Sustained Mass Dog Vaccination (MDV) for Rabies Elimination: The Bangladesh Experience

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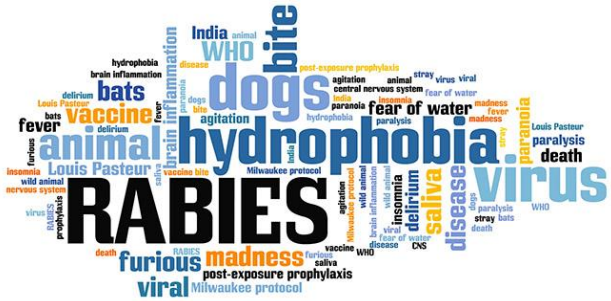


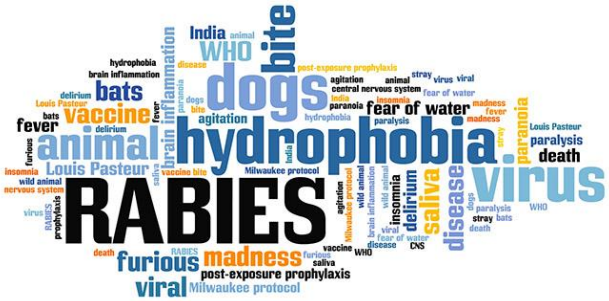
Why Rabies

100% Fatal

100% Preventable

>80% Poor community

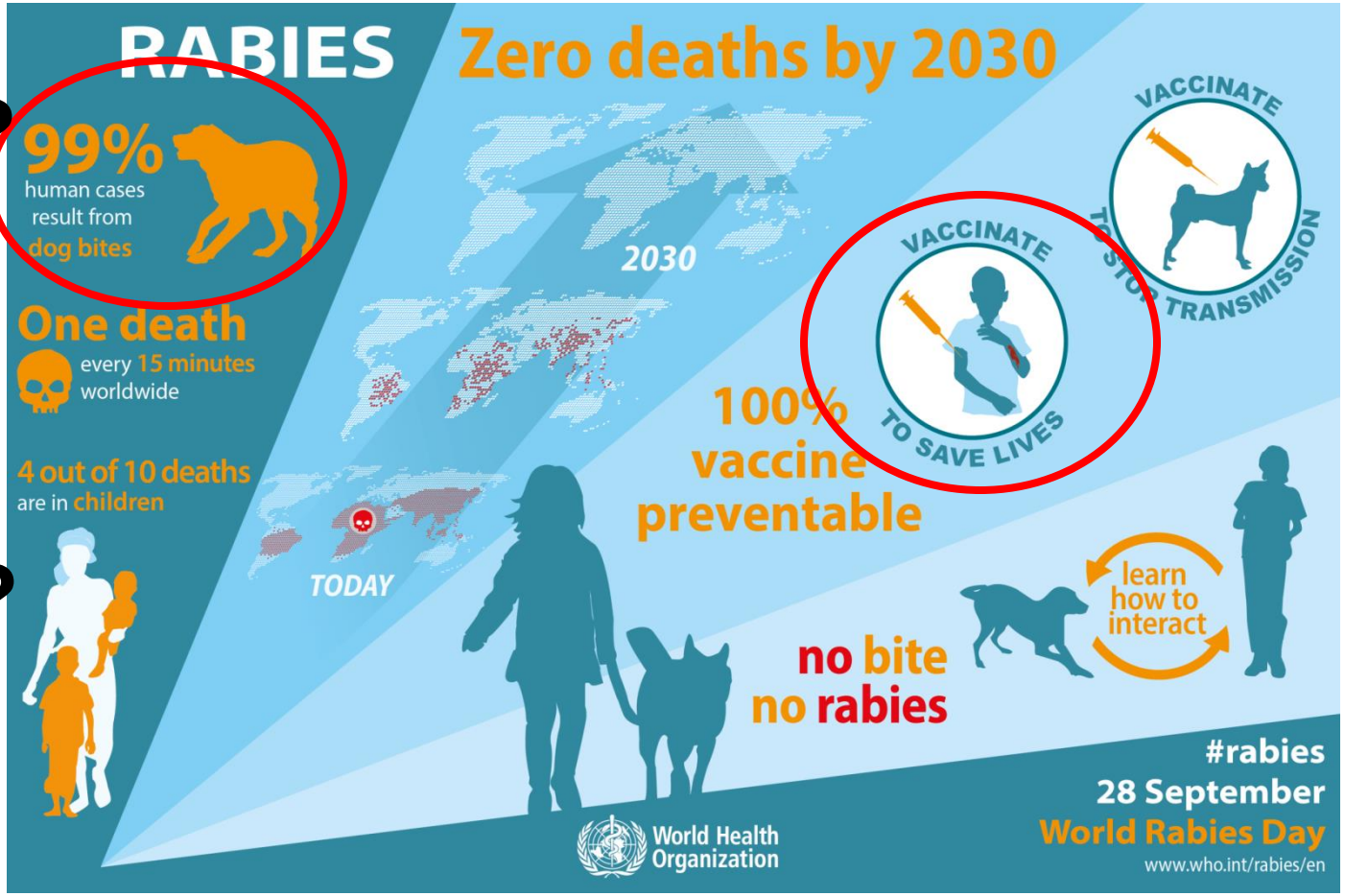
~50% Children



Rabies

Why Dog?

Why PEP?



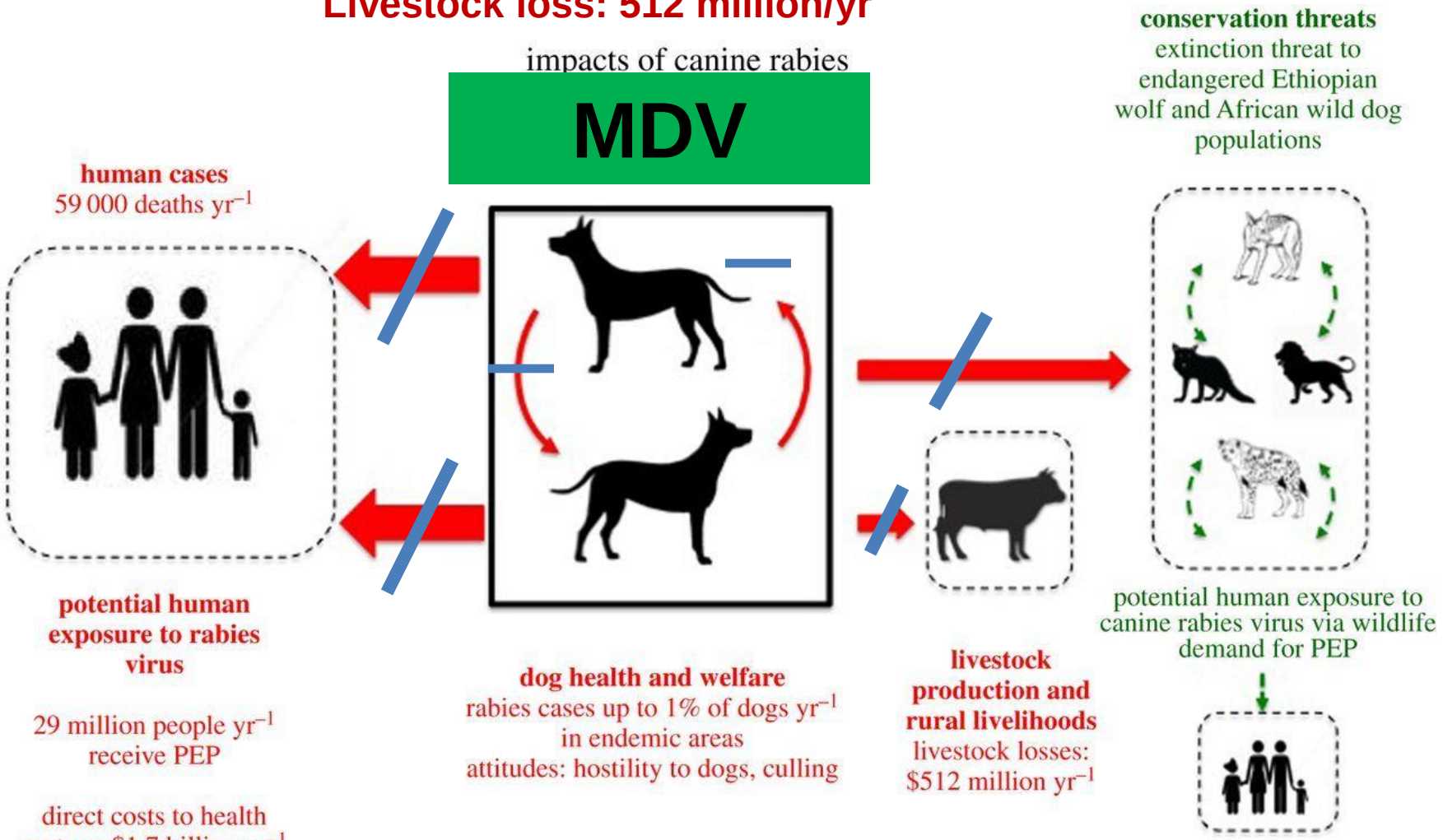
Why Mass Dog Vaccination (MDV)?

