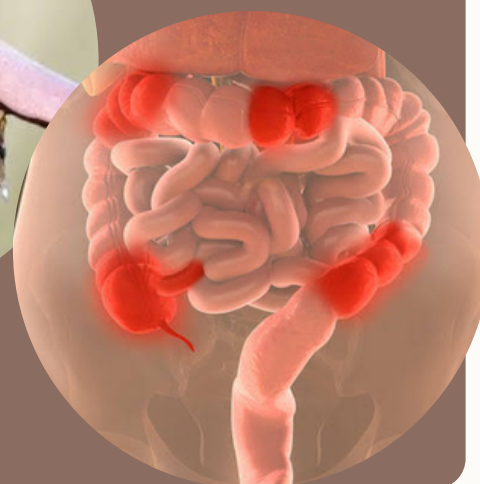


PHARMACY BULLETIN



IN THIS ISSUE:

Nipah Virus	Pg 1 - 3
Tuberculosis	Pg 4 - 5
Crohn's Disease	Pg 6 - 7
Rabies	Pg 8 - 10
Hantavirus	Pg 11 - 12
Safety Alerts	Pg 13 - 20



Advisor

En. Abdullah Bin Othman



Editors

Dr. Subramaniam A/L Thanimalai
Lim Hoi Leng



Contributors

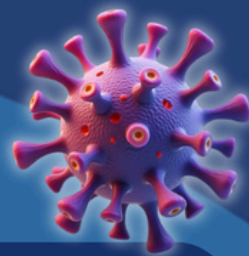
Khairul Najmi Wafdi Bin Khairul Azhan
Qistina Aulieya Binti Nasri
Khor Chun Keat
Ang Xuan Jie
Hong Zie Sheng





NIPAH VIRUS

By: Khairul Najmi Wafdi Bin Khairul Azhan



WHAT IS NIPAH VIRUS?

Nipah virus is a zoonotic virus that can cause severe illness in humans, including encephalitis and respiratory disease. It was first recognized during an outbreak in Malaysia in 1998. [2][3]

RESERVOIR & TRANSMISSION

- Natural reservoir: fruit bats of the family *Pteropodidae*. [3]
- Transmission to humans can occur through direct contact with infected animals such as **bats, pigs, or horses**, or by consuming food contaminated by infected bats, including **raw date palm juice/sap**. [3]
- **Human-to-human transmission** can occur through close contact, especially in households and health-care settings. [3]



INCUBATION PERIOD



- The usual incubation period is **3–14 days**. [3]
- In rare cases, it can extend up to **45 days**. [3]



SIGNS & SYMPTOMS

EARLY SYMPTOMS [3]

- | | |
|----------|-----------|
| Fever | Vomiting |
| Headache | Dizziness |
| Fatigue | |

NEUROLOGIC SYMPTOMS [3]

- | | |
|------------|--------------|
| Confusion | Encephalitis |
| Drowsiness | |

RESPIRATORY SYMPTOMS [3]

- | |
|----------------------|
| Cough |
| Difficulty breathing |

COMPLICATIONS

- Severe encephalitis. [3]
- Respiratory failure. [3]
- Long-term neurologic sequelae in some survivors. [3]
- Case fatality is estimated at **40% to 75%**, depending on the outbreak and local clinical response. [3]



DIAGNOSIS

- Diagnosis is confirmed by laboratory testing. [3]
- Main tests include **RT-PCR** from respiratory samples, blood, or cerebrospinal fluid, and **ELISA** for antibody detection. [3]
- Nipah can mimic other causes of encephalitis or pneumonia; therefore laboratory confirmation is essential. [3]

TREATMENT

There is **no approved specific antiviral treatment** and no licensed vaccine for human use at present. [3]

Management is supportive, including:



- Oxygen therapy
- Hydration
- Treatment of complications
- Intensive supportive care if required.

PREVENTION & CONTROL

Avoid contact with sick animals and their tissues. [3]



Avoid raw date palm sap/juice and other foods potentially contaminated by bats. [3]



Use hand hygiene and appropriate PPE in health-care settings. [3]



Isolate suspected or confirmed cases. [3]



Apply infection control precautions (contact, droplet, airborne) when indicated. [3]



SITUATION IN MALAYSIA



- The first recognized outbreak occurred in Malaysia in 1998–1999. [2]
- The outbreak was associated with pig farms and led to substantial human illness and deaths. [2]
- Control measures included culling infected pigs, movement restrictions, and improved biosecurity. [2]

KEY MESSAGE



Early recognition, rapid isolation, strict infection control, and public awareness are essential to reduce transmission and save lives. [3]

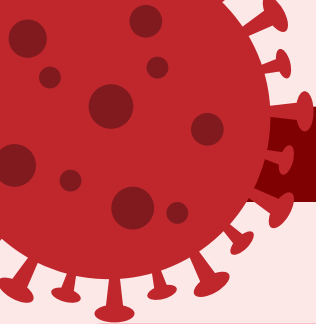
PUBLIC HEALTH IMPORTANCE

- WHO identifies Nipah as a **priority disease** for research and development because of its outbreak potential, high fatality rate, and lack of approved treatment or vaccine. [3][4]
- WHO is actively supporting preparedness, surveillance, infection prevention and control, and clinical management in at-risk countries. [3]

REFERENCES

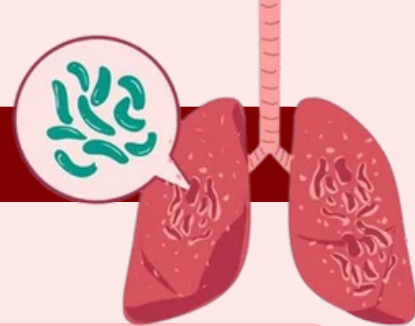
1. Alam, A. M. (2022). Nipah virus, an emerging zoonotic disease causing fatal encephalitis. *Clinical Medicine*, 22(4), clinmed.2022-0166. <https://doi.org/10.7861/clinmed.2022-0166>
2. Looi, L.-M., & Chua, K.-B. (2007). Lessons from the Nipah virus outbreak in Malaysia. *The Malaysian Journal of Pathology*, 29(2), 63–67. <https://pubmed.ncbi.nlm.nih.gov/19108397/>
3. World Health Organization. (2018, May 30). Nipah virus. [Who.int; World Health Organization: WHO. https://www.who.int/news-room/fact-sheets/detail/nipah-virus](https://www.who.int/news-room/fact-sheets/detail/nipah-virus)
4. World Health Organization. Nipah virus infection. World Health Organization. <https://www.who.int/health-topics/nipah-virus-infection>





TUBERCULOSIS (TB)

By: Qistina Aulieya Binti Nasri



INTRODUCTION [2,3,6,10]

Tuberculosis (TB) is a contagious airborne disease caused by *Mycobacterium tuberculosis*. It is primarily transmitted through the inhalation of airborne droplets containing *M. tuberculosis*, typically expelled when an infected individual coughs, sneezes, or talks. It most commonly affects the lungs but can also affect other parts of the body, such as the kidneys, spine, and brain. TB is a preventable and curable disease that is typically treated with antibiotics, with treatment adjusted depending on whether the TB is latent or active.

