National Guideline for Animal Bite Management in Bangladesh 2021

Zoonotic Disease Control Program

Communicable Disease Control (CDC)
Directorate General of Health Services (DGHS)
Mohakhali, Dhaka-1212
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh

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3rd Edition

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MESSAGE

Rabies is a deadly viral disease and the death rate of this disease is 100%. One person dies every ten minutes globally, and approximately 59,000 people die of rabies every year. Although the number of rabies patients has increased worldwide, especially in Asia and Africa, the number of patients is gradually decreasing in Bangladesh.

The Awami League government has been working relentlessly since 2009 to bring healthcare to the people's doorsteps. We have taken substantial steps to develop sustained elimination strategies for Communicable Diseases, which has advanced the overall improvement scenario of the country's health sector. To put the forward motion of elimination, Rabies control and elimination centre have been set up in each district hospital of Bangladesh to ensure health care for rabies among the rural population. All of these centers are provided with free dog bite vaccines.

We are implementing various activities to create awareness among the people and assure required medical facilities to prevent and cure rabies. All member countries of the World Health Organization, including Bangladesh, have agreed to work together to eliminate rabies from the world by 2030. The government is implementing a national rabies elimination program intending to eliminate rabies from the country by 2023.

I am expressing my utmost optimism that this guideline will play a pivotal role in the Rabies Elimination program and serve as an all-inclusive guideline for the health workers in our country.

Joy Bangla, Joy Bangabandhu

Long live Bangladesh.

Zahid Maleque, MP
Hon'ble Minister
Ministry of Health and Family Welfare

Bangladesh Secretariat, Dhaka

MESSAGE

The government of Bangladesh is committed to ensuring universal access to health care. SDG implementation plays a paramount role in achieving sustained development in the health sector, and Rabies elimination is an essential goal of the SDGs.

Father of the Nation Bangabandhu Sheikh Mujibur Rahman had provisioned one of the responsibilities of the state to ensure necessary health care and nutrition services for citizens of Bangladesh according to the 1972 constitution. In the realization of that dream, under the visionary leadership of the Hon'ble Prime Minister of the Government of the People's Republic of Bangladesh, the continuous development of health services in the country is becoming a role model worldwide. We know that rabies is a contagious disease, and the prevalence of this disease is highest in Asia and Africa.

With SDGs implementation in motion, various effective measures have been taken in Bangladesh since 2011 to eliminate rabies. After dog bites, proper medical care and vaccine are administered nationwide free of cost. In addition to raising public awareness, dog vaccination programs are being implemented across the country, which has resulted in a reduction in the incidence of the disease.

Certainly, this guideline will effectively assist all health workers in advancing Rabies Elimination in the health sector of our country.

Lokman Hossain Miah
Senior Secretary
Department of Health Services
Ministry of Health and Family Welfare
Bangladesh Secretariat, Dhaka

MESSAGE

Rabies is a vaccine-preventable viral zoonotic disease responsible for an estimated 59,000 human deaths every year across the world. All warm-blooded mammals are susceptible to the rabies virus (RABV) infection. Transmission of RABV by dogs is responsible for up to 96% of human rabies cases in rabies-endemic regions. Rabies remains endemic in Bangladesh and has high public health importance. Every year estimated 3-4 lacs of people in Bangladesh are bitten by dogs and other animals. Rabies is a deadly viral disease but 100% preventable. Bangladesh has made significant progress in preventing human deaths due to rabies in the last ten years. Vaccinating dogs is the most cost-effective strategy for preventing rabies in people. Dog vaccination reduces deaths attributable to dog-mediated rabies and the need for post-exposure prophylaxis, which is part of dog-bite patient care. On the other hand, another essential strategy to prevent human death from rabies is to provide appropriate animal bite management to all animal bite victims.

I sincerely hope that this guideline will support to guide the health workers in the prevention and management of rabies. This will ensure the uniform provision of post-exposure prophylaxis to all those who need it. The government of Bangladesh is conducting different interventions to comply with the global strategic plan of zero death from dog-mediated rabies by 2030. The government has been implementing various strategies by collaborating with the Directorate General of Health Services (DGHS), The Local Government, and the Department of Livestock Services (DLS). Therefore, Communicable Disease Control (CDC) has been supplying Anti Rabies Vaccine (ARV), Rabies immunoglobulin (RIG) to health facilities, and providing orientation to health workers about rabies vaccination. I hope the guideline will assist healthcare professionals in practicing properly and ensuring uniformity in the indication and use of ARV and RIG.

Finally, I would like to express my sincere gratitude to the experts and the colleagues who have actively initiated and finalized the 3rd edition of the guideline.

Prof. Dr. Abul Bashar Mohammed Khurshid Alam
Director General
Directorate General of Health Services (DGHS)
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh

MESSAGE

Rabies is one of the oldest and most terrifying diseases known to mankind. But it is 100% preventable with appropriate vaccination and adequate management. Before 2010, more than 2000 rabies related deaths were estimated in our country. Domestic dogs (87%) were found to be the single most important animal reservoir followed by cats (11%) and jackals (2%) in a recent study. There is an estimated 1.6 million dog population with around 3-4 hundred thousand human cases and around 50 thousands cattle exposures annually. Bangladesh has started the program from 2010, aiming elimination of rabies from the country by 2023. To eliminate rabies, two critical components must be in place: prompt effective post-exposure prophylaxis and Mass Dog Vaccination (MDV).

Program for Zoonotic Diseases has undertaken National Rabies Elimination Program (NREP) of Communicable Disease Control (CDC) under the 4th HPNSP to phase out rabies transmission throughout the country. The strategy of the National Rabies Elimination Program consists of Advocacy, Communication and Social Mobilization (ACSM), Animal Bite Management (ABM), Mass Dog Vaccination (MDV), Dog Population Management (DPM) and Surveillance and Research. Active surveillance is being rolled out through 67 centers in 64 districts along with 110 Upazila Health Complexes providing free intra-dermal rabies vaccine and Rabies Immunoglobulin (RIG) by trained physicians and health care professionals while ACSM and ABM have continued, MDV was first piloted in Bangladesh in November 2011 in Cox's Bazar. Upon successful piloting, more comprehensive campaigns of MDV were scaled up throughout the country. According to the updated WHO guideline and latest scientific evidences, the National Guideline for Animal Bite Management in Bangladesh has been reviewed with expert consultation.

I would like to express my heartfelt gratitude and thanks to the contributing members, experts, partners, and stakeholders for their active participation and involvement in the development of this guideline.

Prof. Dr. Md. Nazmul Islam
Director, Disease Control & Line Director, CDC
Directorate General of Health Services (DGHS)
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh

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The Zoonotic Disease Control Program, Communicable Disease Control Unit of Directorate General of Health Services is gratefully acknowledging the contributions of Infectious Disease Hospital (IDH), Institute of Public Health (IPH), Institute of Epidemiology, Disease Control and Research (IEDCR), National Institute of Preventive and Social Medicine (NIPSOM), and National Institute of Neurosciences and Hospital (NINS) for their resources in the preparation and finalization of this updated version of national guideline.

Best complements with thanks to the committee members who worked a lot in completion of this national document.

Editorial Board

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Abbreviations and Acronyms

ABM	:	Animal Bite Management
ACSM	:	Advocacy, Communication and Social Mobilization
ARV	:	Anti-Rabies Vaccine
BITID	:	Bangladesh Institute of Tropical and Infectious Disease
BSL	:	Biosafety Levels
CCV	:	Cell Culture Vaccine
CDC	:	Communicable Disease Control
CNS	:	Central Nervous System
CSF	:	Cerebrospinal Fluid
DBM	:	Dog Bite Management
DG	:	Directorate General
DGHS	:	Directorate General of Health Services
DLS	:	Department of Livestock Services
DPM	:	Deputy Program Manager
DRIT	:	Direct Rapid Immunohistochemical Test
DRPCC	:	District Rabies Prevention and Control Center
EPI	:	Expanded Program on Immunization
ELISA	:	Enzyme-linked Immunoassay
ERIG	:	Equine Rabies Immunoglobulin
FAO	:	Food and Agriculture Organization
FAT	:	Fluorescence Antibody Test
FAVN	:	Fluorescence Antibody Virus Neutralization
GARC	:	Global Alliance for Rabies Control
HRIG	:	Human Rabies Immunoglobulin
ID	:	Intra-dermal
IEDCR	:	Institute of Epidemiology, Disease Control and Research
IFA	:	Indirect Immunofluorescence
IHC	:	Immuno-histochemistry
IM	:	Intra-muscular
MDV	:	Mass Dog Vaccination
MIT	:	Mouse Inoculation Test
NREP	:	National Rabies Elimination Program
NRPCC	:	National Rabies Prevention and Control Center
NTV	:	Nerve Tissue vaccine
OP	:	Operational Plan
PEP	:	Post-exposure Prophylaxis
PrEP	:	Pre-exposure Prophylaxis
RFFIT	:	Rapid Fluorescent Foci Inhibition Test
RIG	:	Rabies Immunoglobulin
RNA	:	Ribonucleic Acid
RTCIT	:	Rabies Cell Culture Inoculation Test
RT-PCR	:	Reverse Transcription Polymerase Chain Reaction
TCV	:	Tissue Culture Vaccine
TT	:	Tetanus Toxoid
URPCC	:	Upazila Rabies Prevention and Control Center
WHO	:	World Health Organization
ZDCP	:	Zoonotic Disease Control Program

