UNIT 6: **IMMUNISATION SERVICE DELIVERY AND VACCINE ADMINISTRATION**

**UNIT OBJECTIVES**

1. Identify the EPI vaccines
2. Discuss the rationale for giving each vaccine
3. State the storage temperature of each vaccine
4. Explain the National Immunization Schedule
5. \*Explain preparation of each vaccine to be administered
6. State the site for administration with the dosage used
7. Describe possible expected reactions after vaccination
8. Educate the parents/guardians on what to do in case of a reaction
9. **THE EPI VACCINES**

**Types of Vaccines Used by the Kenya DVI/KEPI**

* There are three (3) types of vaccines, namely:

1. Live attenuated vaccines
2. Inactivated vaccines-either whole cell or cell fractions.
3. Genetically engineered (recombinant) vaccines- which are similar to inactivated vaccines.
4. **Live attenuated vaccines**

* Are derived from disease-causing viruses of bacteria that have been weakened under laboratory conditions. They will multiply in a vaccinated individual, but because they are weak, either cause no disease or a mild form.
* Usually only one dose of this type of vaccine provides life-long immunity, with the exception of oral polio vaccine which requires multiple doses.
* Examples: Oral polio vaccine, measles, yellow fever, BCG, oral typhoid and oral cholera.

1. **Inactivated vaccines**

* Are produced by growing viruses or bacteria and then inactivating them with heat or chemicals. Because they are not alive, they cannot grow in a vaccinated individual and therefore cannot cause the disease.
* Since they are not as effective as live vaccines, multiple doses are required for full protection. Booster doses are needed to maintain immunity because protection by these vaccines diminishes over time.
* Examples: Injectable polio vaccine, Hepatitis A vaccine, Rabies vaccine, inactivated cholera, small pox, influenza vaccine.

1. **Recombinant Vaccines**

* Are produced by inserting genetic material from a disease-causing organism into a harmless cell, which replicates the protein of the disease-causing organism. The proteins are then purified and used as vaccines. Examples include Hepatitis B vaccine and HPV vaccine.
* The following are the major/essential EPI vaccines currently in use:
* BCG
* Oral polio
* DPT/HepB-Hib (Pentavalent)
* Pneumococcal vaccine (PCV)
* Measles vaccine
* Tetanus Toxoid
* Yellow fever

1. **BCG (BACILI CALMETTE-GUERIN VACCINE)**

* Is a freeze-dried live attenuated vaccine prepared from *Mycobacterium bovis?*
* It has a life span of 12 months from the date of preparation, when kept under the right temperature of +2 to +8 degrees centigrade.
* BCG immunization protects against tuberculosis (TB), which is the common disease in Kenya.
* BCG prevents severe forms of meningitis e.g TB meningitis and TB in non-immune infants, and that is why it is important to begin immunization at birth as recommended by the National Immunization Schedule.
* BCG immunity is estimated to last between 7-15 years. Only one administration is recommended in the schedule.
* BCG vaccine should be stored continuously at +2 to +8 degrees C.
* BCG vaccine should be given at birth or at first contact.
* BCG vaccine is usually given to the children up to the age of 5 years, if no BCG scar is present.
* Contacts of persons above 15 years who are not suffering from TB and have a negative mantoux test, should be immunized with BCG immediately.
* N/B: There are no absolute contraindications for BCG besides symptomatic HIV/AIDS and other known immunosuppression diseases e.g cancers.
* BCG is given through the ***intradermal route***, which is found to be the most efficient in immune conversion.
* It produces a lasting scar as an indicator for immunization.
* The dose of BCG is 0.05mls for children less than 1 year or 0.1mls for children above 1 year.

**REQUIREMENTS FOR ADMINSTERING BCG VACCINE**

1. Sterile BCG syringes with needles gauge 26.
2. Sterile 2ml reconstituting syringe and needle gauge 21.
3. Safety box
4. A vaccine carrier with ice packs and a sponge
5. Refuse bins.

