

WORLDWIDE
HUMAN RABIES DEATHS > 60,000

- MORE THAN:
- JAPANESE ENCEPHALITIS
- POLIO
- MENINGOCOCCAL MENINGITIS
- YELLOW FEVER
- SARS
- BIRD FLUE



RABIES DEATHS AND PEP

	INDIA	CHINA	OTHER ASIA	AFRICA
BITES	1,300,000	1,100,000	961,000	793,000
DEATHS	19,290	2,217	9,328	23,979
TOTAL WORLDWIDE DEATHS				> 55,000
PREDICTED DEATHS ABSENCE OF ANY PEP:				> 324,707
PREDICTED DEATHS IF ALL CAT III GIVEN RIG:				???

(WHO project 2005, in print, FX Meslin, Geneva,
Estimates made on basis of survey data)

















RABIES VACCINES

- **HDCV** **France, Germany, Canada, India**
- **PVRV** **France, India, Columbia, China**
- **PCEC** **Germany, India, Japan**
- **PDEV** **Switzerland, India**
- **PHKC** **China, Russia, Central Asian Republics**
- **SMB** **South America, Vietnam, Cambodia**
- **Semple** **India, Bangladesh, Nepal, Pakistan, Africa**

Blue are WHO recognized products

Black are recognized locally only

Red are WHO condemned products

WHO APPROVED PET REGIMENS

ESSEN IM REGIMEN (5 VISITS)

- 1 IM DOSE DAY 0,3,7, 28

ZAGREB OR 2-1-1 IM REGIMEN (3 VISITS)

2 IM DOSES DAY 0 AND 1 DOSE DAY 7, 21

THAI RED CROSS ID REGIMEN (4 VISITS)

2 ID DOSES (0.1 ML) AT 2 SITES DAY 0,3,7,28

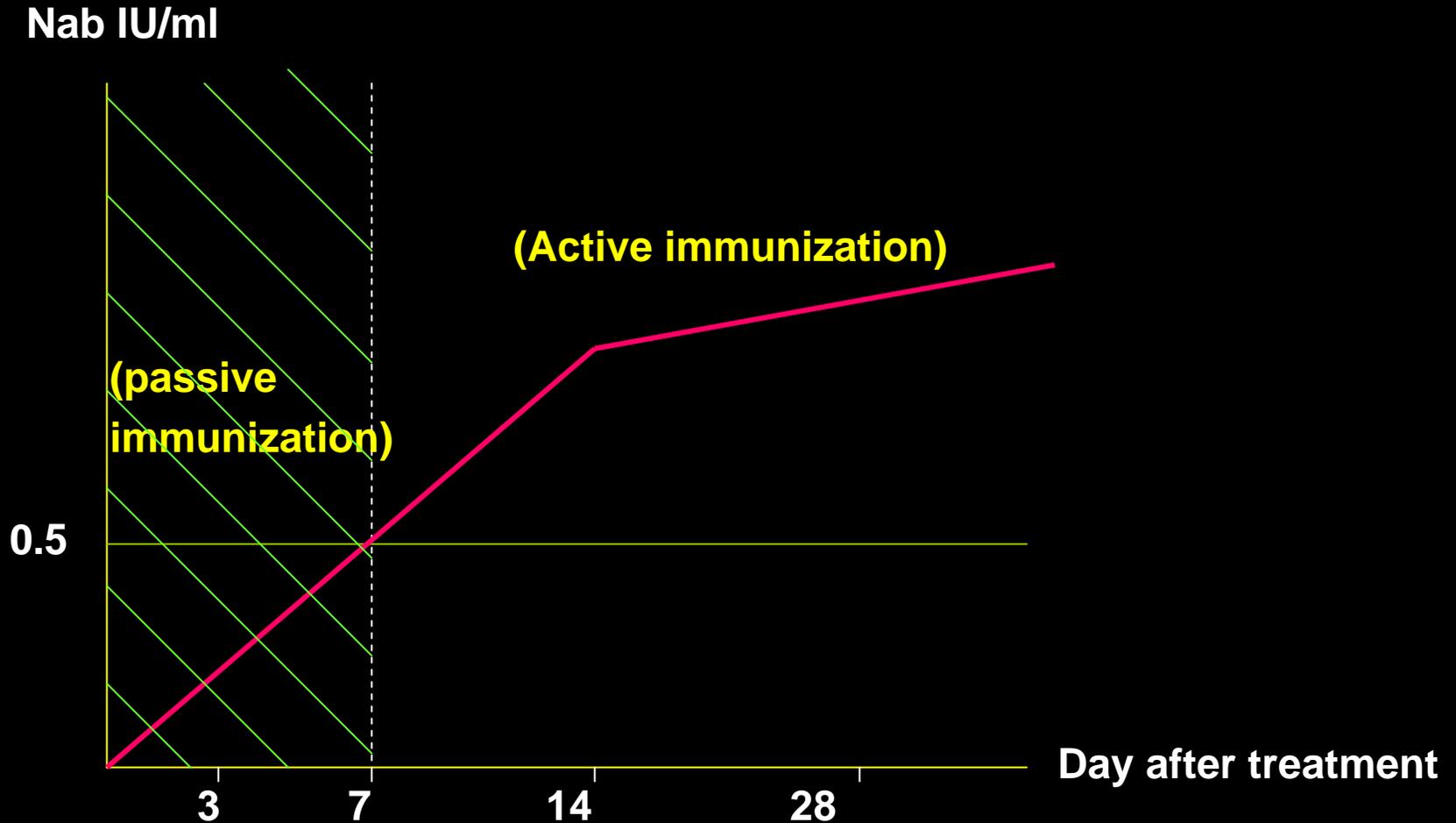
OXFORD 8-SITE ID REGIMEN (5 VISITS)