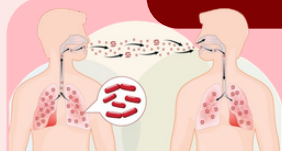
Situations in Malaysia

In early 2026, Malaysia reported 3,161 cumulative TB cases, with 596 new infections reported in one surveillance week alone. Sabah was the most affected state, followed by Selangor, Sarawak, Johor, and Kuala Lumpur/Putrajaya.

ETIOLOGY [1,3,10]

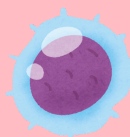
TB is mainly caused by infection with *Mycobacterium tuberculosis*, a slow-growing, acid-fast bacillus. In some cases, TB can also be caused by other members of the *Mycobacterium tuberculosis* complex, including *M. bovis*, *M. africanum*, and *M. canettii*, although these occur less commonly. TB is spread through airborne particles, but transmission typically requires prolonged close contact with an infected person, especially in enclosed or poorly ventilated spaces.

PATHOGENESIS [1,3]



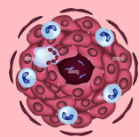
a) Inhalation: *Mycobacterium tuberculosis* is inhaled through airborne droplets from an infected person.

b) Reaches alveoli: Bacteria reach the alveoli in the lungs.



c) Uptake by macrophages: Bacteria are phagocytosed by alveolar macrophages but survive and multiply inside them.

d) Immune response activated: Macrophages release cytokines, recruit more immune cells to the site of infection.



e) Granuloma formation: Immune cell wall of the bacteria forming a granuloma to contain the infection

Latent TB infection:

Bacteria remain dormant inside a granuloma. No symptoms. Not infectious.

Active TB infection:

If immunity is weak, bacteria multiply and granuloma breaks down. Bacteria spread in lungs and to other parts of the body.



SYMPTOMS [4,5]



Persistent cough



Coughing up blood



Weight loss



Fever & chills



Night sweats

TYPES OF TUBERCULOSIS [2,3]

LATENT TB

TB bacteria lives in the body but inactive

Cannot spread TB bacteria to others

Do not have any symptoms

Sputum smears and cultures are negative

Chest radiograph is typically normal

ACTIVE TB

TB bacteria active in the body

Can spread TB bacteria to others

May have symptoms such as a cough, fever, or weight loss

Sputum smears and cultures may be positive

Chest radiograph may be abnormal

MANAGEMENT OF TUBERCULOSIS [7]



REGIMEN [7]

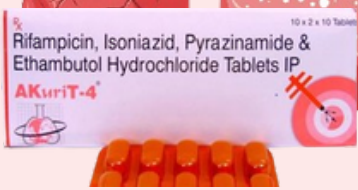
6 months

2 months EHRZ

4 months HR

Isoniazid (INH)
Rifampicin (RIF)
Pyrazinamide (PZA)
Ethambutol (EMB)

Isoniazid (INH)
Rifampicin (RIF)



FIXED-DOSE COMBINATION (FDC) [7]

FDC tablets are combinations of two or more anti-TB drugs in a tablet.

- To simplify TB treatment
- To improve patient compliance
- To prevent development of drug-resistant TB

- AKuriT-2:** Isoniazid 75 mg and Rifampicin 150 mg
- AKuriT-4:** Isoniazid 75 mg, Rifampicin 150 mg, Ethambutol 275 mg & Pyrazinamide 400 mg

ACTIVE TB [7]



Drug	Mechanism of action	Adults	Children	Common adverse drug reactions
		Dose range (mg/kg/day)	Dose range (mg/kg/day)	
Isoniazid*	Inhibit the synthesis of mycolic acid, resulting in disruption of the bacterial cell wall.	5 (4 - 6) - Max dose: 300 mg/daily	10 (7 - 15) - Max dose: 300 mg/daily	- Skin rash - Jaundice - Nausea - Abdominal pain - Hepatitis - Anorexia
Rifampicin	Inhibit DNA-dependent RNA polymerase, which further inhibits bacterial protein synthesis and transcription.	10 (8 - 12) - Max dose: 600 mg/daily	15 (10 - 20) - Max dose: 600 mg/daily	- Skin rash - Jaundice - Nausea - Abdominal pain - Orange or red urine
Pyrazinamide	Inhibit trans-translation and possibly coenzyme A synthesis needed for the bacteria to survive.	25 (20 - 30) - Max dose: 2000 mg/daily	35 (30 - 40) - Max dose: 2000 mg/daily	- Skin rash - Jaundice - Nausea - Abdominal pain - Joint pain
Ethambutol	Inhibits the enzyme arabinosyltransferases and prevents the biosynthesis of the mycobacterial cell wall.	15 (15 - 20) - Max dose: 1600 mg/daily	20 (15 - 25) - Max dose: 1000 mg/daily	Visual impairment

*Pyridoxine 10 mg/day should be given to patients on isoniazid. Patients at high risk for neuropathy: Pyridoxine 30 mg/day

LATENT TB [7] (adult dosing)

Drug	Duration	Interval	Dose range (mg/kg)
Isoniazid (6H/9H)	6 or 9 months	Daily	5 (max 300 mg)
Isoniazid + Rifampicin (3HR)	3 months	Daily	INH: 5 (max 300 mg) RIF: 10 (max 600 mg)
Rifapentine + isoniazid (3HP)	3 months	Weekly	INH: 15 (max 900 mg) RPT: <50 kg: 750 mg >50 kg: 900 mg
Rifampicin (4R)	4 months	Daily	10 (max 600 mg)

Contact healthcare providers if have the following symptoms: loss of appetite, nausea, vomiting, abdominal discomfort, persistent fatigue or weakness, dark-coloured urine, pale stools, jaundice, confusion or drowsiness.

ADULT DOSING [7]

Body weight (kg)	Number of FDC tablets daily
30 - 37	2
38 - 54	3
55 - 70	4
> 70	5

