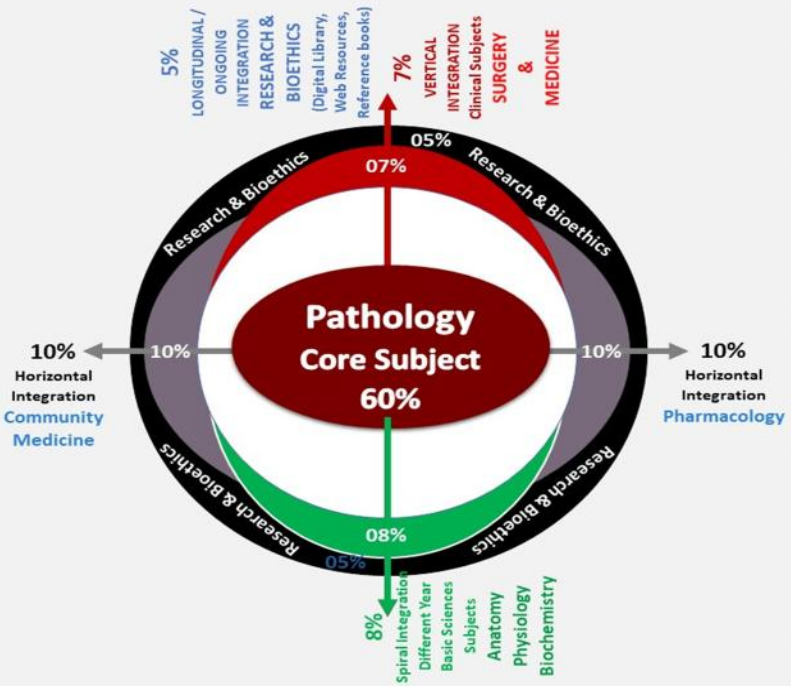
Prof. Umar, LGIS (Lecture) Model

Prof. Umar's Clinically Oriented Integration Model
For Basic Sciences Interactive Lectures

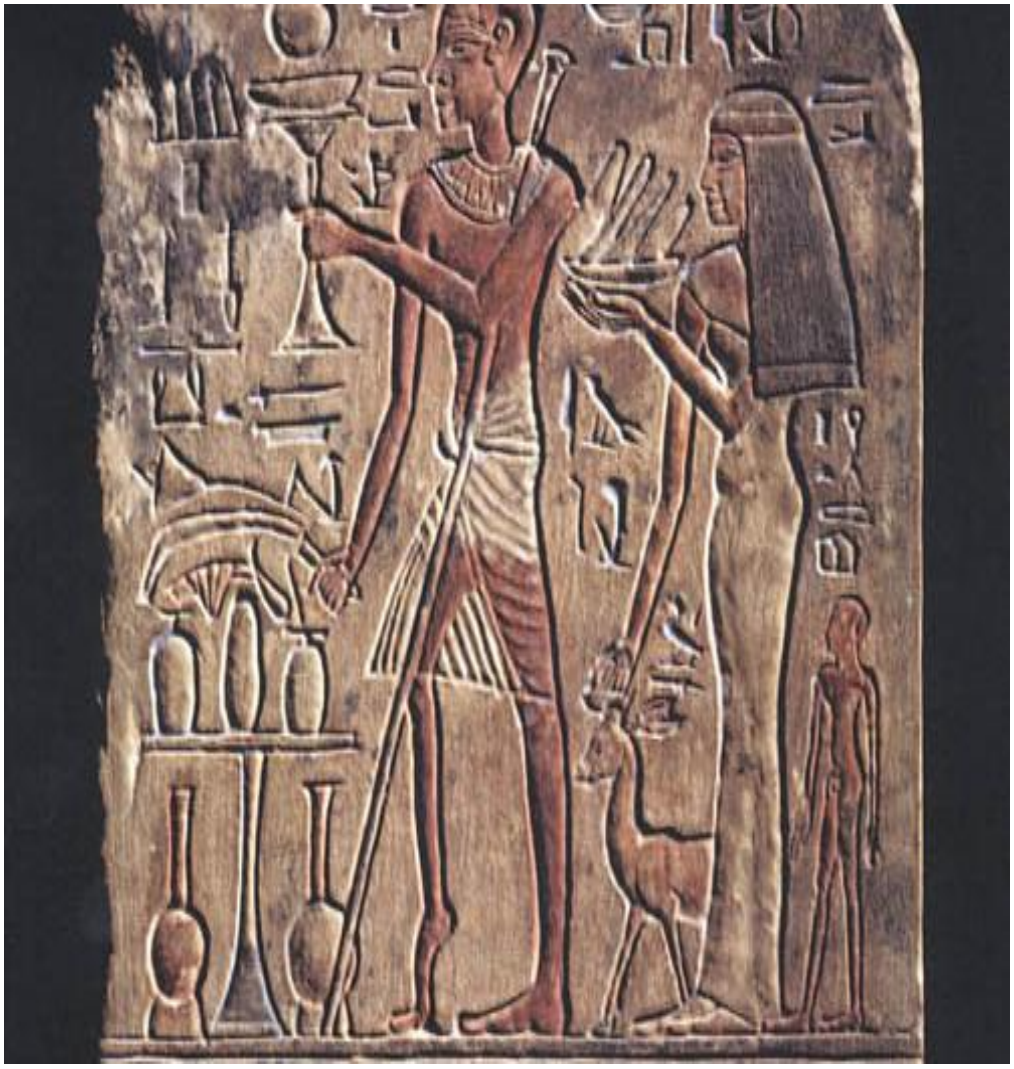


Model 3rd Year Pathology LGIS (≈30 slides)	
Core Subject – 60% (≈ 18-20 slides)	
Pathology (≈ 18-20 slides)	
Horizontal Integration – 20% (≈ 5-6 slides)	
Same Year Subjects	• Pharmacology (10%) (≈ 2-3 slides) • Community Medicine (10%) (≈ 2-3 slides)
Vertical Integration – 07% (≈ 2-3 slides)	
Clinical Subjects	• Medicine (3-5%) (≈ 1-2 slides) • Surgery (3-5%) (≈ 1-2 slides)
Spiral Integration – 08% (≈ 2-3 slides)	
Different Year Basic Sciences Subjects	• Anatomy (1-3%) (≈ 1-2 slides) • Physiology (1-3%) (≈ 1-2 slides) • Biochemistry (1-3%) (≈ 1-2 slides)
Longitudinal / Ongoing Integration – 05% (≈ 1-2 slides)	
Research & Bioethics (≈ 1-2 slides)	

RMU is thriving to upgrade the Integrated Clinical Oriented Modular Curriculum and Teaching. There are many deficiencies in this system which RMU has learned with five year experience of real ground experience. We have designed the teaching (lecture) model of integration, covering all components of vertical and horizontal and clinical integration along with continuous step ladder pattern of research, professionalism and ethic. This teaching strategy is in alignment with assessment principles of integrated modular curriculum.