**HOW TO PREPARE THE BCG VACCINE**

1. Always open ampoules/vials of BCG vaccine with great care, because sometimes a vacuum is maintained inside the ampoule.
2. Wash hands
3. Dilute the vaccine under sterile conditions with a sterile diluent.
4. Transfer the diluent with a dry sterile 2ml syringe using gauge 21 long needle into the ampoule/vial containing the vaccine.
5. Gently mix the vaccine well before filling the syringe
6. Withdraw the vaccine with needle and syringe, and then discharge it back into the ampoule twice or thrice to give a homogenous solution.
7. If the vaccine comes in a vial, use non-touch technique and withdraw the diluent and mix as described above.
8. In case of ampoule, break the ampoule neck with care to avoid harming yourself, by covering the ampoule neck with clean cotton swab.
9. Remember BCG is very sensitive to sunlight and heat.
10. Keep the reconstituted vaccine in a sponge with a slit in a vaccine carrier.
11. BCG potency lasts for six (6) hours after being reconstituted.
12. Reconstitute the vaccine as soon as the first eligible child for BCG reports at the clinic.
13. Record the time of reconstitution.
14. Discard the reconstituted BCG vaccine after 6 hours or at the end of immunization session whichever comes first.
15. Never store diluted BCG vaccine for next day’s use.
16. Open a BCG vaccine vial even if only one child is to be given the immunization.

**HOW TO FILL THE SYRINGE**

1. Allow the ampoule/vial to stand upright on the sponge in the vaccine carrier for about 1 minute to let bubbles disappear.
2. Fill the syringe with the required dose of the vaccine using BCG syringe.
3. Withdraw one dose at a time to avoid exposure of the reconstituted BCG vaccine.
4. Measure the volume of vaccine to be injected according to the markings on the barrel of the 0.05ml syringe for children less than 1 year and 0.1 ml syringe for children over 1 year.
5. Do not withdraw several doses in advance.

**HOW TO INJECT THE VACCINE**

* With your left hand, hold the left forearm of the child to be immunized.
* Stretch the skin over the site between your left index finger and the thumb.
* Introduce the needle upwards, into the skin, keeping it as flat as possible, so as to give it intradermally.
* Inject BCG vaccine intradermally on the outer (dorsal) aspect of the left forearm at the junction of the upper and middle thirds.
* When you give the injection intradermally into the lower layer of the skin, a wheal appears (about 7-8mm) with small pits on it like an orange peel.
* Remove the needle and DO NOT rub the site.
* Caution the parent/guardian not to rub the site or apply anything on it.

**AVAILABLE VACCINE PREPARATION**

* BCG is a live attenuated bacterial vaccine named after the original two researchers.
* The current preparation is prepared from an attenuated strain of *Mycobacterium bovis.*
* BCG is prepared in multi-dose lyophilized (freeze-dried) containing 20 doses per vial, and also as a liquid formulation of single doses.

**STORAGE**

* At facility level, BCG vaccines and its matching diluent must be stored in the vaccine refrigerator in the same tray at +2 to +8 degrees centigrade.
* Once reconstituted, it can be used within six (6) hours and must be discarded after 6 hours or at the end of the session, whichever comes first.

**SCHEDULES**

* At birth and up to 59 months of age.

**DOSE**

* 0.05ml for infants’ less than one year old, and 0.1ml for children above 1 year.

**INJECTION SITE**

* Upper outer aspect of the left forearm, at the junction of the lower two-thirds and the upper one-third.

**ROUTE OF ADMINISTRATION**

* Intradermal

**BOOSTER DOSES**

* None

**RECOMMENDED TARGET GROUP**

* Children under-five years of age. In Kenya BCG is given empirically at birth or at any age up to 59 months.
* Pre-term infants and low birth weight infants (<2kgs) should receive the BCG vaccine at the time of discharge from hospital irrespective of the current weight.
* If the pre-term or LBW baby was born at home, BCG vaccination should be given at first contact with the health facility just like all babies born at home.

**MOH POSITION ON BCG RE-VACCINATION**

* Infants who do not develop a scar more than 6 weeks after vaccination should be re-vaccinated once with a similar dose of BCG vaccine unless advised otherwise by a specialist.
* If the infant does not develop a scar after the second dose- do not repeat again.
* Tuberculin skin testing will not be routinely performed on neonates or infants prior to administration of BCG vaccine unless requested by a pediatrician.
* A reactive tuberculin test is a contraindication for BCG vaccination.

