Rabies Epidemiology

Fourth Grade 2024

LECTURE OBJECTIVES

To clarify Rabies Agent-host-Env.

To outline Rabies Immunization

To Describe Pre & Post Exp. Prophylaxis.

Epidemiology of Rabies

Zoonotic acute viral encephalopathy of mammals (carnivorous) Progress into: **hydrophobia**, convulsions, resp paralysis & death (2-6) days.

60,000 deaths/year (1death/10min),

40%<15yrs (why?)

Dog bites: Endemic areas10-130/10^5 (Asia & Africa).

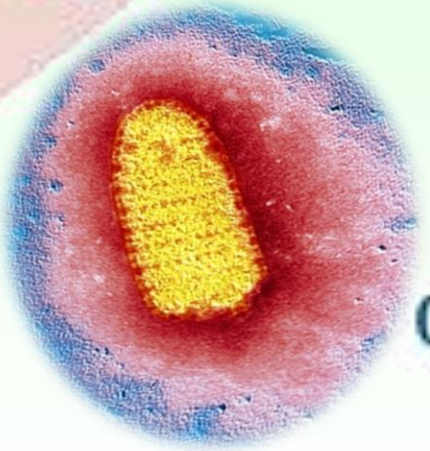
WHO ➔ zero death by 2030

Only always fatal communicable disease in man

- Urban (canine) type transmitted by dogs
- Sylvatic type transmitted by wild animals & bats.

Human and dog rabies cases are correlated world wide (years 1990-2015)

Human rabies cases



1000
100
10
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0.1 1 10 100 1000 10,000 100,000