LECTURE CONTENT ANALYSIS

CORE CONTENT	70%
HORIZONTAL INTEGRATION	15%
VERTICAL INTEGRATION	15%



An Egyptian Stele thought to represent a polio victim, 18th Dynasty (1403–1365 BC)

Poliomyelitis

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MBBS,FCPS

Assistant Professor, MU II, HFH

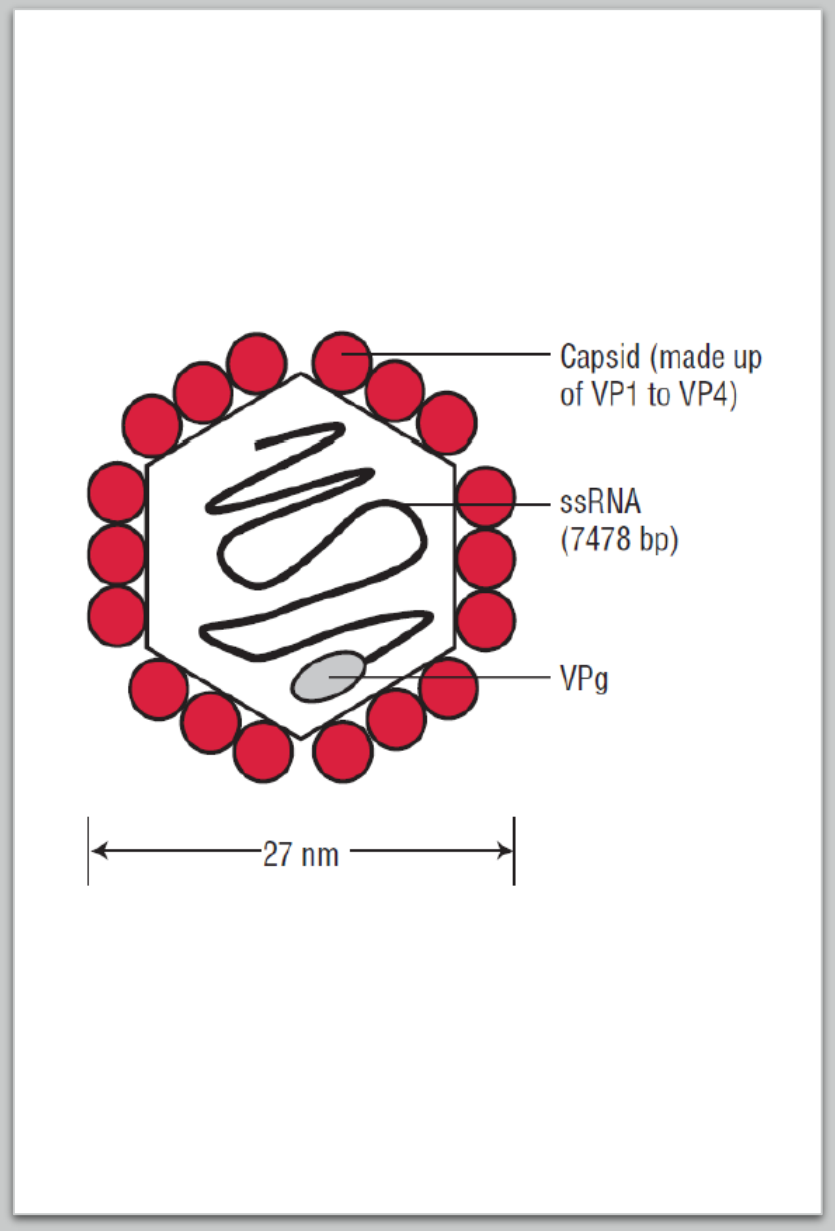
Learning objectives

At the end of this lecture students will be able to

- To know about epidemiology, pathogenesis of poliomyelitis.
- To know about clinical features, management, and prevention of the disease.

Poliovirus

- Poliomyelitis virus, an enterovirus type C
- Poliovirus is composed of an RNA genome and a protein capsid.
- The viral particle is about 30 nm in diameter with icosahedral symmetry.
- **3 Serotypes.**



Vaccine Associated Poliovirus

- OPV is live attenuated vaccine, and which can cause disease in individuals causing poliomyelitis.

History

The disease was first recognized as a distinct condition by the English physician Michael Underwood in 1789

The virus that causes it was first identified in 1909 by the Austrian immunologist Karl Landsteiner.

Major outbreaks started to occur in the late 19th century in Europe and the United States. In the 20th century it became one of the most worrying childhood diseases in these areas.