**MOH POSITION ON BCG VACCINATION OF SPECIAL RISK GROUPS**

* HIV exposed or infected infants are to be vaccinated, unless advised against by a pediatrician.
* For BCG vaccination of infants born to TB infected mothers, refer to TB treatment guidelines.

**Minor side effects/Complications/reactions following BCG administration**

1. Acute inflammatory reaction at the site of injection which appears 2-4 days of immunization. It is unexpected but heals rapidly on its own, leaving a small flat scar.
2. Deep abscesses at the immunization site. This are due to injecting the vaccine too deep into the subcutaneous layer of the skin instead of the intradermal layer.

* No medication is required but if necessary apply a sterile dry dressing.
* Very occasionally, deep abscesses may require aspiration.
* When they do, reassure the patient/guardian and refer child for further management.
* Excessive ulceration is when an ulcer is still present more than 12 weeks after immunization, or one which is more than 1 cm. No treatment is required but apply a sterile dry dressing.
* Lymph node enlargements sometimes occur, if they ulcerate refer for further management.
* C/I: Pre-existing illness, low birth weight, advanced infections, immunosuppression.

1. **POLIOMYELITIS VACCINE (OPV AND IPV)**

**AVAILABLE VACCINE PREPARATION**

* Live attenuated and killed polio virus vaccines.
* **Live attenuated OPV:** Trivalent (tOPV) containing serotypes 1, 2 and 3. Currently used for routine immunization. Monovalent Oral Polio Vaccine (mOPV) types 1 and 3. Currently used only during mass vaccination campaigns for children aged 0-59 months in response to outbreaks of specific type as they are more immunogenic alone than when combined with the other two serotypes. Bivalent Oral Polio Vaccine (bOPV) which is used to respond to an outbreak of either type 1 or 3.
* **Inactivated Polio Virus Vaccine** (IPV) serotypes 1, 2 and 3.
* Currently, only one formulation is available in the country in a combination preparation with DPT-HepB-Hib. It is administered parenterally by intramuscular injection at 6, 10 and 14 weeks.
* Inactivated polio virus vaccine are suited only for countries which have eradicated the wild poliomyelitis disease and only require a vaccine preparation to sustain their immune status.
* Live attenuated polio vaccines are the recommended preparations for use in countries or regions with known transmission or risk of transmission of wild poliomyelitis as they are more immunogenic than the killed virus vaccines.

**SCHEDULE FOR TRIVALENT OPV**

* In Kenya, the infants receive 4 doses of trivalent OPV before one year of age.
* 1st dose is given immediately at birth or within 2 weeks of birth. This is known as the “**birth dose**” or “**zero dose”.**
* The other 3 doses should be given at 6, 10 and 14 weeks of age.

**ROUTE OF ADMINISTRATION**

* 2 drops administered orally constitute one dose.

**BOOSTER DOSES**

* No routine booster doses are given above 14 weeks of age, however supplementary doses are given during mass vaccination campaigns using appropriate mono or bivalent poliovirus vaccines.
* Polio vaccines have no contraindications.
* C/I: GIT disorders e.g diarrhea, child who is sick at admission, immunosuppression.

