



# **Monitoring Adverse Reactions to TB Medications**

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Introduction to TB Nurse Case Management Online  
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**Melissa Davis, RN** has the following disclosures to make:

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- No conflict of interests
- No relevant financial relationships with any commercial companies pertaining to this educational activity





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# **Monitoring for Adverse Reactions to TB Medications**

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# Objectives



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- Describe the monitoring process for adverse drug events associated with anti-TB drugs.
- Examine the difference between side effects and drug toxicities.
- List the most common adverse effects of TB therapy.

# Preparing for medication administration



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- Obtain patient information
  - Patient's weight
  - Patient's medications
  - Patient's past medical history
- Establish a rapport with the patient
  - Determine what barriers you may encounter
- Draw baseline labs
  - CBC, CMP (with creatinine level), Glucose, HIV test



# Preparing for medication administration



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- Provide education to the patient and additional family members as needed.
  - Treatment will be for months, not days.
  - Provide educational materials on medications and side effects.
  - What are the expectations of the patient? The nurse?
- Provide notification to the patient's physicians.
  - Critical if medications interact with each other.





# Preparing for medication administration



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- Medication classes that can decrease in efficacy
  - Beta blockers
  - Anticoagulants
  - Anti-depressants
  - Anti-diabetic drugs
  - Anti-anxiety agents
  - Anti-psychotics
  - ACE inhibitors
  - HMC CoA Inhibitors (statins)
  - Hormonal Contraceptives
  - Immunosuppressants
  - Opiates
- May need dosage adjustment.



# Preparing for medication administration



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- Perform baseline toxicity screening.
  - Are signs and symptoms of toxicity present before medications administered?
  - Vision screening
    - Red/green color discrimination
    - Visual acuity
  - Hearing screening (if needed)
- Ensure that the medication orders are correct.







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# Baseline: Prior to Starting Anti-TB meds

- Medical History
- MD/RN evaluation
- Chest X-ray
- Sputum Specimen
- HIV Testing
- Toxicity assessment
  - Vision screenings
  - Hearing screenings
- Weight
- Labs (CBC, CMP, etc.)

Texas Department of State Health Services Clinical Assessment for Tuberculosis Medication Toxicity											
NAME: _____		D.O.B.: ____/____/____		SS#: ____/____/____							
Adverse Drug Reaction Assessment: Ask all the below questions to monitor for medication toxicity, noting that some symptoms may be more commonly associated with certain medications. Those with** are associated with second-line drugs; those with <sup>1</sup> are associated with Isoniazid/Rifapentine (3HP) but may also be present in other regimens. Document any [ + ], incl. potential pregnancy in women, in progress notes & notify physician. Results: [ + ] = Present; [ - ] = Denies; [ NA ] = Not Applicable											
	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
Weight											
Temperature											
Blood Pressure											
Pulse											
Do you have any of the following symptoms now or since your last clinic appointment?											
Abdominal pain/diarrhea**											
Abnormal behavior**											
Allergic reaction (specify)** <sup>1</sup>											
Bruises, red/purple spots on skin <sup>1</sup>											
Change in heart rate**											
Change in urine output											
Convulsions**											
Dark urine (coffee colored) or change in color <sup>1</sup>											
Ears ringing/fullness/hearing loss** - AK, CAP, KM, SM											
Eye pain/irritation (redness, excessive tears)											
Fever or chills <sup>1</sup>											
Flu-like symptoms <sup>1</sup>											
Headaches (chronic)											
Increased gas/stomach cramps**											
Jaundice (yellow skin/eyes) <sup>1</sup>											
Joint pain/swelling (chronic) - PZA											
Light colored stools <sup>1</sup>											
Loss of appetite <sup>1</sup>											
Malaise/fatigue											
Memory Loss**											
Mood changes/depression**											
Musculoskeletal Pain <sup>1</sup>											
Nausea/vomiting <sup>1</sup>											
Numbness/tingling/pain, arms, legs <sup>1</sup>											
Nervousness/Giddiness/Restlessness											
Skin discoloration**											
Skin rashes/itching <sup>1</sup>											
Sleep problems**											
Sores on lips or inside mouth <sup>1</sup>											
Shortness of breath <sup>1</sup>											
Teeter/Fall to Left or Right when standing (eyes closed)											
Unusual bleeding (nose, gums, stool, urine, etc.) or easy bruising - RIF, RPT <sup>1</sup>											
Vertigo/dizziness/fainting <sup>1</sup>											
Visual problems/changes in vision*** - EMB, RBT											
Weakness, tiredness <sup>1</sup>											
Weave/Stagger when walking (normal gait)											
Use of over the counter drugs, ie. Tylenol products?											
Ask women about signs of pregnancy											
Drug Issued	Mfg/Lot#/Exp	Route/ Frequency	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
Name/Title											
Interpreter											
Next Appt.											

