

Challenges and Successes of Rabies PEP: Notes from an LMIC

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**United Against Rabies
Meeting**

23 – 25 September 2024
Cape Town, South Africa



Who wants to “own” dog bite/rabies?

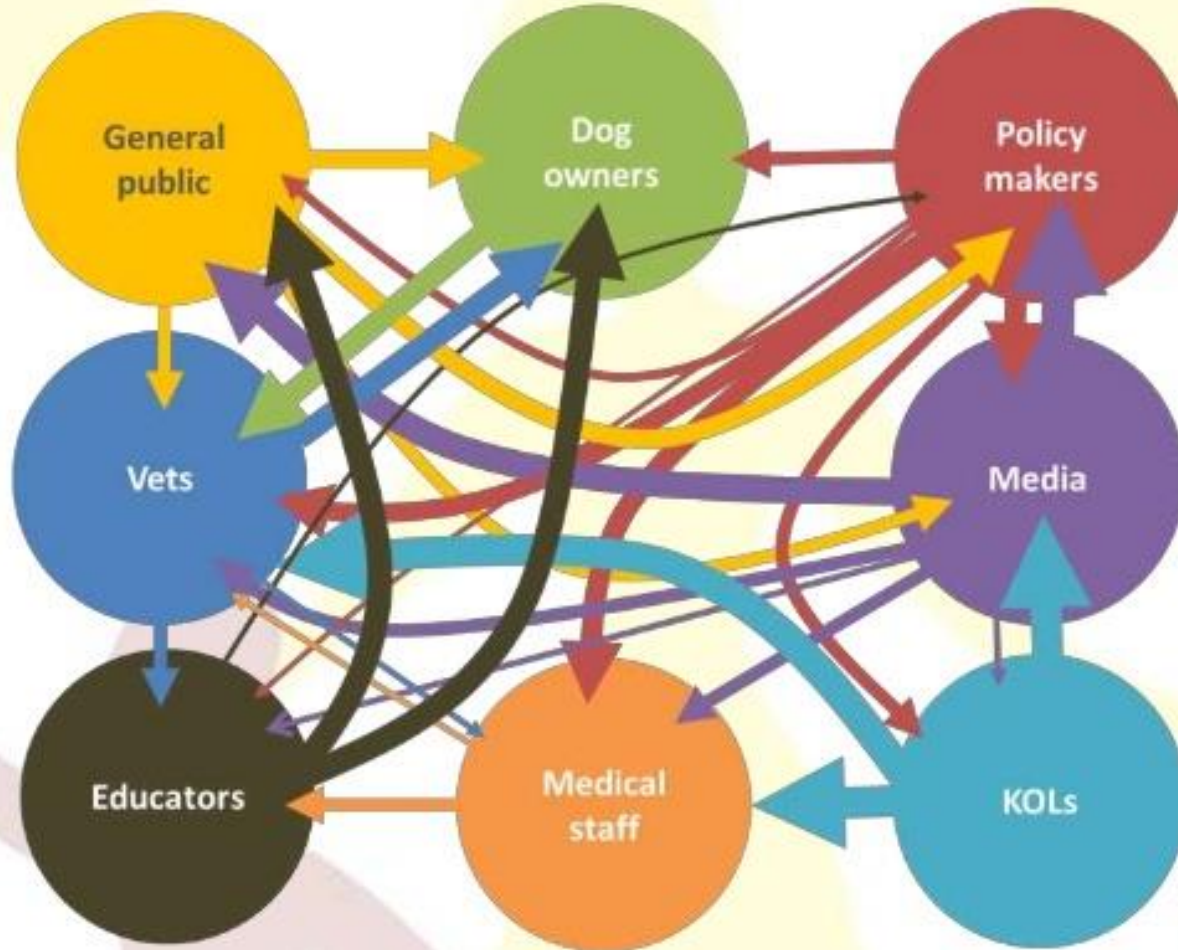
- No medical discipline
- No government body
- Not Animal Health Department
- Not veterinarians
- Not Civil Society
- Not environmentalists
- Not epidemiologists

Rabies remains WHO's *Most Neglected Tropical Disease*

Rabies Influence Map



Rabies influence map



Who should be involved in the One Health Approach to eliminate rabies

General public, dog owners, Policy makers, Public health officials, city officials, veterinarians, doctors, educators, community, industry, civil society members and Key Opinion Leaders

Indus Hospital and Health Network



IHHN is a network of primary, secondary, and tertiary care health facilities providing quality healthcare in Pakistan. It was opened in 2007 and now has 12 hospitals and >10 satellite clinics.