Breaks rabies transmission cycle

Produce herd immunity

Impacts of Canine Rabies

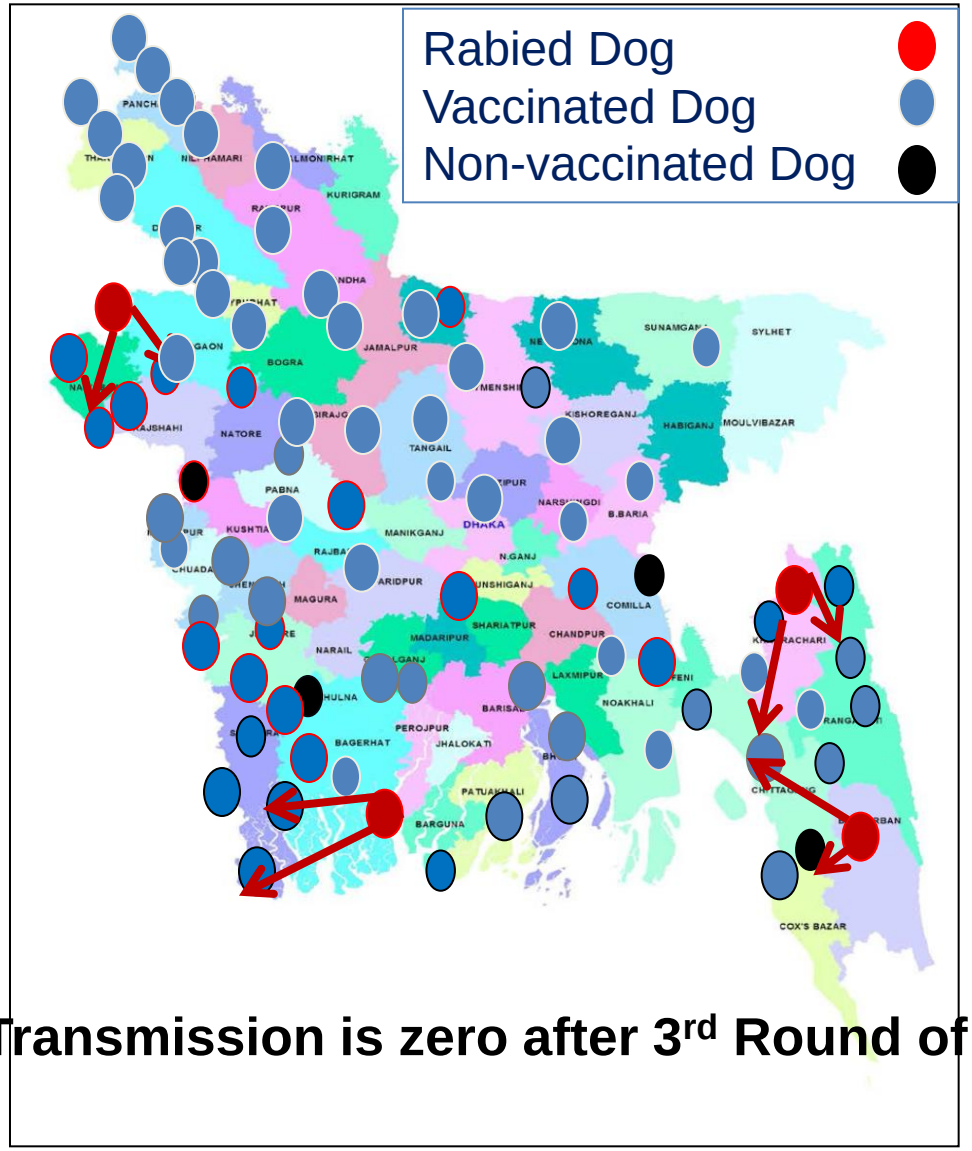
PEP receive: 29 million people/yr
Direct cost: 1.7 bullion USD/yr
Pt-borne cost: 1.4 billion USD/yr
Livestock loss: 512 million/yr



Transmission of Rabies:

- **From dog to dog/other animal: $R_{0=}$ 2-3**
- **from Human to Human: $R_{0=}$ 0**
- **Lower R_0 takes lower time to eliminate rabies**

MDV: Stop transmission of Rabies



Rabies Transmission is zero after 3rd Round of MDV

Still Neglected: Why?