TB105- Clinical Assessment for TB Medication Toxicity- Revised 8/2017 (Continued on Reverse)



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# Baseline: Prior to Starting Anti-TB meds

Texas Department of State Health Services Vision/Hearing Screening Form													
NAME: _____ D.O.B.: ____/____/____ SS#: ____/____/____													
Red/Green Color Discrimination: The (X) mark indicates the plate cannot be read. Screen all 14 plates. Client must pass 10 of the first 11 plates for the test to be regarded as normal. Refer for evaluation if $\geq 7$ plates are read as normal. Results: [N] = Normal [A] = Abnormal													
Ishihara Plate #	Normal Reading	Red/Green Deficiency	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
1	12	12											
2	8	8											
3	5	2											
4	29	70											
5	74	21											
6	7	X											
7	45	X											
8	2	X											
9	X	2											
10	16	X											
11	Unreadable	X											
		Protan											
		Strong											
12	35	5	(3) 5	3	3 (5)								
13	96	6	(9) 6	9	9 (6)								
14	Can trace 2 lines	Purple (Red)	Purple (Red)	Red (Purple)	Red (Purple)								
Results													
Initials													
Visual Acuity: If initial screen was conducted with corrective lenses (glasses or contacts), follow-up screens must be done the same. A change of 1 or more lines from the initial screen in either one or both eyes must be reported to the physician immediately. Results: [P] = Pass [F] = Fail [U] = Unscreenable Chart Used: [ ] Letter [ ] "E" [ ] Other, Specify: _____ Corrective Lenses: [ ] = Yes [ ] = No													
Distance Acuity	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
Right Eye	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/
Left Eye	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/
Both Eyes	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/	20/
Results													
Initials													
Hearing Sweep Check: When patient is taking amikacin, capreomycin, kanamycin, or streptomycin, for each of the four frequencies listed, record the lowest level in decibels (dB) at which the person responds. Record the findings for both the right and left ear. Refer to an appropriately licensed professional if any two of the four frequencies are recorded as greater than 25 dB in either ear or the same ear or if there is a change of decreased hearing level from baseline. Start with 40 dB, if heard decrease by 10 dB until no response is obtained or until 20 dB is reached. If 20 dB is heard, record as 20 dB. Once no response is obtained, increase the dB level by 5 until a response is obtained and recorded. If a response is not heard at 40 dB, record as 40+ dB. Results: [P] = Pass [R] = Refer [O] = Observe Ear: [R] = Right [L] = Left													
Frequency	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
Ear	R	L	R	L	R	L	R	L	R	L	R	L	R
300 Hz													
1000 Hz													
3000 Hz													
4000 Hz													
Initials													
TB105- Clinical Assessment for TB Medication Toxicity - Revised 8/2017													
*** From previous page: Changes in Vision may include blind spots in field of vision, blurred vision, changes in peripheral vision													

Texas Department of State Health Services Tuberculosis Case and Suspect Management Plan													
Patient's Name: _____		Initial Report Date & Source: _____											
Nurse Case Manager: _____		Case Management Team: _____											
Directions: Blank boxes indicate week(s) TB service is to be provided. Document date and initials of the provider in the appropriate box when the task is completed. Document comments in progress notes.													
		Action Interval:	0	2	4	8	12	16	20	24	26		
		Begin	Wks	Wks	Wks	Wks	Wks	Wks	Wks	Wks	Wks		
Consents		General Consents, L-30, L-36, HIPAA, TB-209, interpreter form PRN; TB 409, TB 410, TB 411, etc.											
Responsibility		Assign nurse case manager; establish team; document in client's record											
Medical Evaluation		Obtain medical history; document on TB-202											
		Obtain release (L-30); request previous medical records											
		MD evaluation/review; document in progress notes											
		RN evaluation											
		IGRA or Mantoux skin test recorded in mm (if not previously done)											
		Chest X-ray (PA & Lateral if less than 18 years)											
		Supervised sputum for AFB smear/culture according to protocol											
		HIV testing, unless patient has knowledge of HIV+ status or has documented negative HIV test result within 14 days of TB diagnosis											
Toxicity/Clinical Assessment		Lab per protocol or specific order											
		Nutritional assessment											
Treatment		Drug regimen according to protocol or specific order											
		Initiate DOT on all cases/suspects: Recommended Daily X 8 weeks, then daily or 3X/week (Mon/Wed/Fri) until completion of adequate therapy; document DOT on TB-206; other DOT dosing schedules may be ordered.											
		Pyrazinamide X2 months and ethambutol X2 months (or until susceptibilities are reported and client's organism is known to be pan sensitive)											
		Vitamin B6 (if pregnant, diabetic, at risk for peripheral neuropathy)											
Consultation		Obtain Informed Consent form TB-411 (TB-411A, if Spanish speaking, only) initially and for any drugs added to regimen											
		Obtain expert consult for drug resistant cases, complicated adult/pediatric cases or client who remains symptomatic or sputum positive after 2 months' therapy; written consult in client record											
Toxicity/Clinical Assessment		Clinical assessment according to protocol; document (TB-205 and progress note as appropriate)											
		Visual acuity (Snellen or Snellen) and color discrimination (Ishihara Plates) initially and monthly if on EMB or Rifampin; document (TB-205)											
		Hearing sweep check initially and monthly if on amikacin, capreomycin, kanamycin or streptomycin; document (TB-205)											

TB 201- Case Management Plan for Outpatient Care - Revised 08/2017

# Administering the medications



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- Ensure that the patient answers each question about toxicity before medications are given.
- Ensure that the correct dosage is given at each patient encounter.
- Ask open-ended questions in addition to the closed ended questions.





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# Patient monitoring

- The frequency with which you monitor the patient depends on how the patient is responding to treatment.
  - How is the patient doing clinically?
  - Are there new s/sx of toxicity?
  - How were the baseline labs?
  - What do your standing delegation orders allow you to do?
- Patient should have a toxicity screening form completed at least monthly.







# Drug side effects

- Unpleasant, but usually mild
- Generally resolve during or after treatment.
- Do not usually require changes in therapy.
- Can include:
  - Gas or bloating
  - Mild nausea
  - Discoloration of body fluids (RIF)
  - Photosensitivity (RIF)
  - Rash (minor)
  - Fatigue





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# Drug adverse effects

- Change in vision
- Hepatotoxicity
- Significant GI problems (severe vomiting)
- CNS toxicity
- Neurotoxicity
- Ototoxicity
- Renal toxicity
- Bleeding problems
- Rash (severe, systemic involvement)





# Adverse Drug Reactions



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- More serious than side effects.
- May be life threatening
- Require modification of dose/discontinuation medications.
- Must be reported to the treating physician immediately.





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# 1<sup>st</sup> line TB medications

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- Isoniazid
  - Kills rapidly dividing TB cells.
- Rifampin
  - Kills rapidly dividing TB cells.
  - Has some effect on semi-dormant TB cells.
- Pyrazinamide
  - Kills semi-dormant TB cells.
- Ethambutol
  - Protects against developing rifampin resistance.



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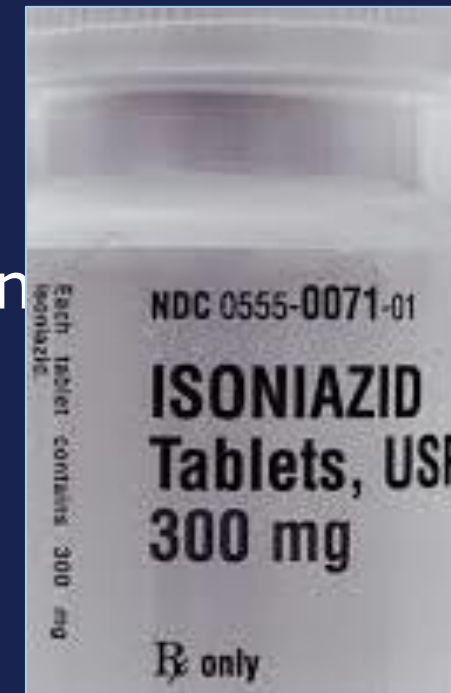
# Common adverse effects in 1<sup>st</sup> line medications



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- Isoniazid
  - Increases liver functions
    - Watch LFTs at baseline and throughout treatment.
    - Fatigue, jaundice, abdominal pain, dark urine, light stools, nausea, poor appetite
  - Can cause peripheral neuropathy
    - Numbness/tingling to hands and feet.
  - Rash



# Common adverse effects in 1<sup>st</sup> line medications



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- Rifampin
  - Increases liver functions
    - Watch LFTs at baseline and throughout treatment.
  - Can cause low platelet count.
    - Need baseline PLTs and monitoring for thrombocytopenia.
  - Orange discoloration of body fluids.
  - Can damage kidneys and cause decreased urine output.
  - Interacts with many other medications.
    - Get patient's medication list and review with your physician.



# Common adverse effects in 1<sup>st</sup> line medications



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- Pyrazinamide
  - Increases liver functions
    - Watch LFTs at baseline and throughout treatment.
    - Watch Uric Acid level and monitor for joint pain.
    - Fatigue, jaundice, abdominal pain, dark urine, light stools, nausea, poor appetite
  - Can cause GI problems (upset stomach, lack of appetite)
  - Can cause rash.





# Common adverse effects in 1<sup>st</sup> line medications



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- Ethambutol
  - Can cause eye damage
    - Blurred vision
    - Change in color vision
  - Monitor kidney functions to adjust dosage.
  - Can cause rash





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# Fluoroquinolones

Drug	Standard adult Dosing	Considerations	Side Effects
Moxifloxacin	40mg once daily, PO or IV	Good CNS Penetration	GI upset, dizziness, hypersensitivity, photosensitivity, headaches, arthralgias, tendonitis, tendon rupture (rare), CNS irritability, QTc prolongation, thrush, peripheral neuropathy, elevated liver enzymes (rare hepatotoxicity with moxifloxacin)
Levofloxacin	750-1,000 mg once daily, PO or IV	Good CNS penetration; adjust dose with creatine clearance < 30; avoid caffeine, milk-based products, antacids, or mineral supplements within 2 hrs. of medication	



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# **Vision Screening**

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**Ishihara Testing  
Snellen Eye Exam**