- **Free-of-cost**
- **Paperless**

The catchment population in Karachi comprises a multi-ethnic population of approximately 2.5 million population.

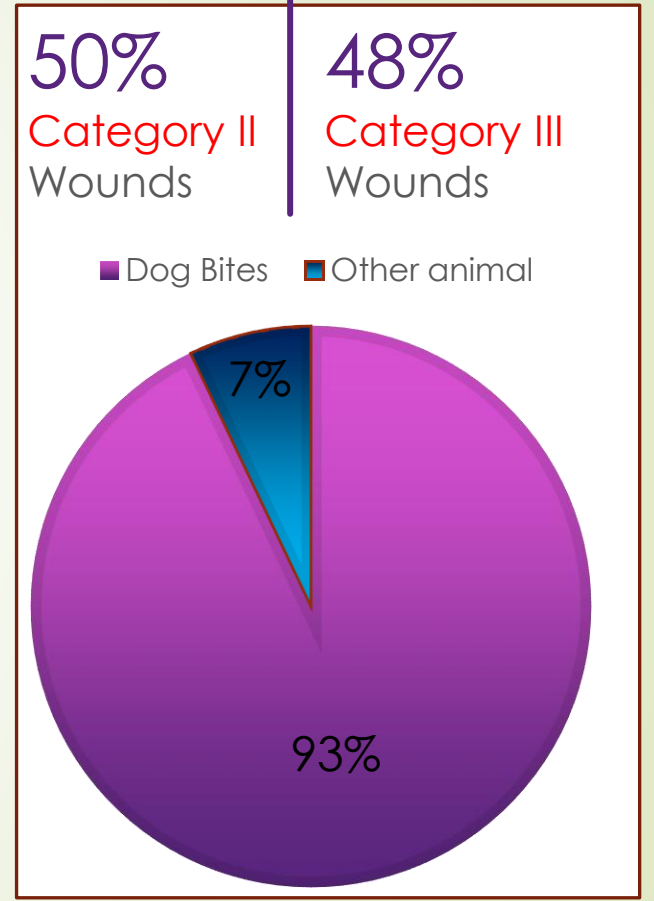
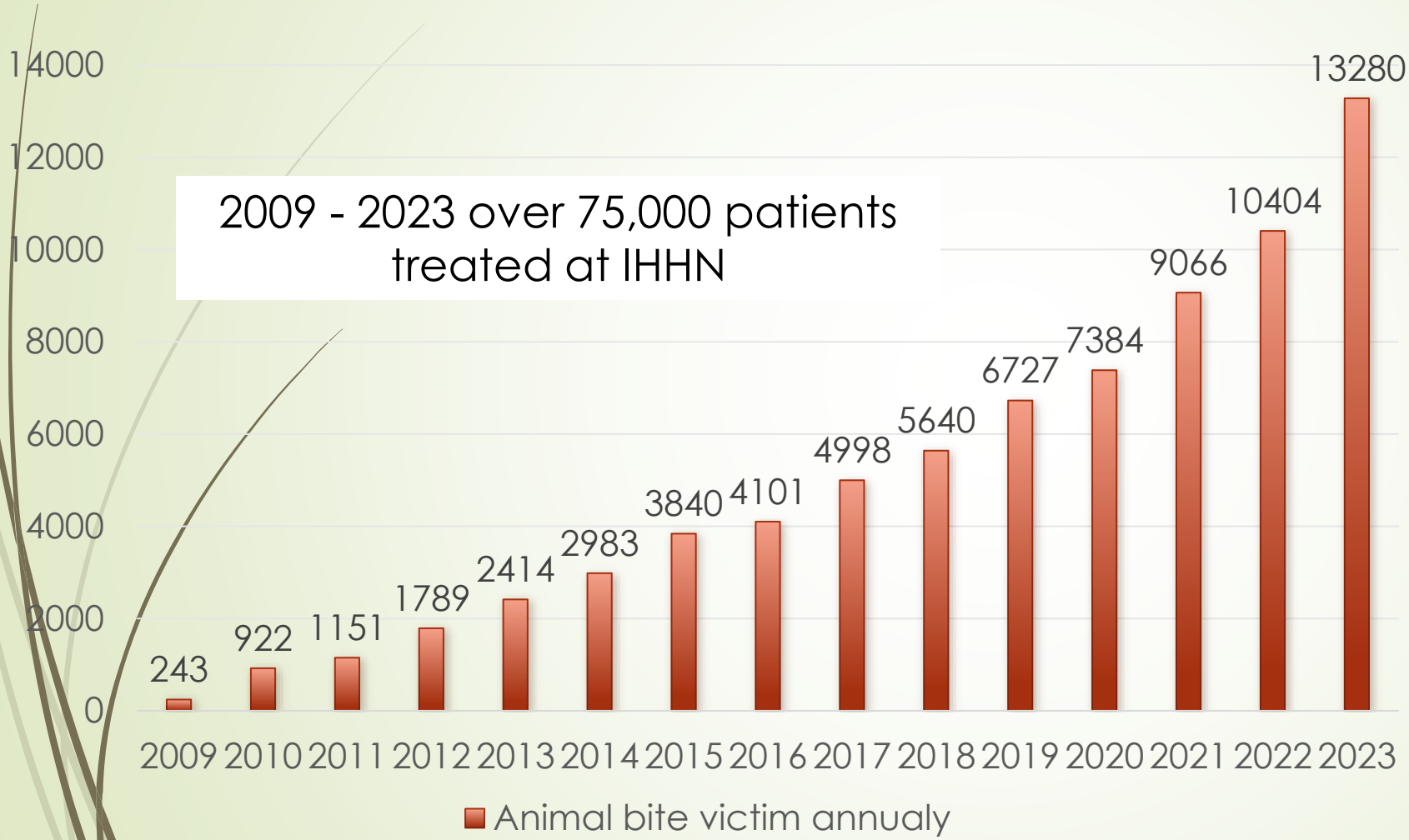
There are more than 190,000 registered dogs in Pakistan and at least another **3 million stray dogs**. According to a study, **more than one million dog-bite cases are reported across Pakistan annually**, and around 2,000- 5,000 people die of rabies every year.