Not economically important

Huge Free-roaming dogs

Public Health Impacts: Not well recognized

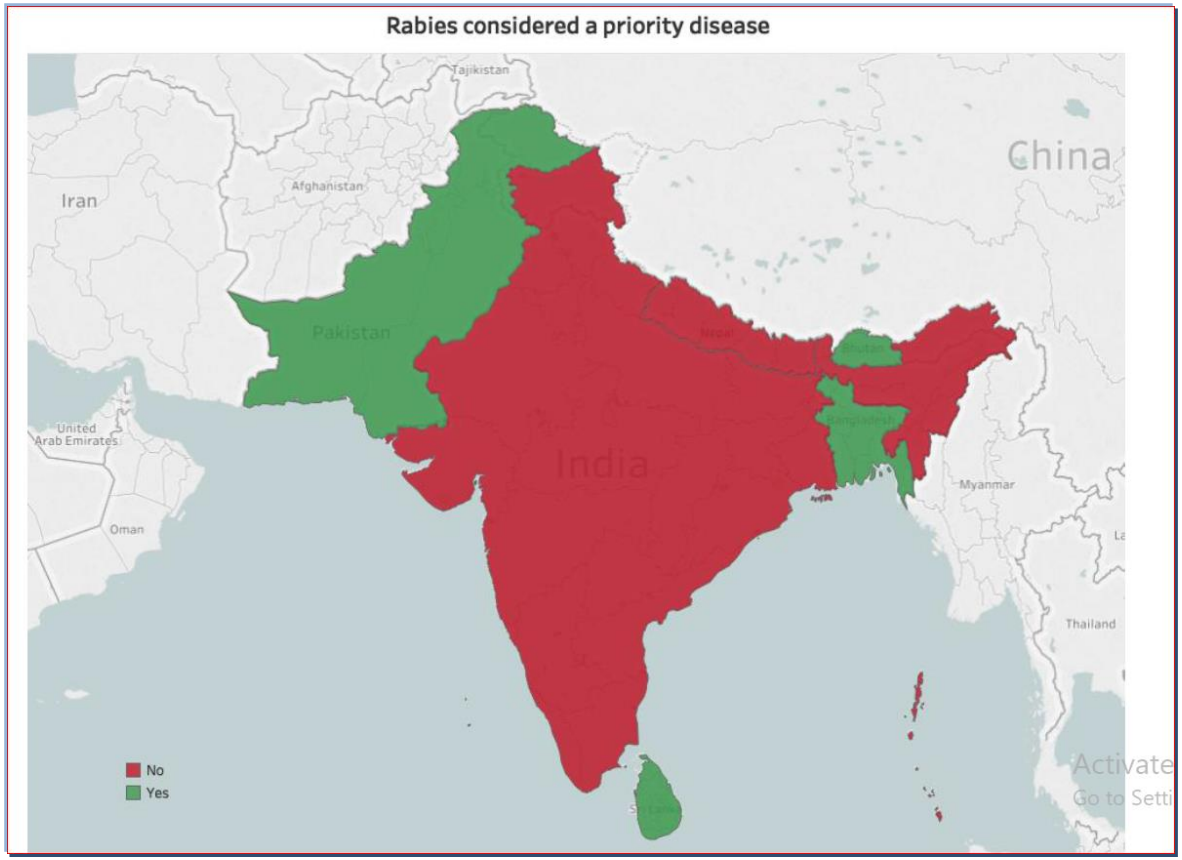
No ownership by DLS

Rabies: Long Incubation Period; Missing link

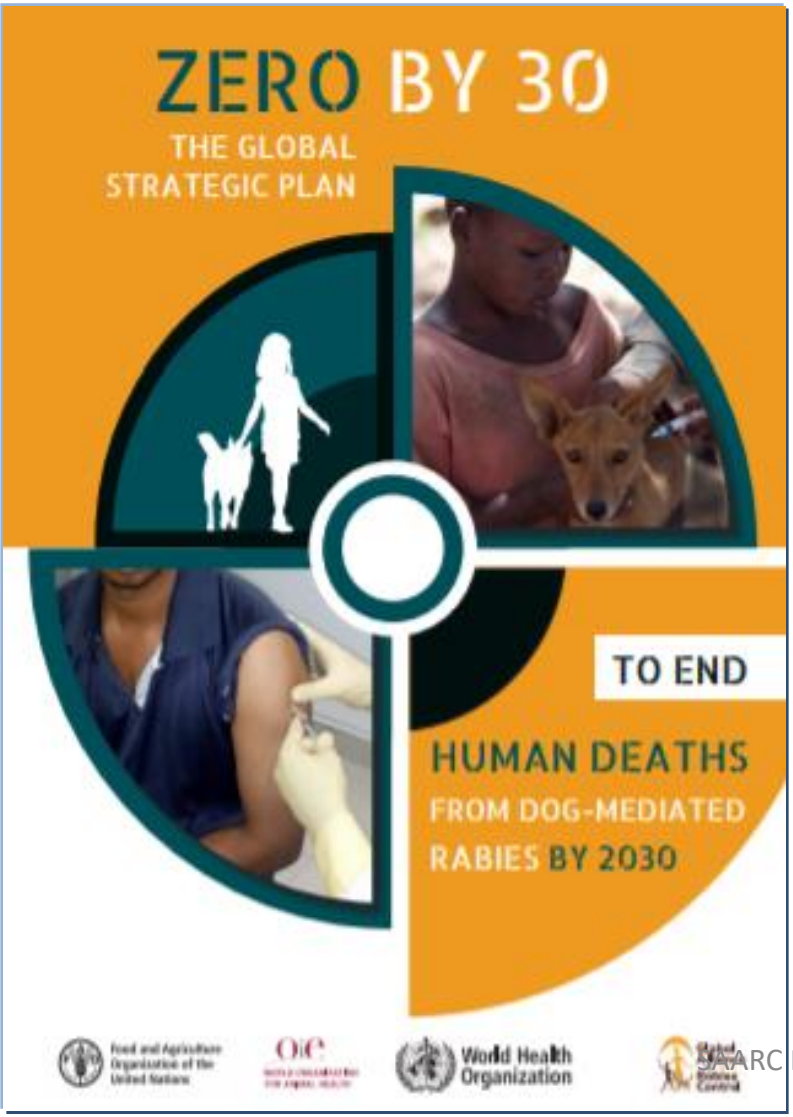
Rabies Elimination in Bangladesh:

Achievements & experiences

Rabies:
A priority Zoonotic Disease



SDG Goal 3 Target 3.3

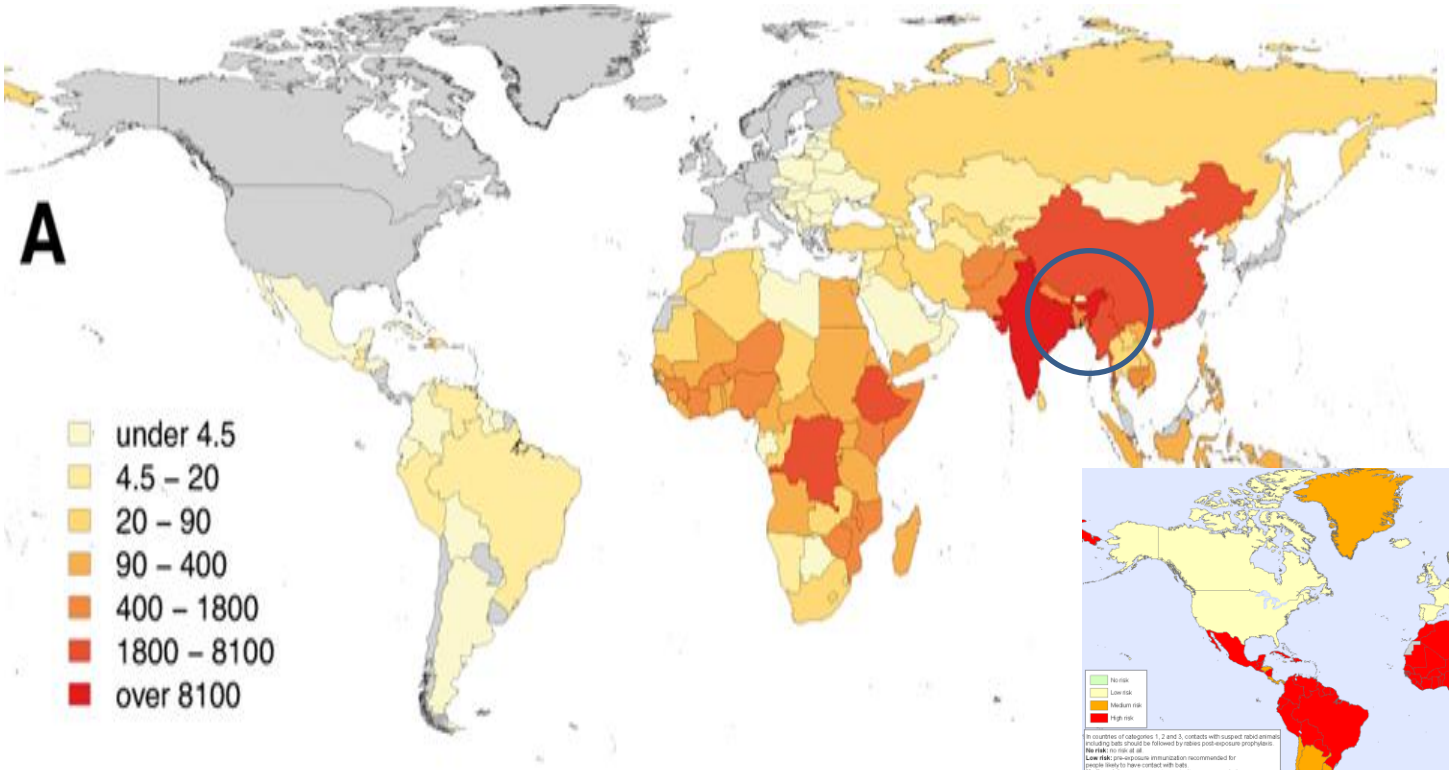


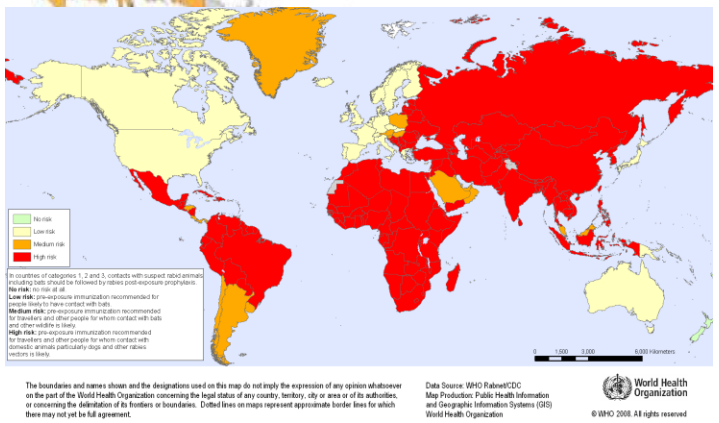
By 2030, end the epidemics of AIDS, tuberculosis, malaria and **neglected tropical diseases** and combat hepatitis, water-borne diseases and other communicable diseases

ZERO BY 30

The Global Strategic Plan to end human deaths from dog-mediated rabies by 2030

Rabies cases in Bangladesh: reduced in 2018 than that of 2011



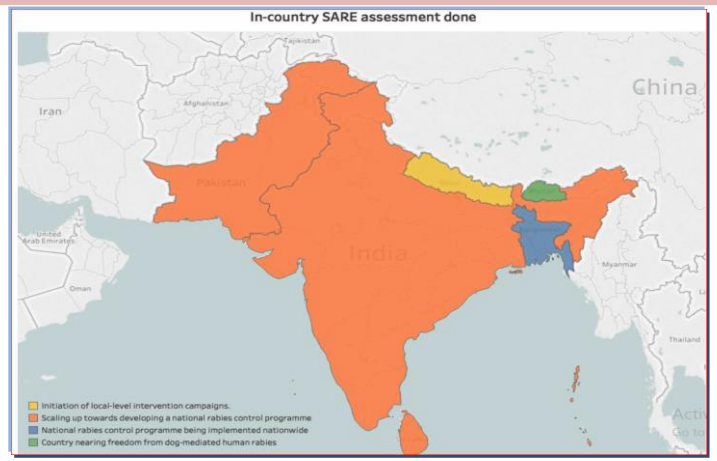


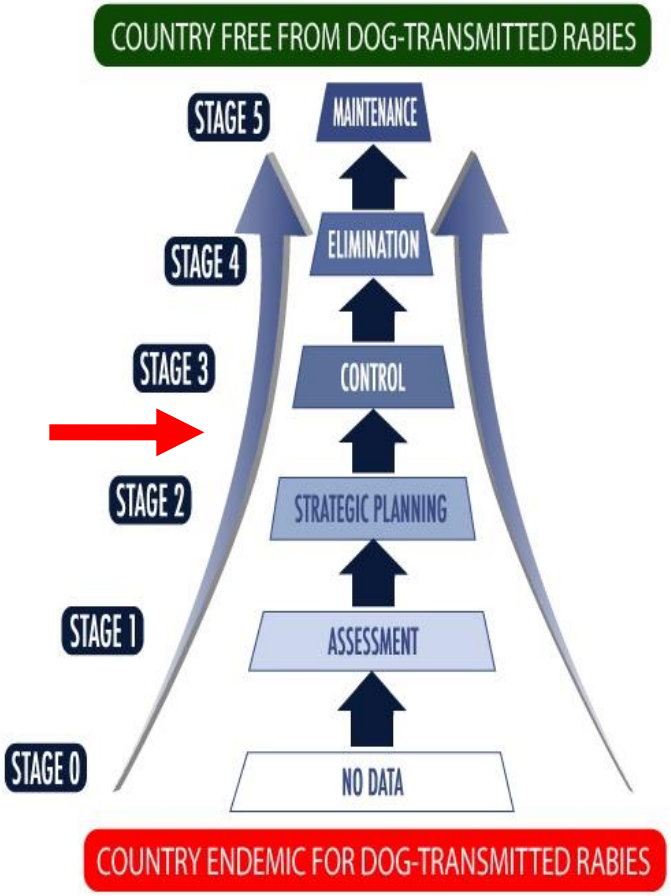
SARE Assessment: Bangladesh

SARE Score: 2.5

Current SARE milestone: 2.5

National rabies control programme being implemented nationwide, with clear inter-sectoral collaboration





Bangladesh is Ahead of other SAARC countries except Bhutan

Rabies scenario in Bangladesh

Area: 147,570 sq.km.
Divisions:8
Districts:64; 498 Sub-districts

Dog population: 1.6 million (estmd.)
Stray Dogs: > 83%

Human dog/animal bite: 0.3-0.4 mill/yr
Annual Human rabies (Estd):
<200 in 2019
Rural burden: > 85%
Children <15years: >45%
Annual Animal rabies: 25,000 approx.

Implementation of REP, Bangladesh: Lesson learnt

- Good Strategy & Planning
- Good inter-sectoral Collaboration & Partnership (One Health Approach)
- Strong Leadership of CDC, DGHS under MoHFW

Rabies Elimination Strategy 2010

Goal

Elimination of rabies by 2022

Strategic Activities

-Advocacy, Communication and Social Mobilization (ACSM)

-Dog Bite Management (DBM)

-Mass Dog Vaccination (MDV)

-Rabies Surveillance and Research

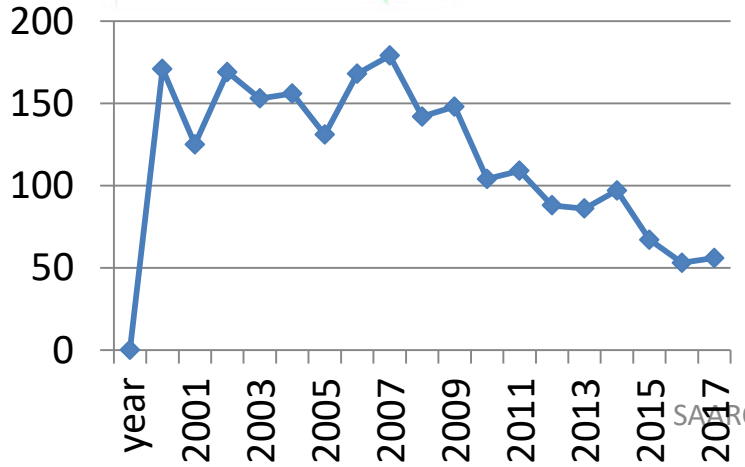
-Dog Population Management (DPM)

Implementation of REP, Bangladesh: Lesson learnt…cont..