Dog rabies cases

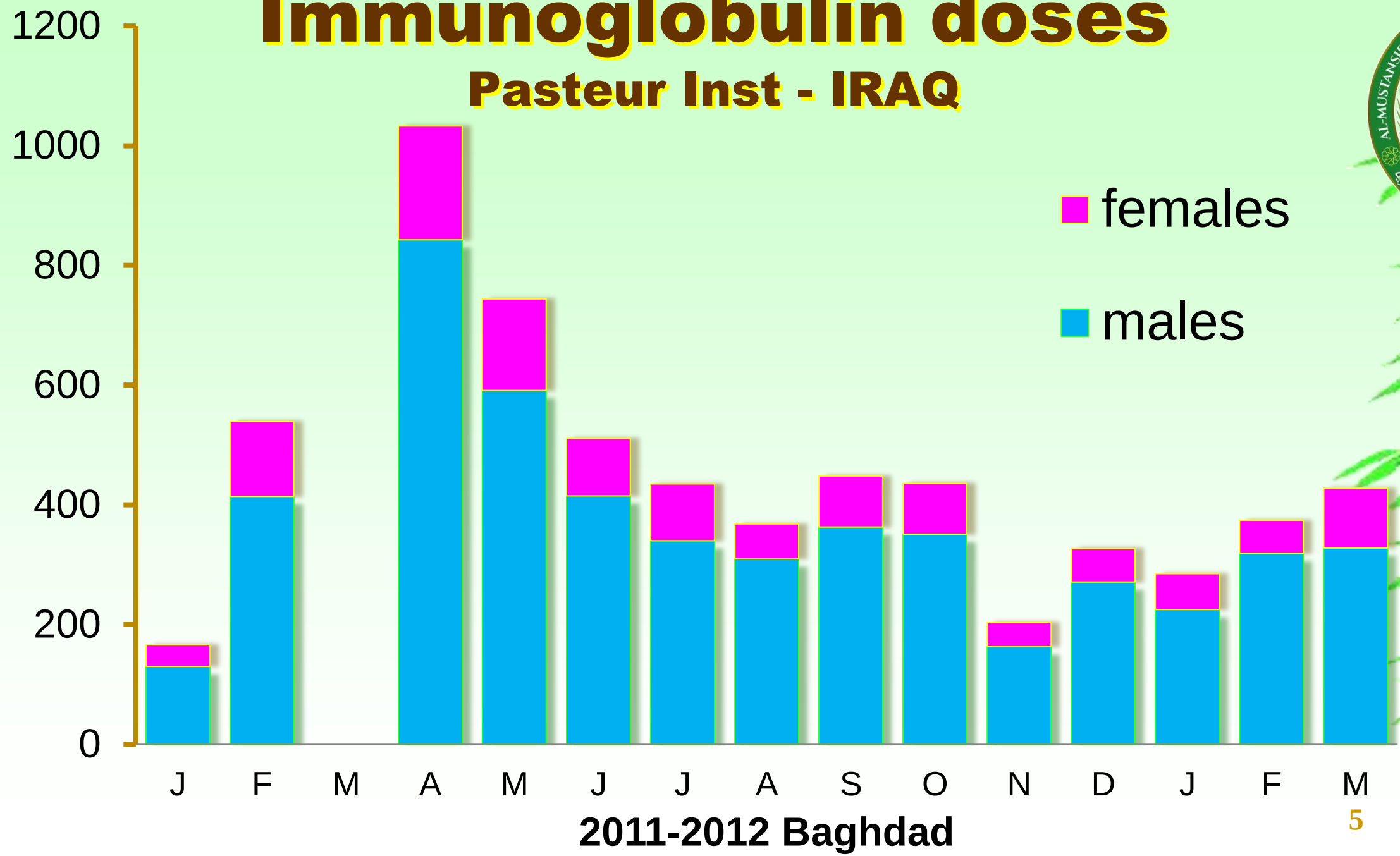
World Health Organization

Organisation mondiale de la Santé

AL-MUSTANSIRIYAH UNIVERSITY-COLLEGE OF MEDICINE 1975

Immunoglobulin doses

Pasteur Inst - IRAQ



2011-2012 Baghdad

Animal Diagnosis

Agent: Lyssavirus bullet shape RNA virus.
Host: warm blooded animals & man.
Diagnosis: by killing or testing the dead animal:

- FA staining of brain or infected tissue
- Microscopic exam of brain for Negri bodies.
- Mouse inoculation & Virus isolation test.

Diagnosis in man by clinical & post mortem is too late!

Reservoir

- Dogs: in developing countries
- Wild canines: (Enzootic): fox, wolf.
- Bats: America & Europe

Source of infection

Saliva of rabid animals

Modes of transmission

➔ Animal Bite or scratch: dog, fox
➔ Licks on abraded skin.
➔ Organ transplant: cornea
➔ Aerosol: bat caves, lab workers.
➔ Man to Man? Dead end infection

Incubation period

2-12 weeks

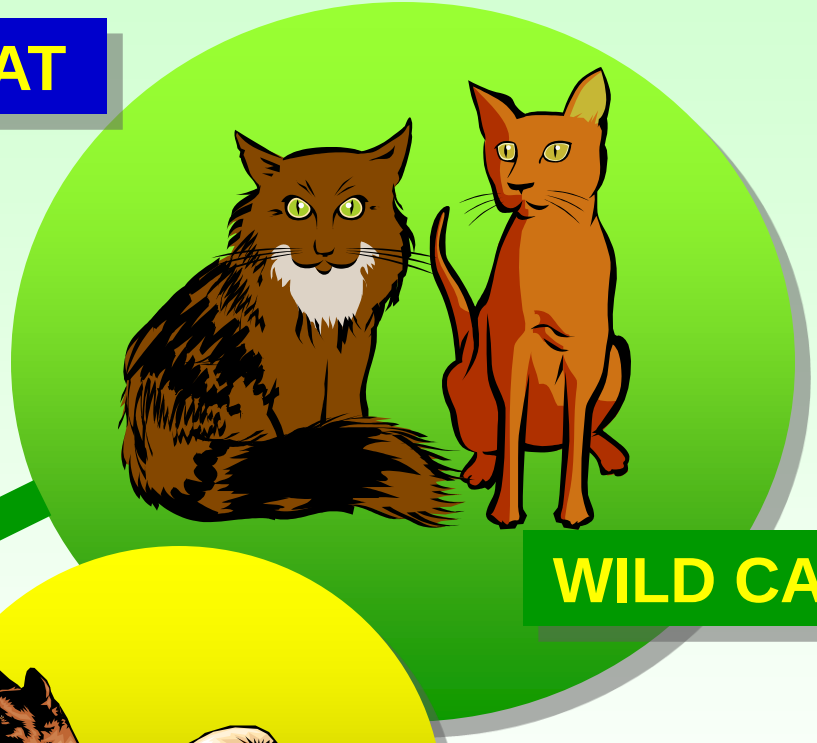
Only communicable disease with so variable and multi factor dependant:

Depends on:

1. Biting animal species
2. wound:
   - ❑ **Severity**
   - ❑ **Site**
   - ❑ **Distance from head**
3. Protection by clothing
4. **Immunoglobulin given**

Epidemiologic types

BAT



SYLVATIC TYPES

WILD CANINES

99%

DOG

URBAN (canine)TYPE

RABIES VACCINE (CCEEV)

Inactivated RABV

IM route: 1 ml vials Deltoid

ID route: 0.1 ml (more immunogenic) Thigh, Deltoid

Side effects: rare ➔ **Anaphylaxis**, **encephalopathy**

PrEP (Pre-exposure immunization):

Three doses: **IM days 0,7,21** (or ID 4 doses, day 0,0,3,3)

Boosters: after one year, then every 3 years

PEP (Post-exposure immunization):