**POSSIBLE REACTIONS/COMPLICATIONS FOLLOWING POLIO VACCINATION**

* Very Rare

1. **PENTAVALENT VACCINE (DPT-HepB-Hib)**

* Is a combination preparation which protects against diphtheria, pertusis, tetanus, hepatitis B and hemophilus influenza type B.?
* **Schedule**: Given in 3 doses at intervals of 4 weeks at 6 weeks, 10weeks and 14weeks.
* **Dose**:0.5ml
* Vaccination against **tetanus** is also through five appropriately spaced doses of adsorbed tetanus toxoid which is known to provide immunity against tetanus for up to 20 years **for all recipients**. This is also known as the 5-T.T schedule. Survivors of tetanus disease do not develop reliable immunity to subsequent attacks and must still be vaccinated against the disease before discharge from the hospital.
* Newborns can be protected from neonatal tetanus during the first 6 weeks of life through vaccination of pregnant women using the 5-T.T schedule. However, additional preventive measures e.g clean delivery and clean cord care practices have to be observed. At the age of 6 weeks, the infant should receive tetanus toxoid vaccination in combination vaccines (PENTAVALENT) so as to stimulate antibody formation.
* **Schedule for the 5-T.T doses during pregnancy include:**
* **First pregnancy**: 1st T.T dose (given from the 4th to 6th month i.e 2nd trimester) then the 2nd T.T dose given 1 month after the 1st dose (between the 5th and 8th month).
* **Second pregnancy**: 3rd T.T dose (given anytime between the 4th and 8th month).
* **Third pregnancy**: 4th T.T dose (given anytime between the 4th and 8th month).
* **Fourth pregnancy**: 5th T.T and last dose (given anytime between the 4th and 8th month)
* **Subsequent pregnancies**: No more T.T doses.
* **Schedule for trauma and occupational prophylaxis against tetanus include:**
* 1st T.T dose: At first contact (or atleast within 7 days after injury)
* 2nd T.T dose: 1 month after 1st T.T.
* 3rd T.T dose: 6 months after 2nd T.T.
* 4th T.T dose: 1 year after 3rd T.T.
* 5th T.T dose: 1 year after 4th T.T.
* **Monovalent Hepatitis B vaccine** is recommended for the prevention of hepatitis B in health workers and other risk groups in three scheduled doses administered at 0, 4 and 6 months interval. Pentavalent vaccines and their respective components are contraindicated at birth. Monovalent Hep B vaccine is the only Hep B vaccine that can be used at birth.

**COMMON ISSUES ON THE PENTAVALENT VACCINE**

* Is a safe and efficacious combination vaccine available?
* Is administered parenterally and therefore a combination vaccine reduces the number of injections given thus encourages compliance to the vaccination schedule.
* **Dosage**: The standard pediatric dose combination five component vaccine is **0.5ml** given intramuscularly, into the **antero-lateral aspect** of the **left thigh.**

**POSSIBLE REACTIONS FOLLOWING PENTAVALENT IMMUNIZATION**

1. Injection abscess if aseptic technique was not followed.
2. A nodule may appear in the Subcutenous layer.

* If these happen, reassure the parent/guardian that it is a normal reaction but advice to seek medical advice if it persists.

1. **VITAMIN A SUPPLEMENTATION**

* Vit. A though not a vaccine was integrated into the infant immunization schedule in the 1980s due to its immune boosting effects and the obviously optimal opportunity for administration.
* Vit. A deficiency is a cause of preventable blindness in Kenya and therefore all efforts must be made to strengthen the supplementation of Vitamin A to all infants.
* A child should have gotten atleast two (2) doses of vitamin A before the first birthday.
* The MOH recommends regular vitamin A supplementation for infants and young children up to the 5th year of life.
* **Vitamin A schedule for children under 5 years:** Started when the baby is 6months old at 100,000 IU. And every 6months 200,000 IU till Baby is 5 years. The preparation is a capsule that is inserted orally.
* **Vitamin A schedule for lactating mothers:** Given at delivery or at first presentation to the health facility within the first six (6) weeks after delivery. (6 weeks postpartum). The dose is 200,000 IU capsule given once.

1. **PNEUMOCOCCAL VACCINE**

* PCV10 is a 10 valent pneumococcal conjugate vaccine which was introduced into the infant immunization schedule in 2011 to protect the infants against Streptococcal pneumoniae.
* **Dosage and route of administration**: 0.5mls of vaccine injected intramuscularly into the anterior upper, outer aspect of the **right thigh.**
* **Schedule:** Three (3) doses given at 6, 10 and 14 weeks of age.
* **High risk clients:** Patients with sickle cell disease, damaged spleen, diabetics, elderly (>65 years), patients on chemotherapy and on steroid treatment. All high risk clients should receive a single intramuscular dose of 0.5mls of the specific vaccine.