Dog/Animal bite management:

67 RPCCs in Bangladesh

- **Provision of free vaccines:**
  - Inj. Human ARV (IDRV) & RIG (limited) for free of cost
  - Syringe with needle
- **Trained Human resource:**
  - > 3000 trained physicians, nurses & HCPs



Decrease Human Rabies case from >2000 in 2010 to <200 in 2010

Mass Dog Vaccination (MDV)

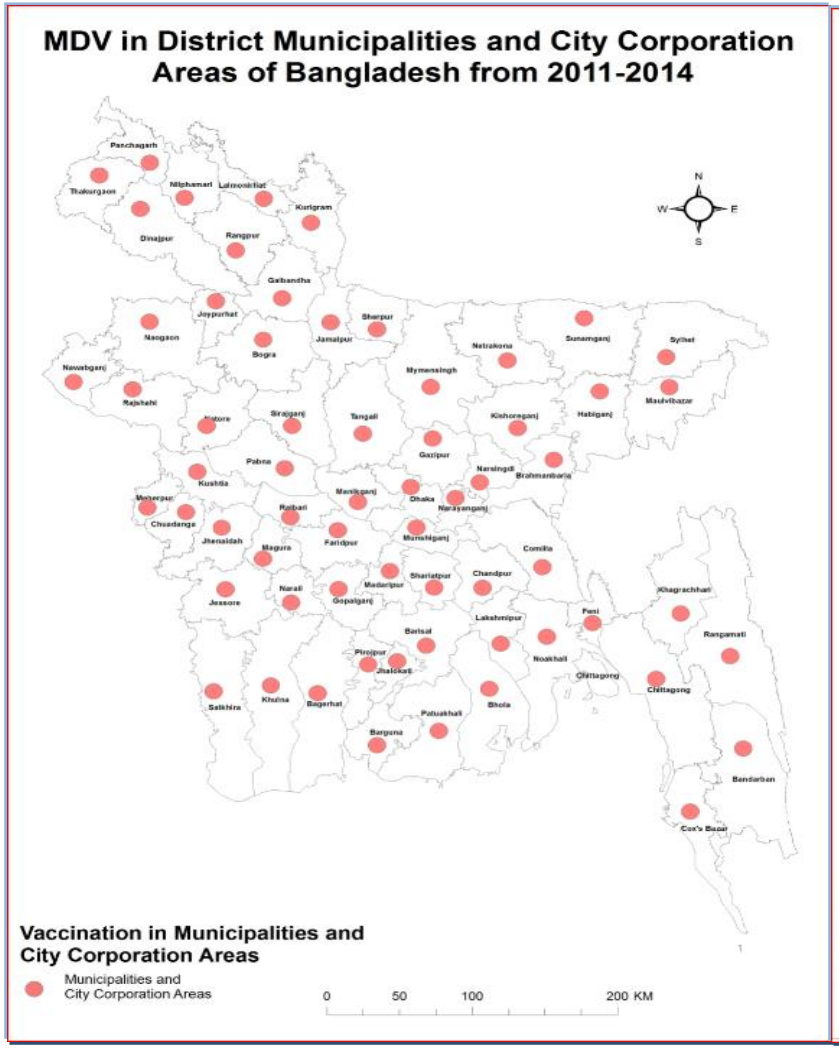
A Milestone for Bangladesh

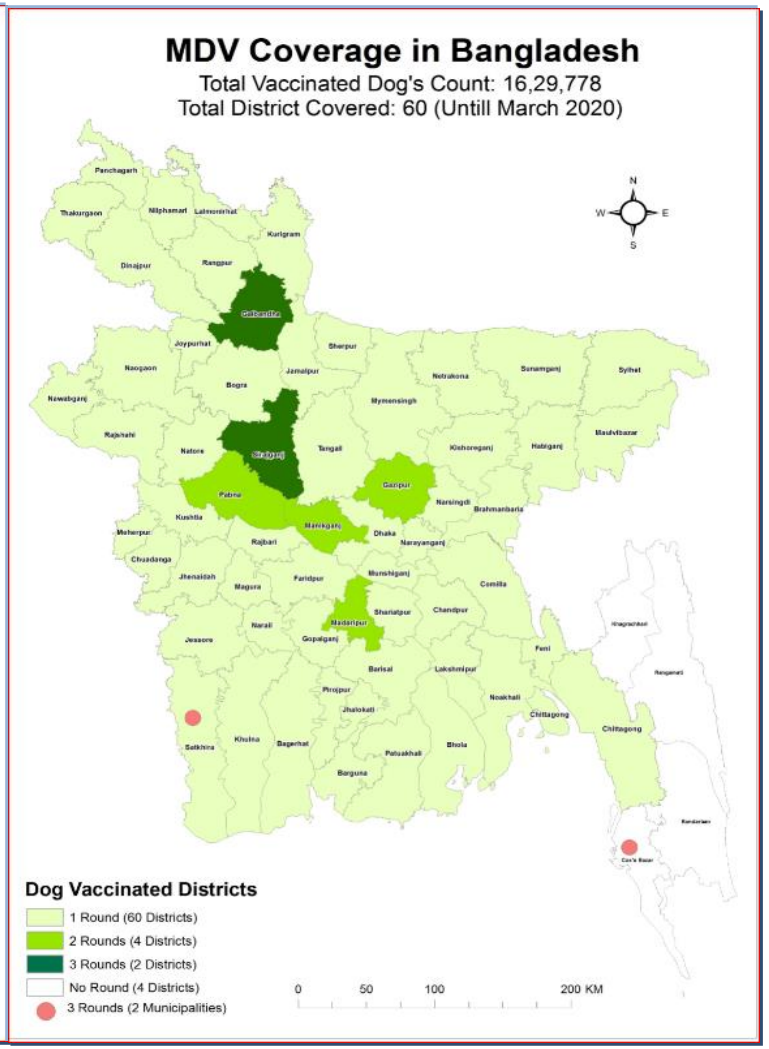
Goal:

-3 rounds of MDV throughout the country

-Ensure >70% coverage

MDV : Achievements
First Piloting at Cox's Bazaar district on 2011





MDV Campaigns

Campaign: 500

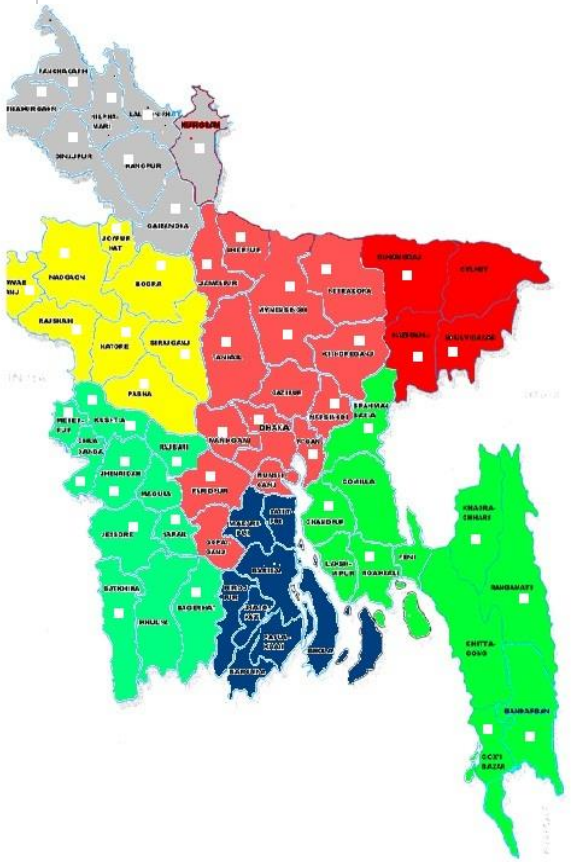
One round:

- **Districts: 60**
- City Corporations: 10
- Municipalities:64

Two rounds: 2CC, 4 districts

3 rounds: 2 municipalities and 2 districts

Ready to cover the whole country



Mass Dog Vaccination Coverage

Year	Dogs Counted	Dogs Vaccinated	Coverage (%)
2011-20	206,8126	168,0097	81

Implementation of MDV: Lesson learnt

Bangladesh Model of MDV: Characteristics

SNOW BALL CAPACITY BUILDING

SHORT DURATION CAMPAIGN

PUBLIC HEALTH PROGRAM WITH LOCAL FINANCING

I. Snow Ball Capacity Building

Dog Catcher: from Dog killers to Dog catchers

Dog Catcher Number: 0 to 40 to 3000

Dog catcher availability: No district to all 64 district

MDV Consultant (Vets): 0 to 5; Part-time **Vets working for MDV**: 0 to 100

Campaign Capacity: One municipality to a whole division

Expert Dog catchers/dog lovers

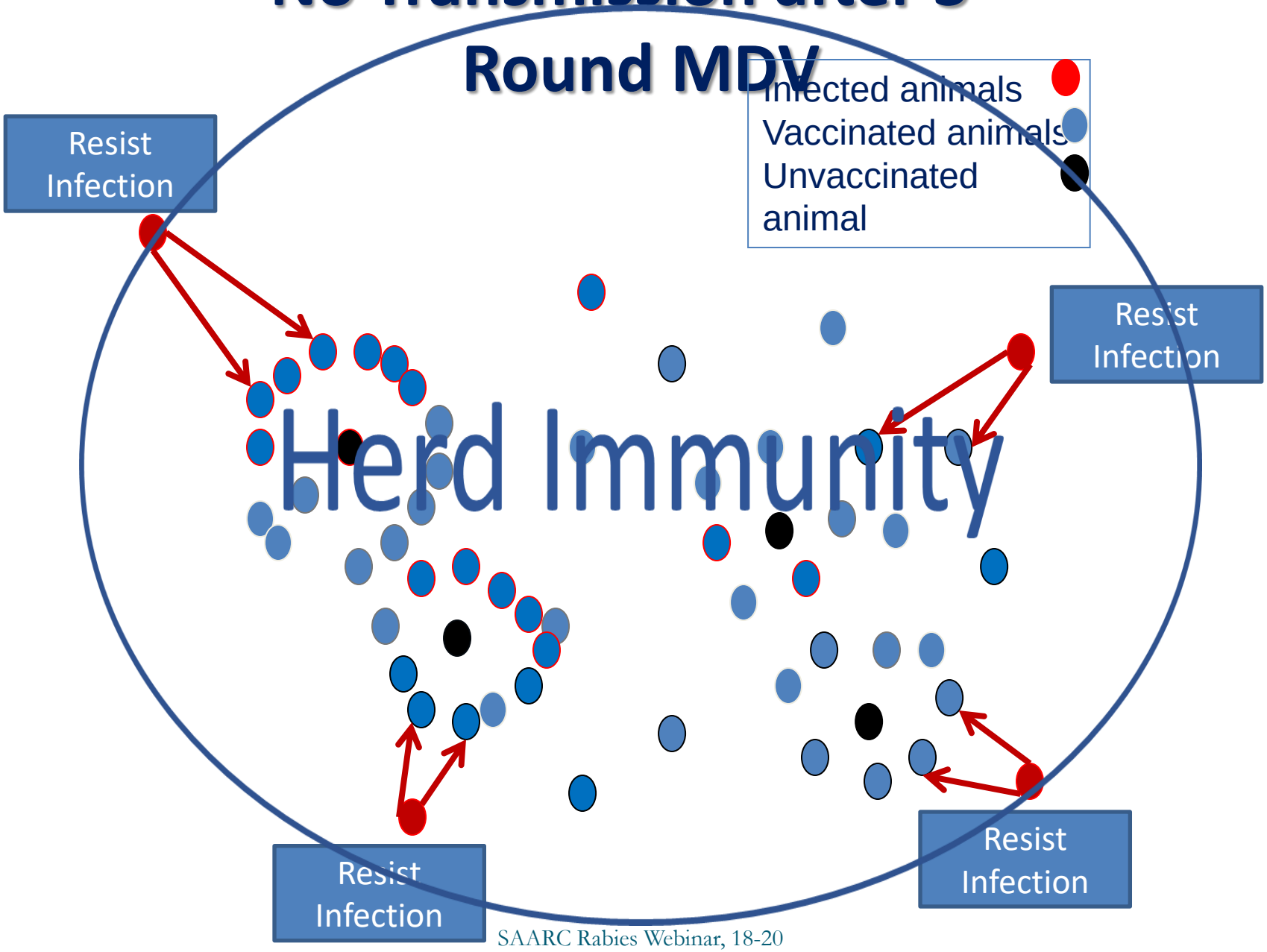
II. Short Duration campaign: 7-10 days

Day 0-1	Advocacy Meeting Ground preparation
Day 2	Microplanning
Day-3	ACS Training
Day-4-8	MDV Campaign

MDV Campaign

MDV Campaign

No Transmission after 3rd Round MDV



III. Public Health Program with Local Financing

STRATEGY & PLAN:

HAS A NATIONAL STRATEGY AND NATIONAL COSTED PLAN

COMMITTEES & COORDINATION:

FUNCTIONAL STEERING AND TECHNICAL COMMITTEES

ONE HEALTH APPROACH

APPROVAL:

INCLUDED AND APPROVED IN THE 4TH HPNSP AS A DIFFERENT PROGRAM

FINANCING:

33 MILLION USD

SUSTAINABILITY:

ENSURED UP TO 2022 AND BEYOND

Understanding

The science

Public Health Importance

Technical Feasibility

MDV Bangladesh Model

PROVED TO BE FEASIBLE OVER TIME AND PLACE IN BANGLADESH

MAY BE FEASIBLE IN COUNTRIES OF SOUTH ASIA

Impact of MDV and PEP on human rabies incidence in Bangladesh

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SCIENTIFIC REPORTS

nature research

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Trends and clinico-epidemiological features of human rabies cases in Bangladesh 2006–2018

Sumon Ghosh[1*], Md. Sohel Rana[1,9], Md. Kamrul Islam[1], Sukanta Chowdhury[2], Najmul Haider[3,10], Mohammad Abdullah Heel Kafi[2], Sayed Mohammed Ullah[1], Md. Rashed Ali Shah[1], Afsana Akter Jahan[1,4], Hasan Sayedul Mursalin[1], Aung Swi Prue Marma[1], S. M. Emran Ali[5], Shohrab Hossain[6], Rajub Bhowmik[7], Nitish C. Debnath[8], Abul Khair Mohammad Shamsuzzaman[1], Be-Nazir Ahmed[1], Umme Ruman Siddiqi[1] & Sanya Tahmina Jhora[1]

