



TB 101

TB/Refugee Nurse Training
December 2 - 4, 2009

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The Mycobacteria

Human pathogens (mostly)

M tuberculosis Complex

(*M tuberculosis*, *M bovis*,
M microti, *M africanum*)

M leprae

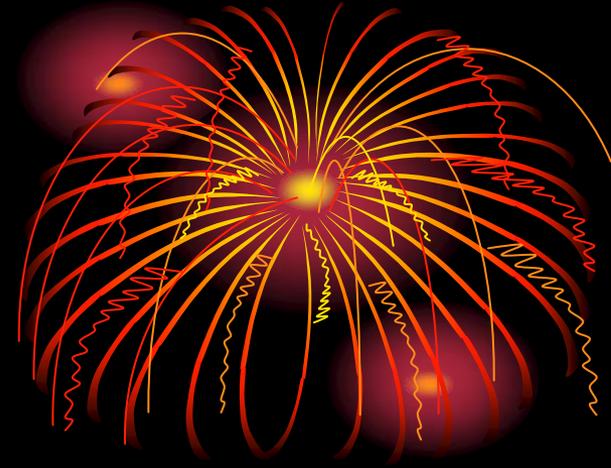


Transmission of TB

- Spread from person to person through the air

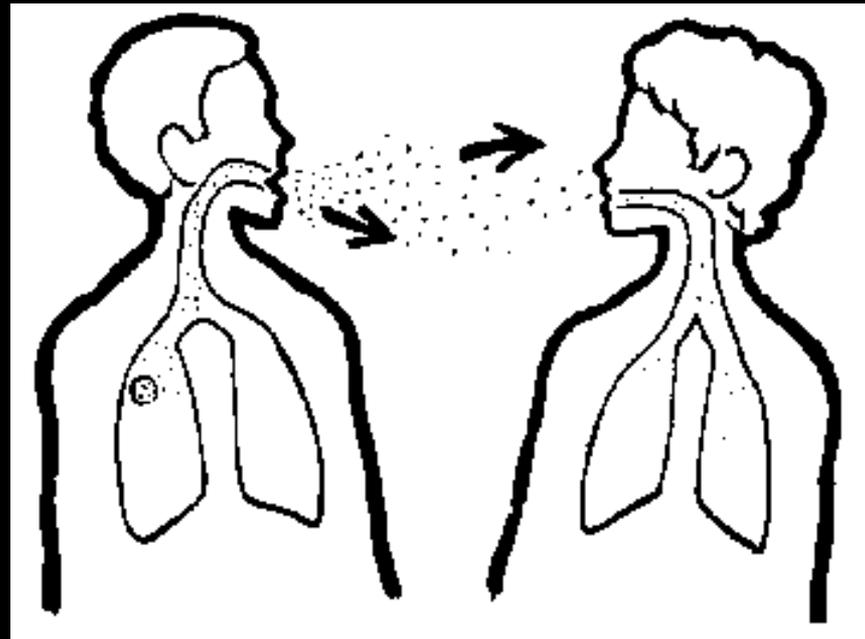


TB: Airborne Transmission



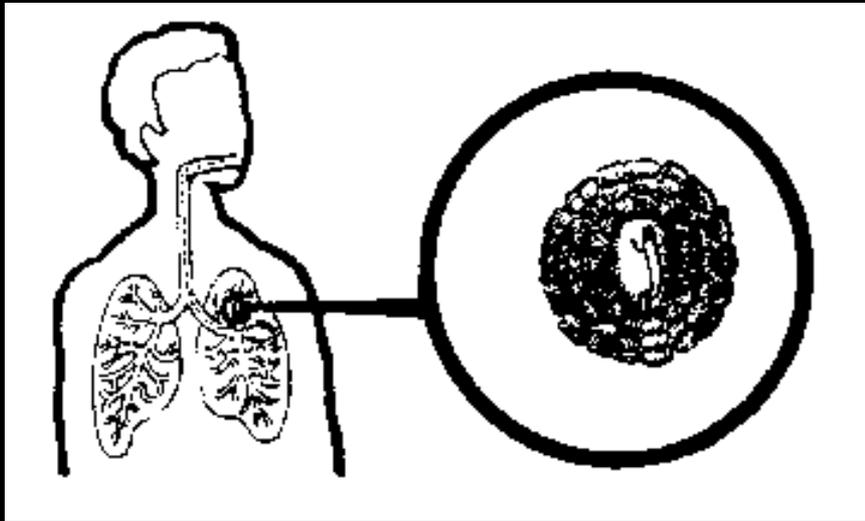
TB bacteria airborne

Person with active pulmonary TB



Person breathing TB bacteria

TB Invades/Infects the Lung



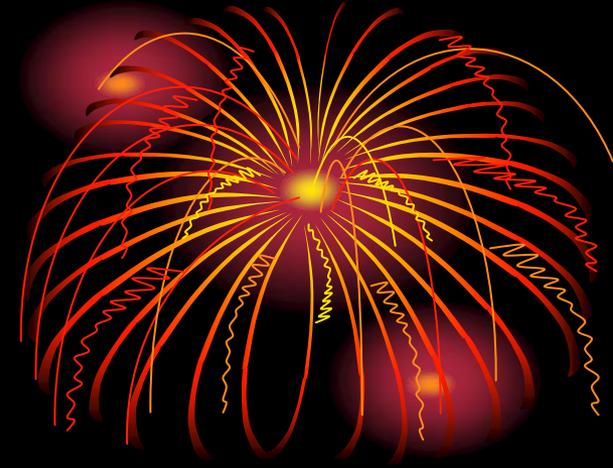
Effective immune response

Infection limited to small area of lung

Immune response insufficient



TB Disease



- *M tb* actively growing/destroying tissue in one or more locations
- Symptoms vary depending on location
 - Pulmonary TB
 - Cough > 2 weeks duration
 - Weight loss
 - Fever
 - Night sweats

Antituberculosis Drugs Currently in Use in the United States

- First-line Drugs

- Isoniazid
- Rifampin
- Rifapentine
- Rifabutin*
- Ethambutol
- Pyrazinamide

- Second-line Drugs

- Cycloserine
- Ethionamide
- Levofloxacin*
- Moxifloxacin*
- Gatifloxacin*
- *P*-Aminosalicylic acid
- Streptomycin
- Amikacin/kanamycin*
- Capreomycin



Treatment Regimes

- Initial Phase
- Continuation Phase
 - 4 months
 - 6 months
 - longer????



Treatment of TB Disease

- 4 regimens approved for drug susceptible disease
- Recommendations for HIV-infected same with a few exceptions