“Dawn” 13-May-2023

Sindh province reported 200,000 bites Jan-Oct 2023



Post Exposure Prophylaxis (PEP) at The Indus Hospital Korangi Karachi



Challenges for Post Exposure Prophylaxis (PEP)



Lack of
community
awareness



Poor knowledge,
attitudes and
practices
amongst doctors
and paramedics



Inadequate
understanding
of cell culture
vaccines and
RIG
applications



**Frequent
stockouts of ARV
and RIG**



**PEP
considered to
be
unaffordable**

Meeting the Challenges at IHHN One by One

- Dog bite treatment center uniformly practices 2018 WHO-recommended PEP
- PEP training centers in Sindh for HCPs
- Published Guidelines
- Raise awareness amongst the public and healthcare professionals.
- Clinical and Lab Research and publications
- One Health Approach Proof of Concept
- Managing patients with Rabies

RABIES PREVENTION AND TRAINING CENTER since 2009



Rabies Vaccine*



- Brands
- Volume 0.5/1 ml
- Prequalified/not
- Evolving IM/ID schedules
- Package insert: “for IM use”
- Storage of reconstituted vax
- Interchangeable brand/route
- Re-exposure
- Borderline Category 2/3

* WHO/ GLOBAL MARKET STUDY FOR HUMAN RABIES VACCINE DECEMBER 2020
https://cdn.who.int/media/docs/default-source/immunization/mi4a/human-rabies-vaccine-market-study_public_summary.pdf

Rabies Immunoglobulin



Misconceptions:

HRIG is “superior but unaffordable”

ERIG is “unsafe”

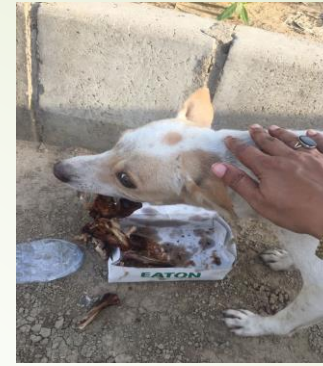
- Pre-2018: infiltrate wound, inject remaining into distant muscle
- Post-2018: into wound **only**
- eRIG is safe; skin test not required
- eRIG is noninferior to hRIG
- If vaccine was injected 8 days back, now what?
- Saliva in eye