1. Introduction

Rabies is a fatal viral disease. Globally, every year many people and livestock die of this disease and so is also Bangladesh is ranked third in the world list for rabies infection. Since 2010, the Government of Bangladesh has priorities the 'Rabies Control' as an important program. A joint initiative of the Ministry of Health and Family Welfare, Ministry of Fisheries and Livestock and Ministry of Local Government and Rural Development started 'Rabies Control' activities from 2011 and prepared a 'National Strategy Paper' on rabies control and developed a roadmap for its implementation by 2023 with the commitment to 'Rabies free Bangladesh'. The Communicable Disease Control (CDC) under the Directorate General of Health Services (DGHS) is working diligently to implement this roadmap and moving forward to eliminate rabies from Bangladesh by 2030. In pursuance of this, with the achievement of the UN-approved Sustainable Development Goals (SDGs) 3.3, the DGHS has been continuing its efforts under the 'National Rabies Elimination Program' in 2010 of the Zoonotic Disease Control Program. Strategies adopted for successful implementation of rabies elimination program includes:

1. Advocacy, Communication and Social Mobilization (ACSM)
2. Animal Bite Management (ABM)
3. Mass Dog Vaccination (MDV)
4. Dog Population Management (DPM)
5. Surveillance and Research

In 2013, the Technical Working Group and the National Steering Committee were formed to provide technical and ethical support from the highest level of government for the immediate and successful implementation of these strategies. CDC has set up one 'National Rabies Prevention and Control Center' (NRPCC) at Infectious Disease Hospital (IDH) at Mohakhali, Dhaka and 64 'District Rabies Prevention and Control Center' (DRPCC) at all District Sadar Hospitals as well as one in Bangladesh Institute of Tropical and Infectious Disease at Chittagong and 105 'Upazila Rabies Prevention and Control Center' (URPCC) at Upazila Health Complex to Ensure modern management of animal (dog, cat, fox, mongoose, monkey

etc.) bite victims by washing the affected area, with soap and running water for 15 minutes and Anti-Rabies Vaccine (3-times in 7-days, 6 doses with regimen of '2-2-2-0-0')1 provided by well-trained health care providers. The use of Rabies Immunoglobulin (RIG) administration is determined according to the category of exposure (category III). Physicians, staff nurses, EPI technicians, statisticians, storekeepers, health inspectors, assistant health inspectors and many more officers and employees of all District Sadar Hospitals and Upazila Health Complexes across the country are trained. They can provide modern medical management to the clients after scratch/bite of dogs and other animals.

Significant progress has been made last 10 years after the start of the rabies control program with the active engagement of the Department of Livestock Services and Local Government and the initiative of the DGHS. The number of rabies-related deaths across the country is rapidly declining as the application of modern medical management has been expanded and used after the scratch/bite of dogs and other animals to prevent rabies in humans, led by the DGHS. In 2009, the number of human deaths due to rabies in Bangladesh was estimated at more than 2000. The number of deaths has gradually decreased to 26 in 2020 due to the adoption and effective implementation of the 'National Rabies Elimination Program' since 2010 with the start of the cell culture vaccine.

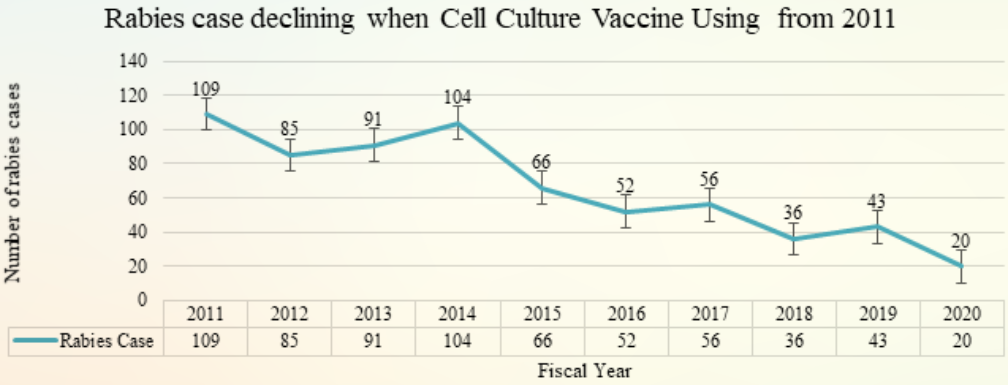


Fig. 1: Rabies cases in Infectious Disease Hospital (2011-2020)

As per necessity for the 'National Rabies Elimination Program', the capacity of the Zoonotic Disease Control Program of the Disease Control Division of the DGHS has been strengthening many ways. This exceptional progress of the 'National Rabies Elimination Program' in Bangladesh in a short period has come a long way in building a rabies-free Bangladesh and this achievement is being welcomed and praised not only in our country but also in the regional and international arena.

In 2012, more than 120,000 patients were vaccinated free of cost, which increased to 25,361 in 201. In the fiscal year 2020-21, CDC provided 101

vaccinations to all District Sadar Hospitals, BITID Hospital, Chittagong and Infectious Disease Hospital Mohakhali. According to the Upazila Health Complex demand, Anti-Rabies Vaccine (ARV) and Rabies Immunoglobulin (RIG) are being provided as part of the Government of Bangladesh program. Dogs are the primary carriers of rabies in Bangladesh, more than 90%. Thus, it is possible to keep humans and other animals safe by preventing rabies in dogs. Countries and regions scientifically vaccinate 70 percent of dogs against rabies on a large scale, creating herd immunity. If three rounds of rabies vaccine are correctly given in the subsequent 3 years, it is possible to get rid of rabies in that area. In the light of this idea, from the beginning of the 'National Rabies Elimination Program' in Bangladesh, that is, from 2012-13, the Mass Dog vaccination program started, and it is still going on. With the active support and cooperation of the Department of Local Government, Directorate of Livestock Services and Zoonotic Disease Control Program under CDC about 21,37,739 dogs have been vaccinated against rabies under the 1st round in 64 districts, 2nd round in 16 districts and 3rd round in 6 districts.

2. Epidemiology

2.1 Causative agent

- Rabies virus (RNA enveloped) under rhabdovirus family.
  - Susceptibility of the virus to physical and chemical agents:
    - Destroyed rapidly by soap, detergents, alcohol, oxidizing agents, ammonium compounds, proteolytic enzymes, ultraviolet rays and X-rays
    - Highly resistant to cold and dryness
      - Survive 35 seconds at 60^0C, 4 hours at 40^0C, 1-2 weeks in brain tissue at room temperature, several days at 0 to-4^0C

2.2 Distribution

Global:

The number of human deaths globally due to dog-mediated rabies is estimated to be 59 000 annually, with an associated loss of 3.7 million DALYs.2 The majority of deaths are estimated to have occurred in Asia (59.6%) and Africa (36.4%) and most DALYs were due to premature death (>99%) and a few to adverse events after administration of nerve tissue vaccines (0.8%). The overall economic cost of dog-mediated rabies was estimated in a probability decision-tree model to be US$ 8.6 billion (95% confidence interval, 2.9–21.5 billion).2 An enhanced verbal autopsy survey within the Million Deaths Study suggested that 12 700 deaths (95% confidence interval, 10,000–15,500 were due to furious rabies in India in 2005. The survey did not include cases of paralytic rabies.3

In Bangladesh

A recent study showed that there are a high number of rabies deaths in males when compared to females. Almost half the deceased was under the age of 15 (47%) and 82% rabies victims from rural areas and 88 % of the case died in home.4 Annually, there are 2-3 lacs animal bite cases reported and Bangladesh has current figure an estimated dog population 1.7 million of which 83% are a stray dog.[5]