 - Twice weekly options are not recommended for HIV+ patients with CD4+ cell counts less than 100



Drug Regimens for Culture-Positive TB with Drug Susceptible Organisms



Regimen 1

- Initial phase
 - INH/RIF/PZA/EMB
 - 7 d/wk for 56 doses (8 weeks)
 - Option – 5 d/wk for 40 doses (8 weeks)
 - Continuation phase
 - INH/RIF
 - 7 d/wk for 126 doses (18 weeks)
 - 5 d/wk for 90 doses (18 weeks)
 - Twice weekly for 36 doses (18 weeks)*
 - INH/RPT
 - Once weekly for 18 doses (18 weeks)*

Drug Regimens for Culture-Positive TB with Drug Susceptible Organisms



Regimen 2

- Initial phase
 - INH/RIF/PZA/EMB
 - 7 d/wk for 14 doses (2 weeks)
 - Then twice weekly for 12 doses (6 weeks) *
 - OR
 - 5 d/wk for 10 doses (2 weeks)
 - Then twice weekly for 12 doses (6 weeks) *
- Continuation phase
 - INH/RIF
 - Twice weekly for 36 doses (18 weeks) *
 - INH/RPT
 - Weekly for 18 doses *

Drug Regimens for Culture-Positive TB with Drug Susceptible Organisms



Regimen 3

- Initial phase
 - INH/RIF/PZA/EMB
 - Three times weekly for 24 doses (8 weeks)
- Continuation phase
 - INH/RIF
 - Three times weekly for 54 doses (18 weeks)



Drug Regimens for Culture-Positive TB with Drug Susceptible Organisms



Regimen 4

- Initial phase
 - INH/RIF/EMB
 - 7 d/wk for 56 doses (8 weeks)
 - or
 - 5 d/wk for 40 doses (8 weeks)
- Continuation phase
 - INH/RIF
 - 7 d/wk for 217 doses (31 weeks)
 - 5 d/wk for 155 doses (31 weeks)
 - Twice weekly for 62 doses (31 weeks)*