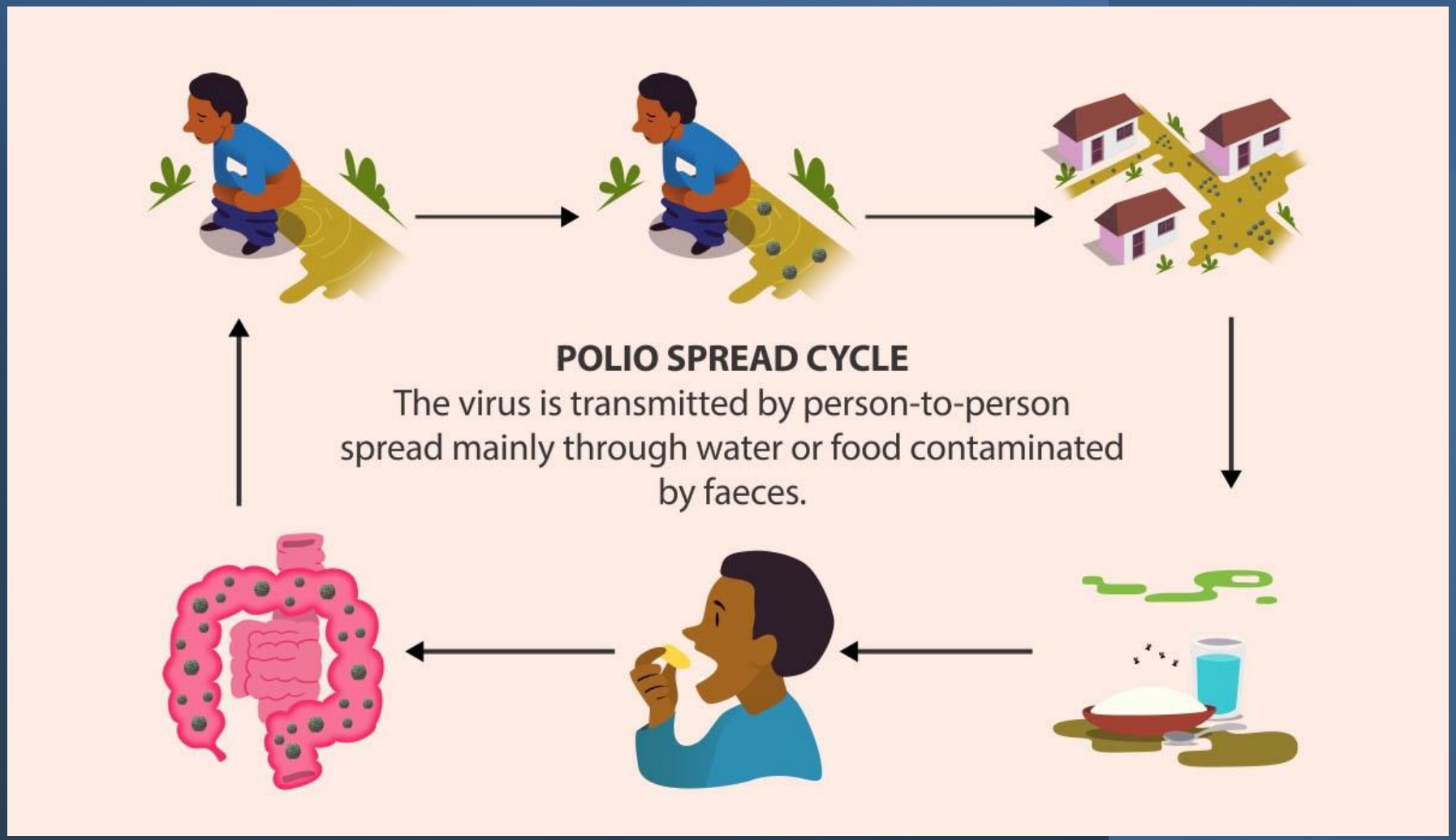
The first polio vaccine was developed in the 1950s by Jonas Salk.

Albert Sabin developed an oral vaccine, which has become the world standard.

Epidemiology

Since 2012 Pakistan, Afghanistan, and Nigeria remain the only countries with endemic poliovirus type 1 transmission.

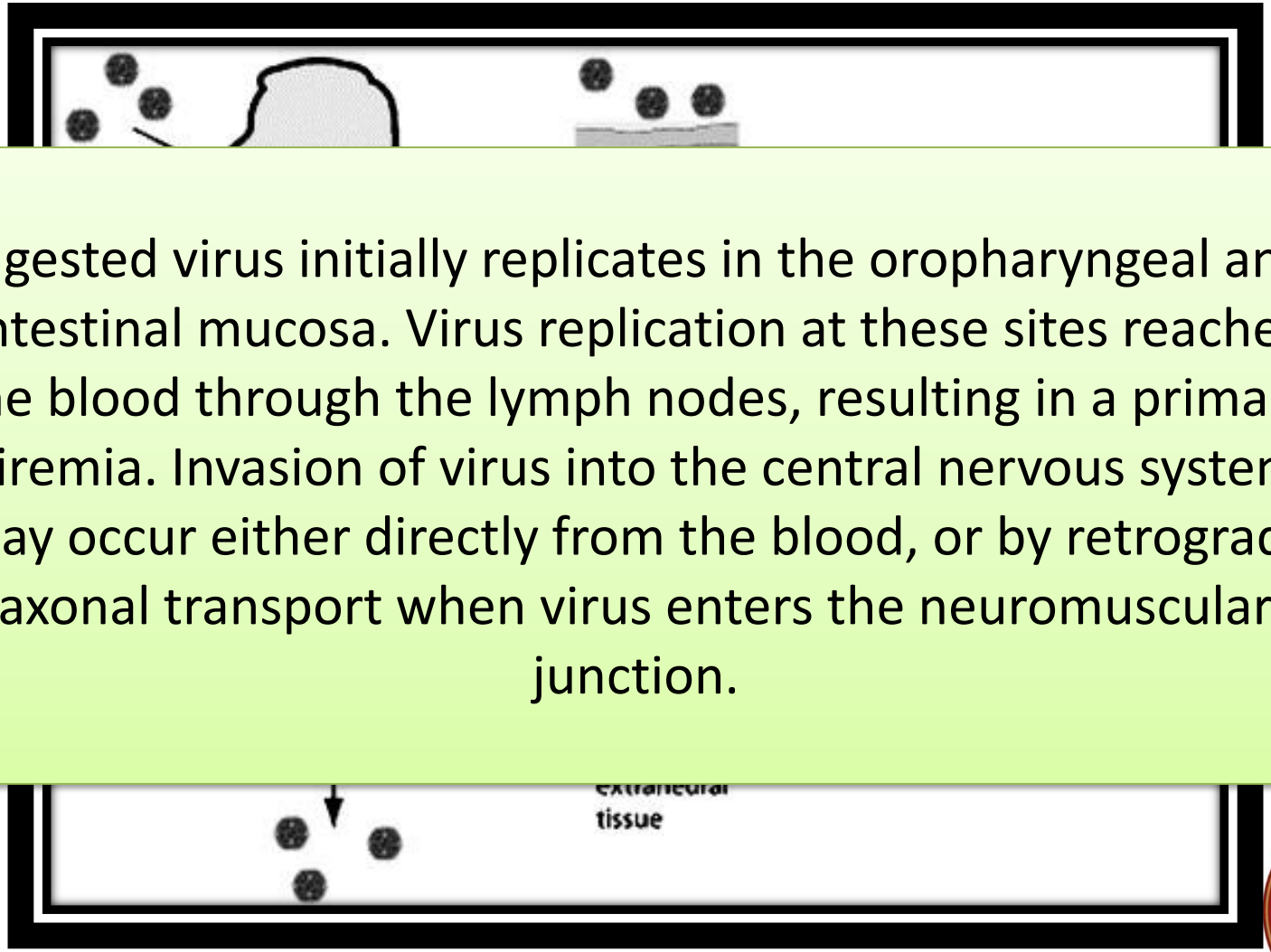
WPV1 cases in Pakistan decreased from 147 in 2019 and 84 in 2020 to a single case in 2021 but increased to 14 cases in 2022 as of July 31.


