Prevention of Rabies in Humans

Rabies is **100% fatal** but also **100% preventable** with prompt and complete post-exposure prophylaxis (PEP). **All** animal bites, scratches and licks must be assessed for potential **rabies virus exposure.**

Exposure Risk Assessment

- All animal exposures must be assessed for potential rabies virus exposure and whether rabies PEP is required
- The assessment is based on behavior and health status (including rabies vaccination history) of the animal, animal species and geographical location where the animal is from/exposure occurred
- High risk rabies incidents may include:
  - Unprovoked animal attack
  - Animal with unusual behavior e.g. domestic animals becoming aggressive or wild animals appearing "tame"
  - Animal sick e.g. drooling, wobbling/unsteady gait, snapping at imaginary objects
  - Animal having died within 2 weeks after the human attack
- **If the incident suggests potential rabies virus exposure, give rabies PEP, see below.**

Notes

- There are **NO blood tests** to confirm or exclude rabies virus transmission from animal to human at the time of exposure Decision to provide PEP based on risk assessment
- If, vaccination history of animal is unreliable, provide PEP
- Do not delay PEP pending laboratory confirmation of rabies in an animal – there might be unforeseen delays. PEP maybe discontinued if animal deemed rabies negative
- PEP must be given **as soon as possible** after the exposure for best protection
- PEP must be given even if there was a delay in presenting to health facility
- No alteration to recommended PEP schedule advised **DAY 0 = DAY OF FIRST VACCINATION**
- All animal bites are notifiable to local authority + the State Veterinarian

Management of Patient Exposed to Potentially Rabid Animal

General wound management is **critical** in all patients:

- Flush well with soap and water for at least 10 minutes, then clean with 70% alcohol solution. Apply iodine solution or ointment
- Avoid or delay suturing (where possible) and use of local anesthetic agents (may potentially spread the virus locally). If suturing required, first infiltrate rabies immunoglobulin (RIG)°, allow to diffuse in an around the tissues of the wound site for as long as possible
- Provide antibiotics e.g. amoxicillin clavulanate
- Provide tetanus vaccination/booster

Further management depends on category of exposure and previous vaccination history of patient:

+ Provide rabies vaccine, see schedule

° Provision of RIG in category 3 exposures is critical, see details for administration

Rabies Immunoglobulin (RIG)

Indication: All category 3 exposures (and category 2 exposure if patient is immunocompromised)

- Each 2ml ampoule contains 300 IU of RIG. Dose: 20 IU/kg, e.g. calculate for each patient per weight of the patient
- Infiltrate RIG in and around wounds, giving as much as anatomically possible without compromising blood supply (especially for extremities)
- If multiple wounds, dilute RIG in sterile saline and infiltrate all wounds
- Inject any remaining RIG into deltoid in the arm that was not used for vaccine administration in adults, and anterolateral thigh that was not used for vaccine administration in infants (<2 years)
- Give RIG at same time as vaccine administration and as soon as possible after exposure for best protection
- If RIG is not immediately available, it should be sourced and administered within 7 days after the first dose of rabies vaccine was provided. If RIG cannot be sourced and administered within 7 days after the first vaccination it should not be provided. RIG provides immediate virus neutralizing effect to prevent the spread of the virus to the peripheral nerves. Production of such antibodies follows only 7-10 days after administration of vaccine. After day 7, RIG is contraindicated because it may compromise the patient's adaptive immunity to the vaccination series
- For category 3 mucous membrane exposures apply full dose of RIG in deltoid muscle of the arm that did not receive the vaccine
- For patients with partially or completely healed wounds (e.g category 3 exposure with delayed presentation) provide RIG in and around healed wound site/s and remaining RIG in deltoid muscle of the arm that did not receive the vaccine

Categories of Exposure

Category	Description	Action
1	Touching or feeding animal Licking intact skin	No action if history of exposure is reliable If history of exposure is not reliable treat as category 2
2	Nibbling of uncovered skin Superficial scratch without any bleeding	Full course of rabies vaccine+ RIG NOT REQUIRED
3	Bites or scratches penetrating skin or drawing even a drop of blood Licking of mucous membranes e.g. eyes and mouth Licking of broken skin or abrasions Bat bites or scratches (these may be very small and not obvious)	Full course of rabies vaccine+ AND RIG° RIG CRITICAL IN THESE EXPOSURES TO IMMEDIATELY NEUTRALIZE THE VIRUS AS VACCINE IMMUNITY MAY TAKE 7 DAYS OR MORE TO DEVELOP

