structured. In spite of the inconsistencies inherent in notification systems, this still constitutes an extremely valuable data set [1; 10]

1.5.3.1 Data Sources

Malaria is under passive and active surveillance. Malaria case data are reported to the National Malaria Control Programme (NMCP) and the National Notifications Surveillance System (NNSS). Passive surveillance occurs through the notification system where cases and deaths are routinely reported alongside 32 other medical conditions.

Active surveillance occurs in the three provinces belonging to the "Malaria zone" where specific programmes have been put in place to decrease mortality and morbidity due to malaria. These control programmes rely heavily on surveillance data collected actively from communities at risk.

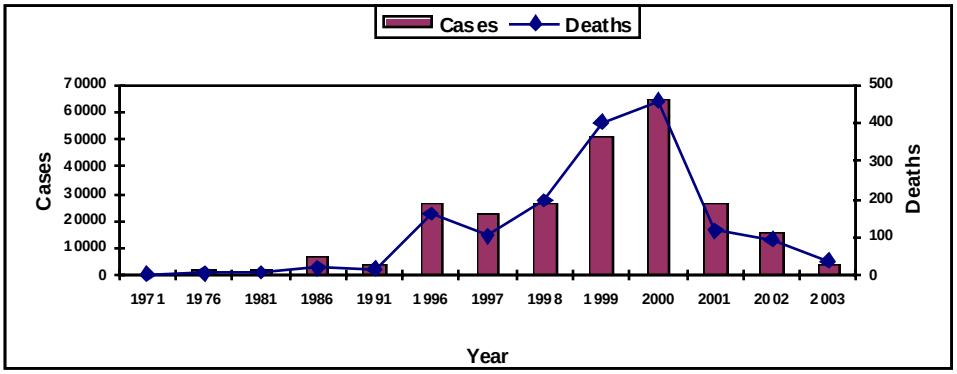
Each of the provincial malaria programmes in the malaria-affected provinces are actively involved in malaria control and drive malaria control in the provinces. The system has allowed the creation of very good structures for patient management and community outreach. Field workers visit households on a regular basis and collect blood specimens for testing.

The notification system is also receiving data to a certain extent from the three malaria provinces. The number of reported cases in these two systems do differ because of differences in collection but strong interactions are in place to address this issue. NNSS receives more detailed epidemiological data regarding each case (e.g. Race, Sex, Age). This report presents data regarding cases and deaths reported to both systems [1; 10].

1.5.3.2 Disease situation and trends

During the last 32 years, a cumulative 256143 cases and 1638 deaths were reported to the NDOH (fig. 1.5). The observed rise from 1996 to 2000 possibly reflects an increase in malaria transmission in South Africa, but the increase could also have been due to improved reporting via the active surveillance systems. In 2000, a total of 64622 cases and 458 deaths were reported, representing the highest malaria epidemic that the country has experienced.

Figure 1.5: Reported malaria cases and deaths in South Africa, 1971-March 2003



Source: NDOH: Health Systems Research & Epidemiology and Malaria Control Programme

In 2001, a sharp drop (> 60%) in comparison to cases during the previous year was observed. Regional reports also indicated an equally big drop in malaria cases in neighbouring Swaziland and Southern Mozambique, > 60% and >40% respectively. This is thought to be partly a result of combined interventions, re-introduction of DDT spraying, change of the first – line treatment to co-artemether, and a regional approach to malaria control through the Lubombo Spatial Development Initiative.

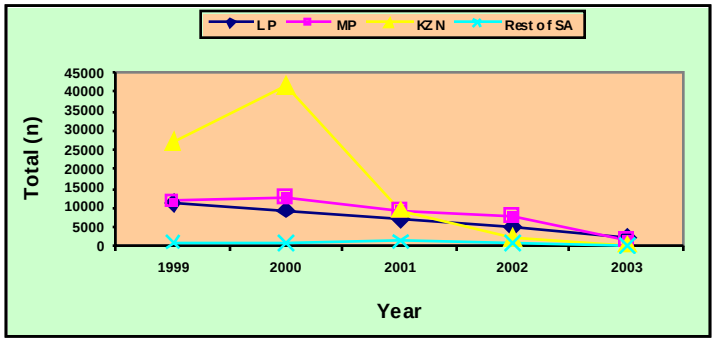
The sharp decrease in malaria - related morbidity and mortality prompted the World Health Organisation to award the South African Health Department with a prize for the best run malaria control programme on the African continent. [11].

1.5.3.3 Geographic distribution

1.5.3.3.1 Malaria affected Provinces

From 1999 to March 2003, a total of 160109 cases were reported in South Africa (fig 1.6). Of these, 155370 cases (97%) were from the provinces affected with malaria (i.e. KwaZulu-Natal, Mpumalanga and Limpopo)..

Figure 1.6: Reported malaria cases from malaria affected provinces, 1999-March 2003



Note: LP =Limpopo, MP = Mpumalanga, KZN = KwaZulu-Natal
Source: NDOH: Health Systems Research & Epidemiology and Malaria Control Programme

KwaZulu-Natal

For the period 1999 to March 2003, KwaZulu-Natal reported the greatest number of cases (81411) (fig. 1.6). The highest figure was in 2000, with 41786 reported cases representing 65% of all cases reported in South Africa. The most affected area was Ingwavuma. From the passive surveillance system, most cases reported were from Durban and Pietermaritzburg. During the first quarter of 2003, KZN had reported 569 cases, representing 2% of national figure (fig. 1.7).