REFERENCES

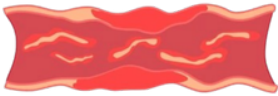
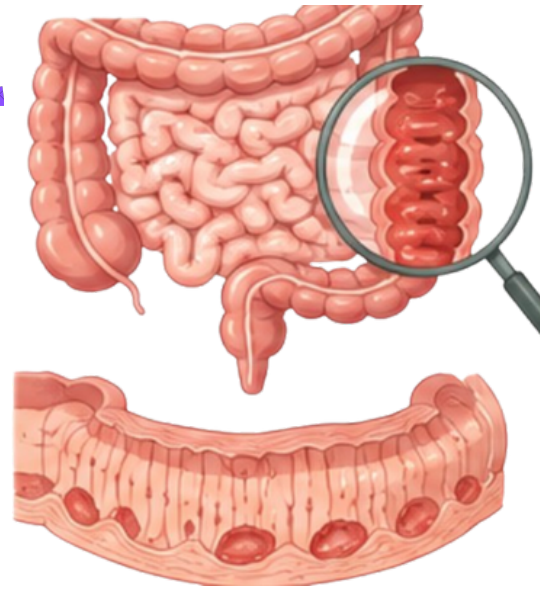
- Alsayed, S. S., & Gunosewoyo, H. (2023). Tuberculosis: Pathogenesis, current treatment regimens and New Drug Targets. International Journal of Molecular Sciences, 24(6), 5202. <https://doi.org/10.3390/ijms24065202>
- Centers for Disease Control and Prevention. (2025). Clinical overview of tuberculosis (TB). <https://www.cdc.gov/tb/hcp/clinical-overview/index.html>
- Centers for Disease Control and Prevention. (2024). TB 101 for health care workers. <https://www.cdc.gov/tb/webcourses/TB101/page8050.html>
- Davidson, G., Davidson, D. U., Okoye, O. K., Mensah, L. S., Ukaegbu, E. C., Agbor, D. B., Adegbola, M. O., Eneyo, U. S., Osuluku, B. A., Dinyain, T. O., Okeke, A. A., Okah, M. J., Owulu, A. I., Peterson, J. C., Onyekweli, S. O., Omoruyi, G. O., Adebiyi, O. S., Atoyebi, F. A., Omeje, A. C., ... Uche, C. J. (2024). Overview of tuberculosis: Causes, symptoms and risk factors. Asian Journal of Research in Infectious Diseases, 15(9), 8-19. <https://doi.org/10.9734/ajrid/2024/v15i9370>
- Ellis, H. T., & Tristram, D. (2024). Tuberculosis overview. In StatPearls. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK441916>
- International Federation of Red Cross and Red Crescent Societies. (n.d.). Emergency details: Malaysia tuberculosis response. IFRC GO. <https://go.ifrc.org/emergencies/7817/details>
- Ministry of Health Malaysia. (2021). Management of tuberculosis (4th ed.). Malaysian Health Technology Assessment Section (MaHTAS), Medical Development Division.
- Padda, I. S., & Reddy, K. M. (2023). Antitubercular medications. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK557666/>
- Syeda Sahra, M. (2025, August 15). Tuberculosis (TB) medication: Antitubercular agents. Medscape. <https://emedicine.medscape.com/article/230802-medication#1>
- World Health Organization. (2026). Tuberculosis. <https://www.who.int/news-room/fact-sheets/detail/tuberculosis>

CROHN'S DISEASE

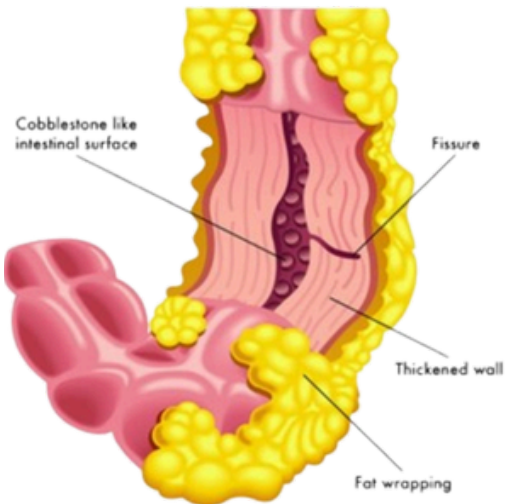
Understand it. Manage it. Live well.

Prepared by Ang Xuan Jie

Crohn's disease is a chronic, idiopathic, immune-mediated inflammatory disease of the gastrointestinal tract that can affect any part from the mouth to the anus. It is a type of inflammatory bowel disease (IBD) characterised by periods of relapse and remission [1].



Transmural inflammation (full-thickness) and patchy pattern



PATHOPHYSIOLOGY^[4,5,6]

- Crohn's disease is an abnormal immune response to intestinal bacteria in genetically susceptible individuals that leads to chronic inflammation of the gastrointestinal tract.
- The inflammation is transmural (full-thickness) and occurs in a patchy 'skip lesion' pattern, most commonly affecting the terminal ileum and colon.
- Repeated inflammation results in deep ulcers and mucosal swelling, producing a characteristic cobblestone appearance. It may also be associated with non-caseating granulomas.
- Extension of inflammation beyond the bowel wall causes mesenteric fat wrapping ('creeping fat').
- Over time, this leads to structural damage such as bowel wall thickening, strictures, fistulas, and abscesses, which can result in complications like intestinal obstruction and malabsorption.

RISK FACTORS^[2]



Genetics: Family history increases the risk.



Smoking: Active smoking is a major risk factor and can worsen the disease.



Age: Most commonly diagnosed in young adults (15–35 years)



NSAIDs: they don't cause Crohn's, but can worsen symptoms.



Ethnicity: more common in Northern European descent.

SIGNS & SYMPTOMS^[3]

GASTROINTESTINAL

- Persistent diarrhea
- Abdominal pain and cramping
- Blood in stool
- Loss of appetite
- Weight loss



SYSTEMIC

- Fatigue
- Fever



EXTRA-INTESTINAL

- Joint pain
- Skin rashes
- Eye irritation
- Mouth sores



MANAGEMENT

Treatment aims to reduce inflammation, relieve symptoms, achieve and maintain remission, prevent complications and improve quality of life.

A. PHARMACOLOGICAL MANAGEMENT ^[7]

MILD TO MODERATELY ACTIVE DISEASE

INDUCTION THERAPY

- Prednisolone 30–40mg OD
- Calcium 1g/day + Vitamin D 1000 units per day
- Enteral therapy (ileal and proximal small bowel disease)
- Proton pump inhibitor (upper GI disease)
- Smoking cessation

Yes

Assess response 2–4 weeks
Clinical response?

No

MAINTENANCE THERAPY

- Taper prednisolone down by 5mg/week
- Azathioprine 1.5–2.5mg/kg/day or as per drug levels
- Calcium and Vitamin D as above
- Proton pump inhibitor (upper GI disease) ± Mesalazine/enteral nutrition
- Assess with endoscopy/fecal calprotectin/radiologically 3–12 monthly for mucosal healing or during flares not responding to medical therapy

Frequent relapse/steroid dependent

- Refer to maintenance therapy for severe disease

Refer to algorithm for severe disease

SEVERELY ACTIVE DISEASE

- Hospital admission
- Exclude surgical abdomen (bowel obstruction, perforation)
- Assess extent of disease (CT/MRI enterography if small bowel involvement)

INDUCTION THERAPY

- IV Hydrocortisone 100 mg QID / Methylprednisolone 40 mg BD or
- Adalimumab SC 160 mg, then 80 mg at 0 and 2 weeks respectively, followed by 40 mg every 2 weeks or Infliximab IV 5 mg or 10 mg/kg at 0,2,6 weeks or Ustekinumab IV 6 mg/kg or Vedolizumab IV 300 mg at 0,2,6 weeks
- Nutritional support (enteral/parenteral) in extensive small bowel disease/fistulae
- PPI (upper GI disease), DVT prophylaxis (e.g. enoxaparin 40 mg od), IV antibiotics if coexisting sepsis

- Switch to infliximab if on steroids
- Tertiary referral
- Surgery

Assess 5–7 days

No

Adequate response?