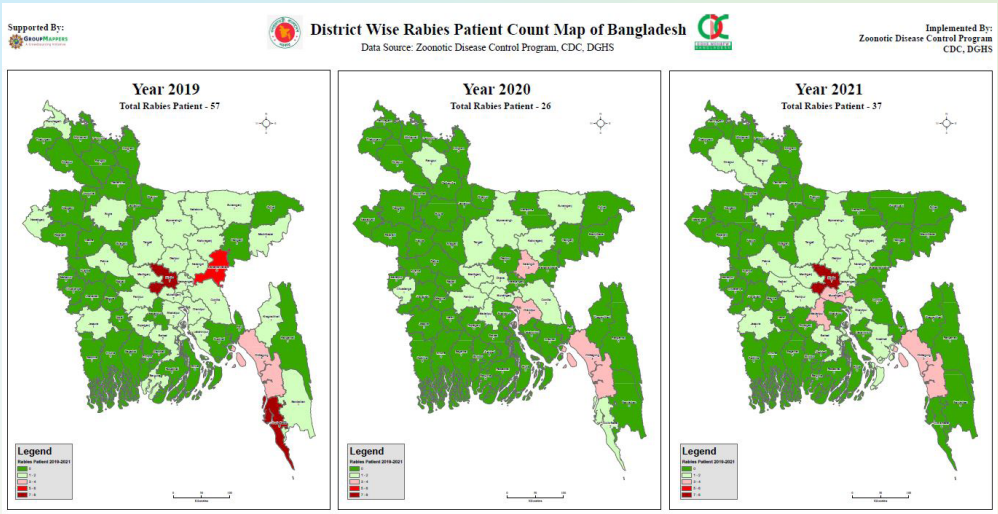


Fig. 2: District wise Rabies case density in Bangladesh of consecutive 3 years (2019- 2021)

2.3 Reservoir / Source of Infection

Rabid canine animals include mostly Dog; in very few cases other animals are Cat, Fox, Jackal, Mongoose, Monkey and other Wild-animals.

2.4 Transmission

- Commonly by contaminated saliva of rabid animal and gains entry into the human body by the animal bite or scratch or through an open wound.
- More than 95% of human cases are acquired from a rabid dogs.
- In rare cases: contamination of mucus membranes with saliva or brain tissue, aerosol transmission, and corneal/organ transplantation.
- Casual contact with a rabid case (e.g., by touching a case with rabies) or contact with non-infectious fluids or tissue (e.g., urine or feces) does not alone constitute an exposure.
- Viruses are not present in the blood (no viremia). Therefore, contact with blood or blood products is not responsible for virus transmission.

2.5 Incubation Period

The incubation period varies from 5 days to several years (usually 2–3 months; rarely more than 1 year), depending on the amount of virus in the inoculum, the density of motor endplates at the wound site and the proximity of virus entry to the central nervous system.6-7

The incubation period depends on factors inclusive of:

1. Location and severity of bite wound
2. The amount of virus inoculated within the wound
3. Degree of innervations at the site of the bite wound

3. Pathogenesis

When rabies virus has been introduced into a wound or onto a mucous membrane, it first multiplies at the site of inoculation. The virus will gain access to the peripheral nervous system to migrate and ascend to the central nervous system.[8]

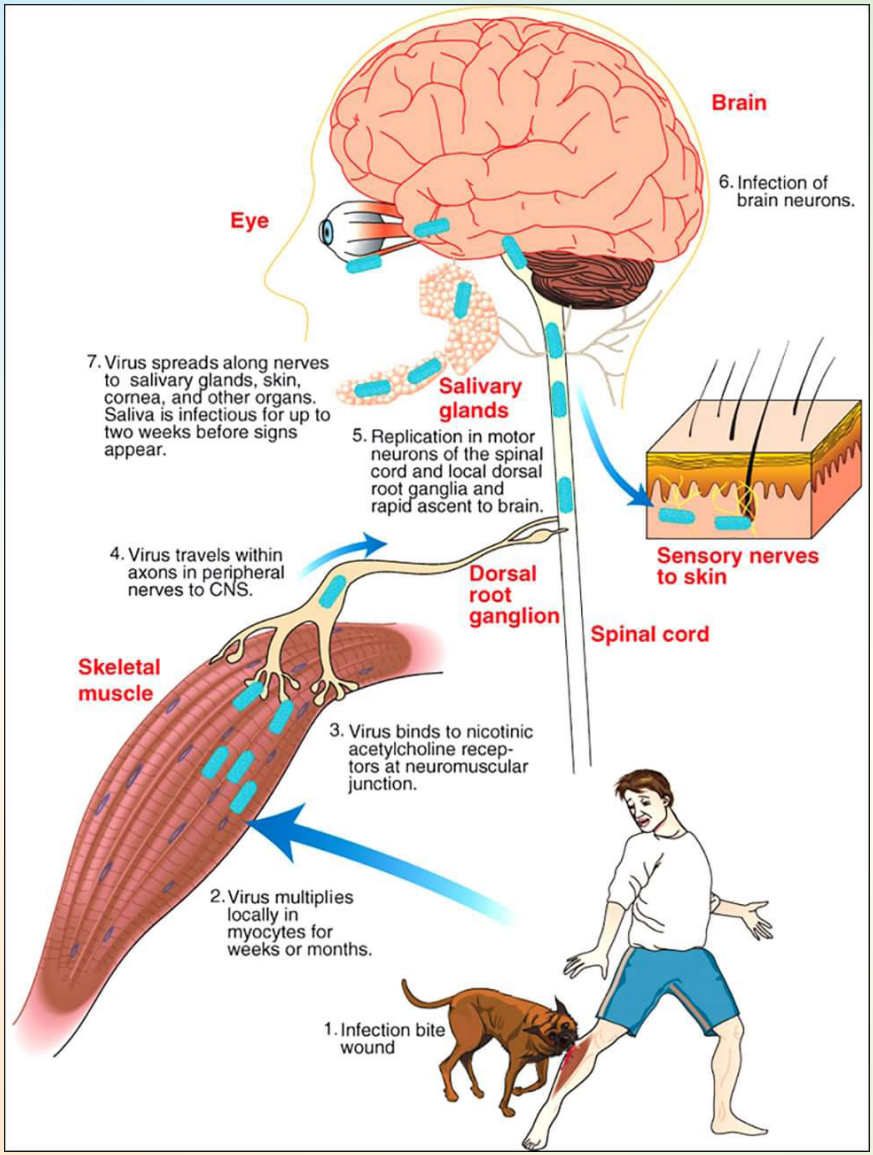


Fig. 3: Pathogenesis of rabies virus infection

4. Clinical Presentation

Prodromal Syndrome: Pain, Itching, Tingling sensation and numbness at the site of wound in association with fever, malaise, headache, nausea, vomiting and myalgia

Classic Rabies (furious form) Manifestations:
Furious rabies accounts for approximately 80% of the total number of human cases; manifesting as signs of-

- Delirium with alternating periods of calm i.e., Altered Behavior, Hallucinations, Incoordination
- **Aerophobia**
- **Hydrophobia** during attempts at drinking due to extremely painful laryngeal spasms
- **Photophobia**
- Excessive salivation, Aggression, Hyperactivity periods of agitation alternating with lucidity
- After a few days, the infection invariably leads to coma and death by cardio-respiratory arrest.[9]

Paralytic or Dumb Form (less common):

An acute, ascending paralysis resembling Guillain-Barre syndrome predominates with initially relative sparing higher cortical functions.[9]

Paralytic (or dumb) rabies accounts for approximately 20% of the total number of human cases.

This form of rabies runs a less dramatic but longer course than the furious form. There is flaccid muscle weakness in the early onset of infection, starting at the bite or scratch site, followed by gradual paralysis. The development of coma generally precedes death by respiratory failure. The paralytic form of rabies is often misdiagnosed, contributing to the underreporting of the disease.

Both forms progress relentlessly to coma, autonomic nervous system dysfunction, and death despite intensive support.

Fatality after the onset of manifestation is 100%.

5. Management

5.1 Pre-exposure prophylaxis:

Pre-Exposure Prophylaxis (PrEP) is a course of rabies vaccination administered to protect a person from getting rabies before exposure to a rabid (or suspected rabid) animal/any other mode of exposure to the rabies virus.

- Inj. Anti-Rabies Vaccine (ARV)
  - **Intradermal:**
    Dose: 0.1ml/ dose at 2-sites, 2-0-2-0-0 at 2 site for 2 doses on Day 0 and Day 7
  - **Intramuscular:**
    Dose: 1 vial 1-0-1-0-0 at a 1 site for 1 dose on Day 0 and Day 7

Indication: Service providers in Rabies case management, laboratory professionals and caregivers for infected dogs and humans.

Table 1. WHO recommended PrEP vaccination schedules using the intramuscular (IM) or intradermal (ID) regimen.[1]

Dose	Route	Duration	No. of injection sites per clinic visit (0, 3, 7, 14, 21-28)	Sites
0.1 ml each site	Intradermal ID-RV	1 week ▪ Day 0 ▪ Day 7	2-0-2-0-0	Deltoid Region of the arm of adults.
1 vial (1 ml)	Intramuscular IM-RV	1 week ▪ Day 0 ▪ Day 7	1-0-1-0-0	Anterolateral area of the thigh is recommended for children (<2 yrs.)