Mpumalanga

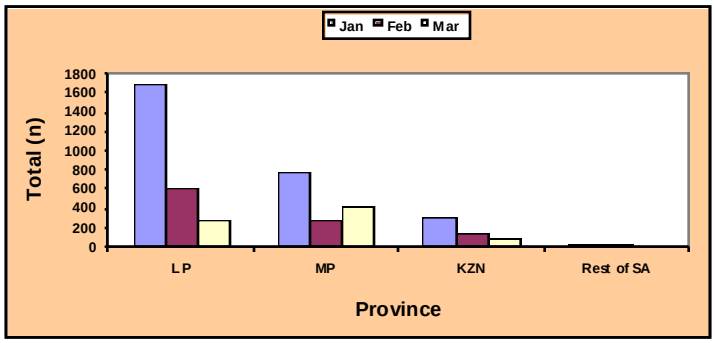
Mpumalanga reported the second highest number of malaria cases (n = 42644) reported during this period (fig. 1.6). Based on records at the Department of Health, these cases were reported from areas of the Tonga district Komatipoort municipality, Kruger National Park, Skukuza, Satara and Tsokwane. From January to March 2003, Mpumalanga reported 32% (n = 1487) of the total cases reported in South Africa mainly from these areas (fig. 1.7).

Limpopo

Limpopo reported the lowest number of malaria cases i.e. 4739 (fig. 1.6). The province is prone to epidemics of malaria particularly during the month of January. This is partly due to an increase in the movement of people and some behaviour change (spending more time outdoors) during the festive season.

An outbreak of malaria was reported during the first quarter of 2003, the province reported 2567 cases mostly in Vhembe and Mopani districts. The malaria control programmes together with district structures strengthened the capacity of Health workers through training in case identification and appropriate treatment. The lesson learned from this outbreak is the importance of creating or strengthening community awareness of malaria during this time of the year. The malaria situation in the province continues to be closely monitored.

Figure 1.7: Reported malaria cases from malaria affected provinces, January-March 2003



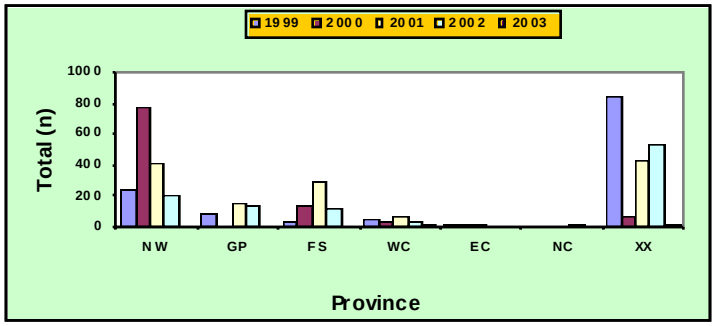
Source: NDOH: Health Systems Research & Epidemiology and Malaria Control Programme

1.5.3.3.2 Rest of South Africa

The rest of South Africa refers to data from all other provinces (North West, Western Cape, Eastern Cape, Northern Cape, Gauteng and Free state) including imported cases reported through the Notification System.

A total of 4739 cases (North West 1645, Free State 588, Gauteng 368, Western Cape 177, Eastern Cape 37 and Northern Cape 28) were categorised among the rest of SA, (fig. 1.8). In this category, North West is most affected (35% of all cases) and is not exempt from the potential ravages of malaria with its debilitating effects on communities. Occasionally, malaria is contracted in the North West and Northern Cape provinces adjacent to the Molopo and Orange rivers respectively. During the first quarter of 2003, only 52 cases were reported from these non-malaria affected provinces (fig. 1.7). Approximately 40% (n = 1890) of reported cases categorised as the rest of South Africa were imported.

Figure 1.8: Reported malaria cases in other provinces of South Africa, 1999-March 2003



NW = North West, GP = Gauteng, FS = Free State, WC = Western Cape, EC = Eastern Cape, NC = Northern Cape, XX = Malaria acquired outside South Africa
Source: NDOH: Health Systems Research & Epidemiology and Malaria Control Programme

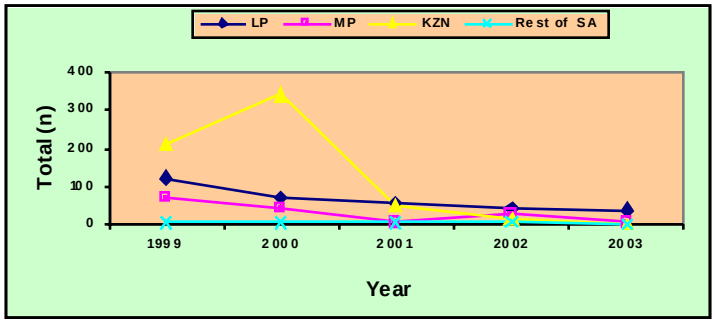
1.5.3.4 Malaria Deaths

1.5.3.4.1 Deaths trends

Of 160109 cases reported during 1999 to March 2003, 1129 died, giving a case fatality ratio (CFR) of 0.7%.

The distribution of malaria deaths is shown in figure 1.9. A steady decline similar to the malaria cases pattern (fig. 1.6) is observed.