POLIO SPREAD CYCLE
The virus is transmitted by person-to-person spread mainly through water or food contaminated by faeces.

Transmission

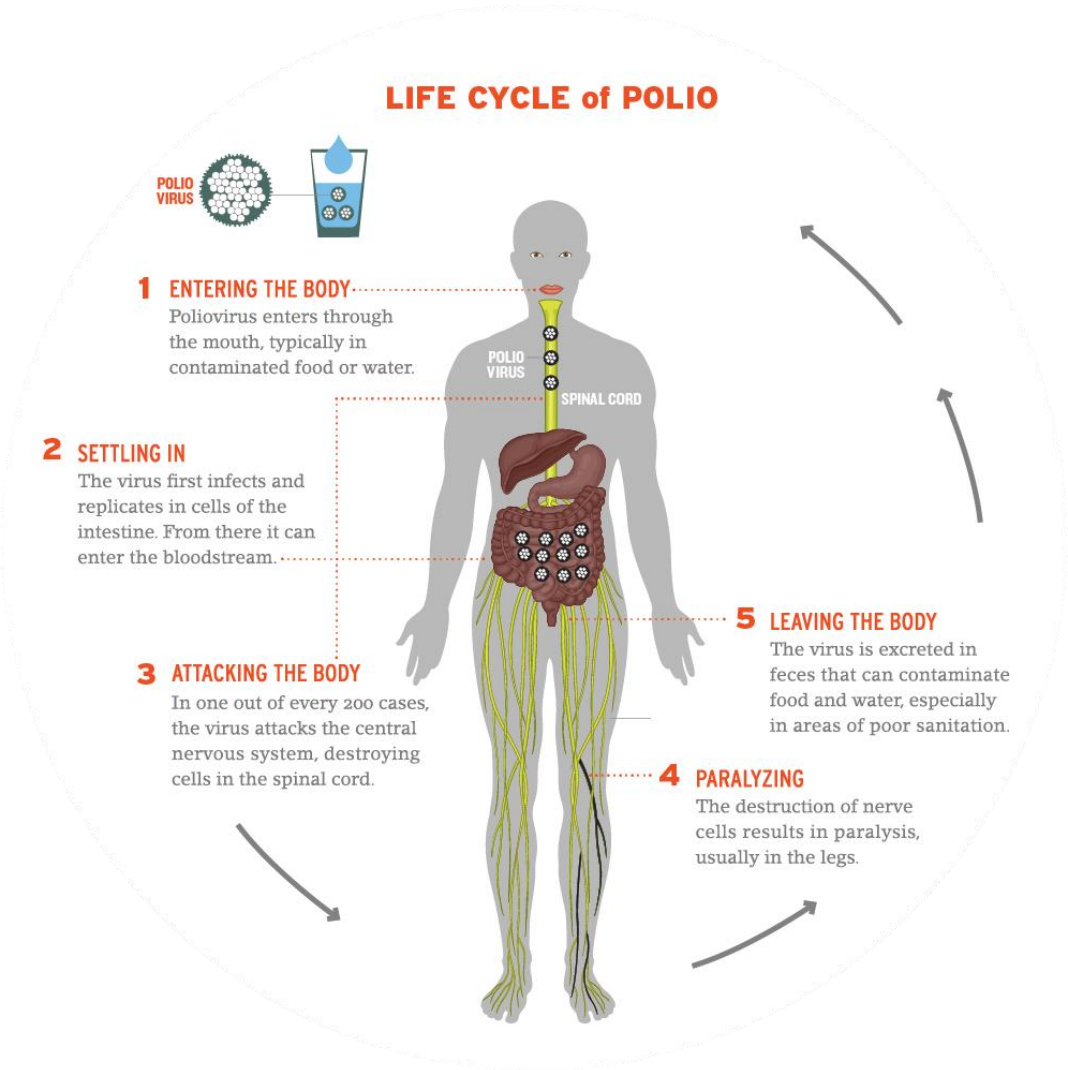
- **An infected person may spread the virus to others immediately before and up to 2 weeks after symptoms appear.**
- The virus can live in an infected person's feces for many weeks. It can contaminate food and water in unsanitary conditions.
- People who don't have symptoms can still pass the virus to others and make them sick.

Pathophysiology



Ingested virus initially replicates in the oropharyngeal and intestinal mucosa. Virus replication at these sites reaches the blood through the lymph nodes, resulting in a primary viremia. Invasion of virus into the central nervous system may occur either directly from the blood, or by retrograde axonal transport when virus enters the neuromuscular junction.

LIFE CYCLE of POLIO



Presentations

Incubation period is 7 to 14 days.