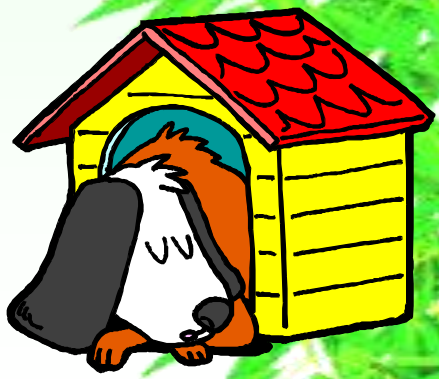
Previously immunized: **Two doses:** IM days 0,3
(or ID 4 doses day 0,0,0,0)

Not immunized: **Four doses:** **IM days 0,0,7,21**
(or ID 6 doses day 0,0,3,3,7,7)

Prevention (100% vaccine preventable)

- License & Immunize dogs
- Euthanize stray dogs
- Dog population control
- Active surveillance for epizootics
- Oral immunization for wild animals:

  using air-drop bait attenuated/recombinant vaccine
- **PrEP** for high risk people: lab workers, veterinarians , zoo personnel, hunters.

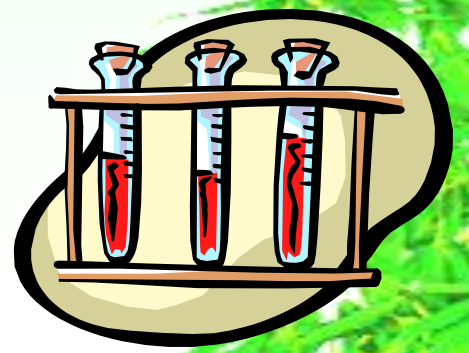


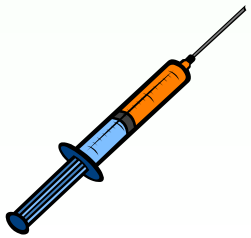
Passive immunization RIG

Neutralizing the RABV at wound site before immune system can respond to the vaccine by producing VNAs.

Two types of Rabies immunoglobulin:

- Max wound infiltration ASAP (<7days)
- hRIG: human (20 IU/Kg)
- eRIG: Equine (40 IU/Kg)





PEP: Post-exposure prophylaxis

➔ **Wound care, CCEEV, +/- RIG**

Done after animal bite, depending on:

- Category Classification: I, II, III
- Animal nature: wild
- Condition of bite: unprovoked bite
- Rabies surveillance: enzootic or epizootic
- Animal condition: diseased/dies within 10d.

Steps of Post-exposure prophylaxis

- ✓ Wound management: washing & flushing with water (+/- soap), then ethanol or povidine iodine, not suture or do it after RIG infiltration, antibiotics, tetanus booster vaccine, analgesics
- ✓ Post-exposure vaccination: series of doses **(only vaccine scheduale given after infection)**
- ✓ Passive immunization: RIG wound infiltration ASAP, except if previously immunized

Dog bites

Classification Categories

Previous Vaccine	Category I (Intact skin)	Category II (No blood)	Category III (blood)
No	Washing No PEP No RIG	Washing Immediate vaccine No RIG	Washing Immediate vaccine RIG
yes		Washing Immediate vaccine No RIG	

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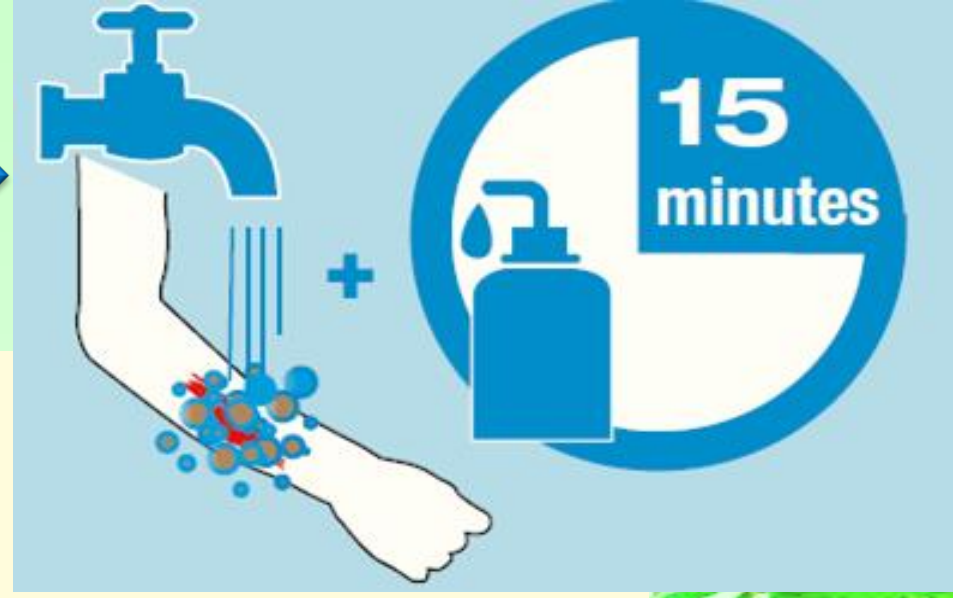
Wound Care



