



## INDIA'S FIRST ANTIBIOTIC FOR AMR – SCIENCE & TECHNOLOGY

**NEWS:** Recently, the government announced the soft launch of Nafithromycin, India's first indigenously developed antibiotic designed to combat antimicrobial resistance (AMR).

WHAT'S IN THE NEWS?

### First Indigenously Developed Antibiotic in India:

- Developed to address **antimicrobial resistance (AMR)**.
- Targets **Community-Acquired Bacterial Pneumonia (CABP)**.
- CABP is a severe illness caused by **drug-resistant bacteria**.
- **Global and National Impact:**
  - Pneumonia causes over **2 million deaths globally** each year.
  - **India:** Accounts for **23%** of the world's **community pneumonia burden**.

### Key Features and Benefits

- **Brand Name:** Marketed as “**Miqnaf**” by Wolkradt.
- **Potency and Regimen:**
  - **10x more potent** than Azithromycin.
  - Effective with a **three-day regimen**, ensuring **faster recovery**.
- **Broad Pathogen Coverage:**
  - Targets both **typical and atypical pathogens**.
  - No new antibiotics in this class developed globally in over **30 years**.
- **Patient-Centric Benefits:**
  - **Minimal side effects:** Few gastrointestinal issues.
  - **High tolerability:** No significant drug interactions; efficacy unaffected by food.

### C. Development Support

- **BIRAC Collaboration:**
  - Supported by the **Biotechnology Industry Research Assistance Council (BIRAC)** under the **Department of Biotechnology**.



**India's First Indigenous Antibiotic**  
**NAFITHROMYCIN**  
A milestone in combating antimicrobial resistance (AMR)

- Developed by BIRAC (Biotechnology Industry Research Assistance Council)**  
14 years of research, ₹500 crore investment
- 10x More Effective:** Targets drug-resistant pneumonia
- 3-Day Regimen:** Faster, safer, and more tolerable
- Global Breakthrough:** First in its class in 30+ years
- Marketed as "Miqnaf" by Wolkardt Pharma**

Source: **PIB**

## Understanding Pneumonia

### A. Overview of Pneumonia

- **Lung Infection:** Involves the **filling of alveoli** (air sacs) with pus and fluid, causing painful breathing and limiting oxygen intake.

### B. Causes and Transmission in Children

- **Bacterial Causes:** *Streptococcus pneumoniae* and *Haemophilus influenzae* type b (**Hib**) are primary bacterial agents.
- **Viral Causes:** **Respiratory Syncytial Virus (RSV)** is the leading viral cause.





- **Modes of Transmission:**

- **Inhalation of microorganisms** from the nose or throat.
- **Airborne droplets** from sneezes or coughs.
- **Blood transmission** during or shortly after childbirth.

## C. Walking Pneumonia

- **Less Severe Pneumonia:** Caused by **atypical bacteria** like *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*.
- Affects **younger people** more often, allowing them to continue daily activities.

## Bacterial Pneumonia

### A. Common Causes

- **Primary Bacterium:** *Streptococcus pneumoniae*.
- **Other Bacteria:**
  - *Haemophilus influenzae*
  - *Staphylococcus aureus*
  - *Mycoplasma pneumoniae*

### B. Transmission

- Spread through **respiratory droplets** when an infected person **coughs or sneezes**.
- Can develop after a **viral respiratory infection** weakens lung defenses, making them more vulnerable to bacterial invasion.

## Viral Pneumonia

### A. Common Causes

- Caused by various viruses, including:
  - **Influenza virus**
  - **Respiratory Syncytial Virus (RSV)**
  - **Coronaviruses** (e.g., SARS-CoV-2)
  - **Adenoviruses**

### B. Transmission

- Spread via **airborne droplets** from coughing, sneezing, or talking.
- Can also be transmitted through **contact with contaminated surfaces**.



## Aspiration Pneumonia

### A. Causes and Risk Factors

- Occurs when **food, liquid, or vomit** is inhaled into the lungs, leading to infection.
- Common in individuals with impaired **swallowing reflex** due to:
  - **Neurological conditions** (e.g., stroke, dementia)
  - **Sedation or alcohol intoxication**

### B. Transmission

- **Not contagious**; arises from inhaling material containing bacteria such as:
  - *Anaerobes*
  - *Streptococcus pneumoniae*
  - *Enterobacteriaceae*

## Fungal Pneumonia

### A. Common Causes

- Caused by fungi such as:
  - *Histoplasma capsulatum*
  - *Coccidioides immitis*
  - *Blastomyces dermatitidis*
  - *Cryptococcus neoformans*

### B. Transmission

- Occurs when **fungal spores** are inhaled from the environment, typically from **soil** or **decaying organic matter**.

## Antimicrobial Resistance (AMR)

### A. Definition and Causes

- **AMR:** Microorganisms (bacteria, viruses, fungi, parasites) become **resistant to antimicrobials** (antibiotics, antivirals, antifungals, etc.).
- **Key Cause:** Misuse or overuse of antibiotics accelerates **microbial evolution**, making infections difficult to treat.

### B. Consequences of AMR

- **Health Risks:** Increased spread of infections, severe illnesses, disability, and death.
- **Treatment Challenges:** Makes **common infections harder or impossible to treat**.



## National Initiatives to Combat AMR

### A. National Programme on AMR Containment (2012-17)

- **Objectives:**
  - Establish a **laboratory-based AMR surveillance system**.
  - Conduct surveillance on **antimicrobial usage** in healthcare.
  - Promote **rational use of antimicrobials** through stewardship programs.
  - Raise **awareness** among healthcare providers and the community.

### B. National Action Plan (NAP) on AMR (2017)

- **Comprehensive Strategy:**
  - India was among the **first countries** to develop a NAP on AMR.
  - **One Health Approach:** Involves various stakeholder ministries and departments.
  - **Focus Areas:** Surveillance, infection control, rational antimicrobial use, and public awareness.

## Conclusion

- The **development of Nafithromycin** is a crucial step in India's fight against **antimicrobial resistance** and pneumonia.
- With comprehensive national programs like the **NAP on AMR**, India is taking proactive steps to combat the growing threat of drug resistance.