Summary Product Characteristics

1. **Name of the proprietary product: --**

   Name of the nonproprietary of Product: Artesunate Injection 60 mg

   Route of Administration: IM/IV

2. **Qualitative and Quantitative composition:**

Sr. No.	Ingredients	Specification	Label claim	Quantity / Vials (mg)	% Overages	Resion of inclusion
1.	Artesunate (Sterile)	In-House	60.00 mg	60.00	Nil	Antimalarial

3. Pharmaceutical Form: Powder for Solution for Injection

4. Clinical Particulars:

4.1 Therapeutic Indications:

It is indicated for the treatment of severe malaria caused by Plasmodium falciparum, in adults and children.

4.2 Posology and method of administration:

Adults and children: Artesunate injection is administered at a dose of 2.4 mg of artesunate/kg body weight, by intravenous (I.V.) or intramuscular (l.M.) injection, at 0, 12 and 24 hours, then once daily until oral treatment can be substituted.

Administration: The powder for injection is difficult to dissolve and care should be taken to ensure that it is completely dissolved before parenteral administration

The formulation should be used immediately after reconstitution. If the solution is cloudy or precipitate is present, the parenteral solution should be discarded. Do not use water for injection for reconstitution of the artesunate powder or for dilution of the resulting solution prior to injection.

The powder for injection should be reconstituted with 1 ml of sodium bicarbonate 5% w/v, shake vigorously till the solution become clear.

For I.V. Use: Add 5 ml of sodium chloride 0.9% w/v and mix again to prepare final concentration of 10 mg/ml for I. V. use. The required amount of drug for I. V. use should be administered slowly over a period of 2-3 minutes.

For I.M. Use: Add 2 ml of sodium chloride 0.9% w/v and mix again to prepare final concentration of 20 mg/ml for I.M. use.

4.3 Contraindications

Artesunate Injection is contraindicated in patients with hypersensitivity to Artesunate or other Artemisinins.

4.4 Special warnings and precautions for use

Non-falciparum malaria: Artesunate has not been evaluated in the treatment of severe malaria due to Plasmodium vivax, Plasmodium malariae or Plasmodium ovale.

In cerebral malaria and complicated malaria, general supporting therapy is usually required.

Renal/hepatic impairment: Dose adjustment is not necessary in patients with hepatic or renal impairment.

Pregnancy: There has been limited clinical experience with the use of artesunate in pregnancy. In animal studies, artesunate has been associated with foetal toxicity during the first trimester of pregnancy. To date, clinical data regarding safety in the first trimester have not indicated an increased risk of foetal harm. Treatment with artesunate should not be withheld during the first trimester if it is potentially life-saving for the mother.

Lactation: The active metabolite of artesunate is excreted at low levels in breast milk. The drug levels are not expected to cause any adverse effects in breast fed infants. The amount of drug present in breast milk does not protect the infant from malaria.

4.5 Interaction with other medicinal products and other forms of interaction:

Few clinical drug-drug interaction studies have been performed; however no clinically significant interactions have been identified.

4.6 Pregnancy and Lactation:

Pregnancy: There has been limited clinical experience with the use of artesunate in pregnancy. In animal studies, artesunate has been associated with foetal toxicity during the first trimester of pregnancy. To date, clinical data regarding safety in the first trimester have not indicated an increased risk of foetal harm. Treatment with artesunate should not be withheld during the first trimester if it is potentially life-saving for the mother.
Lactation: The active metabolite of artesunate is excreted at low levels in breast milk. The drug levels are not expected to cause any adverse effects in breast fed infants. The amount of drug present in breast milk does not protect the infant from malaria.

4.7 Effects on the ability to drive and use machines

Patients receiving Artesunate for injection should be warned that dizziness may occur, in which case they should not drive or use machines..