Vaccinating dogs against rabies is an effective means of reducing human rabies. We subjected 1327 clinically diagnosed human rabies death and mass dog vaccination (MDV) data during 2006–2018 to quantify the impacts of MDV on human rabies incidence in Bangladesh and a subset of rabies death data (422) for clinico-epidemiological analysis. A positive and increasing trend of MDV ($p = 0.01$ and tau = 0.71) and a negative and declining trend ($p < 0.001$ and tau = −0.88) of human rabies cases (Correlation coefficient: −0.82) have been observed. Among 422 deaths, the majority (78%) of the victims sought treatment from traditional healers, and 12% received post-exposure prophylaxis (PEP). The mean incubation period of rabies in cases with exposure sites on the head & neck (35 days) was shorter than the upper limb (mean = 64 days, $p = 0.02$) and lower limb (mean = 89 days, $p < 0.01$). MDV has been found to be effective for reducing human rabies cases in Bangladesh. Creating awareness among the animal bite victims to stop reliance on traditional healers rather seeking PEP, addressing the role of traditional healers through awareness education programme with respect to the treatment of dog bites, ensuring availability of PEP, and continuing to scale up MDV may help to prevent human rabies deaths.

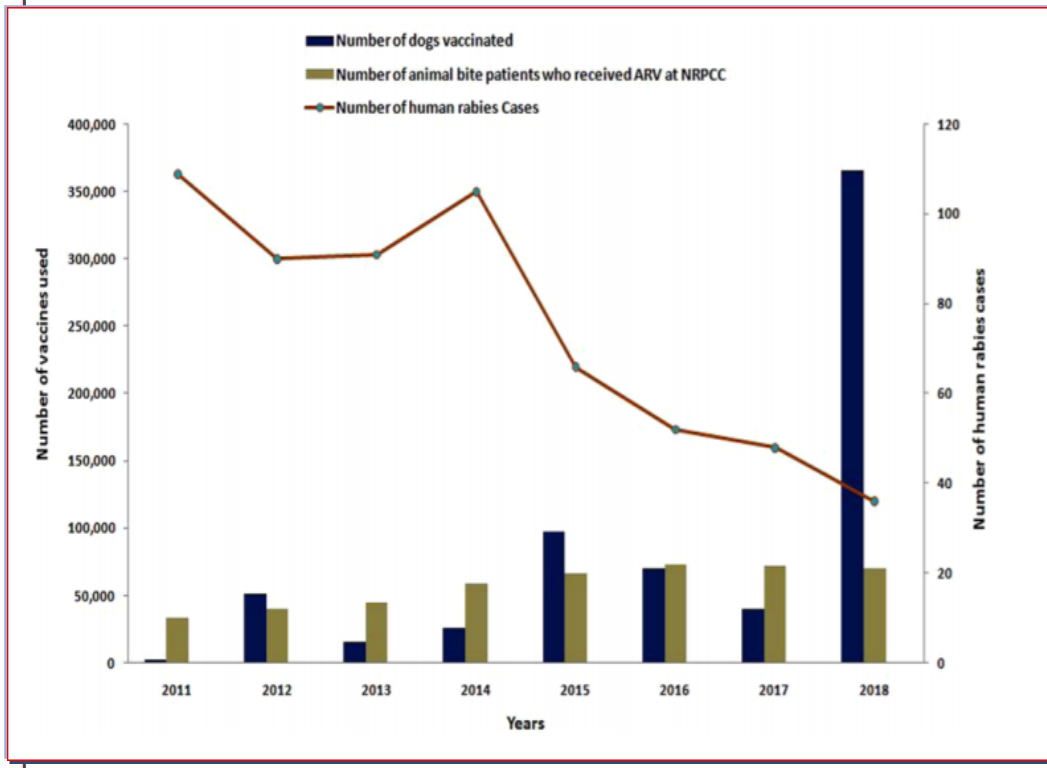


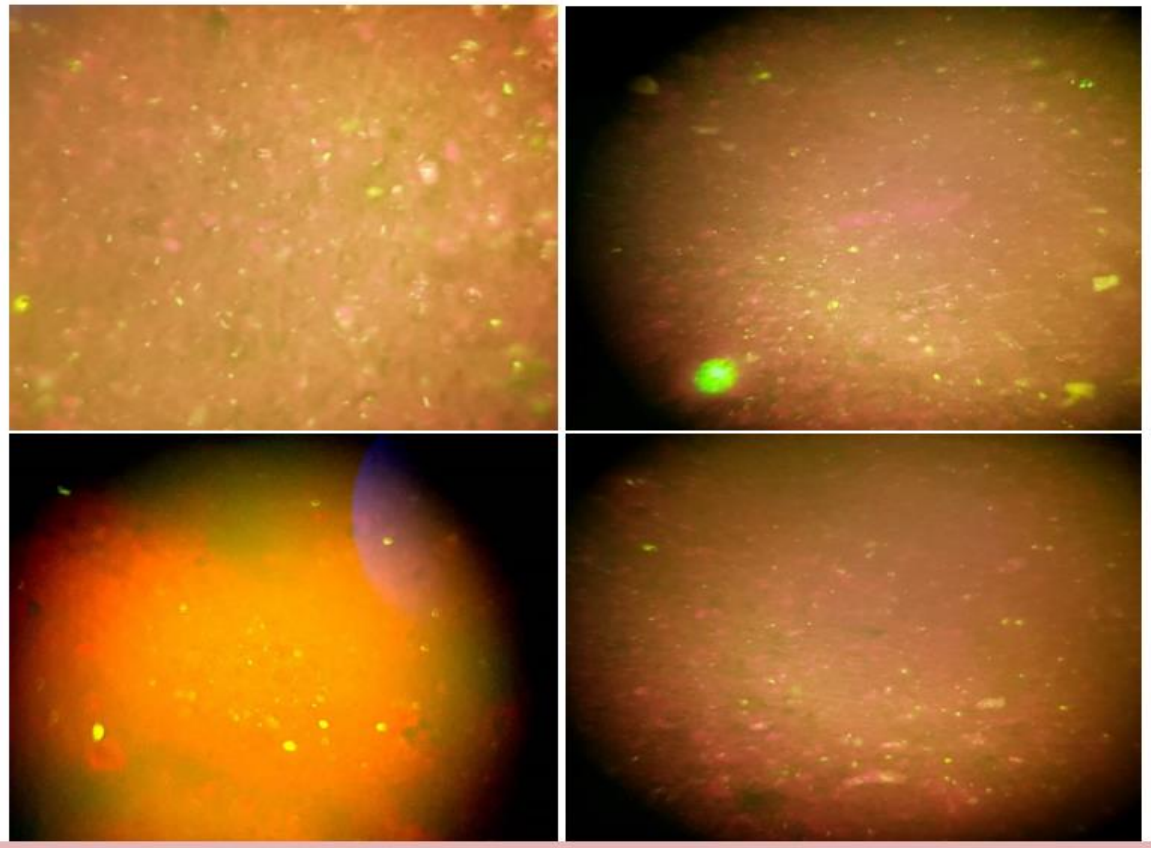
Figure 4. Impact of MDV and PEP on human rabies incidence in Bangladesh, 2006–2018