Yes

MAINTENANCE THERAPY

- Convert to oral prednisolone 30–40mg OD then taper 5mg/week or
- Adalimumab SC 40mg every 2 weeks or Infliximab IV 5 mg/kg 8 weekly or Ustekinumab SC 90mg or Vedolizumab IV 300 mg every 8 weeks or
- Azathioprine 1.5–2.5 mg/kg/day or as per drug levels
- Smoking cessation
- Calcium 1g/day + Vitamin D 1000 units per day
- PPI (upper GI disease) ± Mesalazine/enteral nutrition
- Assess with endoscopy/fecal calprotectin/radiologically 3–12 monthly for mucosal healing or during flares not responding to medical therapy

Frequent relapse/steroid dependent

- Tertiary referral
- Dose escalation
- Other rescue therapy
- Surgery

B. SURGICAL TREATMENT ^[8]

Surgery is not a cure but may be needed if complications occur:

- Bowel obstruction
- Fistulas
- Abscesses
- Severe bleeding
- Cancer or precancerous changes



C. LIFESTYLE ^[9,10]



Eat a well-balanced diet. A low-residue diet may help during flare.



Avoid trigger foods (spicy, high-fat, caffeine, alcohol).



Stay hydrated.



Stop smoking.



Manage stress and get enough rest.

1. Ghazi LJ. Crohn Disease: Practice Essentials, Background, Pathophysiology [Internet]. Medscape.com. 2019. Available from: <https://emedicine.medscape.com/article/172940-overview>
2. Mayo Clinic. Crohn's Disease [Internet]. Mayo Clinic. Mayo Clinic; 2024. Available from: <https://www.mayoclinic.org/diseases-conditions/crohn-s-disease/symptoms-causes/syc-20355504>
3. Cleveland Clinic. Crohn's disease [Internet]. Cleveland Clinic. 2023. Available from: <https://my.clevelandclinic.org/health/diseases/9557-crohn-s-disease>
4. Ransinghe I, Hsu R, Tian C. Crohn Disease [Internet]. PubMed. Treasure Island (FL): StatPearls Publishing; 2024. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK456021/>
5. Angelopoulos I, Tsounis EF, Mouzaki A, Triantaf C. Creeping Fat in Crohn's Disease—Surgical, Histological, and Radiological Approaches. Journal of Personalized Medicine [Internet]. 2023 Jul 1;15(7):1029. Available from: <https://www.mdpi.com/2075-4426/15/7/1029>
6. Hendrickson BA, Gokhale R, Cho JH. Clinical Aspects and Pathophysiology of Inflammatory Bowel Disease. Clinical Microbiology Reviews [Internet]. 2002 Jan 1;15(1):79–94. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11806/>
7. The Malaysian Society of Gastroenterology & Hepatology (MSGH). Inflammatory Bowel Disease for [Internet]. 2021 Aug. Available from: https://msggh.org.my/files/Malaysian_IBD_treatment_Algorithms.pdf
8. Seifarth C, Kreis ME, Gröne J. Indications and Specific Surgical Techniques in Crohn's Disease. Visceral Medicine. 2015;3(4):273–9.
9. Darber J. Living with Crohn's disease: Recognizing and managing flares - Harvard Health Blog [Internet]. Harvard Health Blog. 2019. Available from: <https://www.health.harvard.edu/blog/living-with-crohn-s-disease-recognizing-and-managing-flares-2019/1268410>
10. Mayo Clinic. Crohn's Disease - Diagnosis and Treatment - Mayo Clinic [Internet]. Mayo Clinic. Mayo Clinic; 2022. Available from: <https://www.mayoclinic.org/diseases-conditions/crohn-s-disease/diagnosis-treatment/drc-20355507>

RABIES: The Fatal Connection

A devastating neurological infection caused by the Lyssavirus. Once clinical signs appear, it is nearly 100% fatal.

Prepared by: Khor Chun Keat



According to Ministry of Health Malaysia Rabies Guidelines 2022, rabies causes about 60,000 deaths yearly, with 95% in Asia and Africa.^[3]

Children under the age of 15 account for 40% of global rabies deaths.^[3]

Malaysia (Sarawak 2017–2021): Since an outbreak was declared in 2017, Sarawak recorded 41 human cases, 39 of which were fatal.^[3]

ANIMAL RESERVOIRS IN MALAYSIA^[1]

Domestic animals

- **Dogs:** Primary reservoir; main transmission source in Malaysia.
- **Cats:** Alternate reservoirs; usually infected via "spill-over" from dogs.
- **Livestock:** End hosts (cattle, goats, horses); rarely spread the disease due to paralytic symptoms rather than aggression.
- **Low-risk:** Rodents, rabbits, and herbivores; insignificant in transmission.



TRANSMISSION^[3]

Primary source

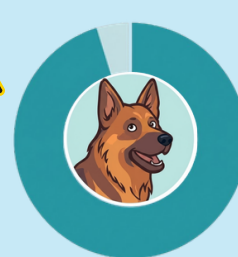


Transmission occurs through **bites or scratches** contaminated with infected saliva, nervous tissue, or cerebrospinal fluid (CSF).

Mucous Membranes



The virus can also enter through breaks in the skin or mucous membranes (**eyes, nose, and mouth**).



- Importantly, the rabies virus cannot cross intact skin.
- Source: Rabid dogs are the principal source for 95% of human rabies cases.

CATEGORY OF HUMAN EXPOSURE^[3]



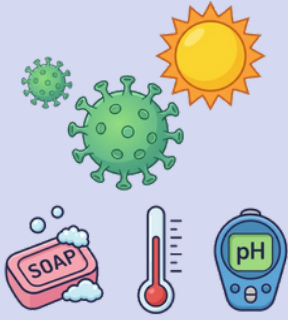
Possible Exposure

A person who had close contact (bite, scratch, or mucosal exposure) with an animal showing rabies signs during the incident or within 14 days following it.

Exposed

A person who has had close contact with an animal that has been laboratory-confirmed as rabid.

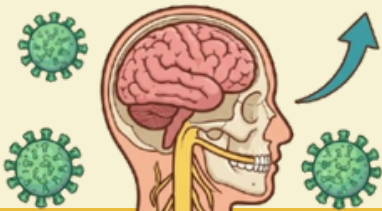
Viral Stability and Inactivation^[3]



The rabies virus is relatively fragile and depends heavily on its host for survival.

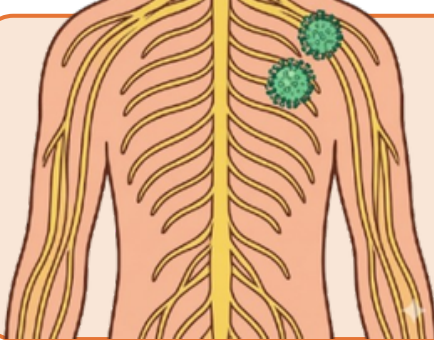
- **Environmental Sensitivity:** It is easily killed by sunlight, heat, UV radiation, and drying out (desiccation).
- **Chemical Vulnerability:** It is inactivated by common detergents, acids/alkalines (pH <4 or >10), and organic halides.
- **Carcass Viability:** The virus can survive in a carcass for less than 24 hours at room temperature (20°C), but may persist for several days in colder conditions (0–4°C).

Pathogenesis^[3]



- 1 **Inoculation:** Virus enters the body and multiplies at the entry site.
- 2 **Neural ascent:** Travels through peripheral nerves to the brain and central nervous system.
- 3 **Replication & shedding:** Multiplies in the brain and salivary glands, then spreads through saliva.