At least 95% of infections are asymptomatic.

Patients who become symptomatic can present with

Mild poliomyelitis	Nonparalytic poliomyelitis	Paralytic poliomyelitis

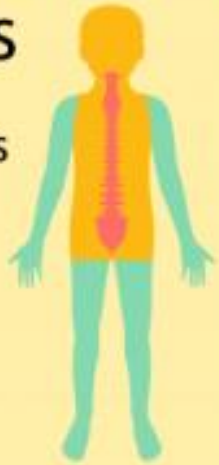
Post-poliomyelitis syndrome is the constellation of symptoms that affect polio survivors and is not infectious.

Acute Flaccid Paralysis

rapid-onset limb weakness

Acute Flaccid Myelitis

rapid-onset paralysis and weakness in one or more limbs with spinal cord lesions, most commonly in young children



Associated with:

- Poliovirus
- Enterovirus EV68
- West Nile Virus
- Adenovirus

Other AFP

Associated with many causes:

- HIV
- Tick bites
- Guillan Barre Syndrome
- Rabies
- Snake Venom

Information sources: Washington State Dept. of Health

POLIO

Contagious Viral Illness

Poliovirus Destroys Nerve Cells in the Spinal Cord → **Causing Muscle Wasting and Paralysis**

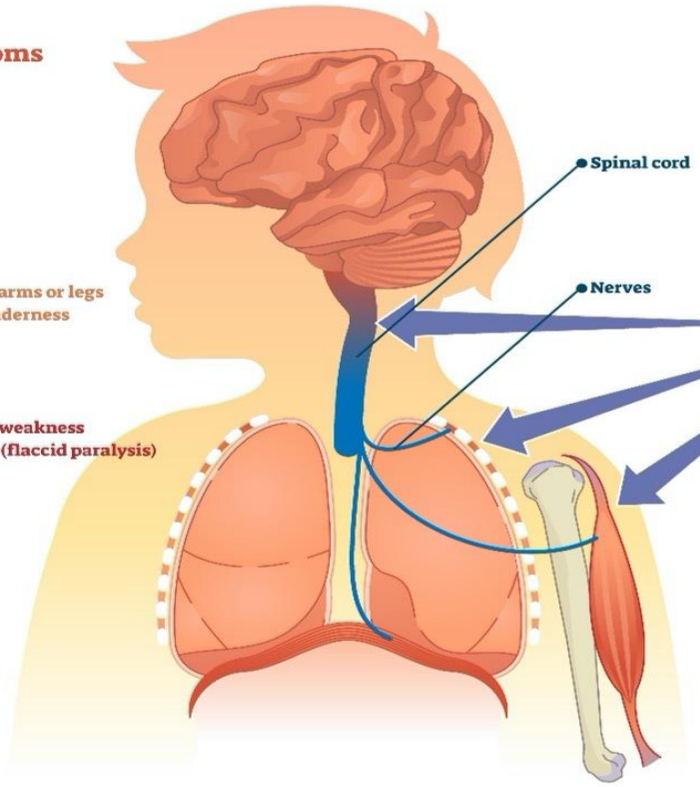
Signs and symptoms

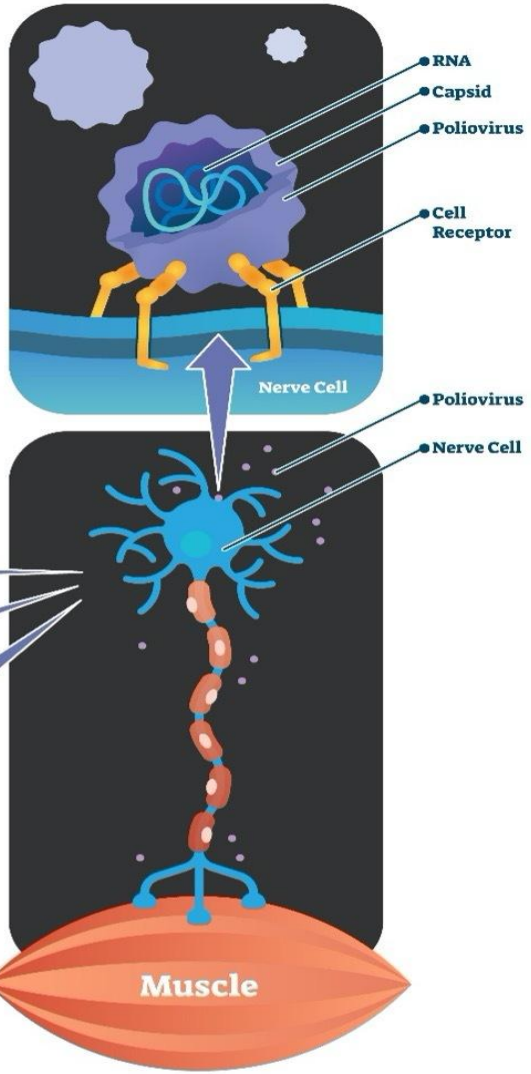
Nonparalytic polio

- Fever
- Sore throat
- Headache
- Vomiting
- Fatigue
- Back pain or stiffness
- Neck pain or stiffness
- Pain or stiffness in the arms or legs
- Muscle weakness or tenderness