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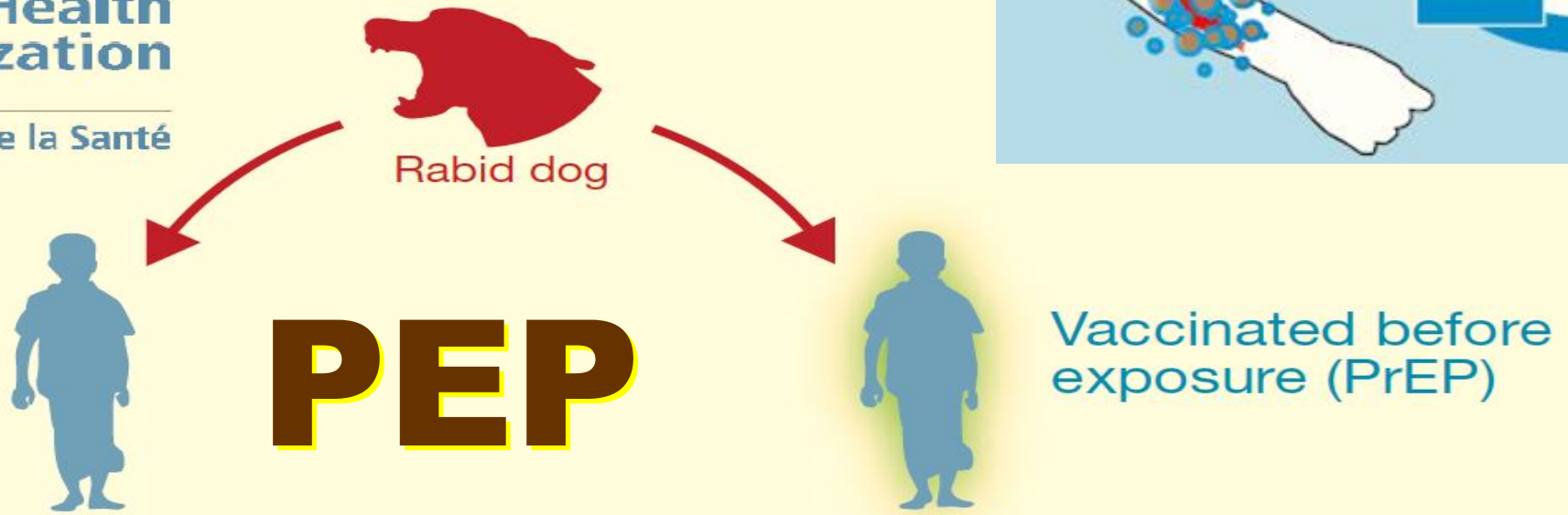

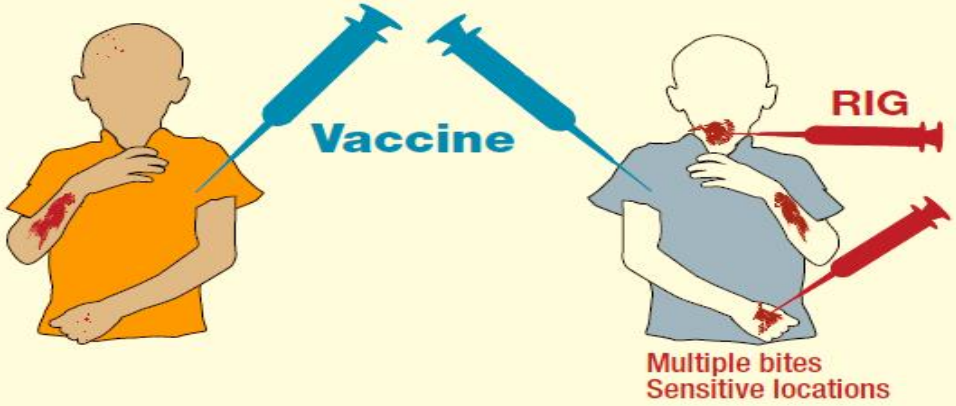

References

➔ WHO. Expert Consultation on Rabies; Third report 2018

➔ WHO. Rabies vaccines: WHO position paper; No 16: April 2018

➔ WHO-FAO. Eliminating Rabies Is An Achievable Goal, If We Work Together; Dec 2020

Thank you