Figure 1.9: Reported malaria deaths from malaria affected provinces in South Africa, 1999-March 2003



Note: LP =Limpopo, MP = Mpumalanga, KZN = KwaZulu-Natal
Source: NDOH: Health Systems Research & Epidemiology and Malaria Control Programme

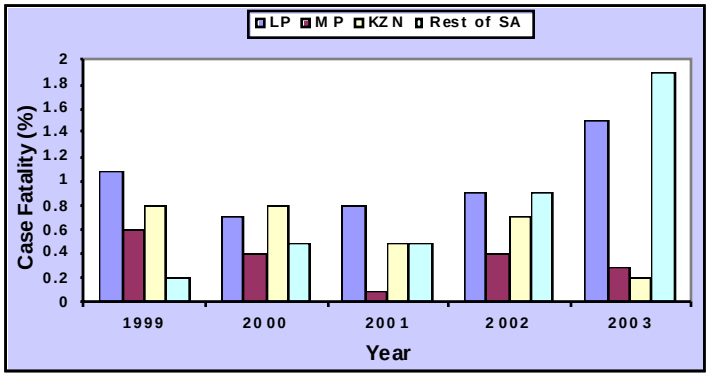
In 2000 a large number of deaths (340) was reported in KZN alone. This results in Kwa-Zulu Natal being the province with the highest number of deaths (n = 618) reported, followed by Limpopo with 334 deaths and Mpumalanga with 152 deaths as from 1999 to March 2003.

1.5.3.4.2 Case fatality rate

Although the case fatality rate fluctuates, there seems to be an increase in the case fatality rate in Limpopo and the rest of South Africa (1.4% and 1.9% respectively) in 2003 (fig. 1.10). This is possibly due to late care seeking at health facilities.

There has been a fluctuation in the case fatality rate in KwaZulu-Natal, and Mpumalanga. There is need to increase awareness in communities and strengthen capacity among health workers to facilitate early diagnosis and appropriate malaria management in these areas.

Figure 10: Case fatality rates curve in South Africa, 1999-March 2003



Source: NDOH: Health Systems Research & Epidemiology and Malaria Control Programme

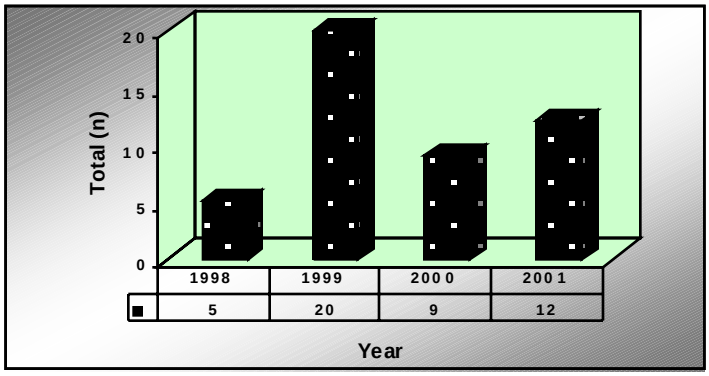
1.5.3.4.3 Maternal Deaths

Malaria infections and disease can increase the risk of complication and deaths for both the mother and child. According to the WHO report (1990) on Malaria in pregnancy, the prevalence of malaria in pregnant women in South Africa is less than 1%. This is in line with The Abuja Malaria Declaration on Pregnant Women, whose goal is to reduce maternal deaths due to malaria to below 10%.

Figure 1.11 shows the effect of malaria infection on pregnancy in South Africa. From 1998 to 2001, a total of 46 maternal deaths due to malaria were reported to the National Department of Health. Although there were some fluctuations, 20 deaths (43%) were reported in 1999. Disaggregated data wasn't available to show distribution by province that would have facilitated better planning.

A confidential investigation of maternal deaths is conducted in the country and provides critical information in this regard. To further address this matter, a recommendation was made that; the Malaria control programmes should include the prevention and management of malaria in pregnancy and childbirth in their strategic and operational plans and the Maternal, Child and Women's Health directorate should include malaria control as part of their plans and work [12; 13].

Figure 1.11: Reported maternal malaria related deaths in South Africa, 1998-2001

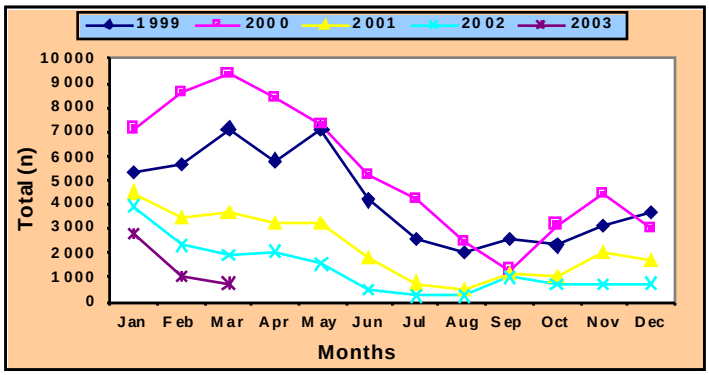


Source: NDOH; Saving Mother report on Confidential Enquiries into Maternal Deaths in South Africa, 1999-2001.