Clinical Manifestations^[1]



Incubation period in human usually lasts 3–12 weeks. Symptoms progress into two forms:

- **Furious rabies (2/3 cases):** Hyperactivity, agitation, hydrophobia, aerophobia. Death often occurs within days from cardio-respiratory arrest.
- **Paralytic rabies (1/3 cases):** Gradual paralysis starting at the bite site. Slower course and often misdiagnosed.

Post-Exposure Management^[2]



Death is preventable if effective intervention is delivered immediately after exposure. Local treatment of the wound:

- **Flushing:** Wounds must be flushed and washed immediately for a minimum of 15 minutes using running water and soap or detergent.
- **Disinfection:** After washing, the wound should be dressed with povidone-iodine or alcohol.
- **Suturing:** Secondary suturing should be avoided to prevent inoculating the virus deeper into the tissue.

Wound Categorization & Treatment^[2]

Category of Exposure	Description	Action
Category 1 (Low Risk)	Touching/feeding animals or licks on intact skin	No treatment required if the history is reliable
Category 2 (Moderate Risk)	Nibbling of uncovered skin, minor scratches, or abrasions without bleeding	Immediate wound treatment and anti-rabies vaccination
Category 3 (High Risk)	Single or multiple transdermal bites/scratches, licks on broken skin, or contamination of mucous membranes with saliva	Immediate wound treatment, anti-rabies vaccination, and Rabies Immunoglobulin (RIG)

Pre-Exposure Prophylaxis^[3]

- **High-Risk Groups:** Includes veterinarians, lab personnel handling rabies specimens, wildlife officers, and dog handlers.
- **Vaccine Regimen:** Two intramuscular (IM) doses are given on Day 0 and Day 7.
- **Monitoring:** Periodic antibody titer checks (every 6 months to 2 years) are required to determine if a booster is necessary.

Post-Exposure Prophylaxis^[2]

- **Required for Category 2 and 3 rabies exposures.**
- **The treatment includes a rabies vaccine, with the addition of Rabies Immunoglobulin (RIG) depending on risk assessment and immune status.**

Rabies Vaccine

1 Intramuscular (IM)



- Injected into the deltoid (adults) or anterolateral thigh (young children).
- One full vial (>2.5IU) per dose.

2 Intradermal (ID)



- Injected into the deltoid (0.1 ml per site). ID is preferred as it saves costs and reduces the number of clinic visits.

Rabies Immunoglobulin (RIG)



- RIG gives rapid passive protection before vaccine antibodies develop.
- Inject as much as possible into and around the wound.
- Can be given up to Day 7 after first vaccine dose, not after Day 7, as it may interfere with the vaccine's effectiveness.
- **Types and dosage:**
 - a) Equine RIG Dose: 40 IU/kg
 - b) Human RIG Dose: 20 IU/kg

Patient Category	Recommended Vaccine Regimen	Schedule (Days)	RIG Required
Unvaccinated (Immunocompetent)	IM 4 doses (1-1-1-1-0) ID 3 visits (2-2-2-0-0)	IM Day 0, 3, 7, 14 ID Day 0, 3, 7	Yes (if indicated, by Day 7)
Previously Vaccinated	IM 2 doses (1-1-0-0-0) ID 2 doses / 4 sites	Day 0, 3	No
Immunocompromised	IM 5 doses (1-1-1-1-1) ID 4 doses (1-1-1-0-1)	IM Day 0, 3, 7, 14, 28 ID Day 0, 3, 7, 28	Yes (even if previously vaccinated)

****Number indicates dose. Eg: (2-2-2-0-0) indicates 2 doses on Day 0, 3, 7 respectively.**

Health Education & Community Advice^[3]



Wash hands with soap and water after touching pets.



Ensure pet dogs get annual anti-rabies injections



Keep pets in the house compound and avoid mixing with stray or wild animals.



Report stray animals to Local Authorities and pets with aggressive or strange behavior to DVS.

REFERENCES

1. Ministry of Health (MOH) Malaysia. Interim Guideline for Prevention and Control of Human Rabies in Malaysia [Internet]. Scribd. 2026 [cited 2026 May 11]. Available from: <https://www.scribd.com/document/330475760/Interim-Guideline-for-Prevention-and-Control-of-Human-Rabies-in-Malaysia>
2. World Health Organization (WHO). WHO Guide for Rabies Pre and Post Exposure Prophylaxis in Humans [Internet]. 2014 [cited 2026 May 11]. Available from: https://cdn.who.int/media/docs/default-source/searo/india/health-topic-pdf/pep-prophylaxis-guideline-15-12-2014.pdf?sfvrsn=8619bec3_2
3. Ministry of Health (MOH) Malaysia, Department of Veterinary Services Malaysia. Guidelines on Rabies Management in Human and Animals [Internet]. 2022 [cited 2026 May 11]. Available from: <https://jknjohor.moh.gov.my/jknj/wp-content/uploads/2024/06/GUIDELINES-ON-RABIES-MANAGEMENT-IN-HUMAN-AND-ANIMALS.pdf>

HANTAVIRUS INFECTION

PREPARED BY: HONG ZIE SHENG

KNOW THE FACTS ABOUT HANTAVIRUS

? What is Hantavirus?

Hantavirus is a virus spread mainly by rodents. People can become infected when they breathe in air contaminated with rodent urine, droppings, or saliva. Although rare, hantavirus infection can cause severe lung disease and may be life-threatening. ^[1,2]

! How Does Infection Occur? ^[1,2]

People can get hantavirus through:

- 🐭 Breathing in dust contaminated with rodent urine, droppings, or saliva
- 🐭 Touching contaminated surfaces and then touching the eyes, nose, or mouth
- 🐭 Direct contact with infected rodents
- 🐭 Rodent bites (rare)

Hantavirus is generally NOT spread through casual contact between people.



🛡️ Prevention Tips ^[1,2,5]

Keep Rodents Away

- ✓ Seal holes and gaps in homes and buildings
- ✓ Store food in rodent-proof containers
- ✓ Dispose of waste properly
- ✓ Keep living areas clean

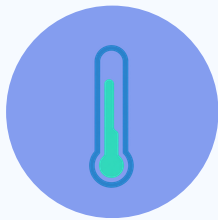
Clean Safely

- ✓ Ventilate enclosed spaces before cleaning
- ✓ Wear gloves and appropriate respiratory protection
- ✓ Spray rodent droppings with disinfectant before removal
- ✗ Do not sweep or vacuum dry rodent droppings



🏥 Treatment ^[1]

There is currently no specific antiviral treatment approved for most hantavirus infections. Early recognition and supportive medical care, including oxygen therapy and intensive care management when necessary, can improve outcomes.



EARLY SYMPTOMS ^[1]

- ✓ Fever
- ✓ Fatigue
- ✓ Muscle aches
- ✓ Headache
- ✓ Chills
- ✓ Nausea, vomiting, or abdominal pain



SEVERE SYMPTOMS^[1]

- ⚠ Cough
- ⚠ Shortness of breath
- ⚠ Chest tightness
- ⚠ Fluid in lungs
- ⚠ Respiratory failure



⚠ SEEK IMMEDIATE CARE^[1]

Seek immediate medical attention if respiratory symptoms develop following any rodent exposure. Do not delay – early care saves lives.