CHANGES ARE NOT TRANSLATED INTO TEACHING OF HCPs

Regimen History

Regimen	Visits	Schedule	Vials	Route	Approval
NTV	14	Daily	Multodos e	S/c abd wall	1980 declared obsolete
Zagreb	3	0,7,21	4	IM	WHO 1992
Essen	4 (5)	0,3,7,14 (28)	4 (5)	IM	ACIP 2009
TRC ID	5	0,3,7,28,90	1	ID	TRC 1984
TRC updated	4	0,3,7,28	0.8	ID	WHO 2006
IPC 1 - week	3	0,3,7	0.6	ID	WHO 2018

Risk Assessment and WHO Wound categorization



Wound Category	Description	WHO Recommendation
Category 1	Touching / feeding of animals: intact skin	No exposure; Reassurance only
Category 2	Nibbling on uncovered skin: minor scratches or abrasions without bleeding	Moderate risk; vaccinate only
Category 3	Single or multiple transdermal bites or scratches; contamination of mucous membrane with saliva (eye, mouth)	High risk: vaccinate plus RIG

3-Day Training Workshops for government and NGO HCPs and clinics

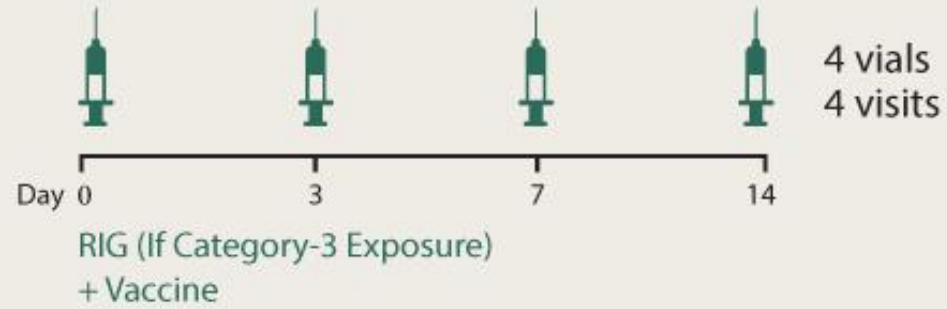
Prerequisites:

1. Suitable wound wash facility
2. Supply of Rabies Vaccine
3. Supply of equine RIG



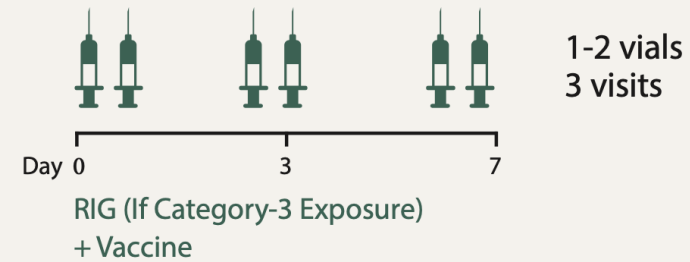
ESSEN IM Regimen

1-Vial/dose intramuscular into deltoid on each of days



IPC ID Regimen

2-Site Intradermal Regimen (2-2-2) 0.1 ml i.d. per site



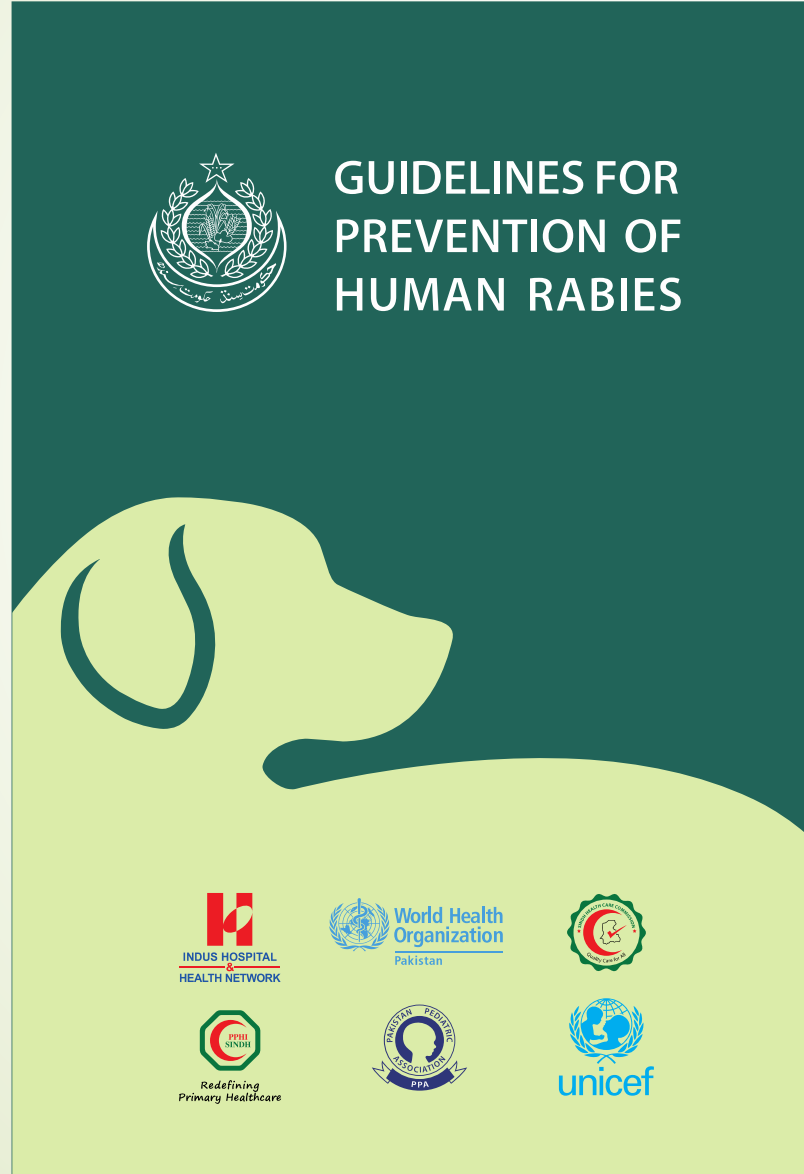
2 site ID IPC regimen is economical and equally effective, must be promoted in high-burden clinics

Rabies PEP Trainings 2021-23 through IHHN

- 29 health facilities identified in Sindh



Guidelines 2024





Awareness



World Rabies Day: every year since 2007
More than 30 PEP workshops and lectures
Advocacy in print media, radio, TV talk shows



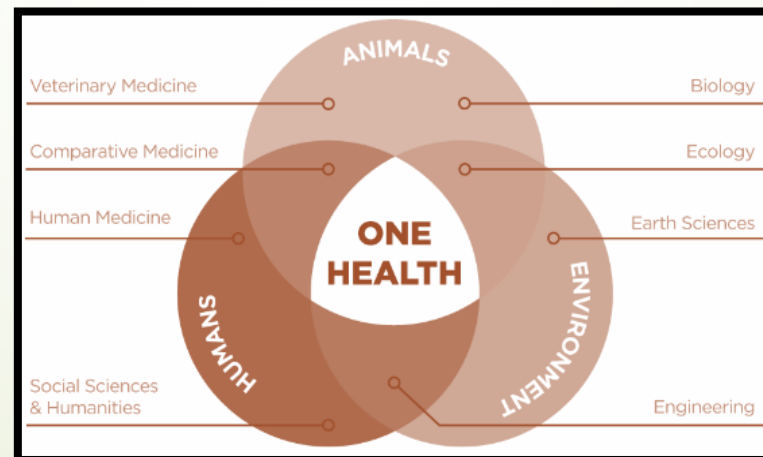
WRD 2014





One Health Approach: IHHN's Proof of Concept

- Vaccinating 70% of unowned dogs in an area will produce herd immunity against rabies.
- Sterilization surgeries will enable control of rising dog population



WHO Expert Meetings - the catalyst to One Health

**Bangkok, Thailand
(Apr 2017)**



Geneva, Switzerland (Jul, 2017)