+ Rabies Vaccine

Indication:	Schedule:	Intramuscular	**INEFFECTIVE IF GIVEN IN GLUTEUS MAXIMUS (Buttocks)**	Dose:
Category 2 and 3 exposures	FOUR doses administered intramuscularly on days 0, 3, 7, 14 (Day 0=day of first vaccination)	injection in deltoid muscle in adults, anterolateral thigh in infants (<2 years)		1 amp per dose for adults and children

Special Groups

- **Immunocompromised patients**

  In category 2 and 3 exposures:
  Give RIG and 5 doses of vaccine (day 0, 3, 7, 14 & 28)

- **Pregnant women & children**

  No contraindication to vaccine or RIG

- **Individuals at high risk (e.g. continual or frequent) for rabies virus exposure (e.g. veterinarians)**

  Provide pre-exposure vaccination comprising 3 doses of vaccine administered intramuscularly in deltoid muscle (day 0, 7, 21 or 28)

- **Previously rabies vaccinated individuals**

  If a patient had three or more rabies vaccines in the past, then give two booster doses on days 0 and 3 post-exposure (but NO RIG). Adequate booster responses have been shown in patients up to 20 years after initial vaccination

Factors to Consider for Risk Assessment

Animal Species

Commonest animal source for human rabies in SA

Dogs | Mongoose | Cats | Jackal | Cattle and goats

(the leading source, > 80 % of human rabies cases associated with dog exposures)

No risk

Birds | Reptiles

Unlikely risk

Mice and rats | Squirrel | Hyrax (commonly known as "dassie")
Baboons/Monkeys*

* **Baboons and monkeys** commonly bite with little provocation. To date, in South Africa there have been no human rabies cases associated with baboons/monkeys

Bats are a uncommon source of human rabies, associated with rabies-related viruses only. Bites or scratches may be very small and not obvious. See below, examples of category 3 exposures

Animal Health

If the animal has died or is sick this increases the likelihood of rabies

Typical rabies symptoms include

Dogs: aggression, drooling, wobbling, snapping at imaginary objects, muscle paralysis

Cats: aggression, uncoordinated, frothing, abnormal vocalisation and response to owners

Cattle and goats: choking ("bone in the throat"), knuckling of fetlocks and hind-quarters

Wild animals: may lose fear of humans. Mongoose tend to be more tame

If the patient presents more than 14 days after exposure, and the animal is still alive and healthy, then risk of rabies exposure is very low

Animal Behaviour

Factors which indicate higher risk of exposure:

Unprovoked attack

- The animal has bitten multiple people
- Domestic animal being unusually aggressive, wild animal appearing "tame"

Note: Teasing an animal, trying to take an animal's food or guard dog attacking an unfamiliar person entering their territory are provoked attacks

Geography

Consider the local occurrence of rabies and origin of animal if known

South Africa is endemic for rabies and several hotspots for transmission exists

Contact State Veterinarian for geographical risk assessment if not known

Examples of Category 3 Exposure

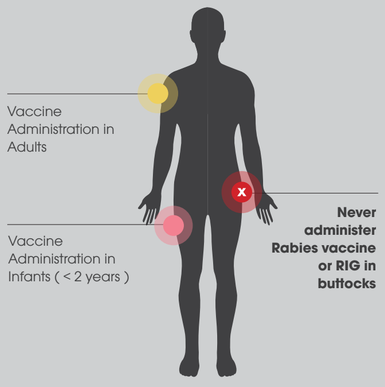
Wounds do not have to be large or bleed profusely to be considered as category 3. A single drop of blood drawn from the wound indicates a category 3 exposure. For example, bat bites are usually only small, deep puncture wounds without overt bleeding (see far left)

Category 2 exposures imply a superficial scratches or nicks with no break in the skin or bleeding

Wound Management and Administration Technique

Step 1
Thoroughly clean the wound for at least 10 minutes with soap and water, then clean with 70% alcohol solution. Apply iodine solution if available

Step 2
Category 3, infiltrate RIG in & around wound as much as possible. Remaining RIG administrated to deltoid that did not receive the vaccine in adults or anterolateral thigh in infants (<2 years)



Step 3
Administer vaccine by intramuscular injection into deltoid muscle in adults and anterolateral thigh in infants (<2 years). Give further doses as per PEP schedule

Avoid or delay suturing (where possible) and use of local anesthetic agents (may potentially spread the virus locally)

Other Considerations

Supply of RIG and Rabies Vaccine

Procedures should be in place to ensure continuous access to supplies of vaccine and RIG (either local stocks or robust referral systems)

Provincial Department of Health should be contacted if there are any difficulties in sourcing RIG

Non-compliance:

It is critical to follow the protocol

Ensure compliance with follow-up vaccines

Non-compliance to rabies PEP protocol may lead to human rabies death

A human rabies death constitutes a public health system failure so it is important to confirm all suspected rabies cases and to investigate reasons for the failure

health
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