1.5.3.5 Monthly Distribution

Malaria transmission in South Africa is seasonal with the greatest number of cases occurring between October and May during summer rainfall seasons (fig. 1.12). However, during the period 2001 to 2003 the largest numbers of cases were reported in January while in 1999 and 2000 was in March. This variation is possibly due to; (i) varying time implementation of one of the preventive measures (IRS), the duration and type of insecticides used for spraying, (ii) the ambient rainfall pattern.

Figure 1.12: Pattern of malaria cases by months in South Africa, 1999-March 2003



Source: NDOH: Health Systems Research & Epidemiology and Malaria Control Programme

1.5.4 Treatment/Management

A set of norms and standards is in place for management of malaria, a Primary Health Care package for South Africa is described in Annex 1.2. Malaria is treated with drugs that block the growth of the plasmodium; these drugs interfere with the parasite's metabolism of food, whereas others prevent the parasite from reproducing.

The choice of chemotherapeutic agents is dependent on the severity of the illness and the resistance in the geographical area where malaria was acquired.

For uncomplicated malaria in South Africa, *artemether lumefantrine* or alternatively *quinine* plus either *doxycycline* or clindamycin is recommended. *Sulfadoxine-pyrimethamine* (*SP*) is currently used to treat patients in Mpumalanga and Limpopo provinces, but combination therapy of *SP* with *artesunate* (an *artemisinin* derivative) is expected to be introduced in these areas in the near future. This *artesunate* plus *SP* combination should replace all use of *SP* monotherapy as soon as *artesunate* is available.

It should be noted that *SP* (an *artesunate* plus *SP*) is ineffective in KwaZulu-Natal. For severe malaria, quinine (with the addition of *doxycycline* or *clindamycin*) is recommended. All patients with malaria require careful clinical and parasitological follow-up (Annex 1.3) [14; 15; 16].

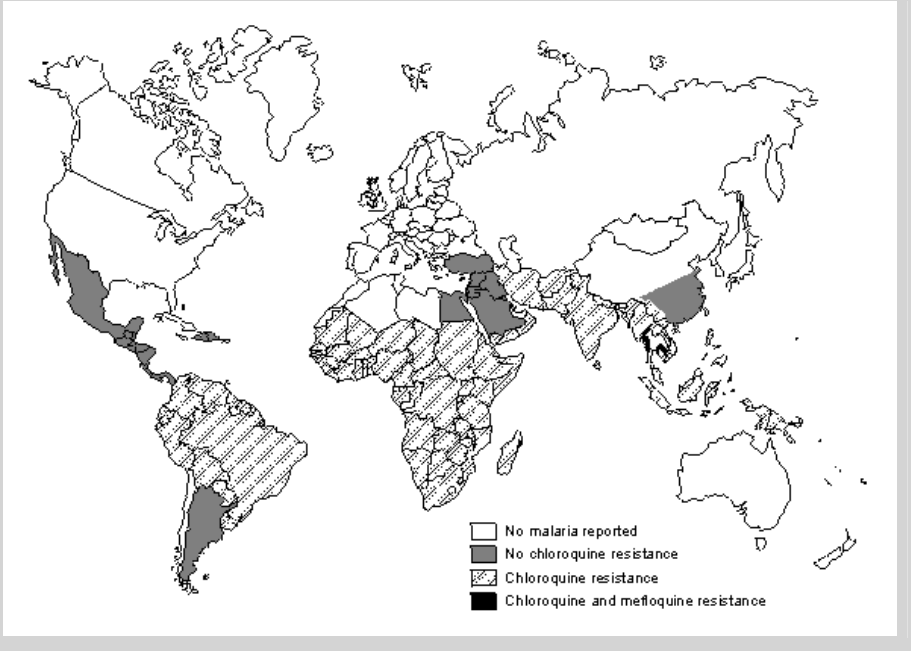
Resistance should not be confused with a lack of compliance, inadequate dose and re-infection. If a patient vomits within one hour after oral dose, the dose must be repeated. Other treatment includes fever-reducing drugs, antibiotics,

physical cooling and rehydration. Multidrug resistance is most common in the world [14].

1.5.4.1 Distribution of drug-resistant malaria

Drug-resistant strains (*P. falciparum*, *P. vivax*) of malaria are now common in much of the world including South Africa (figure 1.13). For example, the widespread resistance of *P. falciparum* to chloroquine has complicated the prevention and treatment of malaria.

Figure 1.13: Map showing malaria-endemic zones worldwide



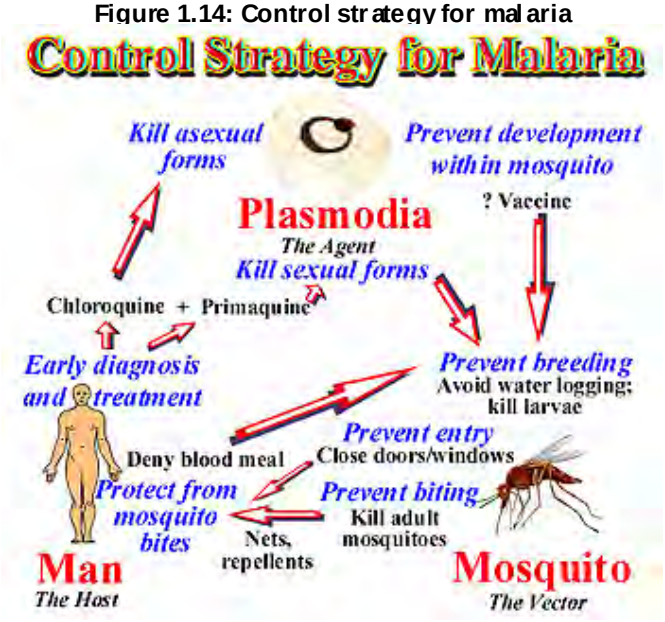
Source: http://sprojects.mmi.mcgill.ca/tropmed/disease/malaria/geographical.htm#resistance

1.6 Control of malaria

Control of malaria is a complex chain of measures that often complement one another. Figure 1.14 depicts this control chain: For example, by taking personal protective measures, three things can be achieved - prevention of malaria in the given individual, thus reduced parasite load and reduction in spread, and by denying blood meal to the mosquito the egg laying is also hampered.