4.8 Undesirable effects:

Blood and lymphatic systems disorders: Neutropenia and anaemia (both occasionally severe), thrombocytopenia, pure red cell aplasia, post-treatment anaemia, mild and transient decrease in reticulocyte count.
Nervous system disorders·: Dizziness, light-headaches, headache, insomnia, tinnitus, peripheral neuropathy.
Respiratory disorders: Cough, nasal symptoms
Gastrointestinal disorders: Altered taste, nausea, vomiting, abdominal pain or cramps, diarrhoea, raised serum amylase, pancreatitis.
Hepatobiliary disorders: Transient rises in liver transaminases (AST, ALT), hepatitis.
Skin and subcutaneous tissue disorders: Rash, alopecia.
Musculoskeletal and connective tissue disorders: Arthralgia, muscle disorders
General disorders and administration site conditions: Fatigue, malaise, fever, pain at injection site.
Immune system disorders: Hypersensitivity

4.9 Overdose

Experience of acute overdose with artesunate is limited. The overdose of artesunate is associated with pancytopenia, melena, seizures, multi organ failure and death. Treatment of overdose should consist of general supportive measures.

5. Pharmacological Particulars:

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Antimalarial

Artesunate is a hemisuccinate derivative of dihydro-artemisinin, which is itself formed by the reduction of artemisinin. The mechanism of action of the artemisinins likely involves cleavage of the internal endoperoxidc bridge through reaction with haeme within the infected erythrocyte, thereby generating free radicals which alkylate vital parasite proteins. However, artemisinins have also been reported to inhibit an essential parasite calcium adenosine triphosphatase. The artemisinins are distinguished from other antimalarials by their ability to kill all erythrocytic stages of the malaria parasite, including the relatively inactive ring stage and late schizonts, as well as the gametocytes responsible for malaria transmission. Artesunate and the artemisinins are the most rapid acting of the antimalarials, and they have also been shown to enhance splenic clearance of infected erythrocytes by reducing cytoadherence.

5.2 Pharmacokinetic properties

Absorption: After intravenous injection artesunate is very rapidly biotransformed to its active metabolite, dihydroartemisinin (DHA). Consequently, artesunate half-life (t1/2) is estimated to be less than 5 minutes. Artesunate is rapidly absorbed following intramuscular injection, and peak plasma levels are generally achieved within 30 minutes of administration.

Distribution: Dihydroartemisinin (DHA) has been shown to substantially accumulate in P. falciparum infected erythrocytes. Plasma protein binding of dihydroartemisinin is determined to be 93% in patients and 88% in healthy volunteers.

Metabolism Elimination: Artesunate is extensively and rapidly hydrolysed by plasma esterases, with possible minimal contribution by CYP2A6. The main metabolite, dihydroartemisinin, accounts for most of the in vivo antimalarial activity of IV administration.

DHA is further metabolized in the liver via glucuronidation and is excreted in the urine; a-dihydroartemisinin-P-glucuronide has been identified as the major urinary product in patients with falciparum malaria.

5.3 Pre-clinical Safety:

Not applicable.

6. Pharmaceutical Particulars:

List of Excipients:

Sodium Bicarbonate BP

Sodium Chloride BP

Water For Injections BP

6.2 Incompatibilities:

Not applicable.

6.3 Shelf Life: 36 months

6.4 Special Precautions for storage:
Store below 30°C in a dry place, protected from light.
The reconstituted solution should be stored below 30^0C and should be used within 1hour.

6.5 Nature and contents of container:
White to off white powder filled in a 15 ml Clear glass vial, plugged with grey butyl rubber plug with flip-off seal, packed in a carton along with a plastic tray containing 1 ml ampoule of Sodium Bicarbonate Injection BP (5 % w/v) , 5 ml ampoule of Sodium Chloride Injection BP (0.9%w/v) and Pack insert.

6.6 Special precautions for disposal and other handling:
No special requirements. Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

7. Marketing Authorization Holder:
Oliklin Pharmaceuticals Nigeria limited
22/24, Kabba Street nomanslands, Kano Nigeria

8. Marketing Authorization Number: Under application

9. Date of first Authorization /renewal of the authorization: ---

10. Date of revision of text: