

Untouched by hand  
**touched by heart**

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## Message from Chair

Hello friends,

We are back again with another interesting edition of news letter about antimicrobial resistance.(AMR).With the advent of time micro organisms are becoming resistant to antibiotics We at aspiira ensure that with the technology we detect accurately the causative organism and good antibiogram which will help in the selective and efficient use of antibiotics which will

drastically reduce the antimicrobial resistance. In this news letter, we will discuss 1) Prevalence 2) Mechanism of development 3) Diagnosis and treatment of antimicrobial resistance.

Sincerely,  
Dr. Pankaj Shah  
MD (Pathology)  
Managing Director

## Antibiotics : Bedrock of modern medicine...since more than 70 years, magic bullets beaten to ineffectiveness

Antibiotic use is a major driver of resistance. India is the world's largest consumer of antibiotics for human health at the rate of 10.7 units per person with 62% increase in pill popping habits over the last decade. An average Indian has been found to be popping over 11 antibiotic pills a year. [timesofindia.indiatimes.com](http://timesofindia.indiatimes.com)

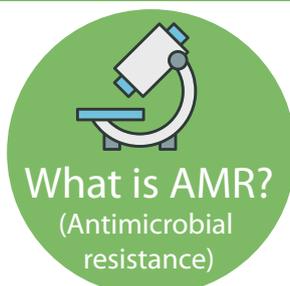
## Antibiotic resistance a global threat, says WHO

### Bug Trouble

#### What are drug-resistant micro-organism?

Anti-microbial resistance (AMR) means an antibiotic originally effective in treating infections caused by micro-organism is now ineffective

Resistant micro-organism can withstand attack by antibiotics, antifungals, antiviral and antimalarials, Standard treatment become ineffective and infections persist.



## Introduction

Antimicrobial resistance (AMR) is an important concern for the public health authorities at global level. AMR a major public health problem of developing countries due to relatively easy availability and higher consumption of medicines and greater levels of resistance compared to developed countries.

The approximate infectious disease mortality rate in India today is 416.75 per 100,000 persons and irrational use of antimicrobial agents against these diseases, leads to increase in development of antimicrobial resistance.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3783766/>

Hospital-acquired infections (HAI) a critical problem affecting the quality of healthcare, and constitute a major source of adverse healthcare outcomes. The emergence of multidrug-resistant bacteria (MDRB) has become a public health problem, particularly for patients admitted to intensive care units (ICU). In critical care units, there is extensive antimicrobial use, which imposes a selection pressure and promotes the emergence of MDRB.

The resistance among *E. coli* to third generation cephalosporins (a class of antibiotics) was 8-11%. The CDC found it to be 5%.

The resistance to klebsiella (*K. pneumoniae*) to third generation cephalosporins was 20-27%. The CDC found it to be 15%. Resistance to carbapenems among these isolates is now between 7 and 11%.

In India, antibiotics are readily available in medical and general stores without prescription thus making the country the biggest antibiotic users.

Infection is defined as the invasion of an organism's body by disease-causing agents, their multiplication, and the reaction of host tissues to these organisms and the toxins they produce.

<https://en.wikipedia.org/wiki/Infection>

Infections are mainly caused by infectious agents like virus, bacteria, fungi and parasites which can be chronic and/or acute. A short-term infection is an acute infection whereas long-term infection is a chronic infection. The infections caused by this agents is termed as infectious disease which can be transferable and communicable.

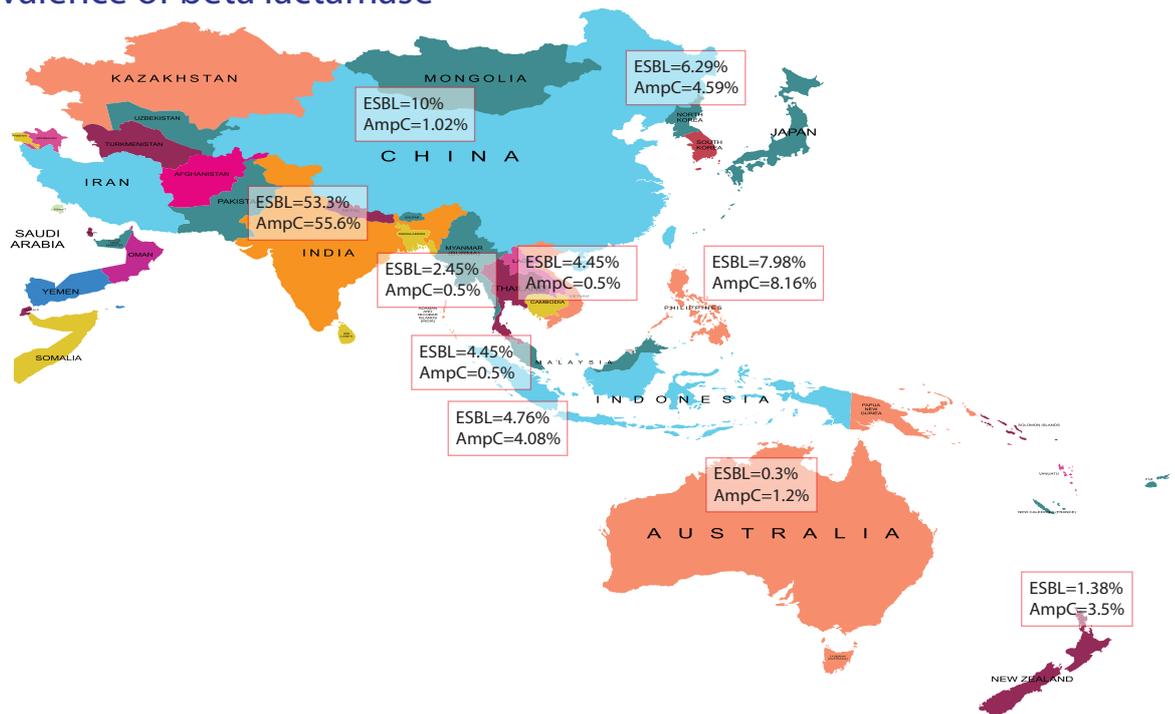
## What is Antimicrobial resistance?

Antimicrobial resistance (AMR) is the ability of a microorganism (like bacteria, viruses, and some parasites) to stop an antimicrobial (such as antibiotics, antivirals and antimalarials) from working against it.

[www.who.int/antimicrobial-resistance/en/](http://www.who.int/antimicrobial-resistance/en/)

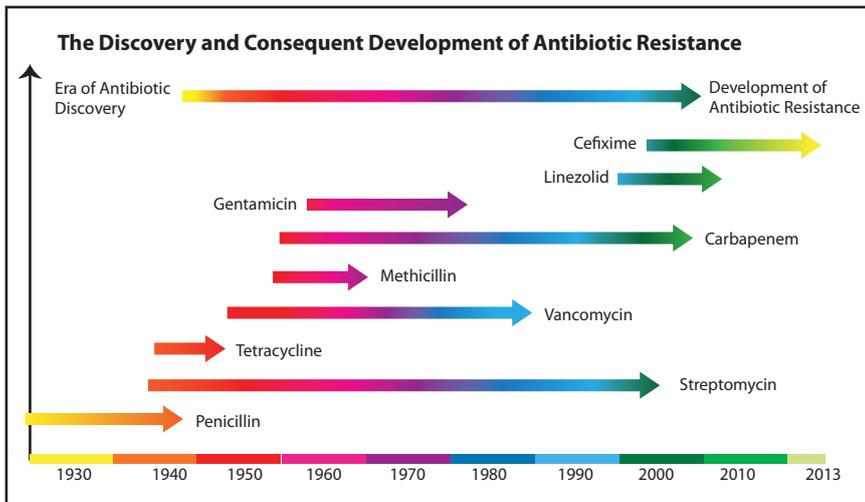
Meta analyses of the drug susceptibility results of various laboratories in India reveal an increasing trend of development of resistance to commonly used antimicrobials in pathogens like *Salmonella*, *Shigella*, *Vibrio cholerae*, *Staphylococcus aureus*, *Neisseria gonorrhoeae*, *N. meningitidis*, *Klebsiella*, *Mycobacterium tuberculosis*, *HIV*, *plasmodium* and others. New resistance mechanisms, such as the metallo-beta-lactamase NDM-1, have emerged among several gram-negative bacilli.

## Asia Pacific prevalence of beta lactamase



### ASIA-PACIFIC REGION (SMART STUDY)

1. India
2. China
3. S. Korea
4. Taiwan
5. Philippines
6. New Zealand
7. Australia
8. Malaysia
9. Singapore
10. Vietnam
11. Thailand



## How is it developing?

When antibiotics are used incorrectly i.e for too short time period, or in small dose, or at inadequate strengths, or for the wrong disease - bacteria are not killed and can pass on survival traits to even more bacteria through several mechanisms. As a result, the medicines become ineffective and infections persist in the body, increasing the risk of spread to others. Microorganisms that develop antimicrobial resistance are referred to as SUPERBUGS.

<http://www.who.int/mediacentre/factsheets/fs194/en>

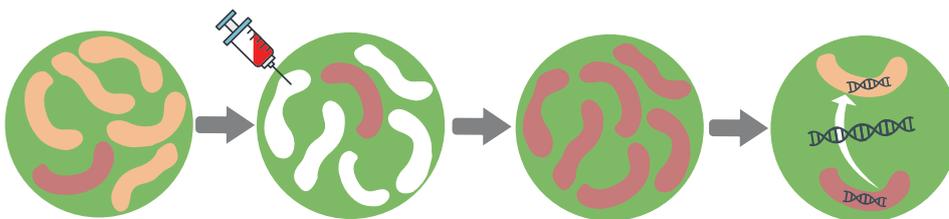
## What causes antibiotic resistance?

**Step 1:** Large numbers of bacteria exist all around us. Because of random, natural mutations, some of them are resistant to antibiotics.

**Step 2:** When exposed to antibiotics, the susceptible bacteria die, even the good ones that help to protect you from infections. The bugs who are naturally resistant survive.

**Step 3:** The remaining resistant bacteria now have room to thrive and multiply.

**Step 4:** Resistant bacteria can transfer parts of their DNA that code for this resistance to other bacteria. This is how antibiotic resistance "spreads".



### Result of Misuse / Overuse of Antibiotics

Due to this new resistance mechanisms are emerging and spreading globally, threatening the ability to treat common infectious diseases, resulting in prolonged illness, disability, and death.

Antibiotic is one of the most important medical inventions in the 20th century and it had been taken for granted in treating many deadly infectious diseases.

- Patient movement within and among medical institutions
- Appropriateness of prescription and use
- Infection control measures
- Travel of people and goods
- Socioeconomic factors

### Antibiotic Use ↔ Antibiotic Resistance

- Selection by non-antibiotic substances
- Antibiotic residues in the environment
- Dose & duration of treatment
- Linkage of resistance determinants
- Gene transfer
- Clonal Spread

## How to stop?

" Antibiotics should not be prescribed if not required."

### Every time antibiotics are prescribed



### Specific recommendations for common prescribing situations

1. Order recommended cultures before antibiotics are given and start drugs promptly.
2. Make sure indication, dose, and expected duration are specified in the patient record.
3. Reassess within 48 hours and adjust Rx if necessary or stop Rx if indicated.

#### Rx for urinary tract Infections

- Make sure that culture results represent true infection and not just colonization
- Assess patient for signs and symptoms of UTI.
- Make sure that urinalysis is obtained with every urine culture.
- Treat for recommended length of time and ensure that planned post-discharge treatment takes into account the antibiotics given in the hospital

#### Rx for pneumonia

- Make sure that symptoms truly represent pneumonia and not an alternate, non-infectious diagnosis
- Treat for the recommended length of time and ensure that planned post-discharge takes into account the antibiotics given in the hospital.

#### Rx for MRSA infections

- Verify that MRSA is growing in clinically relevant cultures. Do not use vancomycin to treat infections caused by methicillin- susceptible staph (and not MRSA).

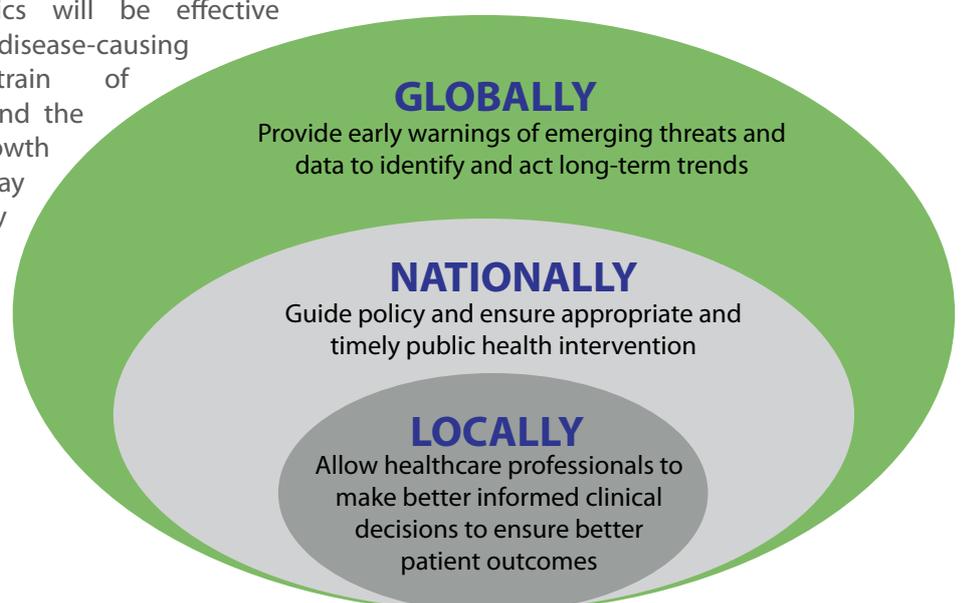
SOURCE: CDC Vital Signs, 2014

## How to get rid of AMR ?

Microbiology laboratories are the first lines of defense to avoid antibiotic resistance & for detection of new antibiotic resistance as they serve as the current best approach for managing today's problems of emerging infectious diseases and antimicrobial agent resistance by providing good patient care.

## Why to go for culture testing?

It's critical to know which antibiotics will be effective against the particular pathogen (i.e., disease-causing agent) therefore the species/strain of bacteria/pathogen must be identified and the drugs most effective at inhibiting their growth must be determined. The only reliable way this can be done is a culture and sensitivity test.



## AMR : One world One fight

Source: Global Action Plan on Antimicrobial Resistance. WHO  
ISBN 978 92 4 150976

A lot of useful healthcare information can be obtained from these sites.

- [www.nrhm.gov.in](http://www.nrhm.gov.in)
- [www.nlm.nih.gov](http://www.nlm.nih.gov)
- [www.cdc.gov](http://www.cdc.gov)
- [www.who.int](http://www.who.int)
- [www.nhp.gov.in](http://www.nhp.gov.in)
- [www.nhs.uk](http://www.nhs.uk)

## Why Aspira?

In Aspira all clinical samples like urine, blood, sputum, stool and other body fluids are processed and positive samples are reported along with antibacterial susceptibility as per standard guidelines (Clinical and Laboratory Standard Institute - CLSI & European Committee on Antibiotic Susceptibility Testing - EUCAST) .

The main purpose of Aspira is to assist in the diagnosis and treatment of infectious diseases.

Aspira has a complete solution of microbiology testing and through our IT the results are available to our doorsteps.

## Technology available at Aspira

### Blood culture FX

The BACTEC blood culture system is a fully automated microbiology growth detection system designed to detect microbial growth from blood and body fluid specimens.

2. The BD FX40 builds on the proven superior fluorescence detection technology, exceptional media performance and high instrument reliability.
3. BACTEC™ media provide a unique & superior formulation to enhance recovery of aerobic and anaerobic bacteria, fungi, and yeast.

### VITEK 2

The VITEK 2 is an automated microbiology system utilizing growth-based technology for Identification and Antibiotic susceptibility testing of bacteria and yeast .

2. It works based on an Advanced Expert System which gives you an accurate phenotypic profile of the bacterial resistance mechanism(s) according to CLSI & EUCAST guidelines.

### BacT/ALERT 3D

1.The BacT/ALERT 3D instrument is an automated microbial detection system. The BacT/ALERT system offers advantages in every dimension of microbial detection testing.

- 2.BacT/ALERT Culture Media brings the most advanced, innovative microbial growth and detection technology to the laboratory.
- 3.BacT/ALERT media provide unsurpassed performance, in the detection of a wide variety of microorganisms including bacteria, fungi, and yeasts.

### FILMARRAY

1.The FilmArray is an FDA-cleared multiplex PCR system that integrates sample preparation, amplification, detection and analysis. It requires just a few minutes of hands-on-time and its turnaround time is just about an hour, giving you faster results which may lead to better patient care.

2.The FilmArray has four FDA-cleared panels – the Respiratory Panel, the Blood Culture Identification Panel, the Gastrointestinal Panel, and the Meningitis/Encephalitis Panel. Together, these panels test for more than a hundred pathogens. Thus, FilmArray is not only the fastest way to better results; it's the fastest way to more results.



## Exclusive Mobile Apps

AspiraHealth is an exclusive app that's specifically built to track your diagnostic tests at Aspira Pathlabs easier. This makes the process for our customers, hassle free.

AspiraHealth is designed to track, save and share your diagnostic reports at our pathlabs.

Having to visit pathlabs with the impending anxiety of the test results can be very stressful and time consuming. So, don't visit us. We'll bring you your test results ON YOUR PHONE. AspiraHealth is designed for exactly that.

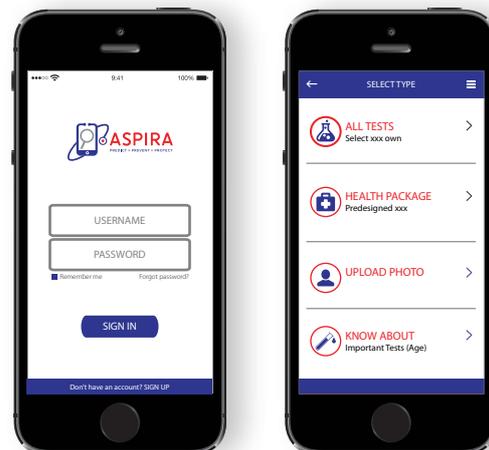
## Here's How

- ▶ Find an Aspira registered healthcare provider/lab near you: SEARCH SIMPLER
- ▶ Book an appointment for Home/Lab visits: HASSLE FREE BOOKINGS
- ▶ Check status of appointments: REAL TIME APPROVALS DIRECTLY FROM LAB CENTRES
- ▶ Track your tests and reports right on your phone: TRACK RESULTS
- ▶ Understand your reports with our indicators: INTERPRET RESULTS BETTER
- ▶ Track health with automated archives: DOWNLOAD/SAVE/SHARE ARCHIVED REPORTS

If you've not tried Aspira yet, and just need a regular health tracking system, just enter your diagnostic test results manually and we'll keep track of your health.

The five simple steps to make healthy living, easier

- 1 SEARCH 2 BOOK 3 PAY 4 TRACK 5 RELAX



## Congratulations Dr. Chaitali!

1. Manuscript entitled 'Rifampicin resistant tuberculosis: What is the best initial empiric regimen in Mumbai, India?' accepted in European Respiratory Journal coauthored by Dr. Chaitali Nikam

2. E poster abstract was selected at the 27th ECCMID, the European Congress of Clinical Microbiology and Infectious Diseases, which took place in Vienna, Austria, 22 – 25 April, 2017 authored by Dr. Chaitali Nikam under Mycobacterial diagnostics session

Title: Evaluation of point-of-care testing of rapid, simple and cost effective detection of M. tuberculosis

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