1. **MEASLES VACCINE**

* Is a live hyper-attenuated preparation derived from Edmonston strain of the measles virus cultured on human diploid cells? It is then lyophilized.
* Is available in monovalent formulation or in combination with mumps and rubella vaccine formulation (MMR)
* The monovalent formulation is administered at 9 months of age in the Kenya routine immunization schedule for infants primarily because measles occurs frequently in infants less than one year of age and this is the earliest year at which an acceptable sero-conversion rate of 85% is achieved.
* Combined measles, mumps and rubella vaccine (MMR) is best utilized to provide a second opportunity dose for measles at 15 months of age.
* **Dosage and routes of administration:** The monovalent measles vaccine is given as a single dose of **0.5mls**, deep **Subcutenous injection** over the **deltoid** muscle of the **left** upper arm of the child.
* **MMR** vaccine is also given as a single dose of 0.5mls subcutaneously.
* **Recommendation:** In view of local measles epidemiology and the high susceptibility of infants to measles infection, the MOH recommends the routine use of monovalent measles vaccine at 9 months of age followed by a **second-opportunity dose** starting from 15 months of age. This second opportunity dose may be the monovalent measles vaccine or the combination MMR vaccine.
* **Second opportunity doses** of monovalent measles vaccine will be given **for the public good** through mass vaccination campaigns for the management of measles outbreaks. The target age groups for mass vaccination exercises will be determined by the Ministry of Health.
* In the event of a measles outbreak, the age of the primary dose of monovalent measles vaccine is lowered to 6 months but parents/guardians are reminded to return for the normal vaccine doses at 9 months.
* **Contraindications:** No major contraindications for the monovalent measles vaccine unless determined by a specialist. MMR vaccine is contraindicated in children known to be allergic to eggs because the mumps virus strain is cultured on embryonated chicken eggs.
* HIV infection is an indication (rather than contraindication) for measles vaccination in Kenya as the risk of severe measles disease is worse than the risk of vaccine derived measles in HIV exposed or infected infants. Such infants should receive monovalent measles vaccines at 6 months of age followed by the normal dose of monovalent measles vaccine at 9 months.
* In situations where displaced people are moving internally or across our national boarders, all children aged between 6 months and 12 years should be vaccinated against measles- **regardless of previous vaccination status.**

**POSSIBLE REACTIONS AFTER THE IMMUNIZATION**

1. Slight fever
2. Running nose occurring 5 to 10 days after immunization.
3. Slight rash

* This mild illness shows that the vaccine is working to protect the child.
* Tell the mother about the possible reactions after measles vaccine.

1. **TETANUS TOXOID VACCINE (T.T)**

* Was first produced in 1924.
* Produced from the toxin produced by *Clostridium tetani.*
* The concentration of toxoid in the single dose adult preparations is similar to that in the pediatric preparations.
* T.T is given regardless of age. Pregnant women are immunized so that they provide maternal antibodies to their babies which protects them against neonatal tetanus.
* There is no known contraindication to T.T vaccine.
* T.T should be stored continuously at +2 to + 8 degrees C. should never be frozen as this reduces its potency.
* **Dosage and route of administration**: 0.5mls given through the intramuscular injection into the left upper arm into the deltoid muscle.

**OPPORTUNITIES FOR GIVING 5-TT VACCINATION SCHEDULE**

* The aim of the 5-TT schedule is to provide about 20 years + of protection against this killer disease for those at risk and especially for childbearing age mothers and their unborn babies.
* There are 3 main opportunities for the administration of the 5-Tetanus Toxoid schedule (5-TT).These include:

1. 5-TT for focused antenatal care (FANC)
2. 5-TT for Trauma and Occupational prophylaxis
3. 5-TT for girls and women of child bearing age
4. 5-TT for school-aged children

**Common possible reactions following TT vaccination.**

* TT vaccine is relatively safe that rarely provokes severe reactions. The main local reactions are:

1. Pain at the injection site
2. Swelling and redness at the injection site

* These reactions are usually self-limiting and do not require treatment. Should a person develop a severe reaction after being injected with tetanus toxoid, then the next dose must be differed until a qualified medical opinion is obtained. `

1. **YELLOW FEVER VACCINE**

* Is a live attenuated freeze-dried vaccine that must be reconstituted with the diluent provided? The vaccine must be discarded six (6) hours after reconstitution or at the end of the immunization session, whichever comes first.
* **Schedule**: One dose should be given to children at 9 months of age or at first contact, at the same time as measles vaccine. There are no contraindications for giving yellow fever vaccine to children older than 9 months of age. WHO recommends that yellow fever vaccinations **should not** be given to patients with symptomatic HIV since the vaccine is live attenuated and the vaccine is contraindicated for children less than 6 months and for individuals allergic to eggs.
* **Dose:** 0.5mls given subcutaneously in the upper left arm.