Isoniazid



- Preparation
 - 50 mg, 100 mg, and 300 mg tablets
 - Suspension (can cause diarrhea and cramping)
 - Suspension must be kept at room temperature
- Administration tips
 - Can be cut or crushed
 - Do not take with large fatty meal
 - If upsets stomach, take with small amount of food
 - Avoid alcohol
 - No antacids within 1 hour

Isoniazid



- Adverse Reactions and Side effects
 - Hepatitis
 - Loss of appetite
 - Tiredness, weakness
 - Stomach pain, nausea, vomiting
 - Yellow skin or dark colored urine
 - Can cause flushing with some fish or cheeses
 - Peripheral neuritis
 - Numbness or tingling in hands or feet
 - Arthralgias
 - Optic neuritis

Rifampin



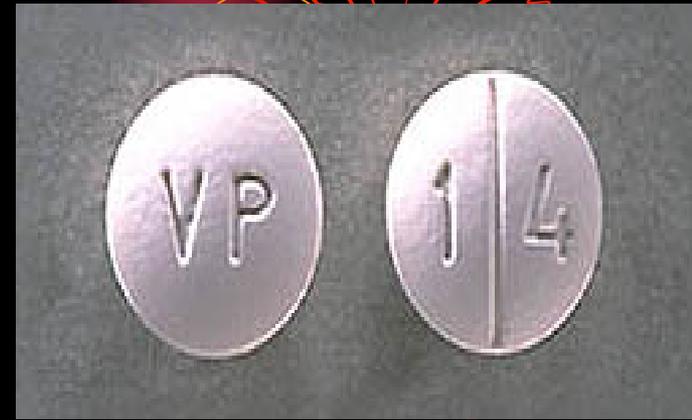
- Preparation
 - 150 mg and 300 mg capsules
- Administration tips
 - Store at room temperature – humidity can affect
 - Power from capsules can be mixed with liquid or soft food
 - Must be administered immediately after mixing
 - Be careful in opening capsules!

Rifampin



- Adverse Reactions and Side effects
 - Orange staining of body fluids – fast!
 - Will stain soft contact lens
 - Rash
 - GI upset, flu-like syndrome
 - Liver toxicity
 - Unusual tiredness or loss of appetite
 - Fever chills
 - Severe abdominal pain

Ethambutol



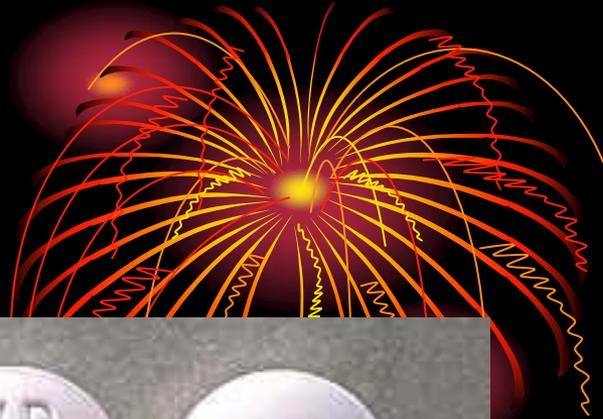
- Preparation
 - 100 mg and 400 mg tablets
- Administration tips
 - Store at room temperature
 - Can be taken with food
 - Can be split or crushed and mixed
 - used immediately

Ethambutol



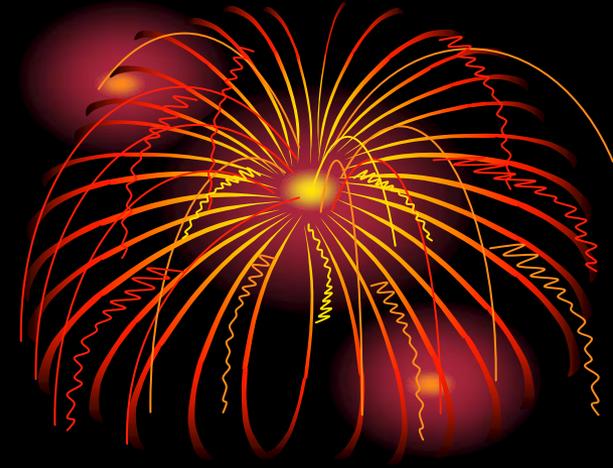
- Adverse Reactions and Side effects
 - Visual disturbances – vision changes, blurring, color blindness, trouble seeing, eye pain
 - Swelling of face
 - Rash, hives, trouble breathing
 - Numbness, pain or tingling of hands/feet
 - Joint pain
 - Fever chills
 - Nausea, vomiting, poor appetite, abdominal pain
 - Headaches, dizziness