In recent years, more emphasis has been laid on early diagnosis and treatment, personal protection or especially with insecticide treated bednets and biological vector control. By these means, it is intended to minimise the use of potentially harmful chemical insecticides [4; 9].

Figure 1.14: Control strategy for malaria



Source: http://www.malariasite.com/malaria/ControlOfMalaria.htm

1.6.1 Malaria vectors and Vector control in South Africa

Mosquitoes vectorial capacity to transmit malaria lies in the obligatory blood feeding habit of female mosquitoes and their close association with humans and their habitations. In South Africa malaria transmission is by two *anopheline* species, *Anopheles arabiensis* and the *Anopheles funestus* group, respectively.

As a result thorough knowledge of the identity and biology of malaria vectors is central to effective and efficient targeted vector control. The mainstay of the malaria control programme in South Africa is through insecticide residual house spraying [17].

1.6.2 Malaria and Rational Use of Insecticides

Insecticides break the contact between vectors and people, thus breaking the cycle of malaria transmission. Random trials in Gambia, Kenya, Ghana and Burkina Faso show that 30% of child deaths could be avoided if children slept under bednets regularly treated with recommended insecticides, such as pyrethroids that are relatives of an extract from chrysanthemum plants [2; 9].

Throughout the world many different insecticides (e.g. diazinon, chlorpyriphos ethyl, cyhalon, cypermethrine, permethrine, DDT etc.) are used for malaria control causing difficulties in complying with established standards. This is an area in which many actors intervene in the manufacturing, distribution and dispensation of aid.

The major disadvantage of these insecticides is the risk of intoxication, their persistence in the environment with slow or variable biodegradation, and the risk of the development of resistance on the part of mosquitoes.

Insecticides are thus a useful tool in malaria control in addition to source reduction and drug

treatment. As the vectors of malaria are quite different in their behaviour and resistance status, different insecticides are useful in different malaria transmission situations. It is dangerous to totally ban compounds that are relatively safe when used indoors and can save lives [2; 18].

1.6.3 DDT

DDT (dichloro-diphenyl-trichloro-ethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odour or taste. The pesticide is now banned for use in agriculture (Annex 1.4).

The Government of South Africa, recently attempted and failed to phase out DDT. Starting in 1995, South Africa switched from DDT to the pyrethroid insecticides. To minimise the cost increase, South Africa economised by spraying only the highest risk houses with pyrethroid; other houses were not sprayed at all. In just four years, malaria cases rose from about 5,000 (in 1995) to as much as 120,000 (in 1999). Malaria deaths increased as well.

Accordingly, the Government of South African decided in 2002 to again use DDT. These experiences show that DDT both costs less and often may work better than the pyrethroid insecticides that replace it. So far, no tropical country has changed from DDT to an alternative insecticide while holding its costs equal and avoiding an increase in malaria cases [18; 19].

1.6.3.1 Evidence against use of DDT

- Public concern: Fear that DDT could possibly be carcinogenic, shorten women's lactation duration and affect the immune and nervous system.
- Environment lobby: Could have adverse effects on the environment through the food chain
- Vector resistance: Where this has been reported, continued use of DDT may not result in an epidemiological impact.
- Access to quality DDT: Poor quality DDT has been of great concern to users.
- Donor influence: Some donor agencies have at times tied funding with whether a country is using DDT or not [18; 19].

1.6.3.2 Evidence for public Health use of DDT

- DDT is sprayed in small quantities indoors with minimal environmental effects
- DDT is both cheap and effective than any of the insecticides available.
- Evidence of malaria resurgence where DDT has been discontinued.
- In areas where vectors have shown reduced susceptibility to Pyrethroids, DDT is the insecticide of choice.
- Tremendous public health benefits of DDT outweigh the "feared" health risks. [18; 19].

The malaria problem has been effectively tackled by Malaria Control Programmes in the malaria provinces of South Africa with effective drugs and insecticides. However, there is increasing consensus that malaria needs to be addressed on a regional level. Therefore, the Lubombo Spatial Development Initiative Malaria Programme was initiated to address the malaria problem in the Lubombo region [1].

1.7. The Lubombo Spatial Development Initiative (LSDI)

The LSDI is a concerted programme of the governments of Swaziland, Mozambique and South Africa to encourage new investment in the geographical area broadly comprising eastern Swaziland, southern Mozambique and north-eastern KwaZulu Natal, South Africa and is linked by the Lubombo mountains.

The LSDI has the following priorities

- Generate economic growth by making maximum use of the inherent but under utilised potential of the area.
- Maximise job creation by ensuring the industries being stimulated are competitive and have a long-term future in the region.
- Broaden ownership patterns in the regional economy
- Ensure co-operation between all levels of the three governments whose countries straddle the Lubombo region in order that the development strategy be implemented with speed and urgency.