5.2 Post-Exposure Prophylaxis:

Post-exposure prophylaxis (PEP) consists of a dose of human rabies immunoglobulin (HRIG) and rabies vaccine given on the day of the rabid (or suspected rabid) animal exposure or as soon as possible, and then a course of vaccination given again as per schedule.

As per WHO recommendation, post-exposure prophylaxis measures

should be taken according to the category of exposure/wound as follows:

Table 2: Category of exposure/wound and recommended measures (WHO customized for Bangladesh, Annex 1).[1]

Category	Type of contact	Recommended treatment
I	▪ Touching or feeding of animals ▪ Licks on intact skin	▪ Wash the site with soap and water only
II	▪ Minor scratches or abrasions without bleeding	▪ Wound management ▪ Anti-Rabies vaccine (ARV) as soon as possible on 1st visit
III	▪ Single or multiple transdermal bites or scratches with active bleeding ▪ Licks or broken skin, contamination of mucous membrane with saliva (i.e. licks) ▪ Exposure to bats *	▪ Wound management ▪ Administer Anti-Rabies vaccine immediately ▪ Administer rabies immunoglobulin (RIG) and ▪ Prophylactic antibiotics if required ▪ Anti-tetanus vaccination if required

Fig. 4: Category II

Fig. 5: Category III

Fig. 6: Category III

5.2.1 Management of animal bite wound

- **Wound care:**
  - Should be immediate, is essential even if the person presents long after exposure.
  - Wash thoroughly (immediate washing and flushing) with soap and running water for 15 minutes, followed by an iodine solution (aqueous solution).
  - Keep wound open
  - Bleeding at any wound site indicates potentially severe exposure and must be infiltrated with either human or equine rabies immunoglobulin.
  - Avoid using a bandage or stitch to the wound.

Fig. 7: Washing with soap for 15 minutes

Fig. 8: Washing with soap for 15 minutes with running tap water

5.2.2 Active immunization with CCV

- **Intradermal (ID) vaccine regimen:**

Dose of IDRV and sites of administration:

0.1ml of reconstituted vaccine is administered per ID site. 0.1ml is injected into the upper layer of the skin over the deltoid area of one arm. Similarly, 0.1ml is injected into the other arm. The common site of injection is the deltoid (upper arm). The other sites recommended for IDRV administration are the suprascapular region and the lateral part of the thigh.

Table 3: WHO recommended PEP vaccination schedules using the intradermal (ID) regimens.[1]

Dose	Route	Duration	No of injection sites per clinic visit (0, 3, 7, 14, 21-28)	Sites
0.1 ml each site	Intradermal (ID)	1 week ▪ Day 0 ▪ Day 3 ▪ Day 7	2-2-2-0-0	Deltoid region (above 2 yrs.) Or Antero-lateral thigh (if ≤ 2 yrs.)

* Day 0 is the first day on which the first vaccine dose is administered.

- **Intramuscular vaccine regimen:**

  The currently available vaccines in Bangladesh for IM administration are described below. Vaccines are WHO approved Cell Culture Vaccines for IM use. Rabies vaccine should not be administered in the gluteal area, as an adequate immune response induction may be less reliable.

Table 4: WHO recommended PEP vaccination schedules using the intramuscular (IM) regimens.[1]

Dose	Route	Duration	No. of injection sites per clinic visit (0,3,7,14,21-28)	Sites
Entire vial (1 ml)	Intramuscular (IM)	14-28 days (Essen Regimen)	1-1-1-1-0 (4 Doses)	Deltoid Muscle Or Anterolateral thigh (if < 2 yrs.)
		21 days (Zagreb Regimen)	2-0-1-0-1	

5.2.3 Passive immunization: Rabies Immunoglobulin (RIG) (if required)

RIG should be administered to all people with category III exposure and those with category II exposure who are immune-compromised. Most of the new equine immunoglobulin (ERIG) preparations are potent, highly purified, safe and considerably less expensive than human rabies immunoglobulin. However, they are of heterologous origin and carry a small risk of an anaphylactic reaction. There are no scientific grounds

for performing a skin test before administering equine immunoglobulin because testing does not predict reactions. The treating physician should be prepared to manage anaphylaxis which, although rare, could occur during any stage of administration. The anti-rabies serum/rabies immunoglobulin (RIG) provides passive immunity in the form of a ready-made antibodies to tide over the initial phase of the infection.

Indication of RIG:

- All WHO-Category III exposures.
- Bites by all wild animals viz. by mongoose, jackal, fox etc.
- Category II exposures in immunocompromised/ immunosuppressed individuals, including HIV infected people & AIDS patients.

Two types of RIGs are available and recommended to use:

i. Equine Rabies Immunoglobulin (ERIG)

ERIG is of heterologous origin raised by hyper-immunization of horses. However, currently manufactured ERIGs are highly purified and the occurrence of adverse events has been significantly reduced.

Dose of rabies ERIG: The dose of equine rabies immunoglobulin (ERIG) is 40 IU per kg body weight the patient (up to a maximum of 3000 IU).

ii. Human Rabies Immunoglobulin (HRIG)

HRIG are free from the side effects encountered in a serum of heterologous origin (i.e. of animal origin), and because of their longer half-life (21 days), are given as dose of 20 IU/kg. HRIG is a homologous biological preparation. HRIG preparation is available in concentration of 150 IU/ml.

Dose of rabies HRIG: The dose of the human rabies immunoglobulin (HRIG) is 20 IU per kg body weight (maximum 1500 IU).

Administration of RIG:

The calculated dose of RIG should be infiltrated as much as possible into the anatomically feasible sites into and around the bite wounds. Multiple needle injections into the wound should be avoided. Any remaining volume of Rabies Immunoglobulin (RIG) should be indicated to rinse the exposure or wound sites. This procedure provides more effective than injecting the remaining Rabies Immunoglobulin (RIG) volume intramuscularly at a distance from the wound or exposure sites. Since RIG may partially suppress the active antibodies, no more than the recommended dose should be given.

Animal bite wounds inflicted can be severe and multiple or, especially in small children. In such cases (WHO Category III), the calculated dose of the rabies immunoglobulin may not be sufficient to infiltrate all wounds. In these circumstances, it is advisable to dilute the RIG in sterile normal saline to be able to permit infiltration of all wounds. RIG should never be administered in the same syringe (ARV & RIG together) or at the same anatomical site as a vaccine.

If RIG was not administered when the anti-Rabies vaccination started, it could be administered until the 7th (seventh) day after administering the first dose of the Anti-Rabies vaccine. Beyond the 7th (seventh) day, RIG is not indicated since an antibody response due to the anti-rabies vaccine is presumed to have occurred. Administration of Rabies Vaccine stimulates the production of neutralizing antibodies by the patient's immune system.

If the patient came several days or months late and the anti-rabies vaccine was not started, then RIG can be used (at bite site) in Category-III. But then attending physician will evaluate each case and do the necessary as required.

The rabies immunoglobulin (ERIG/HRIG) should always be brought to room temperature (20ºC – 25ºC) before use.

Management if anaphylactic reaction occurs:

The patient should be hospitalized for 24-48 hours for observation and management by:

i. Adrenaline: The dose is 0.5 ml of 0.1 percent solution (1 in 1000,

1mg/ml) for adults and 0.01 ml/kg body weight for children, injected intramuscularly (IM).

ii. Inj Hydrocortisone: 100 mg stat.
iii. Inj. Chlorpheniramine
iv. Inj. Ranitidine
v. Oxygen and others, as necessary management for anaphylaxis/ shock

The patient is sensitive to ERIG, then HRIG should be used (if possible). A patient who had prior exposure to antisera (e.g-Anti-tetanus, serum, anti-diphtheria serum) should receive a subcutaneous dose of Inj. Adrenaline (the requirement will be half dose of that required for treatment for anaphylaxis).

Tolerance and Side Effects:

i. There may be transient tenderness/redness at the injection site.
ii. Brief rise in body temperature.
iii. Skin reactions are infrequent.
iv. RIG must never be given intravenously since this could produce symptoms of shock, especially in patients with antibody deficiency syndromes.
v. Serum sickness may occur in 1% to 6% of patients, usually 7 to 10 days after injection of ERIG.
vi. Serum sickness is characterized by joint pain, proteinuria etc. It can be managed by non-steroidal anti-inflammatory drugs (NSAID) and H2 blockers.

Precautions to be taken while administering RIGs:

- ✓ All emergency drugs and facilities for managing any adverse reactions must be available.
- ✓ The RIG vial(s) taken out from the refrigerator should be kept outside for a few minutes before administration to the patient (to warm it to room/body temperature).
- ✓ RIG should be administered before starting anti-rabies vaccination.
- ✓ RIG should not be administered in the same syringe (ARV & RIG together) as the vaccine or at the same site as a vaccine.
- ✓ Pregnancy is not a contra-indication for RIG and anti-rabies vaccination when indicated.