Lab. Diagnosis of Rabies in Cattle and Dogs: A success story

- **Animal rabies diagnosis**:
  - ✓ Previously based on Clinical S/S but no lab confirmation for the decade
  - ✓ CDIL re-established **Rabies diagnosis** capability by DFT in September, 2019 as **a mile stone**
  - ✓ 5 animal cases had been confirmed as rabies yet
  - ✓ **One Health Approach**: CDC, DGHS; DLS; FAO were actively involved. CDC-Atlanta is also on-board

Case 1: Bovine Rabies:

Sample Sender: Dr Manobandra Majumder Mohammadpur, Magura
DFA result: Rabies positive



Central Disease Investigation Laboratory (CDIL), DLS, Dhaka, Bangladesh

Global Alliance for Rabies Control

Mass Dog Vaccin
Revolution towar
elimination

•Community News

An unprecedented task,
in Bangladesh during No

2012) most of the distric
The MDV campaign of E
from control to eliminatio
inexperience, we gather
catch dogs for killing) ou
municipalites) became
they can catch dogs wi
vaccinated thousand d
funds' we could mobiliz
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logistics to move forwa
Through the experienc
now believe we can co
measures towards elim
coverage or reporting or
internationally, but it has

World Health Organization

Bangladesh tackles rabies thr
dog vaccination

September 2014

Bangladesh's canine vaccination programme
cycle of rabies transmission from dogs to hur

Huzzatul Mursalin

World Health Organization

Neglected tropical diseases

The Rabies Elimination Program of Bangladesh

A model for transformation and accomplishment

Credit: WHO

10 April 2017 | Geneva ––Bangladesh is leading a national multipronged rabies elimination program towards its goal of eliminating rabies by 2020, and serving as a role model for others in the region with similar economic and sociocultural characteristics.

The national rabies elimination strategy has two components:

- implementing mass dog vaccination campaigns
- introducing intradermal rabies vaccination following dog bites in health facilities throughout the country.

The Bangladeshi Health Department phased out nerve tissue rabies vaccine in 2011, in line with the recommendations of the World Health Organization.

Advocacy, Communication and Social Mobilization (ACSM)

Advocacy, Communication and Social Mobilization (ACSM)

Rabies Day

Little Docto r

Folk Song

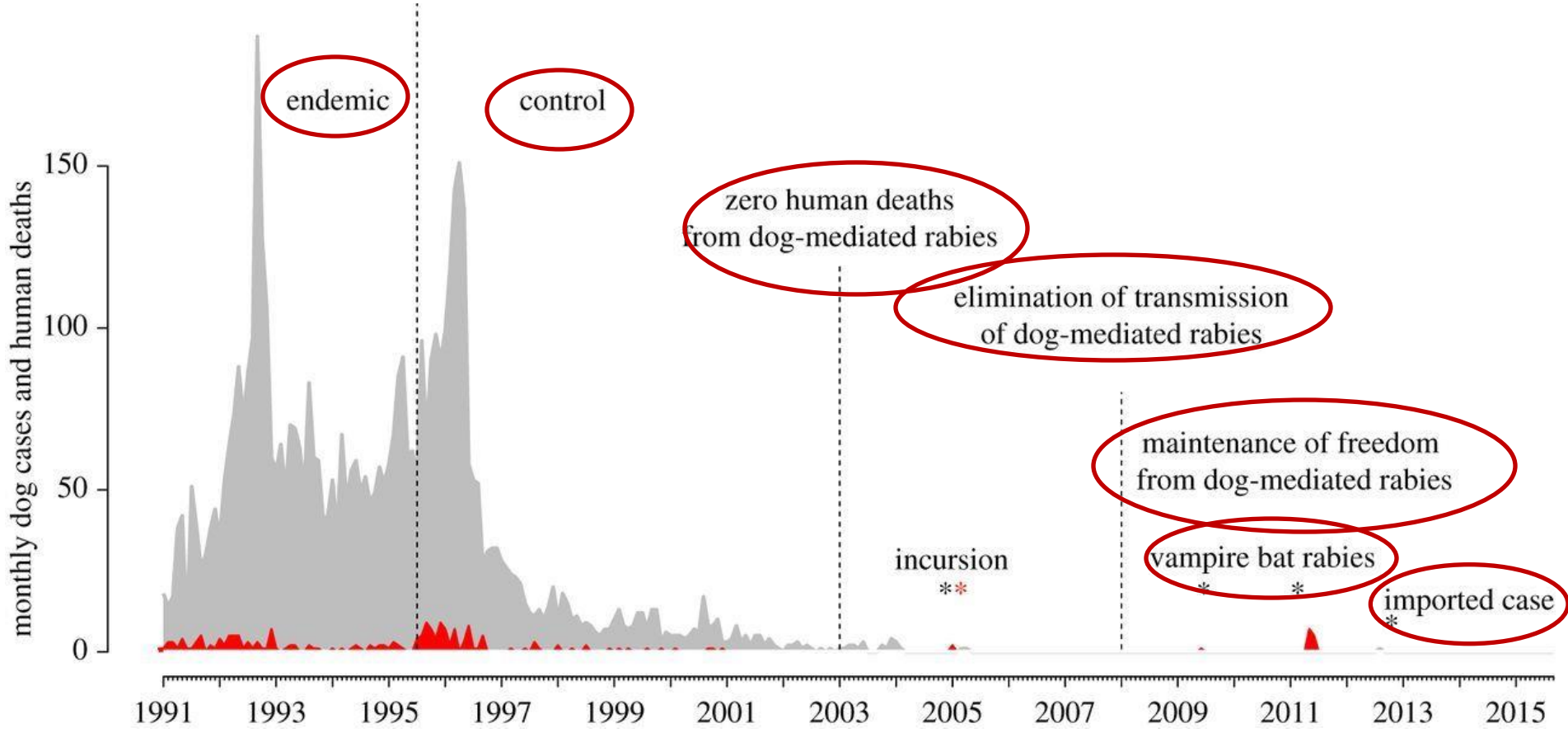
Overcom e Stigma

Folk Song for Community Awareness

DGHS.MOH&FW
BANGLADESH

Observation of World Rabies Day

Path of Rabies Elimination



Challenges

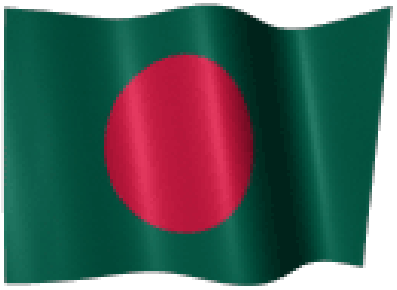
- Large number of stray dogs especially in rural areas
- Quality vaccine (human and animal) and limited RIG
- Limited laboratory facility for rabies diagnosis
- Under reporting of human/animal rabies cases
- Wild animal in some areas

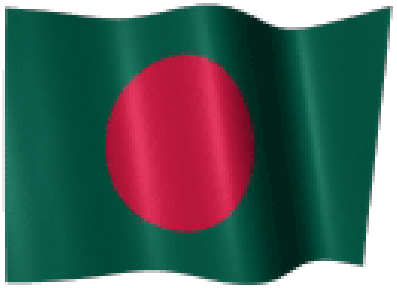
COVID-19: New Challenge

- Lockdown & movement restriction
- Fear of transmission of COVID-19
- Challenge for field MDV program
- Dog bite management

Bangladesh: Rabies Control to Elimination

Acknowledgements





Together we'll make

Rabies free Bangladesh before 2030!

Thank You