Estimation of True Incidence of Malaria

Malaria is one of the foremost public health problems in India. During the first half of the twentieth century, malaria affected every walk of life so much so that one of the major problems in development of economy was the problem of malaria. According to an estimate in 1935, 100 million malaria cases and one million deaths occurred in Indian subcontinent. Another estimate in 1947, when the population of post-partition India was about 344 million, arrived at 75 million cases of clinically diagnosed malaria (21.8% population) and 8,00,000 deaths. As a component of the National Malaria Eradication Programme (NMEP), which was started in 1958, surveillance for detection and treatment of malaria became fully operational by 1961. During the past decade, the incidence of malaria has fluctuated between 2 and 3 million cases annually. Nearly a third of all cases are caused by *Plasmodium falciparum* and the remainder by *P. vivax*.

Estimation of true incidence of malaria and mortality is necessary for a number of reasons, such as planning prevention/control operations, resource allocation, and upgrading medical facilities in hospitals to treat severe and complicated cases. Thus, attempts to obtain as accurate information as possible on the rates of morbidity and mortality attributable to malaria should be made. In India, attempts have been made in the past for estimation of actual incidence of malaria. In 1975 and 1980, NMEP reported 5.2 and 2.9 million cases of malaria respectively. Against this, the Indian Drug Manufacturers Association estimated 12 million cases in 1975 and 20 million in 1980. During 1994–96, WHO-SEARO estimated that there were 15 million malaria cases and 19,500 deaths due to malaria in India, and these figures were 6–7 times more than those reported.

Malaria Research Centre has also carried out a few studies to estimate true incidence of malaria in certain situations. Sharma *et al*. (1983) found that malaria incidence in PHC Kichha in District Nainital (then in U.P.) and PHC Kharkhoda in District Sonepat (Haryana) was high compared with a small number of cases reported based on fortnightly surveillance. During 1981–82, in Kichha, the State Authorities recorded 63 malaria cases and no case of falciparum, while MRC recorded during the same period in the same population 1784 malaria cases of which 1761 were of *P. vivax*, 20 of *P. falciparum* and 3 mixed infections. Similar observations were also made in Kharkhoda PHC in District Sonepat in Haryana state.

Another study in PHC Bisra in District Sundergarh, Orissa state reported a slide positivity rate (SPR) of 33% by adopting weekly surveillance during 1988–89, whereas the SPR recorded by fortnightly surveillance during 1981–87 in Bisra PHC ranged between 9 and 18.5% (Yadav *et al*., 1990). Yet another study in the mining areas of Orissa reported that at any given point of time about 13% population harboured malaria parasites and about 200 persons suffered from new malaria episodes per 1000 population per year.

During 1998–99 the MRC field station at Nadiad undertook a major study to estimate malaria cases and deaths in Ahmedabad City by retrospective analysis of registered cases and reported deaths during the

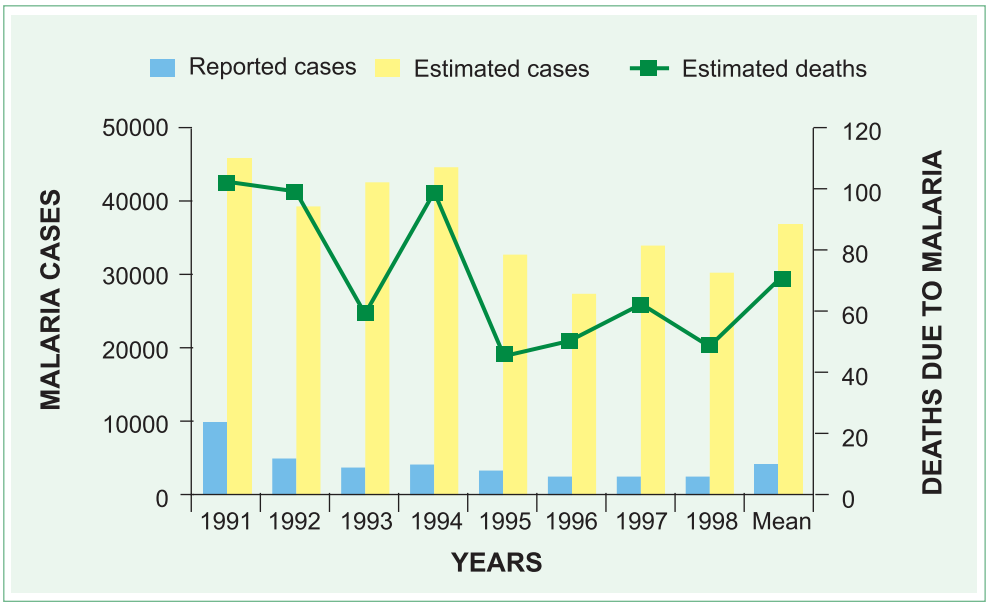

Fig. 2 : **Incidence of malaria in Ahmedabad City**

years 1991–98 (Fig. 2). Apart from malaria surveillance data, data from 99 major public and private health institutions in the city were analyzed. Fourteen health institutions had blood examination facility to diagnose malaria and from these data the number of slides examined, number of malaria cases detected and deaths due to malaria with confirmed slide positivity were collected. The remaining 85 institutions did not have such facility and patients were treated on the basis of clinical symptoms. From these, data such as the number of fever cases reported and number of patients treated for clinical malaria (based on prescription of an antimalarial drug) were recorded. Using data from the above mentioned three sources, an estimate of true incidence of malaria and mortality was made. It was not possible to collect similar data from a number of private doctors in the city, since most of them did not keep the required records of patients. Based on the above said exercise, estimated incidence of malaria was found to be nearly nine times more than the numbers reported, and on an average 71 deaths due to malaria occurred annually against a few reported.

A number of reasons have been attributed to low reporting of malaria cases. First of all active surveillance at fortnightly intervals can not capture all cases such as those occurring between the two consecutive visits. Delayed or nonexamination of slides (Sharma, 1982), poor surveillance and laboratory services (Ansari *et al.*, 1986) and sometimes, breakdown of surveillance machinery (Srivastava and Yadav, 2000) also caused low reporting of malaria cases. In three hospitals under the Steel Authority of India Limited in the mining areas in interior forest of Orissa, a large number (42–68%) of outpatients with fever were treated for clinical malaria and a subsequent study showed that a third of all fever cases indeed had malaria (Yadav *et al.*, 1990). None of these cases were, however, captured in the PHC statistics due to lack of reporting system and even *P. malariae* parasites were not recorded due to misdiagnosis. It is also recognized that a large number of patients avail medical care at private institutions which do not keep or report disease statistics to health services.

Thus, malaria incidence reported under the National Anti Malaria Programme at best reflects a trend of malaria over a number of years and does not present true incidence. Due to the lack of baseline comprehensive information on mortality, morbidity and disability adjusted life years lost (DALY) attributable to malaria, it is important to estimate true incidence and deaths due to malaria in the country. The National Health Policy of 2002 has also emphasized the need to complete baseline estimates for the incidence of common diseases by 2005. n