

Country profile of Turkey

Turkey has trod a long road to malaria elimination. In the past, three *Plasmodium* species, *P. vivax*, *P. falciparum* and *P. malariae*, were present in Turkey, with *P. vivax* predominating (1,2). Since 1970, *P. vivax* has been the only parasite species transmitted locally.

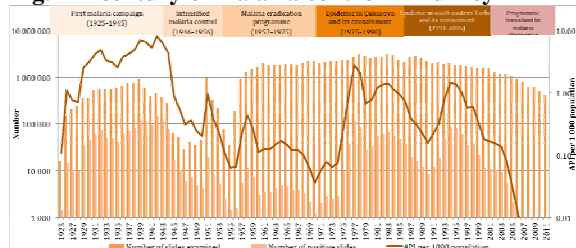
In 2015, only three malaria cases, which were imported, were registered in the country.

Ten *Anopheles* species have been identified in Turkey. *An. sacharovi* is the most significant vector of malaria, followed by *An. superpictus*, *An. maculipennis* and *An. subalpinus* (3).

Short history of malaria and malaria control

Turkey was highly endemic for malaria in the past and has a long history of fighting the disease, launching its first malaria control campaign in 1926 (Fig. 1). After the Second World War (1939–1945), intensified, extended malaria control interventions with the use of new tools, especially dichlorodiphenyltrichloro-ethane (DDT), led to a dramatic decrease in the malaria burden by the 1950s (Fig. 1). A national malaria eradication programme was launched in 1957, which succeeded in reducing the area affected by local malaria transmission to a few provinces in south-east Turkey. An ambitious insecticide spraying campaign was conducted in 1963 that achieved coverage of 93–96% of the population; this was complemented by intensive larviciding and environmental management. Intensified malaria surveillance, covering more than 17 million people by 1962, also did much to reduce the sources of infection. By the end of 1974, 93% of the country was in the consolidation phase; *P. falciparum* and *P. malariae* transmission had been interrupted completely, and *P. vivax* had been limited to focal areas in the south east. The final goal of eliminating local transmission nationwide was, however, not achieved, and major epidemics ensued in the 1970s and 1990s.

Fig. 1 A century of malaria control in Turkey



Source: Reference 5

Containment of both epidemics required complex interventions, which were coordinated by the national malaria network, with mobile teams of specialists assigned to the affected areas. Elements of the efficient, integrated approach included:

- vector control operations designed to reduce the mosquito population density rapidly with a combination of indoor residual spraying, thermal

fogging and ultra-low volume applications, chemical larviciding primarily in and around urban centres, large-scale distribution of larvivorous fish (*Gambusia affinis*) and environmental management (cleaning of drainage canals);

- surveillance to reduce sources of infection by prompt identification of cases both actively and passively, prompt, comprehensive investigation of every case, notification of each case to the National Malaria Control Programme and radical treatment of malaria cases; and
- preventive measures in populations in foci and in the most receptive areas by mass drug administration (chloroquine and pyrimethamine at 2-week intervals) and intensive health education.

Malaria situation between 2000 and the present

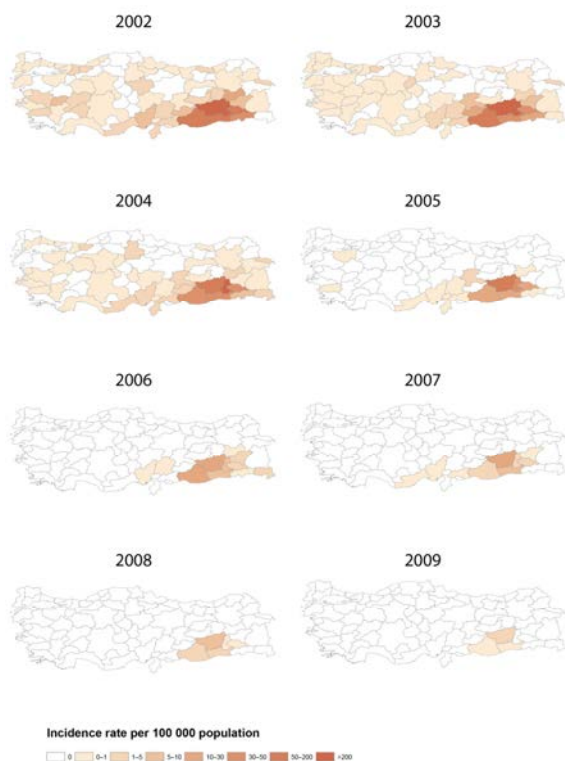
Once the epidemic had been contained by intensive attack-phase and mopping-up operations, the Malaria Control Programme continued control interventions. Despite a number of challenges, the Programme achieved an impressive reduction in the disease burden, the number of the indigenous cases dropping from 11 381 in 2000 to 2036 in 2005. *P. vivax* malaria was endemic only in the south-eastern part of the country, mainly in Diyarbakır, Şanlıurfa and Mardin provinces.