**Amol, Iran
(Oct, 2017)**



Introducing OH to the community

July, 2017



Community Engagement



Daniel Stewart, Animal Behaviourist / Trainer



Modified van for dog-catching



Training for Mass Dog Vaccination

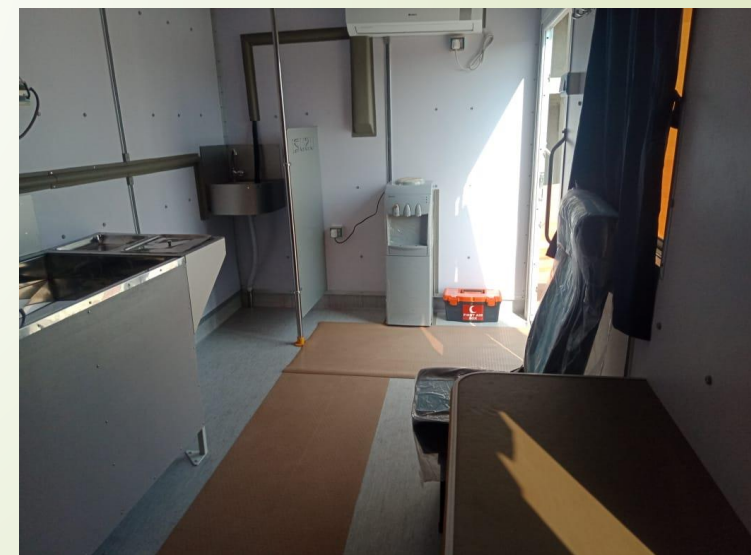


Data Collection for Mass Dog Vaccination





2 surgical
units



Animal Birth Control (ABC)



Rehabilitation after surgery



End of 12-day Training



Rabies Free Pakistan 2018-2021



Google My Maps

Jan '18 – Aug 2021
MDV: 31,912
ABC: 8,423

Rabies Free Pakistan Statistics (Karachi)

Mass Dog Vaccination				Animal Birth Control		
	2018	2019	2020	2018	2019	2020
Jan	465	743	877	Jan	10	115
Feb	396	867		Feb	-	69
Mar	583	1,154		Mar	77	125
Apr	474	255		Apr	133	202
May	245	-		May	194	148
Jun	191	268		Jun	157	70
Jul	465	809		Jul	183	132
Aug	276	411		Aug	178	40
Sep	261	510		Sep	191	56
Oct	2,359	413		Oct	209	108
Nov	2,373	515		Nov	78	59
Dec	4,763	784		Dec	60	190
Total	12,851	6,729	877	Total	1,470	1,314

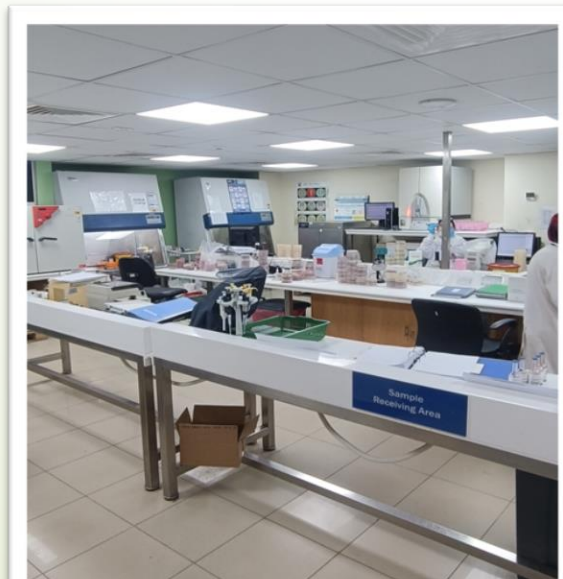
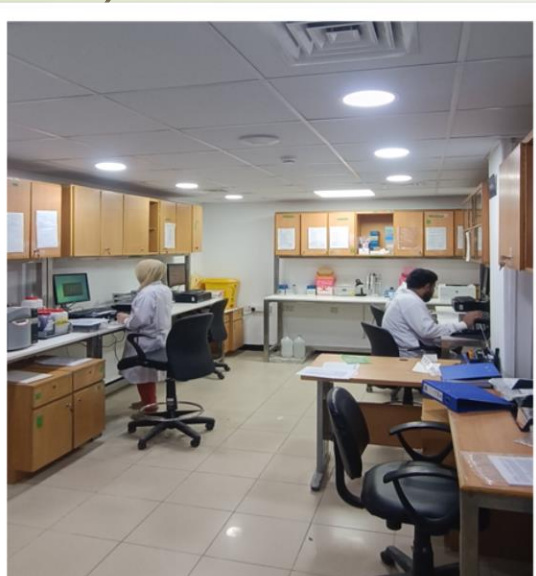
MDV to date: 19,580