1. **TYPHOID VACCINE**

* There are two (2) vaccines licensed for use for the prevention of typhoid, namely:

1. The live oral T21 vaccine
2. The injectable Typhoid polysaccharide vaccine (*Typhim* *VI* and *Typherix).*

* Both are between 50% and 80% protective and are recommended for travelers to areas where typhoid is endemic.
* Boosters are recommended every 5 years for the oral vaccine and every 2 years for the injectable form.
* The **Vi-polysaccharide vaccine** is the currently approved vaccine for public health use in Kenya. This vaccine is composed of purified VI polysaccharide from Salmonella typhi. It is administered as a single dose either subcutaneously or intramuscularly to individuals over two (2) years of age. The vaccine confers protection seven (7) days after injection.
* The vaccine should be stored at a temperature of between +2 and +8 degrees C.
* **Route and dosage of administration:** Intramuscular injection of 0.5mls into the deltoid muscle.
* There are no contraindications other than prior severe reaction to the vaccine component.
* **Booster doses:** A single booster dose should be given to the high risk groups every 3 years. (Food handlers, laboratory staff, employees of sewerage and treatment works).

1. **CHOLERA VACCINE**

* Two (2) types of oral cholera vaccines are available, namely:

1. Shanchol
2. mORCVAX

* These two (2) are identical in terms of strains but formulated by different manufacturers using different methods.

**Storage:** Should be refrigerated at +2 to +8 degrees C.

**Dosages:** Shanchol/mORCVAX should be administered orally in 2 liquid doses 14 days apart for individuals aged 1 year and above. A booster dose is recommended after 2 years in cholera endemic areas.

**MOH RECOMMENDATIONS ON CHOLERA VACCINATION**

* Pre-emptive vaccination with oral cholera vaccines should be undertaken in epidemic prone regions of the country once the risk of cholera becomes significant due to events such as flooding and emergency displacement of communities.
* Specific targets for pre-emptive vaccination against cholera are: internally displaced persons in camps, medical staff and all other personnel involved in relief operations e.g military, paramilitary and aid agency staff.
* In the event of an outbreak, oral cholera vaccine should be administered to all personnel involved in the management of the outbreak. However, the affected communities should receive prophylactic antibiotics instead of vaccination. The relevant management of environmental sanitation and disinfection of drinking water must be instituted together with health education to the affected community.
* Cholera vaccine may also be administered to individuals proceeding on foreign travel if so advised by the country to be visited. Vaccination for travel purposes should be captured on the International Vaccination Certificate (the “Yellow Fever” card) under “other vaccines”.

1. **ANTISNAKE VENOM**

* Antivenom is the only specific antidote to snake venom.
* Immediate treatment of snake bites include:
* Administration of Antivenom and tetanus toxoid.
* Administration of antibiotics and (non-sedating) pain relief.
* Allaying of anxiety
* Management of shock or haemorrhage
* Wound stabilization

**Available antisnake venoms preparations, schedule and route of administration**

* Normally available are the polyvalent purified enzymes prepared from several snake venoms, refined and concentrated.
* This should be given as early as possible, following the bite, to patients while also monitoring and managing:
* Systemic symptoms
* The spreading local damage (marked local or generalized swelling).
* Epinephrine (adrenaline 1:1000 solution) should always be drawn up in readiness before Antivenom is administered.
* N/B: Antivenom treatment always carries always carries a risk of severe adverse reactions e.g shock.

* **The Recommended MOH Procured 10-Valent Anti-snake Venom Preparation in Kenya Should Be Given Intravenously As Follows:**

1. An initial dose of 20ml (each vial has 10mls so, 2 vials) is infused in 250mls of 0.9% sodium chloride (normal saline) or 5% glucose solution (5% dextrose) at the rate of 1ml per minute.

N/B: - The dose of Antivenom given to a child a child is exactly the same as the adult dose irrespective of age or weight because children receive the same dose of the venom in any bite. However, care should be taken to prevent volume overload.

