003; WHO, *HIV/AIDS laboratory capacity: How far we have come and where we are going*, an assessment report of the capacity of laboratories to support scaling up towards universal access to HIV/AIDS prevention, treatment, care and support services in the WHO African Region, Brazzaville, World Health Organization, Regional Office for Africa, 2005.

## ACTIONS PROPOSED

18. **Develop and implement policies and strategies that improve access to correct diagnosis and early effective treatment.** An important first step is to develop or strengthen clear policies and strategies for management of HIV, TB and malaria to address issues such as affordability, access and quality of services while ensuring full community engagement in the process. Policy must elaborate clear diagnostic and treatment guidelines which are user-friendly and consider the different types of service providers. Guidelines must be updated regularly, ensuring clear criteria for changing from first-line medicines to second-line or higher level regimens. Guidelines should also address issues surrounding rational use of medicines, pharmacovigilance, drug resistance monitoring and quality assurance. Monitoring of patients compliance should also be ensured at all levels through patients education and training of service providers.

19. **Develop human resource capacity for prevention and management of drug resistance.** Countries should ensure that all relevant health workers are aware of the factors related to development and management of drug resistance related to HIV, TB and malaria. There is need to train service providers in the rational use of drugs as well as recognition and management of drug side effects in order to ensure treatment adherence.

20. **Strengthen national and subnational health laboratory networks.** Ideally, the national laboratory network should have a pyramidal structure. For example, for TB, there should be one AFB microscopy laboratory serving a population of approximately 50 000. There should also be one AFB culture laboratory per 5 million population and at least one national reference laboratory with drug sensitivity testing capability per country.

21. **Establish and sustain subregional networks for drug resistance monitoring.** Subregional networks can serve as hubs for capacity building and technical assistance for drug susceptibility testing as well as platforms for strategic information sharing across countries for decision-making. They can also provide backup support to the national laboratory networks and quality assurance services. Furthermore, they should participate in drug resistance monitoring and surveillance programmes. Collaboration with centres of excellence should be encouraged. While drug resistance networks are operational for HIV/AIDS<sup>10</sup> and TB, there is need to revive the dormant malaria networks.

22. **Strengthen procurement and supply of HIV/AIDS, tuberculosis and malaria medicines.** Countries need to strengthen their procurement and supply chain management systems to ensure uninterrupted availability of good quality, affordable medicines and commodities for prevention and control of HIV/AIDS, tuberculosis and malaria. Appropriate implementation of activities on quantification and forecasting, acquisition, stock and logistics management, distribution, quality assurance, appropriate use, pharmacovigilance, information system management and reinforcement of regulations to prevent proliferation of counterfeit medicines, will contribute to reducing the risk of drug resistance.

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<sup>10</sup> Bertagnolio S et al, World Health Organization/HIV ResNet drug resistance laboratory strategy, *Antiviral Therapy* 13 (Supplement 2): 49–57, 2008.

23. **Set up drug resistance and drug efficacy monitoring systems.** Regular monitoring of resistance to TB medicines should be conducted as an integral part of routine surveillance. All cases identified should be reported; cases of MDR-TB and XDR-TB should be notified. With HIV cases, representative surveys on a population level are recommended as part of routine surveillance. For malaria, therapeutic efficacy tests of first- and second-line medicines should be conducted at designated sentinel sites.

24. **Implement administrative, environmental and personal protection infection control measures for MDR- and XDR-TB.** It is necessary to institute administrative, environmental and personal protection and integrated infection control measures in order to minimize transmission to vulnerable groups such as health-care workers, family members and persons living with HIV/AIDS. Administrative measures include putting in place and implementing an infection control policy which provides for training of staff, education of patients and public, isolation of patients and use of respirators. Environmental controls include ventilation, filtration or ultraviolet germicidal irradiation.

25. **Advocate for research and development of new diagnostic tools and medicines.** Operational research on specimen collection and transportation in resource-limited countries is required. Operational research is also required on adaptation of the directly-observed treatment short-course to the challenges of MDR-TB and XDR-TB. For HIV, laboratory tests to monitor adverse events and ART failure would do more to limit resistance than access to resistance testing. New point-of-care technology for CD4 counts and viral loads is an urgent requirement. Capacity for conducting clinical trials for new drugs should be improved in the Region.

26. **Mobilize financial resources for supporting implementation of drug resistance actions in the context of health system strengthening.** Countries should make provision in their national health budgets for funds to support activities for prevention, control and monitoring of drug resistance. Countries should also mobilize additional resources from global initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria; the President's Emergency Plan for AIDS Relief (United States); the US President's Malaria Initiative; from the Bill and Melinda Gates Foundation and the World Bank; funds mobilized from other partners would help strengthen health systems as well in order to address the emergence of drug resistance.

27. The Regional Committee is invited to examine and endorse the actions proposed in this document and adopt the draft resolution attached.





**ORIGINAL: ENGLISH**

**DRAFT RESOLUTION**

**DRUG RESISTANCE RELATED TO AIDS, TUBERCULOSIS AND MALARIA: ISSUES, CHALLENGES AND THE WAY FORWARD** (Document AFR/RC59/PSC/8)

The Regional Committee,

Having examined the document entitled “Drug resistance related to AIDS, tuberculosis and malaria: issues, challenges and the way forward”;

Aware that good laboratory services are essential for confirming diagnosis, monitoring treatment outcomes and guiding decisions to change to second line treatment;

Bearing in mind that combination therapy as a mechanism for prolonging the useful therapeutic life of HIV, TB and malaria medicines is recommended as one of the approaches to prevent development of drug resistance;

Aware that there has been an increase in financial resources for the control of HIV, TB and malaria, but noting that these resources have not been readily used for drug resistance monitoring;

Concerned that the many health system challenges like access to health services, procurement and supply management, laboratory infrastructure, human resources and logistics could contribute to the widespread development of drug resistance to HIV, TB and malaria;

Recalling Resolution AFR/RC53/R6 on scaling up interventions against HIV/AIDS, tuberculosis and malaria in the African Region (2003);

Encouraged by measures already taken to build capacity for monitoring drug resistance and to develop and implement new treatment guidelines;

1. ENDORSES the document entitled “Drug resistance related to AIDS, tuberculosis and malaria: issues, challenges and the way forward”;
2. REQUESTS partners to increase both financial and technical support to countries to facilitate the implementation of efforts for prevention and control of AIDS, tuberculosis and malaria drug resistance;
3. URGES Member States:
  - (a) to develop and implement policies and strategies to improve access to correct diagnosis and early effective treatment;

- (b) to strengthen national and subnational health laboratory networks, including human resources capacity;
- (c) to strengthen procurement and the management of HIV/AIDS, tuberculosis and malaria medicines and supplies;
- (d) to set up drug resistance and drug efficacy monitoring systems;
- (e) to implement administrative, environmental, personal protection and integrated infection control measures particularly for multidrug-resistant and extensively drug-resistant TB;
- (f) to mobilize financial resources for supporting implementation of these actions in the context of health system strengthening;

4. REQUESTS the Regional Director:

- (a) to provide technical support to Member States to develop and implement action plans for prevention and control of AIDS, tuberculosis and malaria drug resistance as well as subregional networks for drug resistance monitoring as part of strengthening disease surveillance systems;
- (b) to advocate for more resources and long-term international support for implementation of interventions for prevention and control of AIDS, tuberculosis and malaria drug resistance;
- (c) to monitor and report to the sixty-first session of the Regional Committee and thereafter every year on progress in implementing interventions for prevention and control of AIDS, tuberculosis and malaria drug resistance.