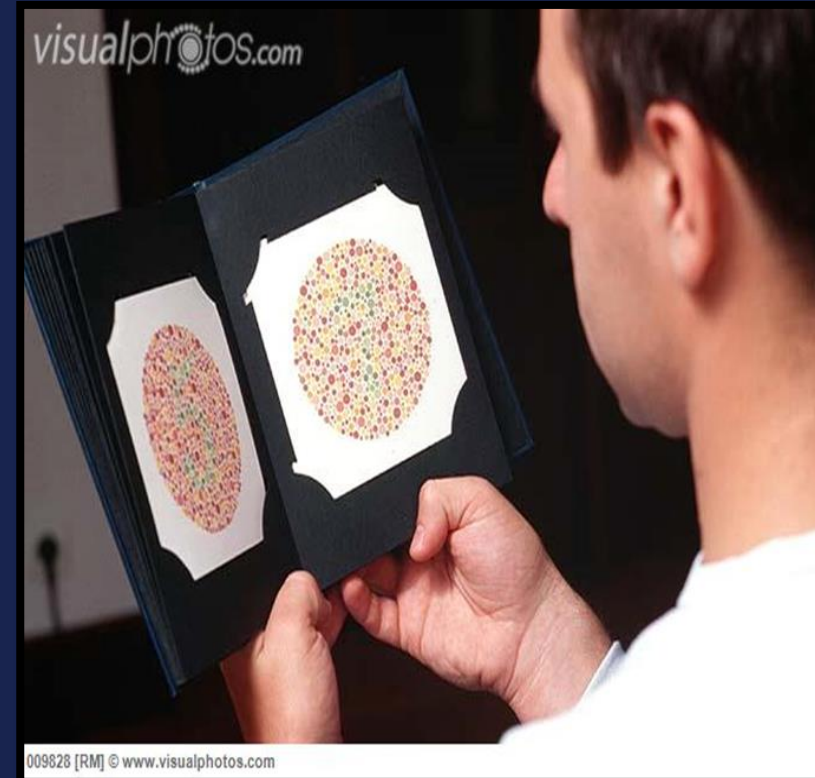
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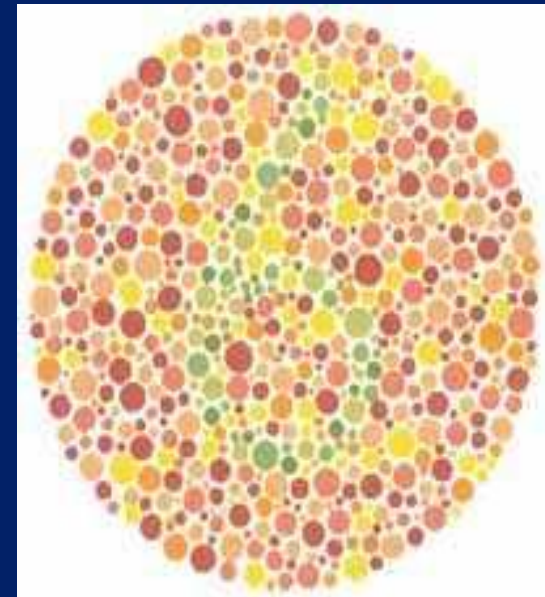
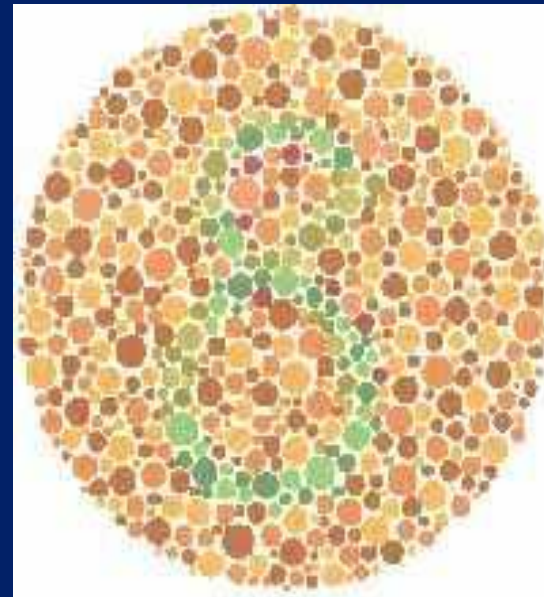
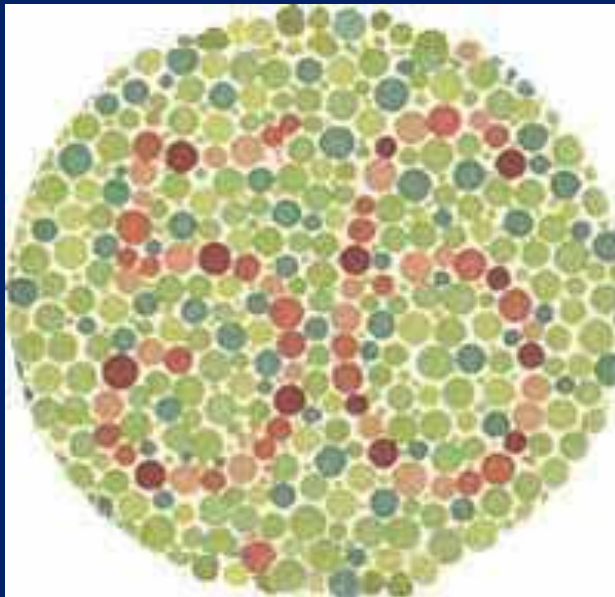
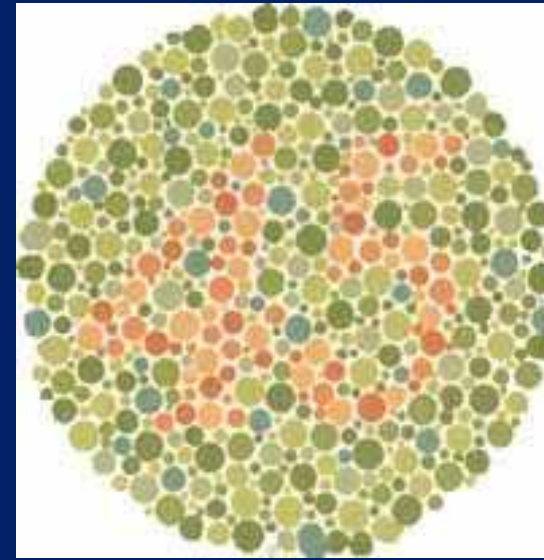
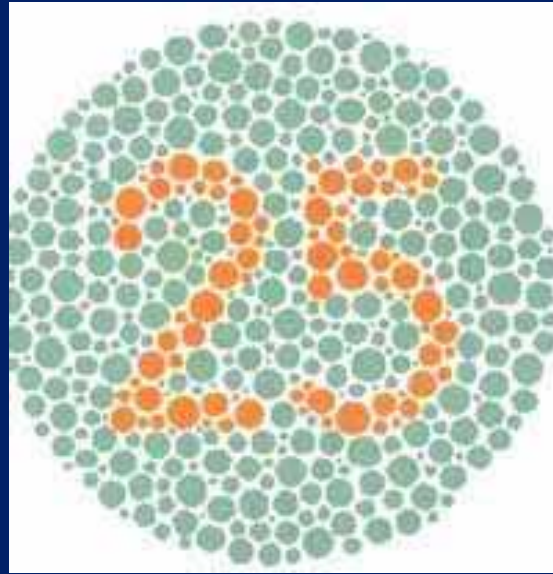
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# Ishihara Test