Pyrazinamide



- Preparation
 - 500 mg tablets
- Administration tips
 - Store at room temperature
 - May be taken with food
 - Can be split or crushed
 - Use immediately following mixing with food

Pyrazinamide



- Adverse Reactions and Side effects
 - Can cause rash after sun exposure – limit sun exposure
 - Gout-like symptoms (pain swelling in joints) and arthralgias
 - GI upset
 - Liver toxicity –
 - yellow skin/dark urine
 - nausea/vomiting
 - Skin rash, severe itching, hives



HIV WITH CD4 LESS THAN 100



- DAILY INITIAL PHASE
- AT LEAST THREE TIMES WEEKLY IN CONTINUATION PHASE (daily or 3X/wk)
- MMWR, Treatment of Tuberculosis, June 20, 2003, pg. 52

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm>

HIV



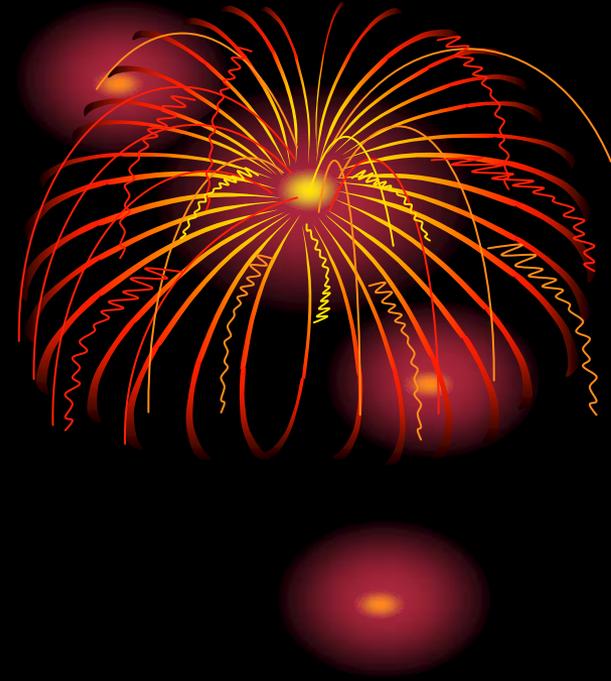
- Once weekly administration of INH-rifapentine in the continuation phase should not be used in ANY client with HIV.
pg 52
- Paradoxical reaction/
reconstitution pg 54

INH RESISTANCE

- HOW DO WE TREAT?

- RIF
- PZA
- EMB

ALL THREE DRUGS FOR THE
DURATION OF TREATMENT



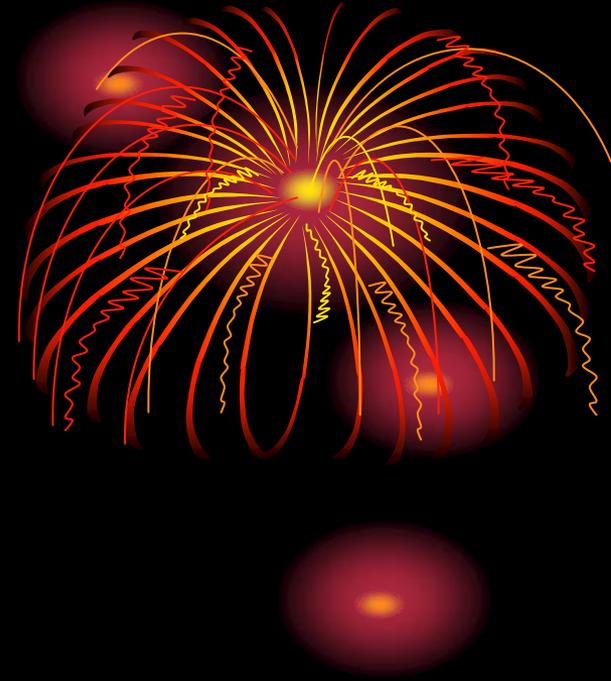
EXTENDED TREATMENT



- 9 MONTHS
 - CAVITATION ON INITIAL CXR
 - NO CULTURE CONVERSION 2 MO
 - NO PZA
 - INH REFAPENTINE 1X/WK AND STILL CUTURE + AT END OF INITAIL PHASE
- 