Paralytic polio

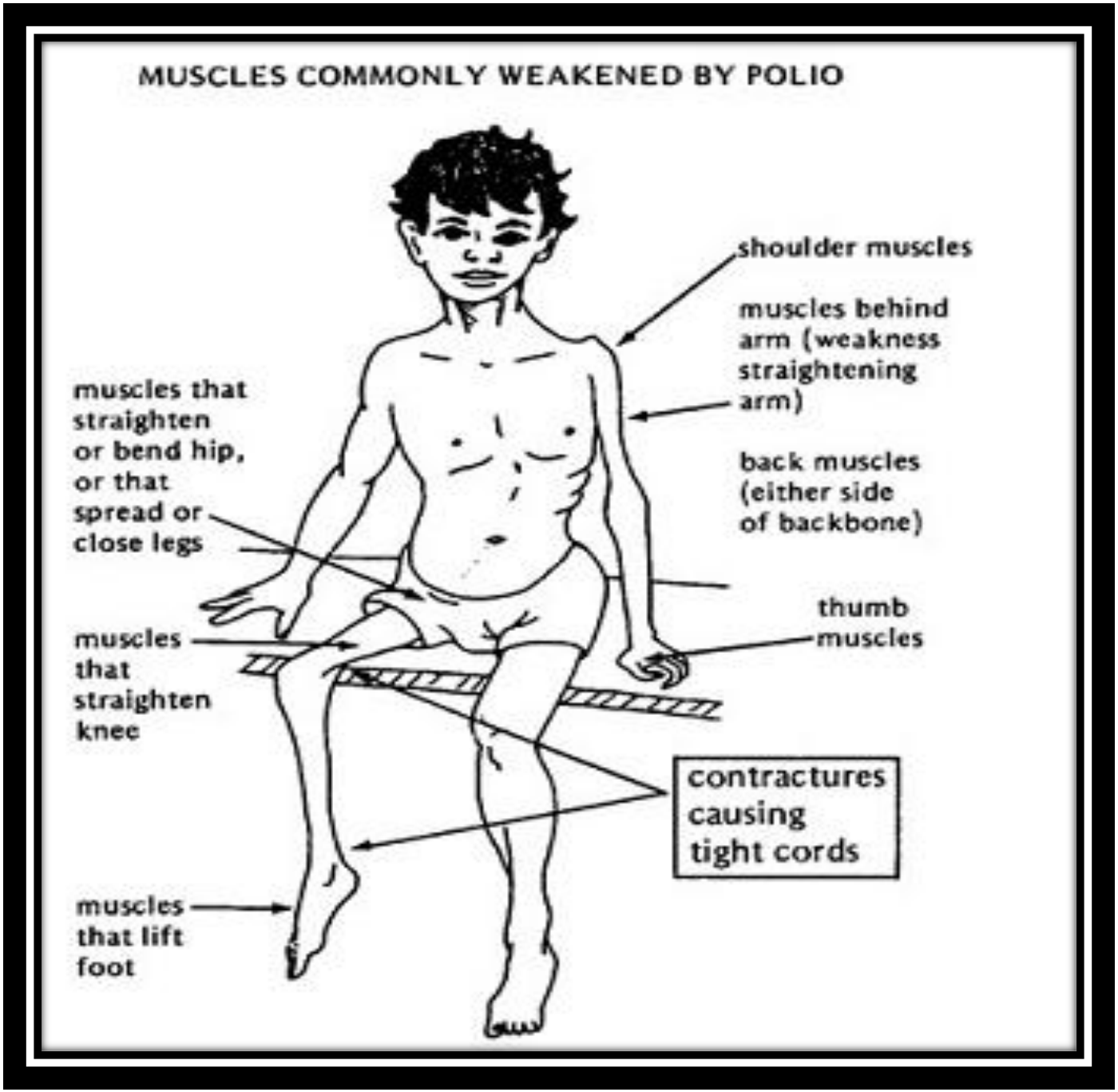
- Loss of reflexes
- Severe muscle aches or weakness
- Loose and floppy limbs (flaccid paralysis)



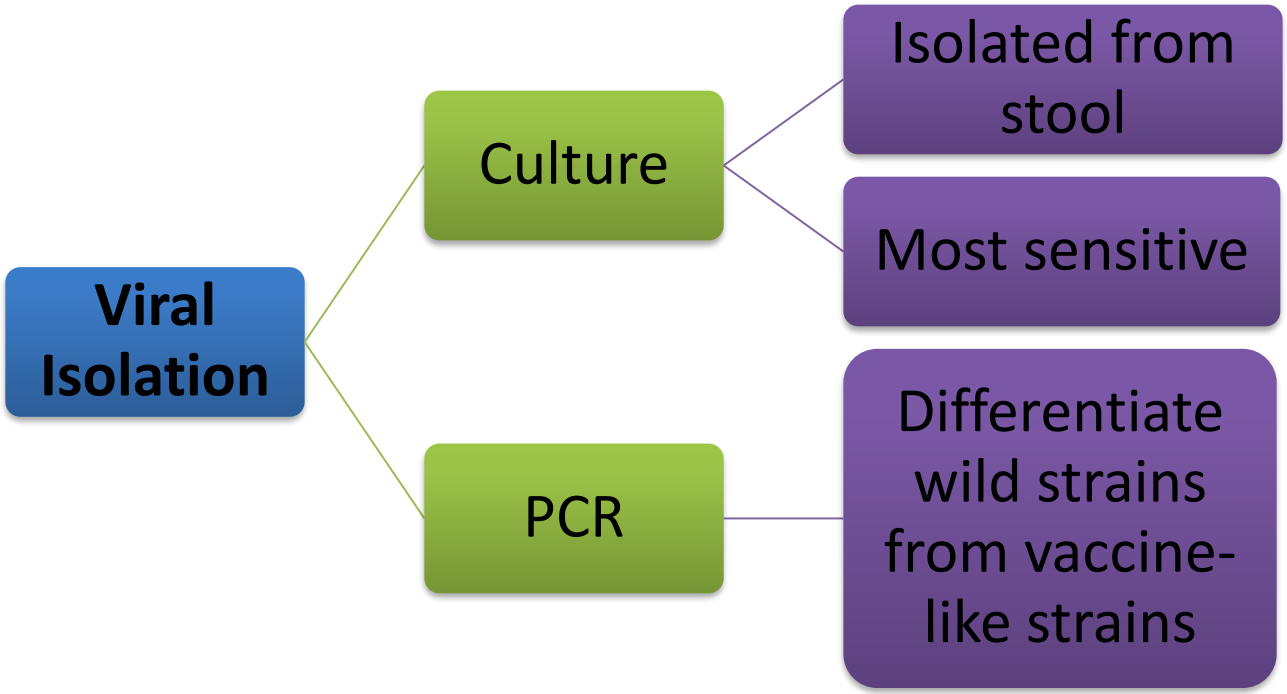


Post poliomyelitis Syndrome

- Post-polio syndrome (PPS), a sub-category of the late effects of polio, is a neurologic disorder characterized by new weakness, muscle fatigability, general fatigue and muscle and joint pain in polio survivors.
- The most possible pathophysiology of new weakness is related to the exhaustion of the motor units (reinnervation mechanisms) that formed after the attack.