The Lubombo Malaria programme is run by the Regional Malaria Control Commission (RMCC), comprising of the malaria control programme managers from the three countries, public health specialists and scientists, all of whom have exceptional experience in communicable disease control in Africa.

Malaria control in Swaziland is carried out by the Swaziland malaria control programme, and in KwaZulu-Natal by the KwaZulu-Natal malaria control programme. Both programmes use insecticide residual house spraying. Insecticide residual house spraying was introduced by the LSDI malaria programme in southern Mozambique in late 2000, where spraying had previously been confined to Maputo city [1].

1.7.1 Programme Objectives

The programme aims, within 5 years, to reduce the prevalence of *Plasmodium falciparum* in Maputo province – perhaps the hardest hit area of the Lubombo SDI from 600 per 1000 to less than 200 per 1000. It aims to reduce the incidence of such infections in the South African and Swaziland parts of the region from 250 per 1000 to 5 per 1000 within five years. This will have a positive impact on socio-economic development in the region [1].

1.7.2 Progress

It is evident that after just two years of sustained effort in implementing malaria control in the LSDI area, great inroads have been made in freeing the area from this debilitating disease. In comparison to the 1999/2000-malaria season, the overall prevalence of the disease in children had decreased in the 2001/2002-malaria season by 70% in Mozambique, while malaria incidence had been reduced by 80% in Swaziland and a staggering 91% in KwaZulu-Natal [1].

1.8 Research programme

Malaria research was first started at the MRC, Research Institute for Diseases in Tropical Environment in Durban in 1980. The Malaria Research Programme (initially known as the National Malaria Research Programme) was established in 1982. The programme extended the initial focus from malaria vector research to insecticide evaluations and

research on the malaria parasites including drug resistance in malaria.

1.9 In conclusion: Given the commitment by government there is no reason to believe that malaria in South Africa cannot again be reduced to low levels if not completely eradicated by the effective use of appropriate insecticides and effective drugs, and sustained in the longer term through a regional approach to control. The latter is a first for the African continent and is timely in view of the World Health Organisation's "Roll Back Malaria" Initiative.

References

1. Malaria Research Programme of the Medical Research Council, South Africa; http://www.malaria.org.za.
2. Malaria; http://www.fightingmalaria.org/pdfs/ddt_thefacts.pdf
3. Malaria and Infectious Diseases in Africa, Journal in English & French. http://www.chez.com/malaria
4. Malaria and Health; http://www.malariaandhealth.com/
5. CDC Travellers Health: Malaria: - http://www.cdc.gov/travel/malinfo.htm
6. Malaria: http://www.nevdgp.org.au/travel/dis/mal2p96.htm
7. WHO – OMS: resources maintained by the tropical diseases research community http://www.who.int/health-topics/malaria.htm
8. H.K. Alles, K.N. Mendis and R. Carter; 1998; Malaria Mortality Rates in South Asia and in Africa: Implications for Malaria Control; *Parasitology Today* 14:9:369-375.
9. WHO expert on committee on malaria (2000). WHO technical report series, 892; 70 pages
10. Department of Health; HSRRCE; Surveillance Strategy Document, 2003, Pretoria
11. Department of Health; Statistical Notes, Volume 3. No. 5. HSRRCE, Pretoria
12. Department of Health, Saving Mothers Report on Confidential Enquiries into Maternal Deaths in South Africa; 1998, 1999-2001, Pretoria
13. WHO – SAMC Information Leaflet, (1990) Malaria in pregnancy. C/o WHO Harare Country; Zimbabwe
14. Guidelines for the prevention of malaria in South Africa, National Department of Health; March 2003; Pretoria
15. Guidelines for the treatment of malaria in South Africa, National Department of Health; March 2003; Pretoria
16. Management of severe and complicated malaria; A practical handbook; WHO, Geneva (1991).
17. Hargreaves K, Koekemoer LL, Brooke BD *et al.* Anopheles funestus resistant to pyrethroid insecticides in South Africa, *Med Vet Entomol*. 2000 Jun; 14(2): 181-9.
18. Policy Spring (Sept-Nov) 2001; http://www.cis.org.au/Policy/Spring01/PolicySpring01_1.html
19. Introduction; http://www.chem.unep.ch/pops/POPs_Inc/proceedings/bamako/eng/who.html

Annex 1.1

Table 1.1: Malaria Inpatient and Outpatient Cases and Deaths, WHO African Region, January-December 2003

