TUBERCULOSIS

DOT’S TREATMENT
TUBERCULOSIS

- TB is caused by *Mycobacterium tuberculosis*
- TB can affect any organ system: bone, kidney, CNS; 80% are pulmonary
SYMPTOMS OF TUBERCULOSIS

- NIGHT SWEATS
- COUGH 2+ WEEKS
- LOSS OF APPETITE
- FEVER
- WEIGHT LOSS
- FATIGUE
TB: A Global Emergency

- 1/3 of the world (2 billion people) infected

- 1 person infected/second resulting in >30 million new infections, 8 million new cases

- Left untreated 1/3 die, 1/3 self-cure, 1/3 remain infectious

- TB kills 1 person every 10 seconds = 5000/day = 2-3 million each year
Problem of TB in India

- Estimated incidence
  - 1.96 million new cases annually
  - 0.8 million new smear positive cases annually
  - 75 new smear positive PTB cases/1 lakh population per year

- Estimated prevalence of TB disease
  - 3.8 million bacillary cases in 2000
  - 1.7 million new smear positive cases in 2000

- Estimated mortality
  - 330,000 deaths due to TB each year
  - Over 1000 deaths a day
  - 2 deaths every 3 minutes
ANTI- TB DRUGS

FIRST LINE
ISONIAZID
RIFAMPICIN
PYRAZINAMIDE
ETHAMBUTOL
STREPTOMYCIN

SECOND LINE
THIOACETAZONE
PAS
ETHIONAMIDE
CYCLOSERINE
KANAMYCIN
CAPREOMYCIN
AMIKacin

NEWER DRUGS
CIPROFLOXACIN
OFLOXACIN
CLARITHROMYCIN
AZITHROMYCIN
RIFABUTIN
What is DOTS?

- Tuberculosis is completely curable through short-course chemotherapy. Treating TB cases who are sputum-smear positive (and who can therefore spread the disease to others) at the source, it is the most effective means of eliminating TB from a population.

- DOTS or Directly Observed Treatment Short course is the internationally recommended strategy for TB control that has been recognized as a highly efficient and cost-effective strategy. DOTS comprises five components.
. **Sustained political and financial commitment.** TB can be cured and the epidemic reversed if adequate resources and administrative support for TB control are provided

2. **Diagnosis by quality ensured sputum-smear microscopy.** Chest symptomatics examined this way helps to reliably find infectious patients

3. **Standardized short-course anti-TB treatment (SCC) given under direct and supportive observation (DOT).** Helps to ensure the right drugs are taken at the right time for the full duration of treatment.

4. **A regular, uninterrupted supply of high quality anti-TB drugs.** Ensures that a credible national TB programme does not have to turn anyone away.

5. **Standardized recording and reporting.** Helps to keep track of each individual patient and to monitor overall programme performance
DOTS

- **DOT** means that a trained health care worker or other designated individual (excluding a family member) provides the prescribed TB drugs and watches the patient swallow every dose.

- **Why use DOT?**
  - We cannot predict who will take medications as directed, and who will not. People from all social classes, educational backgrounds, ages, genders, and ethnicities can have problems taking medications correctly.
  - Studies show that 86-90% of patients receiving DOT complete therapy, compared to 61% for those on self-administered therapy.
  - DOT helps patients finish TB therapy as quickly as possible, without unnecessary gaps.
  - DOT helps prevent TB from spreading to others.
  - DOT decreases the risk of drug-resistance resulting from erratic or incomplete treatment.
  - DOT decreases the chances of treatment failure and relapse.
Who can deliver DOT?
• A nurse or supervised outreach worker from the patient's county public health department normally provides DOT.
• In some situations, it works best for clinics, home care agencies, correctional facilities, treatment centers, schools, employers, and other facilities to provide DOT, under the guidance of the local health department.
• Family members should not be used for DOT. DOT providers must remain objective. For complex regimens including IV/IM medications or twice daily dosing, home care agencies may provide DOT or share responsibilities with the local health department.
• If resources for providing DOT are limited, priority should be given to patients most at risk.
How is DOT administered?

DOT includes:

- delivering the prescribed medication
- checking for side effects
- watching the patient swallow the medication
- documenting the visit
- answering questions

DOT should be initiated when TB treatment starts. Do not allow the patient to try self-administering medications and missing doses before providing DOT. If the patient views DOT as a punitive measure, there is less chance of successfully completing therapy.
The prescribing physician should show support for DOT by explaining to the patient that DOT is widely used and very effective. The DOT provider should reinforce this message.