MUSCLES COMMONLY WEAKENED BY POLIO
shoulder muscles
muscles behind arm (weakness straightening arm)
back muscles (either side of backbone)
thumb muscles
muscles that straighten or bend hip, or that spread or close legs
muscles that straighten knee
contractures causing tight cords
muscles that lift foot

Diagnostic workup



Treatment

- In the acute phase of paralytic poliomyelitis, patients should be hospitalized.
- In cases of respiratory weakness or paralysis, intensive care is needed.
- Intensive physiotherapy may help recover some motor function with paralysis.
- Attention to psychological disorders in longstanding disease is also important

Prognosis

- The death-to-case ratio for paralytic polio ranges between 2% and 30%, depending on age. Bulbar poliomyelitis carries a mortality rate of up to 75%.

Vaccines

OPV

- The WHO expanded programme of immunization (EPI) recommends a 4-doses schedule at birth, 6, 10 and 14 weeks.
- OPV stimulates the immune system to produce anti-poliovirus antibodies against poliovirus types 1, 2, and 3.
- The advantages of oral vaccination are the ease of administration, low cost, effective local gastrointestinal and circulating immunity, and herd immunity.

BENEFITS OF POLIO VACCINATION

01 Prevention of polio infection

02 Elimination of polio-related disabilities

03 Herd immunity to protect the community

04 Global efforts to eradicate polio

05 Improved quality of life for individuals and communities

Case Vignette

A 63-year-old woman, lived in a village of Punjab, sought treatment at a nearby clinic because of persistent itching of the skin on my right lower arm, but it did not relieve.

Four days later, she went to the Emergency Department of Holy Family Hospital with fever, irritability, hydrophobia, and photophobia.

She had no past history of pre-/post-exposure prophylaxis(PrEP/PEP) vaccination.

The husband and son of the patient reported that she had been bitten on her left ankle by a stray dog 6 months before symptom onset. After the bite, the village doctor only applied some traditional Hakeem medicine on the wound.

Rabies

The Rabies is viral disease.
The rabies virus is bullet shaped with a single stranded RNA
Genome.
Incubation period 2 weeks to > 6 months

Learning Objectives

At the end of this lecture students should

- Understand transmission, pathophysiology of Rabies.
- Describe clinical features of Rabies.
- Understand rules of management, and prevention of Rabies.

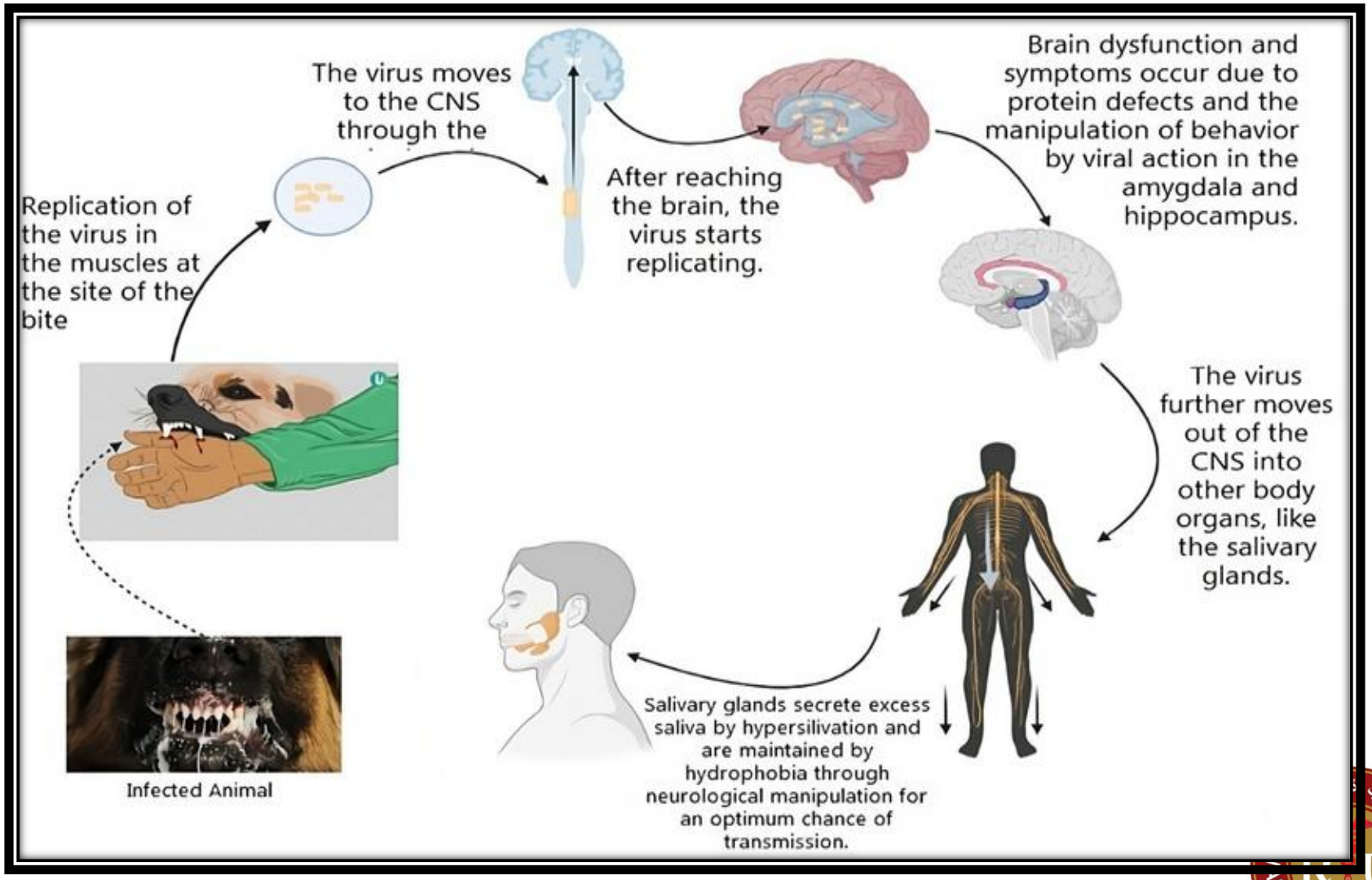
Epidemiology

Rabies is estimated to cause **59 000 human deaths** annually in over 150 countries, with 95% of cases occurring in **Africa and Asia.**

India reports the highest incidence in the world with one bite occurring every 2 seconds and one death from rabies every half hour, adding up to over 17 million bites and **20,000 deaths a year**.