- ✓ While infiltrating RIG into bite wounds, care must be taken to avoid injecting blood vessels and nerves. Anatomical feasibility must always be kept in mind while injecting RIG.
- ✓ While injecting into fingertips, care must be taken to avoid compartment syndrome.
- ✓ In small children with multiple bites, dilute RIG with Normal sterile saline if the volume is insufficient for infiltration in and around all wounds.
- ✓ Keep the patient under observation for at least two hours after ERIG administration and send it home.
- ✓ The treating physician should be prepared to manage anaphylaxis, which could occur at any stage of administration of ERIG.

Fig. 9: Administration of Intradermal vaccine ($\leq 15^0$ angle)

Fig. 10: Administration of Intramuscular vaccine (90^0 angle)

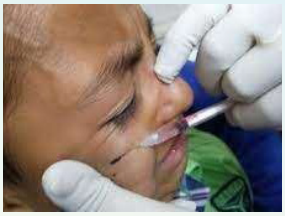


Fig. 11: Administration of RIG inside the border of the wound

5.2.4 Tetanus prophylaxis

Injection tetanus toxoid should be given to the un-immunized individual.

- ➢ Tetanus Toxoid (inj. Tetavax), IM
- ➢ TIG (Tetanus Immune-Globulin), IM if required

5.2.5 Antibiotics (Local/Topical & Systemic)

To prevent infection or sepsis in the wound, a suitable course of an antibiotic may be recommended.

Systemic/local antibiotics: Amoxicillin, Clavulanic acid, and Cloxacillin are recommended.

Table 5: Line of treatment with systemic antibiotics recommended for animal bites management.[10]

Adults	**First-line** • Amoxicillin/clavulanate, 500/125 mg every 8 hours for 7-10 days according to severity **Alternatives** • Clindamycin, 300 mg 3 times per day plus ciprofloxacin, 500 mg twice per day, 7-10 days according to severity • Doxycycline, 100 mg twice per day, 7-10 days according to The severity • Cefuroxime Axetil 500 mg twice per day plus metronidazole, 250 to 500 mg 4 times per day, 7-10 days according to the severity
Children	**First-line** ▪ Amoxicillin/clavulanate, 25 to 45 mg per kg divided every 8 hours, 7-10 days according to the severity **Alternative** ▪ Clindamycin, 10 to 25 mg per kg divided every 6 to 8 hours plus trimethoprim/sulfamethoxazole, 8 to 10 mg per kg (trimethoprim component) divided every 12 hours, 7-10 days according to the severity
Pregnant	▪ Amoxicillin (500mg) 8-hourly with Flucloxacillin (500mg) x 6 hourly, 7-10 days according to the severity,

Local antibiotics: 2% Mupirocin topical antibacterial skin preparations (Bactrocin) ointment, 7-10 days according to the severity

5.3 Re-Exposure (Rabies PEP of previously vaccinated persons):

Re-exposure vaccination for rabies prophylaxis consists of repeating anti- Rabies vaccination as per national guidelines after re-exposing to a rabid (or suspected rabid) animal when one was already vaccinated before, as per schedule. According to WHO Guideline, If a rabid dog bites a previously immunized person within 3 months of completing an entire course of PEP or PrEP, no new course of PEP is required. For exposures occurring More than 3 months after a PEP or PrEP course, treated as Re-

Exposure Prophylaxis for previously immunized individuals.

For re-exposed patients who can show document of previous complete PrEP or PEP and people who discontinued a PEP series after at least two doses of rabies vaccine, the following vaccination regimen apply: (after 3 months)

Table 6: WHO recommended Re-Exposure: (Rabies PEP of previously vaccinated persons).1

Dose	Route	Duration	No of injection sites per clinic visit (0,3,7,14,21-28)	Sites
0.1 ml	Intradermal (1 Site)	Days ▪ Day 0 ▪ Day 3	1-1-0-0-0	Deltoid region Or Antero-Lateral thigh (if ≤ 2yrs)
Entire vial (1 ml or 0.5 ml depending on vaccine type)	Intramuscular	Days ▪ Day 0 ▪ Day 3	1-1-0-0-0	

N.B.

- Local treatment of wound (s) should be ensured
- No RIG is indicated for any of the schedules if reliable vaccination history is available (With Card)

Important points to be noted-

- Administration of any type of ARV on the buttocks is not recommended
- For any person who has had direct or indirect contact with a rabies patient, PEP is not recommended except in special situations when exposed to saliva or organs of a rabid person or animal.
- Patients should be advised not to rub at the injection site after administration of the vaccine.
- Patients must be advised to complete a entire course of vaccine as per the advised schedule.
- All patients who receive rabies PEP should be given a document/ card, clearly stating the date, month & year of vaccination and the type of vaccine used.

5.4 Duration of immunity

Cell Culture Embryonated Egg-based Vaccines (CCEEVs) establish

immunological memory that is assumed to persist for the individual's life, even after titers of neutralizing antibodies decrease or are no longer measurable. Clinical data confirm that vaccinated people respond to booster immunization within 7 days, even if the initial course of PrEP or PEP was administered decades previously and regardless of the route of priming or booster immunization (intramuscular or intradermal) and the presence or absence of detectable titers of RABV specific antibodies at the time of the booster. In addition, published data indicate that periodic booster doses of vaccine are not required after primary rabies vaccination, except as an additional precaution for people whose occupation puts them at continual or frequent risk of exposure. Nevertheless, according to the WHO definition of exposure, all vaccinated individuals subsequently exposed to rabies should receive an abbreviated course of PEP.

5.5 Contraindications and precautions to be taken in post-exposure prophylaxis

There are no contraindications to PEP. PEP can be safely given to infants, pregnant women, Lactating women and immuno-compromised individuals, including children with HIV/AIDS and Covid patients. It should be given as indicated by the nature of the exposure in a setting in which the staff is adequately trained in its administration and the management of possible adverse reactions, as for any other vaccination. As for all vaccinations, recipients should be kept under medical supervision for at least 15-20 minutes after vaccination.

Post Exposure Prophylaxis is life-saving in all animal exposures for all age groups. A complete course of vaccination and immunoglobulins in category III exposure must be administered, even if they have received any dose of COVID-19 vaccine. It can be given on the same day, at different sites.

PrEP can be deferred based on individual risk assessment. PrEP may be initiated with a minimum gap of 2 weeks after completing a course of Covid vaccination. In the current context of the Covid pandemic, Covid vaccination shall be prioritized to PrEP. (Rabies Prophylaxis During Covid -19 Pandemic, Dr. M. K Sudarshan, APCRI, 2021).

6. Diagnosis of Human Rabies

6.1 Laboratory Procedures

- Identification and confirming suspected cases by clinical and laboratory investigation is essential for rabies surveillance and elimination.
- For laboratory diagnosis, recommended samples are saliva, skin (frozen section of nuchal skin biopsy material), tissues, brain, blood/ serum.
- Samples to be collected by trained clinicians or medical technologists, to be preserved in Glycerol (GS)/normal saline and transported in a cool box with 4 ice packs to the laboratory and to be stored in -20ºC to-80ºC temperature.
- Samples to be tested in BSL2 laboratory (Human health laboratory) by trained and skilled laboratory personnel.

The rabies virus can be detected in the lab by any of the following procedures such as,

1. **Antigen detection:** There are two types of tests practiced-

FAT: Immunofluorescence microscopy can detect Rabies Ag in acetone fixed tissue incubated at 37ºC.

DRIT: Normal microscopy Immunohistochemistry method can detect rabies virus inclusions in formalin-fixed tissues, incubation at room temperature.

2. **Virus detection:** RT-PCR or cell culture from saliva, skin, corneal wash sample.
3. **Antibody detection:** From serum by Rapid Fluorescent Focus Inhibition Test (RFFIT) procedure (neutralization test), ELISA.

Table 7: Standard Diagnostic Test for Rabies Virus (Annex 2)[1]

Species (time of test)	Ag detection		RNA detection		Virus isolation		Ab detection	
	Specimen	Test	Specimen	Test	Specimen	Test	Specimen	Test
Human (Ante-mortem)	Skin, Hair Follicle	FAT, ICT	Skin, Hair follicle, Saliva, Tears, CSF	RT-PCR	Saliva, Tears, CSF	RT-CIT, MI	Serum, CSF	RFFIT, FAVN test, IFA, ELISA
Human (Post-mortem)	Skin, Hair follicle, Brain	FAT, DRIT, IHC	Skin, Hair follicle, Brain	RT-PCR	Brain	RT-CIT	NA	NA
Animal (Post-mortem)	Brain	FAT, DRIT, IHC	Brain	RT-PCR	Brain	RT-CIT, MI	NA	NA

7. Documentation and Reporting

Clear and accurate documentation of all aspects of the patient's care is critical to ensure safety, quality and continuity of care. It facilitates assessment, diagnosis, planning, implementation and evaluation of patient care.