WHO IS AT RISK? ^[1]

- Farmers and agricultural workers
- Campers and hikers
- Construction and renovation workers
- Pest control workers
- Individuals cleaning rodent-infested buildings, sheds, or storage areas

COMPARISON AGAINST LEPTOSPIROSIS ^[3,4]

FEATURE	HANTAVIRUS INFECTION	LEPTOSPIROSIS
CAUSE	Virus (Hantavirus)	Bacteria (Leptospira spp.)
TYPICAL EXPOSURE	Inhalation of aerosolized rodent urine, droppings, or saliva	Contact with water, soil, or mud contaminated by animal urine
COMMON MALAYSIAN RISK FACTORS	Cleaning rodent-infested buildings, warehouses, sheds, or cabins	Floodwater exposure, river activities, farming, sewage work
HALLMARK SYMPTOMS	Cough, chest tightness, shortness of breath	Jaundice, conjunctival suffusion (red eyes), calf muscle pain.
MAIN ORGAN AFFECTED	Lungs (Hantavirus Pulmonary Syndrome)	Kidneys and liver (Weil's disease)
SEVERE COMPLICATIONS	Respiratory failure and shock	Acute kidney injury, liver failure, pulmonary hemorrhage
TREATMENT	Supportive care only	Antibiotics plus supportive care
OCCURRENCE IN MALAYSIA	Rare	Endemic and relatively common

REFERENCES

1. Centers for Disease Control and Prevention. About hantavirus [Internet]. Atlanta (GA): CDC; 2024 [cited 2026 Jun 13]. Available from: [CDC Hantavirus](#)

2. Centers for Disease Control and Prevention. Clinical overview of hantavirus disease [Internet]. Atlanta (GA): CDC; 2026 [cited 2026 Jun 13]. Available from: [CDC Clinical Overview of Hantavirus Disease](#)

3. World Health Organization. Human leptospirosis: guidance for diagnosis, surveillance and control [Internet]. Geneva: WHO; 2003 [cited 2026 Jun 13]. Available from: [WHO Human Leptospirosis Guidance](#)

4. World Health Organization. Leptospirosis outbreak toolbox [Internet]. Geneva: WHO; 2024 [cited 2026 Jun 13]. Available from: [WHO Leptospirosis Outbreak Toolbox](#)

5. Ministry of Health Malaysia. Leptospirosis (Rat Urine Disease) Health Education Materials [Internet]. Putrajaya: MOH Malaysia; [cited 2026 Jun 13]. Available from: [Ministry of Health Malaysia](#)

⚠️ NPRA SAFETY ALERT

Denosumab (Prolia®) & Biosimilars



RISK OF MULTIPLE VERTEBRAL FRACTURES (MVF) AFTER DISCONTINUATION OR DELAYED DOSES



WHAT IS DENOSUMAB?

- Monoclonal antibody targeting **RANKL**
- Inhibits osteoclasts → ↓ Bone resorption
- For osteoporosis | **6-monthly** injection



KEY SAFETY ISSUE



Multiple vertebral fractures (MVF) may occur after:

- ✗ Stopping treatment
- 🕒 Delayed dose (>7 months)

🔄 Cause: Rebound bone loss



EVIDENCE & REPORTS



~70 cases
(TGA, Australia)



NPRA Malaysia:
92 ADR reports
(165 events)



No confirmed MVF post-discontinuation



Related fractures reported (limited details)



CLINICAL INSIGHT



↑ Higher Risk in:

- Prior vertebral fractures
- ↑ Rapid ↑ bone turnover
- ↓ ↓ Bone Mineral Density (BMD)



RECOMMENDATIONS FOR HEALTHCARE PROFESSIONALS



Do NOT stop or delay
without medical advice



Emphasise treatment adherence



If discontinuing:

→ Start alternative antiresorptive therapy



Monitor Bone Mineral Density (BMD)



Report all ADRs to NPRA



**ENSURE CONTINUITY OF THERAPY
OR PLAN TRANSITION TO PREVENT MVF**



LINEZOLID:

RISK OF RHABDOMYOLYSIS

Breakdown of Skeletal Muscle → Risk of Kidney Damage

OVERVIEW



- ◆ Oxazolidinone antibiotic
- ◆ Treats Gram-positive infections:
 - ✓ MRSA, VRE
 - ✓ Pneumonia (nosocomial & community-acquired)
 - ✓ Skin & Soft Tissue Infections
 - ✓ Drug-resistant Tuberculosis (TB)



SIGNS & SYMPTOMS

- ◆ Muscle Pain & Weakness
- ◆ Dark-coloured Urine (Myoglobinuria)
- ◆ Localised Swelling
- ◆ Markedly Elevated CK Levels (>5x Upper Limit of Normal)



PROPOSED MECHANISM

Linezolid

Inhibits Mitochondrial Protein Synthesis

Binds to Mitochondrial Ribosome (Similar to Bacterial Ribosome)



→ Mitochondrial Dysfunction → Energy Production ↓
→ Muscle Cell Damage → Breakdown of Skeletal Muscle

→ Release of Myoglobin, CK → Kidney Damage Risk

LOCAL ADR REPORTS (as of Oct 2025)



131 Reports

194 Adverse Events

Most Frequently Reported:

1. Thrombocytopenia (38)
2. Platelet Decreased (16)
3. Rash (9)
4. Maculo-papular Rash (7)
5. Vomiting (6)

ADVICE FOR HEALTHCARE PROFESSIONALS

Monitor for Rhabdomyolysis

- Muscle pain, weakness, dark urine
- Check CK levels periodically

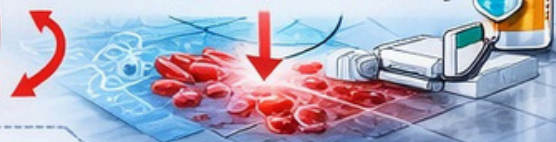


Risk Patients

- Prolonged therapy
- Renal impairment / Drug interactions

Management

- Discontinue linezolid if suspected
- Ensure adequate hydration
- Monitor renal function closely



Report Suspected Adverse Events Related to Linezolid to NPRA

Early Detection = Prevent Kidney Complications!



PRESCRIPTION OPIOIDS & RISK OF OESOPHAGEAL DYSFUNCTION (OIED)



Long-term opioid therapy may cause oesophageal motility disorders.



Q OVERVIEW

- Opioid-Induced Oesophagel Dysfunction (OIED) is an oesophageal motility disorder linked to **chronic opioid** use of at least **3 months**.
- Diagnosed by abnormal oesophageal manometry.