1. If the subject’s condition does not improve within two (2) hours after completion of the first infusion, then a second dose should be infused exactly as per the first dose.
2. Antivenom should never be injected intramuscularly as absorption is exceptionally slow and unreliable.
3. Tetanus toxoid vaccine should be administered to all victims of snake bites as a single intramuscular injection of 0.5mls.
4. Prophylactic broad spectrum antibiotics and metronidazole are advisable in cases of cytotoxic venoms.

N/B: - The MOH recommends that all snake bites are to be treated as poisonous and patients administered the higher valency antisnake venom available under strict supervision of a qualified clinician. Treatment of snake bites started immediately the patient presents to the health facility and arrangements started to move/refer the patient to a suitable higher level facility (Levels 4-6 i.e facilities with an intensive care unit) for further management.

1. **RABIES VACCINE**

* Human death from rabies can effectively be prevented by vaccination either pre-exposure vaccination or as part of post-exposure treatment.

**Pre-exposure vaccination**

* May be recommended for anyone at increased risk to rabies virus e.g Veterinarians and veterinary laboratory staff, animal handlers, wildlife officers and visitors to high rabies-enzootic areas.

**Post-exposure vaccination**

* The indication for post-exposure vaccination, with or without rabies immunoglobulin depends on the type of the contact with rabid animal. There are three types of contact:

**Category I:** Touching or feeding a suspected animal, licks on the skin.

**Category II:** Nibbling of the uncovered skin, minor scratches or abrasions without bleeding, licks on the broken skin.

**Category III:** Single or multiple trans-dermal bites or scratches, contamination of mucous membrane with saliva from licks.

* No treatment is needed for category 1 type of contact. Immediate vaccination is needed for category 2 and vaccination and immunoglobulin administration is recommended for category 3.

**Vaccine Preparations**

* There are 3 types of rabies vaccine licenced for use in Kenya, namely:

1. Purified chick embryo cells (PCEC vaccines), a rabies virus cultured on chick embryo fibroblasts and inactivated by B-propiolactone. It is available as 2.5I.U in 1ml ampoule.
2. Human diploid cells vaccine (HDCV) is purified lyophilized inactivated rabies virus grown in human diploid cell culture. Vials contain a single dose of 2.5I.U suspension in 1ml diluents.
3. Purified Vero Cell Rabies Vaccine (PRVR) is vaccine produced on continuous heteroploid cell line and inactivated using beta-propiolactone.

**Storage:** Between +2 to +8 degrees C.

**Administration and dosage:** Must always be with reference to the specific vaccine manufacturer’s instruction and given in two circumstances:

* Pre-exposure prophylaxis-primary prophylaxis (using Vero cell derived vaccine).5mls intramuscular in the deltoid muscle on days 0, 7 and 28 (3 doses) followed by a booster dose after 1 year.
* Post-exposure prophylaxis (using Vero cell derived vaccine). For persons previously immunized within the last 3 years- Give 2 booster doses on day 0 and 3 intramuscularly in the deltoid muscle. Non-immunized persons-give 5 doses of 0.5mls each on days 0, 3, 7, 14, 28 by intramuscular injection into the deltoid muscle in adults or the antero-lateral aspect of the thigh in children.

**N/B: -** If post-exposure treatment must be given to immunocompromised individuals, HIV positive persons, people under malaria chemoprophylaxis or people under anaesthesia, intramuscular vaccine and rabies immunoglobulin are mandatory and their antibody responses should be monitored serologically.

**MOH RECOMMENDATIONS**

* It has been shown that vaccination of 80% of dogs is sufficient to break the canine transmission chain.
* Efforts to eliminate rabies must involve vaccination of the animal hosts, mainly dogs. This implies control of the dog population, vaccination of stray dogs using bait and traditional routine vaccination of domesticated dogs.
* Persons who are previously immunized get 2 doses on day 1 and day 3, and for new cases not previously vaccinated they should get 5 doses on days 0, 3, 7, 14, and 28.

N/B: The dose of anti-rabies vaccine given to a child is exactly the same as the adult dose irrespective of age or weight because children receive the same dose of rabies virus in any bite.

* ALL reports of animal bites must be forwarded to the nearest office of the Department of Veterinary Services or Kenya Wildlife Services.