

#### 4.8. Suriname

Suriname is one of the most scarcely populated countries of the South American continent. It is one of the three Guianas embraced by the Amazon rain forest and the Atlantic Ocean. It has less than half a million inhabitants with the majority living on the coastal area.

The hinterland has areas populated by Amerindians, several tribes composed of Trio, Caraib, Arrowak and Akurio. Furthermore, there are non-indigenous “maroons” of African descent.

Malaria in Suriname (1999): Epidemiological Map by Levels of Risk is presented in Annex 1, Figure 7.

Due to gold mining activities, urban dwellers and foreigners (mainly Brazilians) presently work and live in the interior. The number of these newcomers is not exactly known, but it is estimated to be between 30- 50,000, approximately the same number of indigenous people in Suriname.

Indigenous villages are far apart and sometimes contain less than a hundred people, thereby making it difficult to employ commonly-used methods to provide health care. As a result, The Medical Mission, a NGO primarily financed by the government of Suriname, provides healthcare to these areas.

The hinterland is divided into functional regions that contain a number of small villages.

Depending on its size, each village has at least one specially trained and licensed health assistant. These assistants are trained in the following areas:

- Medical interviewing and physical examinations
- Diagnosis and treatment
- Prenatal care and assistance in labor
- Recognizing critically ill patients
- Providing information on disease prevention
- Managing immunization programs

In the larger villages there also is a laboratory assistant handling the following areas:

- Hematology: Hb level and ESR
- Urine: microscopy, dipstick tests
- Stools: parasitology
- Malaria microscopy

Each region is supervised by a medical doctor who is located either in the region or in the coordinating center in Paramaribo. On a regular basis this physician visits the health centers in his region to directly supervise and support the health assistant. All health centers are equipped with radio devices that allow consultations with the regional medical officer or with the coordinating center in Paramaribo. When critically ill patients cannot be treated locally, transportation to the capital may be arranged via road, boat, or air, where they are admitted at the affiliated Diakonessen Hospital. Annually, an average number of 120 emergency flights are carried out to transport critically ill patients. Despite the fact that this approach costs a lot of money, it has proven to be more cost-effective and efficient than running regional hospitals in the interior.

Malaria caused by *P. falciparum* is the most prominent infectious disease in the hinterland of Suriname.

During the 80's there was an increase in the number of malaria cases caused by the destruction of the hinterland infrastructure due to an internal armed conflict. In the early 1990s, the increase was caused by the intensification of gold mining and logging activities.

In some regions the API approaches 100 cases per 1000 people.

In 1997, The Medical Mission started a program to reduce the incidence of malaria in the hinterland. This program consists of:

- Increasing the recognition of malaria as a serious health problem among the population at risk.
- Improving the skills and tools of health assistants to diagnose and treat malaria.
- Introduction of an impregnated bed-net project.
- Encouraging government involvement through extensive house-spraying activities.

In the short term it is difficult to measure the effect of these activities on the incidence of malaria. For example, there was a sharp decrease in the incidence in 1997, however this coincided with relatively dry weather that may have influenced the transmission.

In the clinical management of malaria, there was a sustained decrease of annual hospital admissions from 1997 onwards. It is believed that this was due to repeated courses attended by health assistants used to update and improve their skills in the areas of early diagnosis and effective treatment. The health assistants are now capable of diagnosing and treating complications such as severe hypoglycemia, as well as administering medication intravenously.

Regarding the bednet project it was thought that the introduction of bednets in the communities would be more successful if the people were directly involved in their

production and treatment. Several women's groups were organized to produce the bednets and these groups were also instructed to discuss the role of malaria in daily life. This resulted in an increase of the awareness of malaria as a health problem as is the importance of the fight against the disease. In three years 10,000 bednets have already been produced and distributed. However, the proper use of bednets and their effect on the incidence of malaria in households have not yet been evaluated.

In the *Roll Back Malaria* Initiative Meeting in Lima, Peru, October 1999, one of the issues discussed was that of inter-country cooperation. This is a very important issue for Suriname because the Marowijne or Maroni River basin bordering French Guiana. This is one of the areas with the highest incidence of *P. falciparum* malaria.

A *cooperation treaty* (presented in details by the French Guiana participant) between French Guiana/Government of France and Suriname, with the participation of the following institutions has been drafted:

- Ministry of Foreign Affairs, France
- Ministry of Health, French Guiana
- Health centers, French Guiana
- Institute Pasteur, France
- Medical Mission, Suriname
- Bureau of Public Health, Suriname

The *joint project* will serve areas of common epidemiological interest of the Maroni River Basin and includes:

- Shared health information system on Maroni river
- Development of common GIS
- Collaboration on chemo-resistance surveys of malaria
- Prevalence surveys on malaria using common protocols
- Collaboration and coordination of vector control activities
- Improvement of patient care along the border through the introduction of a health card

Other *new activities* regarding *Roll Back Malaria* in the Interior of Suriname are:

- Arranging cross border cooperation with the other neighboring countries such as Brazil and Guyana.
- Training and employment of local entomological assistants to improve rational decision-making in vector control activities and involvement of the local communities.
- Evaluating the effectiveness of the policy of chemo-prophylaxis in pregnant women in endemic areas.
- In vivo resistance studies to evaluate the efficacy of the present treatment program and to assess the necessity to change.

- Increasing number of laboratory assistants.
- Setting up a quality control program for field laboratories.
- Promoting the initiative on all levels in the country. Nationwide, it is felt that the *Roll Back Malaria* initiative can have a strong impact on the success of the present program.

*The following aspects of the malaria situation and the control program were highlighted by the delegation of Suriname:*

- There is no malaria transmission in the northern coast of Suriname, where the majority of the population lives (approximately 500,000 people). Around 150,000 people live in malaria risk areas in the interior of the country;
- The areas of higher risk for malaria are located along the Marowijne River which borders French Guiana, as well as in areas close to the Brokopondo Lake in the northern-central region of the country where *Anopheles darlingi* is present.
- *P. falciparum* malaria represents 85-90% of all malaria annual cases in the country.
- The activities to control malaria are carried out by the Medical Mission. It consists of 54 medical doctors; six of whom are assigned to the interior. This organization also relies on doctors assistants and laboratory support;
- The vector control program is implemented through residual spraying.
- As part of the activities related to RBM malaria, a project is being implemented for the production, impregnation and selling of the bednets with the active participation of women in the communities.
- The population (maroons) in the endemic areas frequently wash the bednets. The project is working on informing and training them about the proper use of insecticide and educating this group about its safety.
- The effectiveness of this project must be studied.
- Entomological assistants are being trained who originate from these communities.
- Quinine and Primaquine are used for anti-malarial treatment and there is a prophylaxis scheme to protect pregnant women.
- The report on hospitalized patients shows a reduction in the number of complicated cases of malaria.