Documentation is also a tool for accountability purposes and provides data to protect the interests of the patient, health facility and health professionals and is essential to risk management.

a. Responsible persons:

- Superintendent/Civil Surgeon/UHFPO/Senior Consultant of the Sadar/Upazila Hospital and In charge of the IDU at other hospitals

Upazila Rabies Prevention and Control Centre: Manual Data entry using register and monthly reporting dog bite cases.

District Rabies Prevention and Control Centre: Manual Data entry using register and send to DHIS2 and email to CDC report rabies case.

National Rabies Prevention and Control Centre, IDH, Dhaka: Manual Data entry using register and monthly reporting dog bite and rabies cases.

Rabies Prevention and Control Centre, BITID, Chattogram: Manual Data entry using register and monthly reporting dog bite and rabies cases.

b. Documentation:

To be ensured at different levels of the District and Upazila as follows:

- **At Emergency:**

Use a Registrar book and/ or digital recording in a computer with following information: Emergency ID no./ Date of seeking care/ Name of the patient/ Age/ Sex/ Address/ Major clinical presentations/ OE findings/ Provisional diagnosis/ Management of the case.

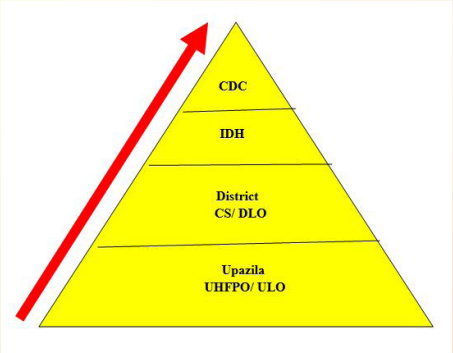


Fig. 12: Case reporting bottom to top approach

- **At OPD:** Use a Registrar book and/or digital recording in a computer with following information: Emergency/ OPD ID no./ Indoor ID no./ Date of admission/ Name of the patient/ Age/ Sex/ Address/ Major clinical presentations/ OE findings/ Provisional diagnosis/ Investigations/ Management of the case.

c. Reporting:

- Reports should be prepared at regular intervals for central authorities/ MIS/ CDC/ IEDCR, because these are used for policy making and implementations (Annex 3 and 4).
- Different types of reports should be prepared: Disease Profile (listing all diseases managed in a specified period of time).

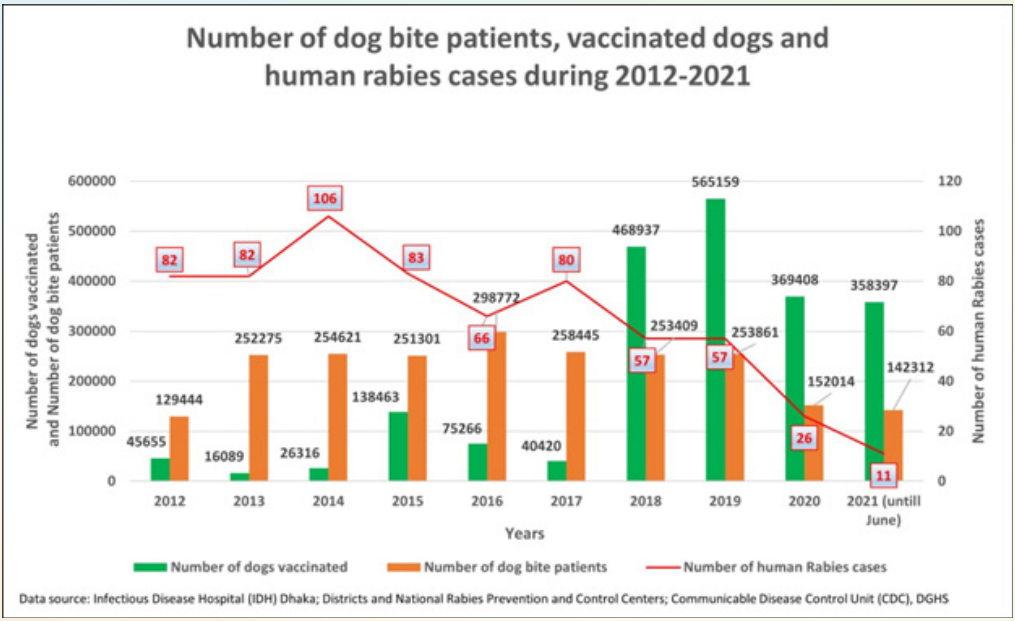
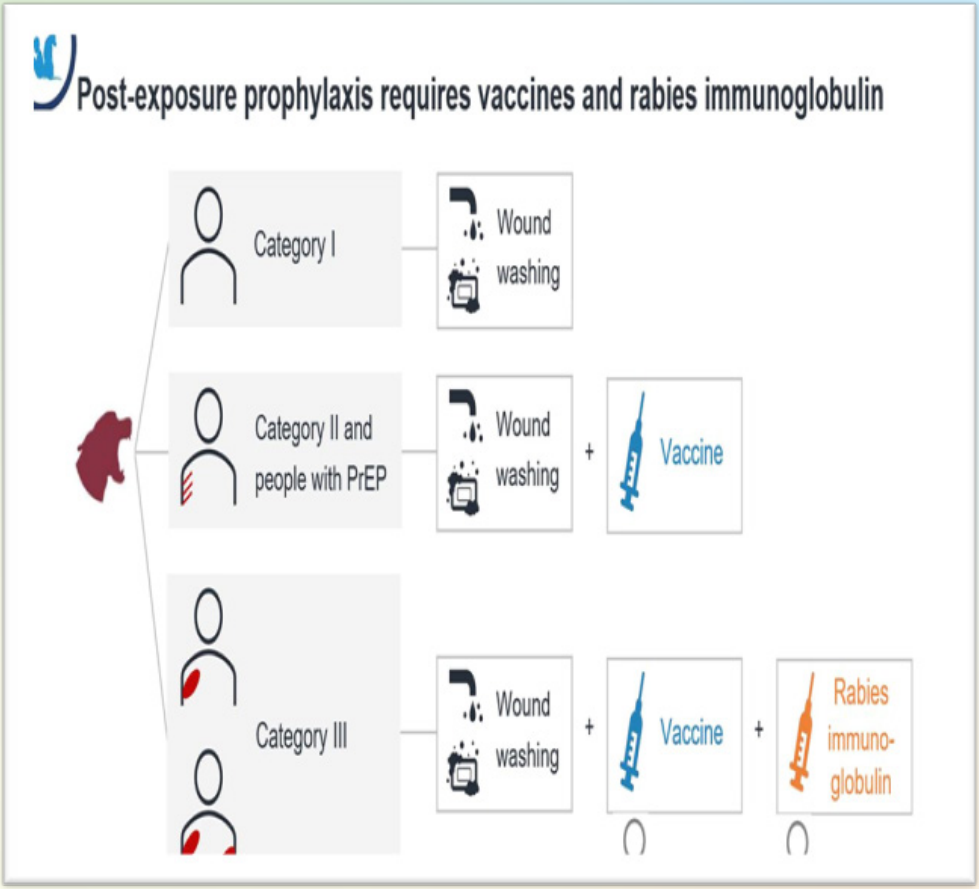


Fig. 13: Impact of national rabies elimination activities on human rabies incidence in Bangladesh 2012–2021