Country	Outpatient				Outpatient				Total malaria deaths
	Under five years	Five years and above	Pregnant women	Total	Under five years	Five years and above	Pregnant women	Total	
Algeria	-	-	-	82	-	-	-	-	-
Angola	-	-	-	-	-	-	-	-	-
Benin	8572	13215	2662	24449	713	276	198	1187	27
Botswana	-	-	-	48237	-	-	-	-	29
Burkina Faso	-	-	-	-	-	-	-	-	-
Burundi	-	-	-	1712421	-	-	-	-	1202
Cameroon	-	-	-	-	-	-	-	-	-
Cape Verde	-	-	-	22	-	-	-	-	0
Central African Rep	-	-	-	-	-	-	-	-	-
Chad	-	-	-	-	-	-	-	-	-
Comoros	-	-	-	-	-	-	-	-	-
Congo	-	-	-	-	-	-	-	-	-
Cote d'voire	-	-	-	-	-	-	-	-	-
DR Congo	-	-	-	4555056	-	-	-	-	17247
Equatorial Guinea	-	-	-	-	-	-	-	-	-
Eritrea	-	-	-	42562	-	-	-	-	23
Ethiopia	73392	358016	-	1082128	-	-	-	-	2064
Gabon	-	-	-	-	-	-	-	-	-
Gambia	159030	124537	8004	291571	6462	4044	516	11766	184
Ghana	497303	764631	134434	1396368	25266	37478	7394	70138	876
Guinea	-	-	-	-	-	-	-	-	-
Guinea Bissau	33035	32039	-	65074	-	-	-	714	-
Kenya	-	-	-	-	-	-	-	-	-
Lesotho	-	-	-	-	-	-	-	-	-
Liberia	-	-	-	83869	-	-	-	-	-
Madagascar	-	-	-	1077257	-	-	-	1121	99
Malawi	-	-	-	1737362	-	-	-	48076	2278
Mali	-	-	-	20879	-	-	-	-	29
Mauritania	-	-	-	-	-	-	-	-	-
Mauritius	-	-	-	-	-	-	-	-	-
Mozambique	-	-	-	3021903	-	-	-	-	2286
Namibia	-	-	-	419223	-	-	-	20408	1096
Niger	-	-	-	80957	-	-	-	-	156
Nigeria	-	-	-	1297459	-	-	-	-	2011
Reunion	-	-	-	-	-	-	-	-	-
Rwanda	-	-	-	-	-	-	-	-	-
Sao Tome and Pri	-	-	-	-	-	-	-	-	-
Senegal	-	-	-	-	-	-	-	-	-
Seychelles	-	-	-	-	-	-	-	-	-
Sierra Leone	-	-	-	-	-	-	-	-	-
South Africa	-	-	-	13311	-	-	-	-	131
Swaziland	-	-	-	7052	-	-	-	-	-
Togo	-	-	-	-	-	-	-	-	-
Uganda	3866	10954	-	1550990	-	-	-	-	291
Tanzania	-	-	-	479413	-	-	-	-	762
Zambia	1399715	971786	-	2371501	96812	60698	-	157510	4899
Zimbabwe	-	-	-	638906	-	-	-	-	1047
Total	2174913	2275178	145100	22018052	129253	102496	8108	310920	36737

- Data not available

Annex 12:

Box: 1: Primary Health Care Packages for Malaria Service in South Africa

SERVICE DESCRIPTION

South Africa has an effective control programme for malaria although seasonal outbreaks occur in endemic areas. In addition to public health measures treatment of cases aims at preventing mortality and complications and eliminating parasitaemia to minimise transmission.

NORMS

1. Members of the Provincial or District Malaria Control teams visit clinics in endemic areas every month during spraying activities throughout the year.
2. During peak transmission times October – May visits are more frequent.

STANDARDS

1. References, prints and educational materials

1.1. Malaria Control Policy in South Africa – Latest version.
1.2. Latest Guidelines for the Prophylaxis of Malaria.
1.3. Latest Guidelines for the Treatment of Malaria.
1.4. Pamphlets on Malaria control Programme.
1.5. Pamphlets on Malaria diagnosis and treatment and prevention in local languages.
1.6. Posters in local languages.

2. Equipment

2.1 Laboratory equipment – rapid diagnostic tests on microscopic slides of blood smears.

3. Medicines and Supplies

3.1 List of drugs in accordance with the Essential Drugs List.

4. Competence of Health Staff

4.1 Staff receives training and periodic continuing education on malaria control and malaria clinical management.

4.2 Staff knows if the clinic is in an endemic area of Limpopo, Mpumalanga, N-E KwaZulu-Natal, or in an occasional focal limited epidemic area of N-W Province and N Cape.

4.3 Staff knows the highest transmission period (e.g. Oct-May) and its relation to rainfall and abnormal seasonal patterns.

4.4 Staff keeps a high level of suspicion of fevers, persons coming from other endemic countries (e.g. Mozambique) and is thus capable of making early diagnosis to offer rapid treatment.

4.5 Staff regards all South Africans as non-immune and prone to severe complications.

4.6 Staff provides information on personal preventive measures and prophylactic treatment to travellers and tourists in high-risk areas.

4.7 Staff treats suspected uncomplicated malaria as per malaria protocol.

4.8 Staff refers urgently to hospital all suspected severe cases.

4.9 Staff confirms diagnosis with blood test either by blood smears for microscopy to laboratory or rapid diagnostic tests.

4.10 Staff repeats blood test if negative and symptoms persist.

5. Referrals

The following are referred:

5.1 All children after initial treatment with tepid sponging and rehydration.

5.2 Patients not responding to treatment within 4 days.

5.3 Patients with symptoms of severe and complicated malaria (recording blood glucose, weight and what treatment if any already given on the referral form).

5.4 Pregnant patients.

5.5 Patients with skin reactions to treatment. **6. Patient Education**

6.1 All patients receive in high risk areas health education on preventative measures: use of impregnated bed nets/curtains, use of repellents on skin, aerosols, coils, vaporisers with insecticides, use of prophylactic drugs and about continuing precautions all year.