Common Symptoms

- Dysphagia (difficulty swallowing)
- Gastroesophageal reflux
- Chest pain

OPIOIDS INVOLVED (MALAYSIA REGISTERED)

- Buprenorphine ● Codeine ● Fentanyl
- Methadone ● Morphine ● Nalbuphine
- Oxycodone ● Pethidine ● Tramadol

! RISK FACTORS

- Stronger opioids (e.g. oxycodone)
- Higher daily opioid dose
- Long-term opioid therapy

Evidence suggests:

- OIED prevalence higher with **oxycodone (31%)** | ● tramadol (12%)
- Median opioid dose in **OIED**: 45 mg morphine equivalent/day

Report all suspected adverse events associated with opioid-containing products to NPRA

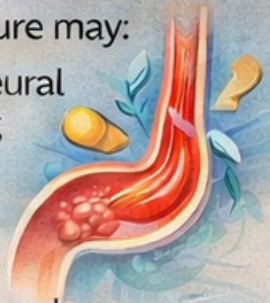
CLICK HERE TO VIEW FULL ARTICLE



PROPOSED MECHANISM

Chronic opioid exposure may:

- Disrupt inhibitory neural pathways controlling oesophageal motility
- Cause unopposed excitatory contractions
- Impair lower oesophageal sphincter (LES) relaxation



ADVICE FOR HEALTHCARE PROFESSIONALS

- Be aware of OIED risk in long-term opioid therapy
- Educate patients on symptoms (dysphagia, reflux, chest pain)
- Use **lowest effective** dose for shortest duration
- Reassess opioid therapy regularly
- Consider opioid withdrawal if OIED symptoms develop



VITAMIN B6 (PYRIDOXINE) & RISK OF PERIPHERAL NEUROPATHY



Excessive or prolonged intake of **Vitamin B6** may cause **nerve damage**, even at low doses.



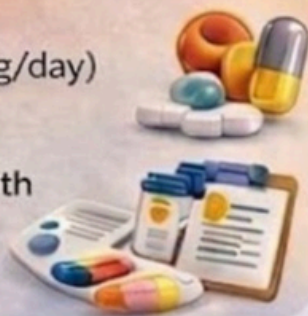
COMMON SYMPTOMS

- **Tingling** and **Burning** sensation
- **Numbness** (hands & feet)
- Clinical symptoms mimic deficiency



RISK FACTORS

- High doses (e.g. >2 g/day)
- Long-term use
- Multiple products with Vitamin B6



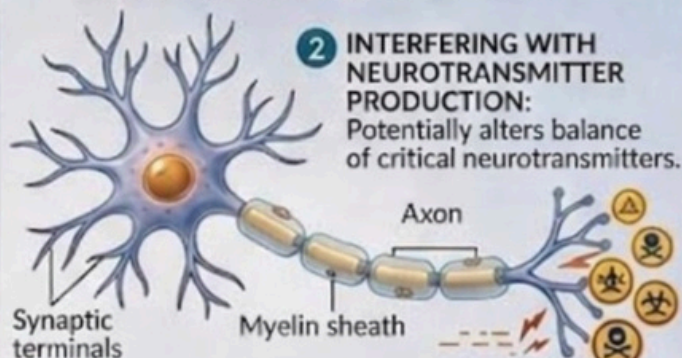
LOCAL ADR REPORTS (as of Oct 2025)

- **1,156** reports received
- Most common: Vomiting, nausea, dizziness, rash
- No confirmed cases of **B6-induced neuropathy**, but tingling & numbness reported



UNDERSTANDING THE PROPOSED MECHANISMS

- 1 **HIGH SUPPLEMENTAL PYRIDOXINE INTAKE** leads to elevated free pyridoxine levels.



- 3 **ACCUMULATION & DIRECT TOXICITY:** Pyridoxine and its metabolites may accumulate and become directly toxic to nerve cells, particularly the distal axons

- 4 **IMPAIRED NERVE FUNCTION:** Alters nerve metabolism and conduction

ADVICE FOR HEALTHCARE PROFESSIONALS

- Review patients' total vitamin intake
- Check B6 content in all supplements
- Advise patients to stop B6 & seek care if tingling, burning or numbness occurs
- Use lowest effective dose for shortest duration



Report suspected adverse events associated with **Vitamin B6**-containing products to **NPRA**

CLICK HERE
TO VIEW FULL ARTICLE





NPRA SAFETY ALERT

Moxifloxacin

DRESS, Fixed-Drug Eruption (FDE) & Photosensitivity Associated with Systemic Use



SERIOUS CUTANEOUS REACTIONS MAY OCCUR
with the systemic use of moxifloxacin



WHAT IS MOXIFLOXACIN?

- Fluoroquinolone antibiotic with broad-spectrum bactericidal activity.
- Active against Gram-positive, Gram-negative, anaerobes & acid-fast bacteria.
- Indicated for respiratory tract infections, pelvic inflammatory disease, skin infections, and intra-abdominal infections.



THE SAFETY CONCERNS

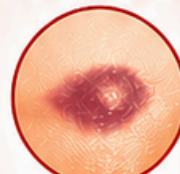
Based on EMA review, the risk of the following reactions has been added to product information.

Frequency: Not known



DRESS

Drug Reaction with Eosinophilia and Systemic Symptoms



FDE

Fixed-Drug Eruption



PHOTOSENSITIVITY

Reaction triggered by UV or visible light exposure



Click here for full article



ABOUT THE REACTIONS



DRESS

Drug Reaction with Eosinophilia and Systemic Symptoms

- Delayed onset: 2–8 weeks (may vary)
- Rash, fever, facial oedema, lymphadenopathy
- May involve multiple organs (liver, kidney, lung, etc.)
- Can be severe or fatal



FDE

Fixed-Drug Eruption

- Onset: within 2 weeks (rapid on re-exposure: 30 min–16 h)
- Round/oval, dusky-red patches on skin or mucosa
- Burning or itching sensation
- Lesions resolve with residual hyperpigmentation



PHOTOSENSITIVITY

Reaction triggered by UV or visible light exposure

- Triggered by UV/visible light (sunlight, sunbeds, phototherapy lamps)
- Phototoxic (dose-dependent) or photoallergic (type IV hypersensitivity reaction)
- Moxifloxacin: lower risk vs other fluoroquinolones (mainly phototoxic)



ADVICE FOR HEALTHCARE PROFESSIONALS



Assess patients thoroughly and take a detailed drug reaction history before prescribing.



Educate patients to monitor for early signs and symptoms of DRESS, FDE, or photosensitivity.



If suspected, discontinue moxifloxacin immediately and start appropriate treatment (e.g. corticosteroids, antihistamines) based on severity.



Advise patients to avoid prolonged sun exposure, and not to use a sunbed or any other UV lamp during treatment.



Report all suspected adverse events related to moxifloxacin-containing products to NPRA.



LOCAL ADVERSE DRUG REACTION REPORTS

To date, NPRA has received:



389
reports



710
adverse events

Most frequently reported adverse events:

- ✓ Pruritus (82)
- ✓ Rash (63)
- ✓ Erythema (30)

- 3 reports of FDE identified
- No reports of DRESS or photosensitivity after systemic use identified

NPRA SAFETY ALERT

Mesalazine: Risk of Idiopathic Intracranial Hypertension (IIH)



OVERVIEW OF PRODUCT(S)

- Mesalazine is an anti-inflammatory agent used for the induction of clinical and endoscopic remission in mild to moderate active ulcerative colitis, and for the maintenance of remission.
- Currently, 16 mesalazine products are registered with the DCA. These are available as single-ingredient products in both oral (tablets/granules) and rectal (suppositories/enemas) dosage forms.