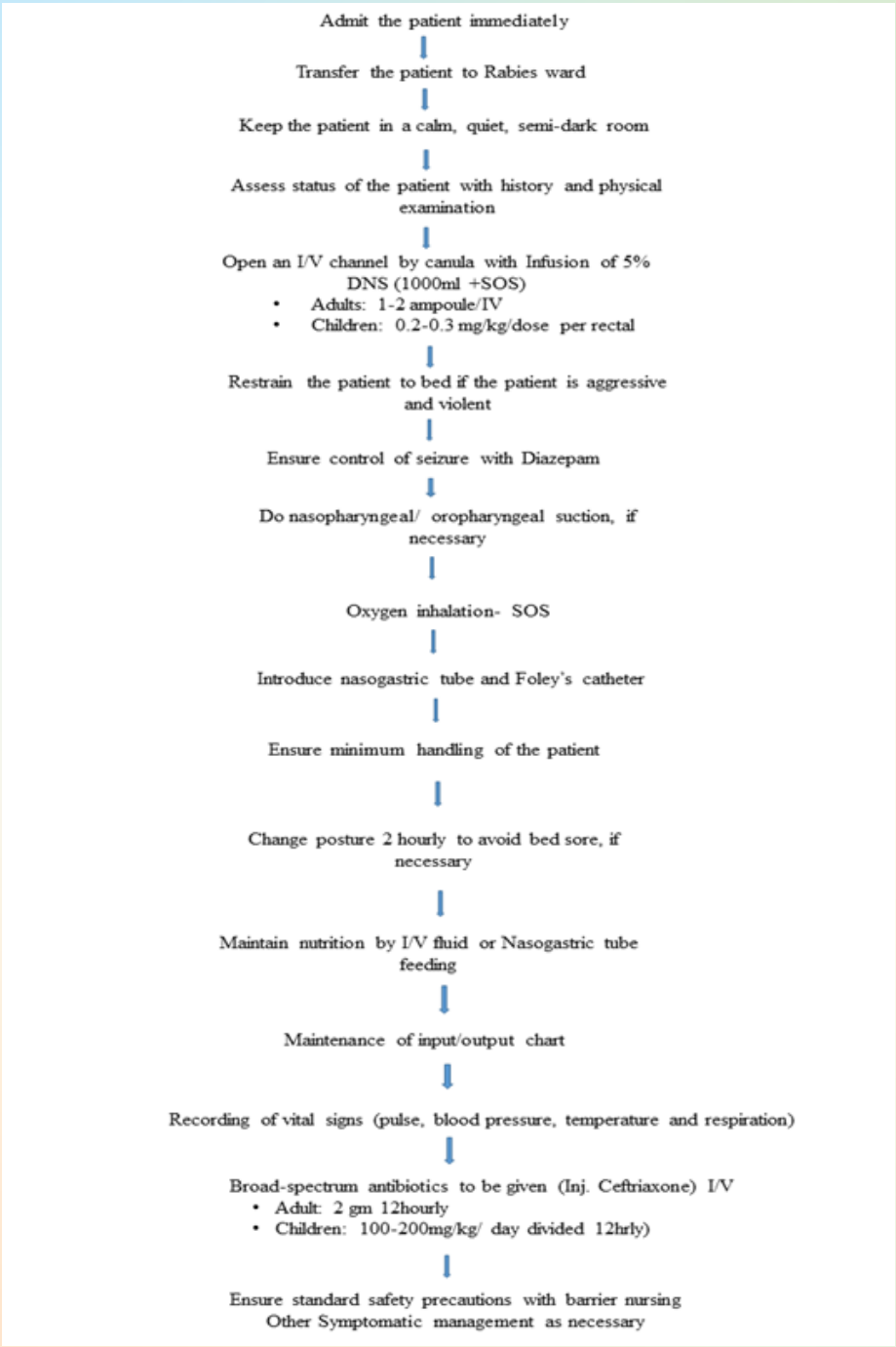
ANNEXURE

Annex 1: Post-exposure prophylaxis requires vaccines and rabies immunoglobulin.

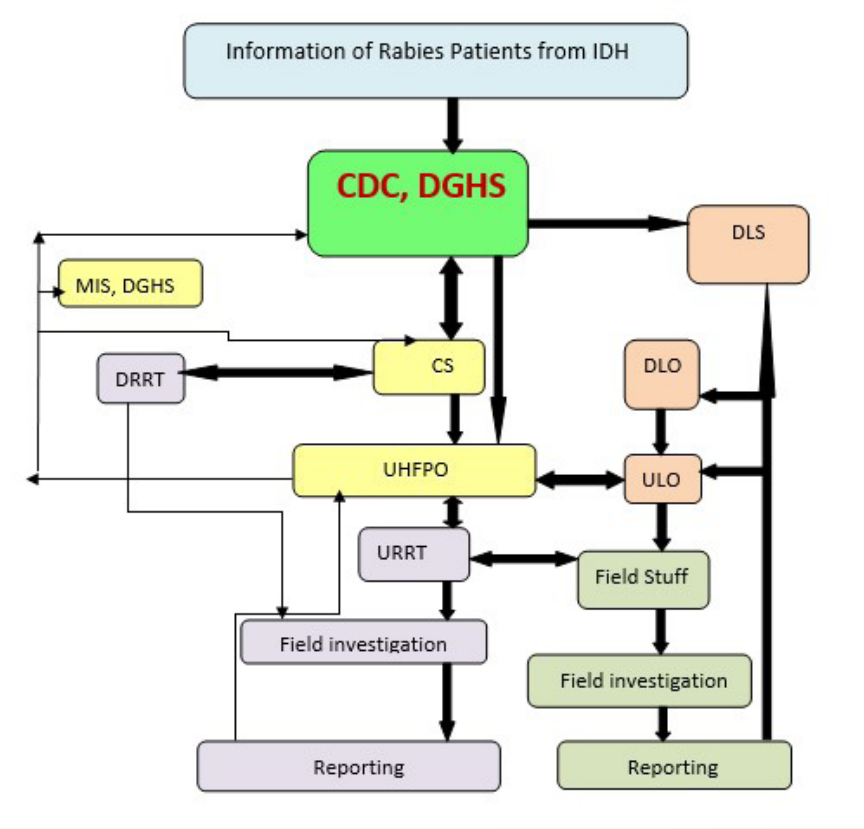


Source: WHO Rabies and One Health Course 2021.

Annex 2: Flow chart for management of rabies patient.

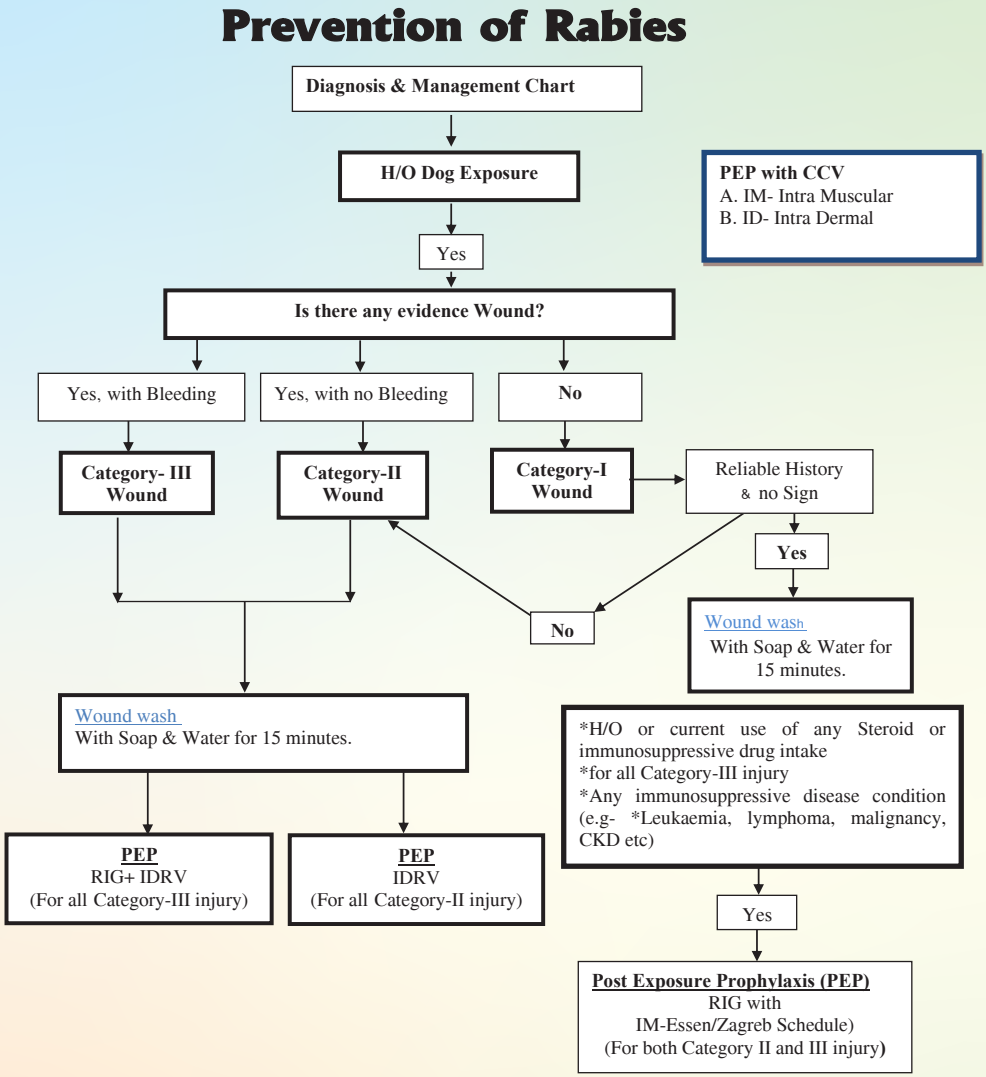


Annex 3: Schematic presentation for field investigation of rabies patient and reporting.