No PZA

- BOVIS
- PREGNANCY
- BLADDER CANCER CLIENTS



EXTENDED TREATMENT



- No Rifampin
 - 12 -18 months (INH, EMB, FQN, PZA plus injectable may be used in initial phase in clients with more extensive disease
- Alternate regimes 5.2.2 pg 37

RENAL INSUFFICIENCY AND END-STAGE RENAL DISEASE

- See page 63-34 Treatment Guidelines



INTERRUPTIONS IN TX

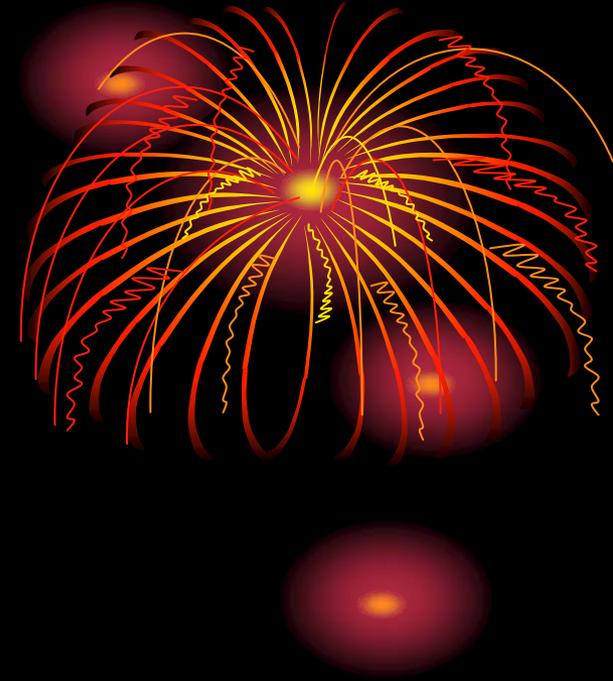


- INITIAL PHASE
 - IF MORE THAN 14 DAYS
 - START OVER

- See page 40-41 Treatment Guidelines



INTERRUPTIONS



- ELEVATED LFT
- GOUT S/S
 - DO NOT D/C PZA
 - INCREASE FLUIDS
 - ANALGESIC FOR PAIN
 - GOUT S/S REVERT ONCE OFF PZA
 - PZA D/C TX EXTENDED TO 9 MO

COMPLETION OF TREATMENT



- INITIAL AND CONTINUATION PHASE IS NUMBER OF DRUGS DOSES NEEDED
- COMPLETED WITHIN 12 MONTH TIME FRAME

MDR

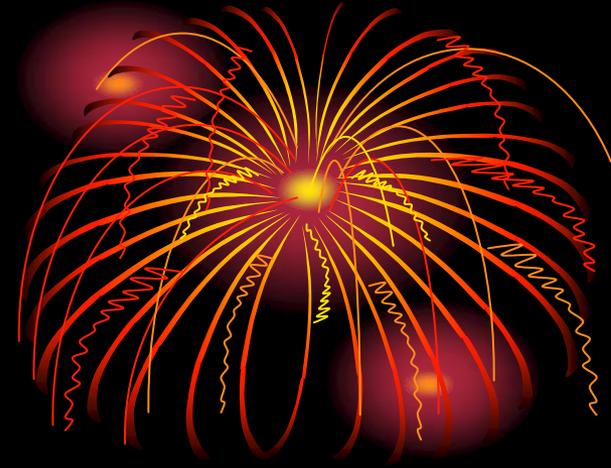
- Resistant to INH and RIF
- THESE CLIENTS ARE AT HIGH RISK FOR TREATMENT FAILURE AND FURTHER ACQUIRED DRUG RESISTANCE...DOT A MUST!