DOT works best when used with a patient-centered case management approach, including such things as:

- helping patients keep medical appointments
- providing ongoing patient education
- offering incentives and/or enablers
- connecting patients with social services or transportation

Patients taking daily therapy can usually self-administer their weekend doses.
## DOTS Regimen

<table>
<thead>
<tr>
<th>Category</th>
<th>Type of Patient</th>
<th>Regimen</th>
<th>Duration in months</th>
<th>Test at month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category I</td>
<td>New Sputum Smear Positive</td>
<td>2 (HRZE)_3,</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>New Sputum Smear Negative</td>
<td>4 (HR)_3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New Extra Pulmonary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New Others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color of box:</td>
<td><strong>RED</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category II</td>
<td>Sputum Positive relapse</td>
<td>2 (HRZES)_3,</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sputum Positive failure</td>
<td>1 (HRZE)_3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sputum Positive treatment after default</td>
<td>5 (HRE)_3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color of box:</td>
<td><strong>BLUE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

H-ISONIAZID     R- RIFAMPICIN     Z-PYRAZINAMIDE    E- Ethambutol
Contd.

<table>
<thead>
<tr>
<th>Category</th>
<th>Type of Patient</th>
<th>Regimen</th>
<th>Duration in months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category III</td>
<td>Sputum Negative, extra pulmonary not Seriously ill</td>
<td>2 (HRZ)$_3$, 4 (HR)$_3$</td>
<td>6</td>
</tr>
</tbody>
</table>

Color of box: GREEN
<table>
<thead>
<tr>
<th>DRUG</th>
<th>DOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISONIAZID</td>
<td>600 mg</td>
</tr>
<tr>
<td>RIFAMPICIN</td>
<td>450 mg</td>
</tr>
<tr>
<td>PYRAZINAMIDE</td>
<td>1500 mg</td>
</tr>
<tr>
<td>ETHAMBUTOL</td>
<td>1200 mg</td>
</tr>
<tr>
<td>STREPTOMYCIN</td>
<td>750 mg</td>
</tr>
</tbody>
</table>
MULTI DRUG RESISTANT TB (MDR-TB)

AT LEAST RESISTANT TO **ISONIAZID** AND **RIFAMPICIN**
TREATMENT BASED ON DOTS – PLUS

**DOTS- PLUS**

**INTENSIVE PHASE 6-9 MONTHS**
- KANAMYCIN
- OFLOXACIN
- CYCLOSERINE
- ETHINAMIDE
- ETHAMBUTOL
- PYRAZINAMIDE

**CONTINUATION PHASE 18 MONTHS**
- OFLOXACIN
- CYCLOSERINE
- ETHIONAMIDE
- ETHAMBUTOL
# DOSAGE FOR CHILDREN

<table>
<thead>
<tr>
<th>DRUGS</th>
<th>THERAPY PER DOSE (THrice A WEEK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid</td>
<td>10-15 mg/kg</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>10 mg/kg</td>
</tr>
<tr>
<td>Pyrizinamide</td>
<td>35 mg/kg</td>
</tr>
<tr>
<td>Ethambutol</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>15 mg/kg</td>
</tr>
</tbody>
</table>
Advantages of DOTS

- The client is supported to successfully complete the full course of medication.
- The client is monitored closely for side effects of medications and supported to work through the side effects appropriately.
- The client is encouraged and supported to complete required check ups – blood work, chest x-rays, etc.
- Reduces the possibility of tb germs becoming resistant to the medication
<table>
<thead>
<tr>
<th>New guidelines</th>
<th>Previous guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily regimen</td>
<td>Intermittent regimen</td>
</tr>
<tr>
<td>Ethambutol in CP of both categories I and II regimen</td>
<td>Ethambutol in CP of category II regimen only</td>
</tr>
<tr>
<td>Fixed dose combination as per weight band</td>
<td>No fixed dose, limited weight band</td>
</tr>
<tr>
<td>No need of extension of IP</td>
<td>Extension of IP for 1 month if sputum is positive at the end of IP</td>
</tr>
<tr>
<td>Follow-up-clinical, laboratory investigation</td>
<td>Follow-up-laboratory only</td>
</tr>
<tr>
<td>Long-term follow-up up to 2 years</td>
<td>No long-term follow-up</td>
</tr>
</tbody>
</table>
99 DOTS:

- 99% of the benefits are enrolled in the regime.
- Introduction of fixed dose drug combination.
- Both drugs are combined.
- It is used in the R. I, E, P

1\textsuperscript{st} – 4 4JC Intensive phase: Isodized, Refampicen, Ethambutol, Pyrazinamed. 1\textsuperscript{st} lane drugs combined together and formed tablets.

Dose: I: 75 mg, R: 150 mg, E: 275 mg, P: 400 mg

This is for one day, one single dose.

2\textsuperscript{nd}, 3FJC: I,R,E dosage is same. It is used in the continuation.

\textbf{II Change}

Previously the regimen was 3 days in a week. But now it is daily treatment.

\textbf{III Change}

Use of Information Technology, mainly for monitoring and implementation with Aadhar Number.
Treatment

Patients are categorized into 2.

Category I:

- All new cases Sputum Senear Positive or Negative
- $R_x$ is divided into intensive phase - 1<sup>st</sup> 4 FDC
- First line agents for 8 weeks or 2 months
- In continuation phase – (IRE drugs) 3 FDC – give for a period of
  - 16 weeks or 4 moths
- Total duration is 6 months
- CNS, TB or Skeletal +B – Continuation phase - 12 week extended to 24 weeks to the continuation phase.

Category II:

Previously treated or Defaulters or relapse
Intensive phase: 4 FDC+Inj. Streptomycin 5 weeks-12 weeks or 3 months
Continuation phase: 3 FDC – 20 weeks or 5 months
Total 8 months
<table>
<thead>
<tr>
<th>Weight category</th>
<th>Number of tablets (dispersible FDCs)</th>
<th>Inj. Streptomycin mg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intensive phase</td>
<td>Continuation phase</td>
</tr>
<tr>
<td></td>
<td>HRZ 50/75/150</td>
<td>E 100</td>
</tr>
<tr>
<td>4-7 kg</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8-11 kg</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>12-15 kg</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>16-24 kg</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>25-29 kg</td>
<td>3+1A</td>
<td>3</td>
</tr>
<tr>
<td>30-39 kg</td>
<td>2+2A</td>
<td>2</td>
</tr>
</tbody>
</table>

A = Adult FDC (HRZE = 75/150/400/275; HRE = 75/150/275)
<table>
<thead>
<tr>
<th>Wt. (kg)</th>
<th>No. of tablets (FDC)</th>
<th>Inj. Streptomycin Gm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IP (H, R, Z, E)</td>
<td>CP (H, R, E)</td>
</tr>
<tr>
<td></td>
<td>75,150,400,275 mg</td>
<td>75,150,275 mg</td>
</tr>
<tr>
<td>25-39</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>40-54</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>55-69</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>&gt;70</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

H: Isoniazid, R: Rifampicin, Z: Pyrazinamide, E: Ethambutol
MISSION INDRADHANUSH

- It is health mission of Government of India.
- It was launched on 25th December, 2014.

Main Aim:

- 90% of full immunization coverage of India by the year 2020.

- Vaccination is being provided against “8” vaccine preventable diseases like DPT, Polio, Measles, TB, Hepatitis, Meningitis and Pneumonia caused by Haemophillus Influenza type “B” and against Rotovirus Diarrhea and Japanese encephalitis.

- 201 districts will be covered in the first phase. Mainly in the states of Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh.
GOAL:

• To ensure full immunization with all available vaccines for children up to 2 years of age and pregnant women.

• The Government has identified 600 high focus districts across 28 states in the country that have the highest number of partially immunized and unimmunized children.

• Because of MISSION INDRADHANUSH, 6.7% increased in the first two phases, earlier it was only 1%.

• In 201, four new additions have been made namely, Rubella, Japanese Encephalitis, Injectable Polio Vaccine and Rotovirus.

• In 2017, Pneumonia was added to this Mission
# REVISED IMMUNIZATION SCHEDULE

This revised (latest) immunization schedule (2018) is recommended by IAP (Indian Academy of Pediatrics).

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Vaccine</th>
<th>Prevents</th>
<th>Minimum age for Dose1</th>
<th>Interval between Dose1 &amp; Dose2</th>
<th>Interval between Dose2 &amp; Dose3</th>
<th>Interval between Dose3 &amp; Dose4</th>
<th>Interval between Dose4 &amp; Dose5</th>
<th>Route of admn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BCG</td>
<td>TB &amp; Bladder Cancer</td>
<td>Birth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intradermal (ID)</td>
</tr>
<tr>
<td>2</td>
<td>HepB</td>
<td>Hepatitis B</td>
<td>Birth</td>
<td>4 weeks</td>
<td>8 weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Polio virus</td>
<td>Polio</td>
<td>Birth</td>
<td>4 weeks</td>
<td>4 weeks</td>
<td></td>
<td></td>
<td>Intramuscular (IM)</td>
</tr>
<tr>
<td>4</td>
<td>DPT</td>
<td>Diphtheria, Tetanus &amp; Pertussis</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks</td>
<td>6 months (Booster-1)</td>
<td>3 years (Booster-2)</td>
<td>Intramuscular (IM)</td>
</tr>
<tr>
<td>5</td>
<td>Hib</td>
<td>Infections caused by bacteria</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks</td>
<td>6 months (Booster-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PCV</td>
<td>Pneumonia</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks</td>
<td>6 months (Booster-1)</td>
<td></td>
<td>Oral</td>
</tr>
<tr>
<td>7</td>
<td>RV</td>
<td>Severe diarrheal disease</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Typhoid</td>
<td>Typhoid fever, Diarrhoea</td>
<td>9 weeks</td>
<td>15 months (Booster-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>MMR</td>
<td>Measles, Mumps &amp; Rubella</td>
<td>9 weeks</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
<td>SC</td>
</tr>
<tr>
<td>10</td>
<td>Varicella</td>
<td>Chickenpox</td>
<td>1 year</td>
<td>3 months</td>
<td></td>
<td></td>
<td></td>
<td>SC</td>
</tr>
<tr>
<td>11</td>
<td>HepA</td>
<td>Liver disease</td>
<td>1 year</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Tdap</td>
<td>Diphtheria, Tetanus &amp; Pertussis</td>
<td>7 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>HPV</td>
<td>Some Cancers &amp; Warts</td>
<td>9 years</td>
<td>For child aged 9-14 years: 6 months. For child aged 15 or more: 5 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dengue fever facts:

- Dengue fever is a disease caused by a family of viruses that are transmitted by mosquitoes.

- Symptoms such as headache, fever, exhaustion, severe joint and muscle pain, swollen glands (lymphadenopathy), and rash. The presence (the “dengue triad”) of fever, rash, and headache, (and other pains) is particularly characteristic of dengue fever.

- Dengue is prevalent throughout the tropics and subtropics. Outbreaks have occurred recently in the Caribbean, including Puerto Rico, the U.S Virgin Islands, Cuba, and in Paraguay in South America, and Costa Rica in Central America.
The acute phase of the illness with fever and myalgias lasts about one to two weeks.

Dengue hemorrhagic fever (DHF) is a specific syndrome that tends to affect children under 10 years of age. It causes abdominal pain, hemorrhage (bleeding), and circulatory collapse (shock).

The prevention of dengue fever requires control or eradication of the mosquitoes carrying the virus that causes dengue.

There is currently no vaccine available for dengue fever.
Causes, incidence, and risk factors:

Dengue fever is caused by one of four different but related viruses. It is spread by the bite of mosquitoes, most commonly the mosquito Aedes aegypti, which is found in tropic and subtropic regions. This includes parts of:

Dengue fever is being seen more often in world travelers

Dengue fever should not be confused with Dengue hemorrhagic fever, which is a separate disease that is caused by the same type of virus but has much more severe symptoms.
Symptoms

- Dengue fever begins with a sudden high fever, often as high as 104-105 degrees Fahrenheit, 4 to 7 days after the infection.

- A flat, red rash may appear over most of the body 2-5 days after the fever starts. A second rash, which looks like the measles, appears later in the disease. Infected people may have increased skin sensitivity and are very uncomfortable.

Other symptoms include:

- Fatigue
- Headache (especially behind the eyes)
- Joint aches
- Muscle aches
- Nausea
- Swollen lymph nodes
- Vomiting
Signs and tests

Test that may be done to diagnose this condition include:

• Antibody titer for dengue virus types
• Complete blood count (CBC)
• Polymerase chain reaction (PCR) test for dengue virus types

Treatment

There is no specific treatment for dengue fever. You will need fluids if there are signs of dehydration. Acetaminophen (Tylenol) is used to treat a high fever. Avoid taking aspirin.
Expectations (prognosis)

The condition generally lasts a week or more. Although uncomfortable, dengue fever is not deadly. People with the condition should fully recover.

Complications

• Febrile convulsions
• Severe dehydration

Prevention

• Clothing, mosquito repellent, and netting can help reduce exposure to mosquitoes. Traveling during periods of minimal mosquito activity can also be helpful.
• Mosquito abatement programs may reduce the risk infection
Thank you