6.2 Clinic staff discusses the purpose of vector control measures and house spraying and larval control in endemic areas, reasons for active detection of cases and treatment in homes by malaria control field teams.

7. Records

7.1 Patients records are kept up to date.

7.2 All confirmed cases of malaria are notified to the malaria control programme.

8. Community Based Services

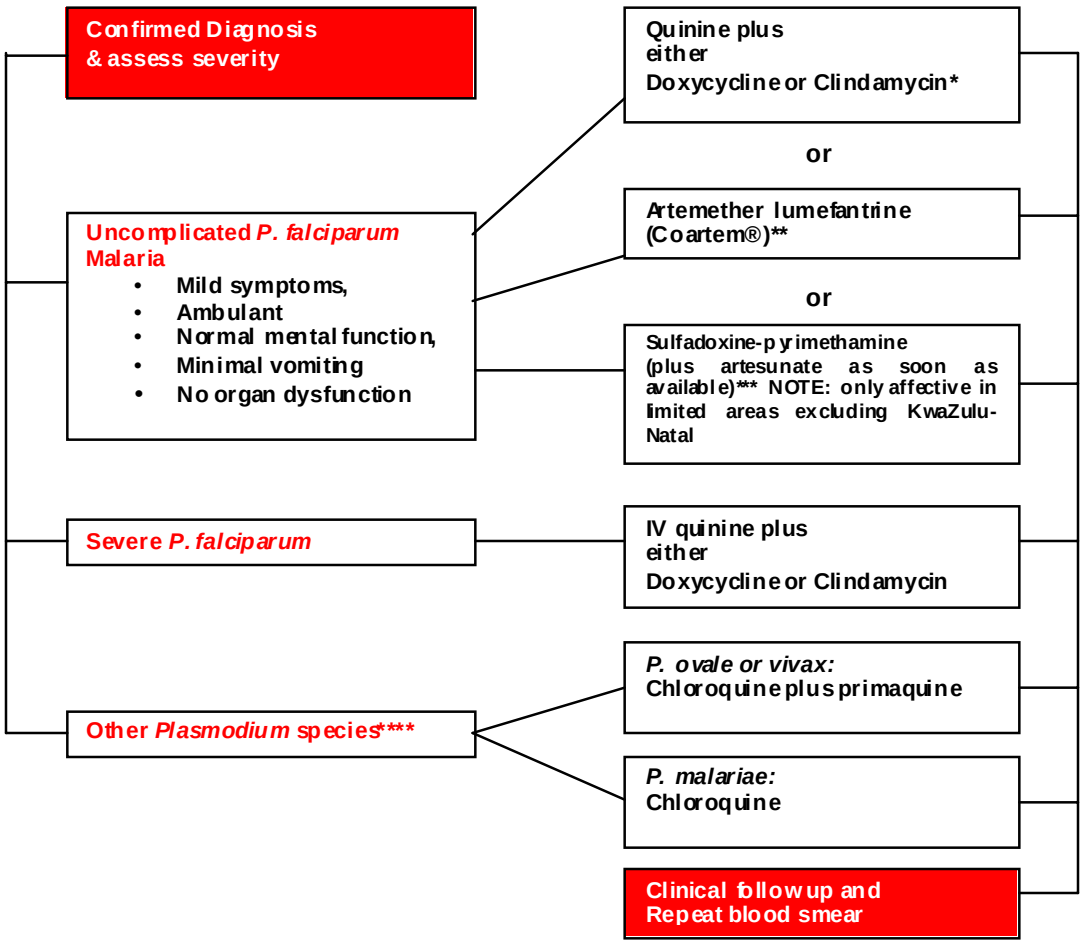
8.1 Clinic staff co-operate with the Malaria Control team and Environmental Health Officers by recording community responses to residual insecticide (e.g. replastering) and any social changes (e.g. influx of migrant workers).

9. Collaboration

9.1 Clinic staff collaborates with other departments like environmental health, water affairs and education.

Source: Department If Health; Communicable Disease Control & Malaria Control Programme

Annex 1.3: Summary flowchart of the treatment of malaria in South Africa, August 2002



Source: NDOH; Guidelines for the treatment of malaria in South Africa, August 2002

Annex 1.4: The status of the use of DDT from vector control in Southern Africa

Country	Date Stopped use in Malaria Control	DDT legislation Status	Reason for Stopping the use of DDT in Malaria Control	Reason for Continuing use of DDT in Malaria Control	Amount required/ Year (kg)
Angola	N/A	N/A	N/A	N/A	N/A
Botswana	1998	Not stated	Poor quality of DDT	N/A	N/A
Malawi	N/A	N/A	N/A	N/A	N/A
Mozambique	Information not available	Not stated	Information not available	N/A	N/A
Namibia	N/A	Not stated	N/A	Vector susceptible; effective; affordable	75, 000
South Africa	1997 (Reinstated 2001)	Not stated	Community refusal	Resistance of *fenestus* to pyrethroids	25,000
Swaziland	N/A	Not stated	N/A	Vector susceptible; effective; affordable	10,000
Tanzania	N/A	N/A	N/A	N/A	N/A
Zambia	N/A	N/A	N/A	N/A	N/A
Zimbabwe	1991	Restricted for public health use	Contamination of tobacco crops for export	N/A	N/A

Source: http://www.fightingmalaria.org/pdfs/ddt_thefacts.pdf