The stable reduction in the number of malaria cases in the previous two decades and restriction of transmission to a few provinces in the south east of the country encouraged the Government to endorse the Tashkent Declaration (4). By 2006, considerable progress had been made, with, for the first time, fewer than 1000 locally acquired cases. In 2008, after further progress in malaria control, the Turkish Government decided to reorient the malaria programme to elimination, with the goal of interrupting indigenous transmission of malaria in the country by 2015. With the support of the WHO Regional Office for Europe, a national strategy and plan of action for malaria elimination were drawn up and implemented.

The malaria elimination programme adopted a comprehensive, integrated approach, directing interventions to the main components of the epidemiological process: the source of infection, mode of transmission and receptive populations.

The National Malaria Control Programme continued to clear up the remaining foci. Local transmission was limited to same provinces in the south east of the country (Fig. 2) that had posed a problem in earlier eradication efforts. Most of the cases and foci were clustered in Diyarbakır and the neighbouring provinces of Şanlıurfa and Batman. A few endemic foci have existed for years in the southern part of Mardin Province.

Fig. 2 Malaria incidence in provinces of Turkey with malaria transmission, 2002–2009



Source: Reference 5

The number of malaria cases continued to decrease, to 166 in 2008 and 38 in 2009. Nine cases reported in 2010 and four reported in 2011 were classified as relapsing cases of infections contracted the previous year.

In 2012, however, as a result of *P. vivax* importation by lorry drivers entering Turkey from endemic countries and a delay in recognition of the index cases, a malaria outbreak was registered in Mardin Province, with 218 introduced and indigenous cases (5,6). The outbreak was brought under control, and only 34 cases of relapsing malaria due to the outbreak were registered in 2013. Five introduced cases were officially reported in 2014 and only three in 2015.

Prevention of reintroduction of malaria

At present, the focus is on identifying imported cases. Because of the country's geographical location, it receives many travellers from other countries, posing a risk for imported malaria. Moreover, the number of Turkish nationals travelling to malaria-endemic countries for business, trade and tourism is increasing.

The Ministry of Health has prepared a legislative and regulatory framework for the prevention of malaria among travellers to and from endemic countries and has established a Directorate General of Health for Border and Coastal Areas. A branch of the Directorate General, the Health Services Department, coordinates the work of 26 travel health centres in the country, which provide consultations for people travelling to endemic countries, issue international certificates of vaccination and provide the necessary pre-travel vaccinations and

malaria chemoprophylaxis free of charge. The drugs and vaccines are provided by the Ministry of Health.

Temporary workers migrate seasonally from remote areas of south-eastern Turkey, in which the remaining residual foci of active malaria were located, to other parts of the country. Regulations require that these workers, who usually live in camps, be examined by local malaria workers. Turkey also has many international migrants, mostly from Iraq, the Islamic Republic of Iran, Pakistan and the Syrian Arab Republic. At provincial level, there is collaboration between malaria control and health facilities and the Ministry of Internal Affairs, which allows appropriate, timely coverage of migrants with examinations for malaria and follow-up.

Outlook

Although Turkey has had a turbulent history of malaria, the country has made significant progress towards national elimination. Strong political commitment, sustainable Government financial support and the necessary operational and technical capacity are prerequisites for maintaining the progress.

While population movement can increase the risks for reintroduction and localized outbreaks of malaria in Turkey, the country's experience shows that a well-prepared health system can prevent reintroduction of vector-borne diseases.

References

1. Nyan A. Malaria control in Turkey. Ankara, 1950.
2. Husametin A. Malaria control in Turkey. *Malaria* 1934;3:129-155.
3. Özbilgin A, Topluoglu S, Es S, Islek E, Mollahaliloglu S, Erkoc Y. Malaria in Turkey: successful control and strategies for achieving elimination. *Acta Trop* 2011;120:15-23.
4. Tashkent Declaration: from malaria control to elimination in the WHO European Region 2006-2015. Copenhagen: WHO Regional Office for Europe; 2005.
5. Eliminating malaria, case-study 5. The long road to malaria elimination in Turkey. Geneva: World Health Organization; 2013.
6. Health Statistics Yearbook 2013. Ankara: Ministry of Health; 2013 (http://sbu.saglik.gov.tr/Ekutuphane/kitaplar/health_statistics_yearbook_2013.pdf).