CS: Civil Surgeon, DRRT: District Rapid Response Team, DLS: Department of Livestock Services, DLO: District Livestock officer, UHFPO: Upazila Health and Family Planning Officer, ULO: Upazila Livestock Officer, URRT: Upazila Rapid Response Team

Annex 4: Schematic Diagram of Rabies Prevention and Post Exposure Prophylaxis (PEP)



Post Exposure Prophylaxis (PEP)
by Cell Culture Vaccine (CCV)

ID	IM	RIG (ERIG/HRIG)
As per WHO 2018 guideline: **(D0, D3, D7, D14, D28)** (2-2-2-0-0) **Route:** Intradermal (ID) **Every inj:** 0.1 ml **Site:** Deltoid, D 0.3.7: Inj at two deltoid **Total dose:** 0.6 ml **Not to be used:** Immunosuppressive conditions, antimalarials use Steroid use etc **Store:** 2-8ºC **Look:** Visible and palpable bleb **Caution:** Reconstituated vaccine to be used within 8 hours **Discard:** after 8 hours of prepare	**As per WHO 2018 guideline:** **(DO, D3, D7, D14, D28)** (1-1-1-1-0) **Route:** Intramuscular regimen **Site:** Deltoid or Anterolateral thigh **Dose:** PVCV-0.5ml or PCECV-1 ml/ inj	**As per WHO 2018 guideline:** **ERIG :** 40 IU/kg body weight(maximum 3000 IU). **HRIG:** 20 IU/kg body weight (maximum 1500 IU). Route: Local and IM **Site:** Infiltration in & around the wound **Timing:** Within 7 days of 1st vaccine dose (Day-0) **Not to be used:** After 7 days of 1st vaccine dose **Precaution:** Skin test for ERIG **Danger:** Anaphylaxis **Caution:** At different site from that of vaccine(IM/ ID)

Annex 5: Recommended guidelines for physical facilities and staff requirements for an anti-rabies clinic (an ideal situation)

I. Accommodation

1. Clinic room 20' X 15' (minimum) and waiting hall
2. Toilet with tap water for washing the wound

II. Staff (as per work load)

1. Medical Officer- 2-3 (Medical Graduate)
2. Staff Nurse- 2-3
3. Attendants - 2

III. Furniture

1. Office Table – Big – 1 (MO) and Small – 1 (Staff Nurse)
2. Armchairs – 4
3. Revolving stools – 3
4. Table for examining the patient -1
5. Footstep stand – 1
6. Almirah - 1

IV. Equipments and Instruments

1. Refrigerator (with voltage stabilizer and thermometer) – 1
2. Weighing machine – 1
3. Vaccine carrier and ice packs (with wells) – 1
4. BP apparatus – 1
5. Oxygen cylinder with mask – 1
6. IV line stand – 1
7. Telephone – 1
8. Health education material – Display / Distribution (as adequate)
9. Fixographs (Big) – 2 with letters

V. Drugs (Injectables and Applicants)

1. Anti-rabies vaccines
2. Anti-rabies serum (Equine and Human)
3. Inj. Adrenaline
4. Inj. Pheniramine Maleate
5. Oral anti-histamines
6. Inj. Steroid
7. Inj. Ranitidine
8. Surgical spirit
9. Povidone Iodine
10. Normal Saline
11. Glucose Saline
12. Tetanus Toxoid
13. Antibiotics, Antipyretics, Analgesics and Anti-Inflammatory drugs

VI. Other Supplies and Consumables

1. Cotton
2. Adhesive plaster
3. Dressing material
5. Surgical gloves
6. Insulin syringes with 26G needles
7. 2 mL and 5mL syringes with 24 G needles
8. Artery forceps
9. Toothed forceps
10. Swab holder
11. Kidney tray
12. Dressing bin
13. Foot-operated waste bin
14. Mattress and linen
15. Used Vaccine & RIG box

VII. Stationary and Others

1. Outpatient register
2. Temperature monitoring chart
3. Standard Clinical Record forms
4. Prescription pads
5. Self-addressed postcards (reply paid) for patient responses
6. Notice board
7. Computers, Multimedia, Printer, Scanner and other Accessories

VIII. Wound wash Place/area

1. Specific place
2. Tap-Water / Facilities for the use of water
3. Soap/ Detergent
4. Antiseptic
5. Disposable Gloves

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At a Glance of National Rabies Elimination Program Activities

Fig. 1: Training on Animal Bite Management, Cumilla

Fig. 2: Training Program on Animal Bite Management

Fig. 3: Seminar on Animal Bite Management

Fig. 4: Orientation Program on World Rabies Day

Fig. 5: Workshop on Animal Bite Management and Rabies Surveillance

Fig. 6: Team of Zoonotic Disease Control Program

Fig. 7: Celebration of World Rabies Day

Fig. 8: MDV Advocacy Meeting in Kalihati, Tangail

Fig. 9: MDV Advocacy Meeting in Katiadi, Kishoreganj

Fig. 10: MDV Advocacy Meeting in Kushtia

Fig. 11: MDV Microplanning

Fig. 12: MDV Animal Control Staff Training

Fig. 13: MDV Animal Control Staff Training

Fig. 14: Supervision and Monitoring of MDV in Sylhet

Fig. 15: Supervision and Monitoring of MDV in Savar, Dhaka

Fig. 16: Supervision and Monitoring of MDV in Titas, Cumilla

Fig. 17: Survey for Unexpected Dog Bite Event in Jamalpur District

Fig. 18: Mass Dog Vaccination Campaign in Jamalpur

Fig. 19: Celebration of World Rabies Day

Fig. 20: National Guideline Preparation Meeting for Animal Bite Management

Fig. 21: Monitoring of MDV Campaign

Fig. 22: Team of Zoonotic Disease Control Program, CDC

Fig. 23: Rally of Expert Dog Catcher for Celebration of World Rabies Day

Fig. 24: Rally for completing 1st round MDV throughout Bangladesh

জলাতঙ্ক কি?

জলাতঙ্ক হলো প্রাণি থেকে মানুষের দেহে সংক্রমিত ভাইরাস জনিত একটি রোগ। এ রোগে মৃত্যু অনিবার্য কিন্তু শতভাগ প্রতিরোধযোগ্য।

কিভাবে ছড়ায়?

শতকরা ৯৯ ভাগ ক্ষেত্রে কুকুরের কামড়/আঁচড়ে জলাতঙ্ক সংক্রমিত হয়ে থাকে। এছাড়া বিড়াল/শিয়াল/বানর/বেজী ও বণ্যপ্রাণির কামড়/আঁচড়ের মাধ্যমে মানুষের দেহে জলাতঙ্ক ছড়াতে পারে।

কুকুর/প্রাণির কামড়ে আক্রান্ত হলে করণীয়ঃ

বিশ্ব স্বাস্থ্য সংস্থার (WHO) গাইডলাইন অনুযায়ী যত দ্রুত সম্ভব চিকিৎসা নিতে হবে।

ক্ষতের ধরণ	ক্ষতের বিবরণ	চিকিৎসা	
ক্যাটাগরি-১	অক্ষত চামড়ায় লেহন, প্রাণির সংস্পর্শ, কিন্তু কোন আঁচড়/ক্ষত নেই	সকল ক্যাটাগরিতে অতিদ্রুত কাপড় কাঁচার সাবান/ডিটারজেন্ট ও প্রবাহমান পানি দিয়ে ১৫ মিনিট ধরে ক্ষত স্থান ধৌত করতে হবে	কোন টিকা দিতে হবে না।
ক্যাটাগরি-২	আঁচড়/ক্ষত আছে কিন্তু রক্তক্ষরণ নাই		Inj. Anti Rabies Vaccine(ARV)*
ক্যাটাগরি-৩	ক্ষত ও রক্তক্ষরণ আছে		Inj. ARV* ও Inj. RIG°

➡ *Dose of Inj. ARV:- প্রতি ডোজে: 0.1 মিলি x দুই বাহুতে; চামড়ার মধ্যে (Intradermally) ডোজ- D_0, D_3, D_7

➡ *Dose of Inj. RIG ক্ষতস্থানে (Infiltration) (40 IU/kg Body Weight, সর্বোচ্চ 3000 IU) - D_0

সংক্রামক ব্যাধি হাসপাতাল, ঢাকা এবং সকল জেলা সদর হাসপাতাল ও নির্দিষ্ট কিছু উপজেলা স্বাস্থ্য কমপ্লেক্সে বিনামূল্যে জলাতঙ্কের টিকা পাওয়া যায়।

জলাতঙ্ক সম্পর্কে যে কোন তথ্য জানতে ও জানাতে
হটলাইন নাম্বার: ০১৭৩১-৩১৪৬০০

E-mail: zdcp.cdc.dghs@gmail.com

DGHS-MOHAFW BANGLADESH

স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়

জাতীয় জলাতঙ্ক নির্মূল কর্মসূচী, রোগ নিয়ন্ত্রণ শাখা, সিডিসি, স্বাস্থ্য অধিদপ্তর