8 ID DOSES DAY 0, 4 ON DAY 7, 1 ON DAY 28, 90.

INTRADERMAL VACCINES, WHY?

- RABIES VACCINE IN INTRADERMAL USE SINCE 1984
- SAVES UP TO 75% IN VACCINE COST PER PET CASE
- SAFETY AND EFFICACY PROVEN IN OVER 100,000 CASES (THAILAND ALOONE)
- APPROVED BY WHO, THAI, PHILIPPINE, SRI LANKAN, SWISS AND NOW ALSO INDIAN GOVERNMENTS

Post-exposure rabies treatment



IMMUNOGLOBULIN INJECTION



CAUSES OF PEP FAILURES

1. NO WOUND CLEANSING
2. VIRUS INOCULATED INTO NERVE
3. INCOMPLETE VACCINE REGIMEN
4. VACCINE INJECTED INTO FATTY TISSUE
5. NO RIG INJECTED INTO WOUNDS
6. THERE IS NO 100% SOLUTION

WHAT DO I USE TO INJECT THE WOUNDS?

- **HUMAN IMMUNE GLOBULIN?**
- **EQUINE IMMUNE GLOBULIN?**



RISKS FROM ERIG

CRUDE ANTISERUM: SERUM SICKNESS	20-50%
CRUDE ANTISERUM: ANAPHYLAXIS	?
WHOLE IgG: SERUM SICKNESS	<1-7%
PEPSIN DIGESTED SPLIT IgG: SERUM SICKNESS	1-6%
CHROMATOGRAPHY PURIFIED, SPLIT: SERUM SICKNESS	LOW
ERIG: ANAPHYLAXIS (QSMI) (1/>100,000)	.0013%
PENICILLIN: ANAPHYLAXIS	.032%

MOUSE CHALLENGE STUDY WITH RIGS

AMERICAN CAYOTE, THAI STREET- AND
ARAVAN STRAIN VIRUSES

<u>EXPERIMENT</u>	<u>SURVIVAL %</u>
CHALLENGED CONTROL HAMSTERS	0-2
HRIG	78
ERIG SUPER PURIFIED	15
ERIG NOT PEPSIN DIGESTED	77
ERIG OLD PASTEUR PEPSIN DIGESTED	53
ERIG QSMI PEPSIN DIGESTED	53
MONOCLONALS	90
MONOCLONALS + VACCINE	0

F.Cliquette (France) and C. Rupprecht (US-CDC),

Lumlertacha (US-CDC) , P.Pakamatz (QSMI)

(Aravan strain had high mortality in all groups, Lumlertacha 2006)

COST OF RABIES BIOLOGICALS

(TO TREAT 50 KG PATIENT)

IN US Dollars

	<u>USA +</u>	<u>THAILAND</u>
PCEC (5 x)	800.-	47.-
• PVRV (5 x)	--	47.-
• HDCV	800.-	--
• HRIG	560.-	500.- (Availability ?)
• ERIG	--	32.-
• Minimum PEP IM+RIG 1,350 +		79.-
• Minimum PEP ID+ERIG -		12.-
• Entry salary government clerk		100.-
•	+ Does not include MD and ER charges	

CONCLUSIONS

- **FRAGMENTING IgG REDUCES EFFICACY**
- **HRIG AND WHOLE IgG ERIG ARE BEST**
- **HRIG NOT GENERALLY AVAILABLE AND COSTLY**
- **ERIG NOT DIGESTED HAS HIGHER RATE OF SERUM SICKNESS (1-7%). THIS MUST BE ACCEPTED.**
- **CHROMATOGRAPHY AND HEAT TREATMENT OF ERIG NEEDS TO BE ABANDONED.**
- **RABIES MONOCLONAL TECHNOLOGY AVAILABLE. SHOULD REPLACE HRIG AND ERIG**
- **VECTOR CONTROL MUST BE PRIMARY GOAL**

What is needed?

CANINE RABIES CONTROL

Humane population reduction. How?

Sustainable vaccination of > 70% of dogs

Legislation and enforcement of dog control and vaccination

Education of population and professionals

OTHER NEEDS

Inexpensive rabies vaccines, HRIG and ERIG (INTERIM)

Production of rabies MABs for high and low cost markets