ABC to date: 2,940

*Oct-Dec 2018 field work with 8 field teams

map data ©2020 Terms

Research in Molecular Pathology Lab at IHHN





Management of human Rabies

- Rabies diagnosis is usually syndromic.
- Lab Dx is invasive procedure, difficult to confirm, costly, time-consuming
- CSF may reveal neutralizing antibodies, PCR pos RV

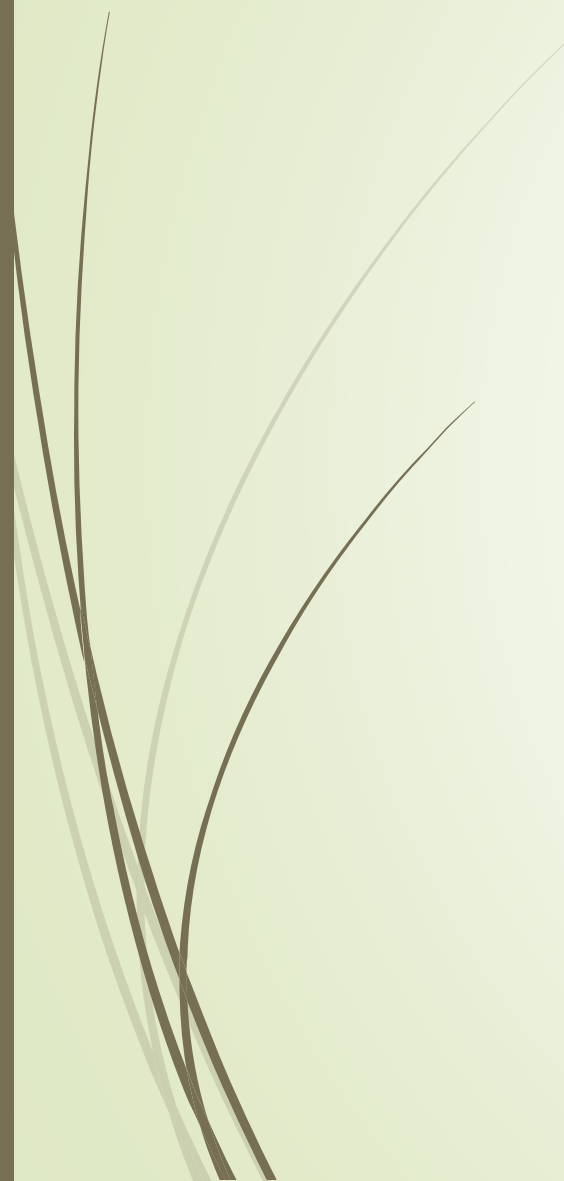
Differential Diagnoses

In early stages of encephalitis rule out:

- Cerebral malaria
- Endemic viral encephalitides
- Bacterial meningitis
- Tetanus
- Botulism
- Intracranial disorders
- Toxins

A 6 year old with rabies





A 45 year old with rabie



If hospitalized:

- Compassionate counseling of family
- Isolate in quiet, darkened room, limit staff
- Palliative care
- No lab tests
- DO NOT intubate
- Do not restrain
- Start IV fluids to rehydrate
- Control seizures
- Sedate heavily with benzodiazapene, until disease process ends life



Key messages for decision and policy makers in LMICs

- Establish National Rabies Program
- Make Rabies a notifiable disease
- Establish surveillance system



Key messages for decision and policy makers in LMICs

- Establish PEP centers in district hospitals **with dedicated wash area**
- Train HCP for PEP
- Promote 1-week IPC regimen
- Sustainable supply of eRIG
- **Sustainable supply of quality vaccine**

Long Road Ahead



**But all can be done if
the will is there**

Thank You