- Designed to give quick & accurate assessment of color vision
- Most effectively done in room with adequate daylight
- Held 75 cm from the patient (approx. arm length)
- Sit & tilt plate at right angle to patient's line of vision
- Screen all plates









Normal (S,M,L)



Protan or Red/Green (S,M)



Deutan or Red/Green (S,L)



Tritan or Blue/Yellow (M,L)





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# Visual Acuity

- Place Snellen Chart on wall & have patient 20 feet from chart
- Have patient cover one eye at a time to read chart, recording the visual acuity for each eye, then with both eyes uncovered
- If patient misses only one letter have them continue reading the next line
- Record the last line the patient reads accurately
- If initial screen was conducted with corrective lenses(glasses/contacts), follow-up screens must be done the same.
- Change of 1 or more lines from initial screen in either one or both eyes must be reported to physician **immediately**



# Managing & Monitoring Visual Toxicities

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1. Baseline & monthly visual acuity test (Snellen chart)
2. Baseline & monthly color discrimination test (Ishihara tests)
3. If change from baseline:
  - a. Hold Rx
  - b. Refer for Ophthalmologic evaluation
  - c. Permanent vision impairment if ethambutol continued



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# Toxicity

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Stop Medication ASAP with suspicion of vision, hearing loss, hepatitis, severe rash

In most cases vision or hearing loss is irreversible

Stopping medication halts extensiveness of damage

Better to miss a few doses vs disability



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# Rashes/Itching

- All TB drugs can cause a rash
- If the rash is not severe, the patient may be able to be treated with antihistamines or low dose prednisone.
- Assess the rash
  - Location
  - Does it itch?
  - When did it start?
  - What does it look like?
  - Has the patient tried any new products – food, perfume, laundry detergent.
  - Have you ruled out other involvement?



# Conclusion

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1. Initial and ongoing assessment for medication side effects or adverse effects is crucial in maintaining a safe course of treatment for the patient.
2. Work with the patient and your treating physician to determine cause of side effects and how to address them.
3. You are the eyes and ears of the physician and the mouthpiece of the patient.



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# Helpful links

- Heartland National TB Center website
  - <http://www.heartlandntbc.org/products/> (to print out educational items)
- CDC TB website
  - <https://www.cdc.gov/tb/default.htm>
- Treatment guidelines
  - [https://www.cdc.gov/tb/publications/guidelines/pdf/clin-infect-dis.-2016-nahid-cid\\_ciw376.pdf](https://www.cdc.gov/tb/publications/guidelines/pdf/clin-infect-dis.-2016-nahid-cid_ciw376.pdf)
- TB education resources
  - <https://findtbresources.cdc.gov/>





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# Thank you

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