Pakistan the number of annual rabies deaths is estimated to be between **2000 - 5000.**

Transmission & Pathophysiology



Animals that can transmit Rabies

Dog 96%

Bat

Wolf

Monkey

Fox

Cat

Mongoose

Mule

Horse

Buffalo

Animals that do not transmit Rabies

Birds

Rabbit

Rat

Fish

Amphibians

(turtles, other sea animals)

Reptiles

CLINICAL FEATURES

- Fever
- Headache
- Periods of mental confusion alternating with periods of normal mentation
- Difficulty in swallowing water and begins to fear even a glass of water**(hydrophobia)**
- Blowing air on the face also causes spasms, provoking fear of breeze **(aerophobia)**

Treatment

There is no treatment of Rabies.

Diagnosis

- Clinical
- In a living patient or animal (antemortem) rabies virus can be detected by PCR in cerebrospinal fluid, saliva or urine.

What to do after the Animal Bite?

- Reassurance, Soothing and Counseling
- Assessment of the number, location and depth of wound/s
- Wear the protective latex gloves & immediately flush the wound/s with clean, flowing tap water and scrub with ordinary soap and water.
- Wash wounds thoroughly for at least 10-15 minutes to remove street dirt and animal saliva.
- Do not suture the wound

Wound Categories

Wound categorization is essential to help guide further management

Category	Depth	Action
I No risk	Touching or feeding of animals, licks on intact skin	Reassurance only No vaccine needed
II Moderate risk	Nibbling of uncovered skin. Minor scratches or abrasions without bleeding	Start Vaccine series Day 0*
III High risk	- Single or multiple transdermal bites or laceration. - Scratches on broken skin contaminated with saliva. - Contamination of mucous membrane of eyes, mouth, nose or wounds with saliva or discharges from rabid animals.	Start Vaccine Series Day 0* plus Infiltrate RIG into wound at same time

*If the biting dog is alive and healthy at the end of 10 days, you may discontinue the vaccine series.

Post exposure Prophylaxis

- The purpose of using vaccine is to get the humoral arm of the immune system to produce antibodies against the virus actively
- Cell culture vaccine new
- Nerve tissue vaccines old

Vaccine Schedule for all Category II and III bites

2 regimens are approved by WHO: Essen and Zagreb

Essen Regimen is the gold standard for PEP

Schedule: Day 0, 3, 7, 14, 28
(5 vials, 5 visits)

Day 0 is the day the first dose is given

WHO Recommended PEP Schedules

Essen intramuscular Regimen

Standard intramuscular regimen.
One dose into deltoid on each of days:

Rabies Immune Globulin (RIG)

- It is important to give immediate protection by giving passive, prepared antibodies that neutralize the virus on site.
- RIG provides protection for the first 14 days until the vaccine takes effect.
- RIG must be given in all Category III wounds once, at the same time as the vaccine on Day0. If, for any reason RIG was not given on Day 0 along with vaccine, it may be given up to Day 7.

Pre- Exposure Prophylaxis

- Veterinarians and animal handlers such as zookeepers
- Dog catchers
- Street cleaners/jamadars
- Children living in endemic areas
- Pet owners
- Travelers to rabies endemic countries
- Those handling infected material from autopsies of animals

RABIES: THE FACTS

World Health Organization

VIRUS TRANSMISSION

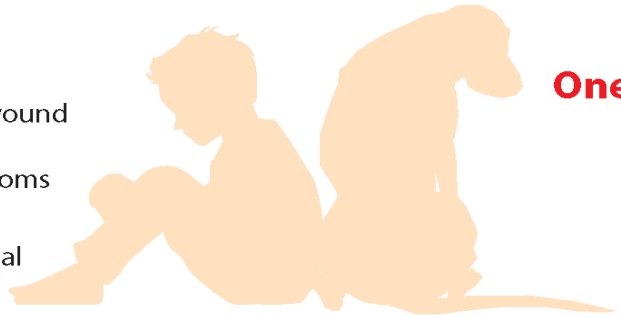
Saliva of infected animals

99% of human cases are caused by **dog bites**

The virus attacks the brain
Rabies is **fatal** once symptoms appear

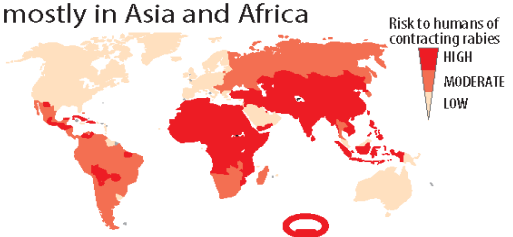
TREATMENT

Thorough washing of the wound with soap, and, vaccine injections can avoid symptoms and **save lives**.
Seek immediate medical care if bitten.



FATALITIES

Rabies affects
poor rural communities
mostly in Asia and Africa



About **One death** every **9 mins**

40% of the victimes are children younger than 15

HOW TO PREVENT RABIES TRANSMISSION FROM DOGS?

Raise public **awareness**

Learn **dog body language**

NO DOG BITE = NO RABIES

VACCINATING DOGS SAVES HUMAN LIVES

Rabies is 100% preventable

Vaccinating **70%** of dogs **breaks rabies transmission cycle** in an area at risk

Every dog owner is concerned

28 September • World Rabies Day • #rabies

THANK YOU