Oral
(tablets/granules)



Rectal
(suppositories/enemas)



OVERVIEW OF SAFETY CONCERN

Idiopathic intracranial hypertension (IIH) is a disorder defined by chronically elevated intracranial pressure in the absence of a mass lesion, hydrocephalus, or other identifiable causes.



Common symptoms:

- Headache (worse in the morning)
- Transient visual obscuration
- Pulsatile tinnitus
- Dizziness, double vision
- Photophobia
- Cognitive disturbances
- Neck and radicular pain



The condition most commonly affects women of childbearing age and is strongly associated with obesity.



SOURCE OF SAFETY CONCERN

The NPRA, through global safety signal monitoring, noted that the UK MHRA had issued an update on the risk of IIH with mesalazine.



Following a review of safety data, mesalazine is very rarely associated with IIH, and an update to product information is recommended.



BACKGROUND OF THE SAFETY ISSUE

- The exact mechanism is not fully understood. An underlying inflammatory process and effects on cerebrospinal fluid dynamics and intracranial pressure regulation may contribute.
- A published case reported that IIH symptoms resolved after discontinuing mesalazine and re-emerged within 15 days of reintroduction, suggesting a temporal relationship.



LOCAL ADR REPORTS

To date, NPRA has received a total of:



67
Reports



152
Adverse Events



No cases of IIH associated with mesalazine use have been reported locally.



Other reported symptoms possibly related to increased intracranial pressure include:

- Headache (4 reports)
- Neck pain (1 report)



ADVICE FOR HEALTHCARE PROFESSIONALS



While NPRA is still reviewing this safety issue, should **remain vigilant** for the potential risk of IIH associated with mesalazine.



Although IIH is not normally life-threatening, in rare cases it can cause **serious vision problems** if not identified early.



Be cautious when prescribing mesalazine to patients with a known history of diagnosed or suspected IIH, or those with existing risk factors such as **obesity** and being of **childbearing age**.



Advise patients to **monitor and report symptoms** of IIH, specifically severe or recurrent headaches, visual disturbances, or pulsatile tinnitus.



Consider **discontinuation of mesalazine** if IIH symptoms occur and initiate prompt clinical management.



Report all adverse events suspected to be related to the use of mesalazine products to the NPRA.

SAFETY UPDATE

HYPERTRIGLYCERIDAEMIA

NEW ADVERSE DRUG REACTION OF ALECENSA®
(alectinib)



WHY IT MATTERS

Severe and life-threatening hypertriglyceridaemia may lead to **acute pancreatitis**, a medical emergency.

Hypertriglyceridaemia-induced pancreatitis has been reported in the postmarketing period for Alecensa.

A new Warning and Precaution will be added to the Product Information.

INDICATIONS APPROVED IN MALAYSIA



1. ADJUVANT TREATMENT

Indicated as adjuvant treatment following tumor resection for patients with ALK-positive non-small cell lung cancer (NSCLC).



2. TREATMENT OF ADVANCED NSCLC

Alecensa as monotherapy is indicated for the first-line treatment of adult patients with ALK-positive advanced NSCLC.



3. TREATMENT AFTER CRIZOTINIB

Alecensa as monotherapy is indicated for the treatment of adult patients with ALK-positive advanced NSCLC previously treated with crizotinib.



MONITORING & MANAGEMENT



Check baseline blood triglyceride measurement before starting Alecensa, and monitor periodically while on treatment.



Monitor for symptoms indicative of acute pancreatitis, especially in patients at increased risk.



If triglycerides are:

- **SEVERE** >500 to 1000 mg/dL (5.7 to 11.4 mmol/L)
- **LIFE-THREATENING** >1000 mg/dL (>11.4 mmol/L)

→ Withhold Alecensa temporarily until recovery to at least **MODERATE** hypertriglyceridaemia: >300 to 500 mg/dL (3.42 to 5.7 mmol/L).



Evaluate risk factors for pancreatitis and address treatable risk factors before and during treatment.



Alecensa may be resumed at the same dose, with triglyceride levels monitored regularly in these patients.

SAFETY CONCERN: HYPERTRIGLYCERIDAEMIA



Reported in **4.3%** of patients (any grade) from pivotal clinical trials.



Severe hypertriglyceridaemia reported in **1.5%** of patients from pivotal clinical trials.



Triglycerides increased from baseline. Most shifts were from normal to Grade 1 (150–300 mg/dL), however, Grade ≥3 elevations were reported.



Postmarketing reports: **5** severe to life-threatening cases. 3 cases complicated by life-threatening pancreatitis (all recovered).



Onset of serious cases ranged between **6 weeks** and **1 year** after starting Alecensa.

RISK FACTORS FOR PANCREATITIS



- Hypertriglyceridaemia
- Diabetes mellitus
- Obesity
- Excessive alcohol consumption
- Gallstones
- Certain medications
- Family history of pancreatitis



Evaluate and treat modifiable risk factors before starting treatment with Alecensa.



ALL ADVERSE EVENTS MUST BE REPORTED TO **NPRA**



Prepared by: Drug Information Centre (DIC), Pharmacy Department, Hospital Sultanah Bahiyah

NPRA SAFETY ALERT

Clindamycin Hydrochloride (Oral Capsules)



RISK OF OESOPHAGITIS AND OESOPHAGEAL ULCER



OVERVIEW

- Clindamycin is a lincosamide antibiotic used to treat infections caused by susceptible anaerobic bacteria, Gram-positive bacteria and Chlamydia trachomatis.
- Oral clindamycin capsules are formulated as clindamycin hydrochloride, a stable, very water-soluble salt with acidic properties.



WHAT IS THE RISK?

Oesophagitis (inflammation) may progress to oesophageal ulcer.

How it can happen:

Clindamycin is acidic when dissolved. If the capsule stays in the oesophagus for too long, it may irritate and injure the lining.



WHO IS AT HIGHER RISK?

- Taking capsules with insufficient water 
- Lying down soon after taking the capsule 
- Elderly patients (≥ 65 years) 
- Reduced oesophageal motility, polypharmacy, prolonged recumbency 
- Anatomical factors (e.g. external compression of the oesophagus) 



EARLY SYMPTOMS

Symptoms usually appear within the first 5 days of starting treatment.



Pain when swallowing (odynophagia)



Difficulty swallowing (dysphagia)



Retrosternal / chest pain



These symptoms are generally reversible and improve after stopping clindamycin and with appropriate management.



ADVICE FOR HEALTH CARE PROFESSIONALS



Be aware of the risk of oesophagitis and oesophageal ulcer with clindamycin capsules, particularly with improper administration.



Advise patients to take clindamycin capsules with a full glass of water.
Remain upright for at least 30 minutes after administration.



Emphasise to patients the importance of adherence to these instructions to reduce the risk.



Advise patients to seek medical attention if they experience pain or difficulty when swallowing, or chest pain.



Consider discontinuation of clindamycin if oesophageal injury is suspected, and manage it accordingly.



Report all suspected adverse events related to clindamycin-containing products to the NPRA.



**TAKE CLINDAMYCIN CAPSULES CORRECTLY.
PROTECT YOUR OESOPHAGUS.**



Take with a full glass of water



Stay upright for at least 30 minutes



Follow the instructions to stay safe

[Click Here For Full Article](#)