XDR

- MDR (INH AND RIF)
- PLUS FLOROQUINOLONES
- PLUS ONE INJECTABLE

- MUST BE REPORTED
IMMEDIATE TO TB CONTROL



CDR

- COMPLETE DRUG RESISTANCE



Step 1

Begin with any
First line agents to
Which the isolate is
Susceptible

Add a
Fluoroquinolone
And an injectable
Drug based on
susceptibilities

Use any
available

PLUS

One of
these

PLUS

One of
these

First-line drugs

Pyrazinamide
Ethambutol

Fluoroquinolones

Levofloxacin
Moxifloxacin

Injectable agents

Amikacin
Capreomycin
Streptomycin
Kanamycin

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Ethambutol

Fluoroquinolones

Levofloxacin
Moxifloxacin

Injectable agents

Amikacin
Capreomycin
Streptomycin
Kanamycin

Step 2

Add 2nd line drugs until
you have 4-6 drugs to
which isolate is
susceptible (which have
not been used previously)

Pick one or more of these

Oral second line drugs

Cycloserine
Ethionamide
PAS

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First line agents to
Which the isolate is
Susceptible

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Fluoroquinolone
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First-line drugs

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Ethambutol

Fluoroquinolones

Levofloxacin
Moxifloxacin

Injectable agents

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Capreomycin
Streptomycin
Kanamycin

Step 2

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Oral second line drugs

Cycloserine
Ethionamide
PAS

Step 3

If there are not
4-6 drugs
available
consider 3rd line
in consult with
MDRTB experts

Consider use of these

Third line drugs

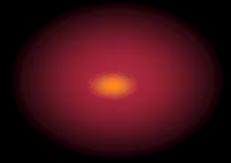
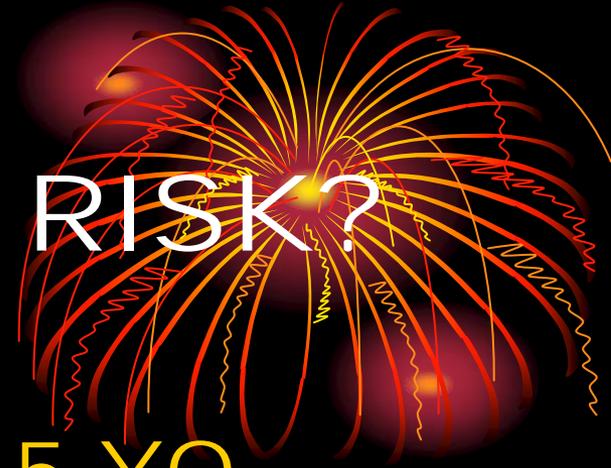
Imipenem Linezolid Macrolides
Amoxicillin/Clavulanate

CONTACT INVESTIGATION



- HOW DO WE DECIDE WHO TO TEST?
- INITIATED WITH THREE DAYS
- VISIT / ACCESS WORKPLACE

WHO ARE HIGHEST RISK?



- CHILDREN LESS THAN 5 YO
 - CXR 2 VIEW EVEN IF TST NEG
- HIV+
 - CXR EVEN IF TST NEG
 - COLLECT SPUTA IF COUGHING
- ONCE TB R/O WINDOW TX

IMMUNE SUPPRESSION

- TNF α DRUGS
- HIGH DOSES OF STEROIDS



SCREENING / TESTING

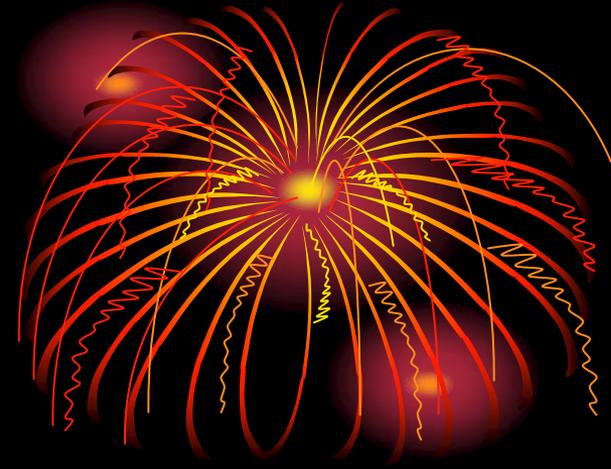


- BASELINE
- FOLLOWUP TESTING
 - SMEAR CONVERSION
 - BREAK IN CONTACT

CASE CONTACTS



- HIGH - MEDIUM - LOW RISKS
- 88% OF CONTACTS WITH LTBI WILL START TX
 - 79% OF THOSE STARTING TX WILL COMPLET TX
- 502 CONTACT SHEETS
 - FILE IN A SEPARATE FOLDER
 - KEEP UP TO DATE - LTBI TX



QUESTIONS??????

CALL US IF YOU HAVE QUESTIONS