Early detection and treatment of nationally important NTDs: Rabies post exposure prophylaxis

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Description of condition and intervention

Rabies is a viral zoonotic disease, caused primarily by the bite of an infected rabid dog. If left untreated, rabies can be fatal. Two forms of rabies exist clinically- furious rabies and paralytic rabies. The furious type is characterized by hyperactivity and hallucinations. The paralytic type may lead to paralysis and coma. It is estimated that 59,000 human deaths are caused by Rabies annually, where in 95% of the cases, an infected dog is the causative animal. Further, this burden of disease is disproportionately in the rural and under 15 years of age population. Post exposure prophylaxis for Rabies includes extensive and thorough washing of the infected wound by the rabid organism. Institution of immunoglobulin and vaccine may follow, depending upon the exposure of the rabies wound site Source: WHO 2021.

International guidelines

Organization	Description	Indications/recommendations
World Health Organization (WHO)	Category II: Includes nibbling of uncovered skin, minor scratches, or abrasions, in absence of bleeding	Vaccine should be injected as soon as possible
	Category III: Single of multiple transdermal bites or scratches, contact with broken skin, mucous membrane either direct or through saliva and exposure to bats	Vaccine and immunoglobulin should be administered at distant sites as soon as possible. Immunoglobulin can be administered up to 7 days after injection of the first dose of vaccine.

Source: WHO 2014

Rabies post exposure prophylaxis
(DCP4 ID: NTD03-06-02)
Cluster: Neglected Tropical Diseases

FairChoices
DCP Analytic Tool

Intervention attributes

Type of interventions

Curative

Delivery platform

This intervention may be delivered at the health centre level.

Equity

In addition to considerations like cost-effectiveness and health systems factors, dimensions of equity can be relevant for priority setting. The opportunity for a long and healthy life varies according to the severity of a health condition that individuals might have, so there are inequities in individuals' opportunities for long and healthy lives based on the health conditions they face. Metrics used to estimate the severity of illness at an individual level can be used to help prioritize those with less opportunity for lifetime health. FairChoices: DCP Analytics Tool uses Health adjusted age of death (HAAD), which is a metric that estimates the number of years lived from birth to death, discounting years lived with disability. A high HAAD thus represents a disease less severe in terms of lifetime health loss, while a low HAAD represents a disease that is severe on average, causing early death or a long period of severe disability. It is also possible to estimate the distribution of HAAD across individuals with a health condition. FairChoices shows for each intervention an average HAAD value of the conditions that are affected by respective interventions that have health effects. Additionally, a plot shows HAAD values for around 290 conditions (Johansson KA et al 2020).

Time dependence

High level of urgency. Treatment delays may lead to case fatality.

Population in need of interventions

Treated population: All individuals (incident cases) of Rabies in the age group of 0 to 99 years and gender are eligible to receive the intervention. The treated fraction is assumed 0.9 for this intervention, taking into account that a fraction may not present for in time for post-exposure prophylaxis.

Affected population: The affected population includes those with the Rabies disease condition in the age-group of 0 to 99 years, both genders. The affected

fraction by this intervention is assumed to be 100%, considering that PEP would need to be given presumptively to more people than actually have rabies (ie all suspected exposures),

Disease states addressed

This intervention targets Rabies in those under category II and III, based on the guidelines mentioned above.

Model assumptions

Table 1: Summary of model parameters and values used in FairChoices – DCP Analytical Tool

Category	Model parameter	Notes
Intervention	**Rabies post-exposure prophylaxis**	Early detection and treatment of nationally important NTDs (Level 2)
Cost calculation		
Treated population	Based on incidence of Rabies	Global burden of disease 2019 study
Gender	Both	
Age	0 to 99 years	
Treated fraction	0.9	
Affected Population	With condition	
Affected gender	Both	
Affected fraction age	0 to 99 years	
Affected fraction	1	
Comparison	No care	
Mortality Reduction (RRR)	1	100% reduction assumed with intervention

Intervention Cost

References

WHO Health Topics-Rabies accessed from https://www.who.int/health-topics/rabies#tab=tab_1

Johansson KA et al 2020: Johansson KA, Coates MM, Økland JM, Tsuchiya A, Bukhman G, Norheim OF, Haaland Ø. Health by disease categories. Distributional Cost-Effectiveness Analysis: Quantifying Health Equity Impacts and Trade-Offs. 2020 Sep 30:105.

Appendix

Literature Review for effectiveness & safety

This literature search is an example of a level 1 search of literature and guidelines for post-exposure prophylaxis of Rabies.

Level 1: intervention inputs taken from DCP3 or generated in an ad hoc manner (e.g., quick google search found one study of cervical cancer screening cost-effectiveness that was used to create an effectiveness parameter for that intervention).

Level of evidence of efficacy studies:

1. low (expert opinions, case series, reports, low-quality case control studies)
2. moderate (high quality case control studies, low quality cohort studies)
3. high (high quality cohort studies, individual RCTs)
4. very high (multiple RCTs, meta-analysis, systematic review, clinical practice guidelines)