

Assessing and Managing Visual Changes related to MDR-TB Medications

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Objectives

- Vision changes related to TB medications
- Identification of causative agents
- Clinical manifestations of vision changes
- Tool utilization
- Nursing considerations

Common vision changes related to TB medications:

Retrobulbar Neuritis

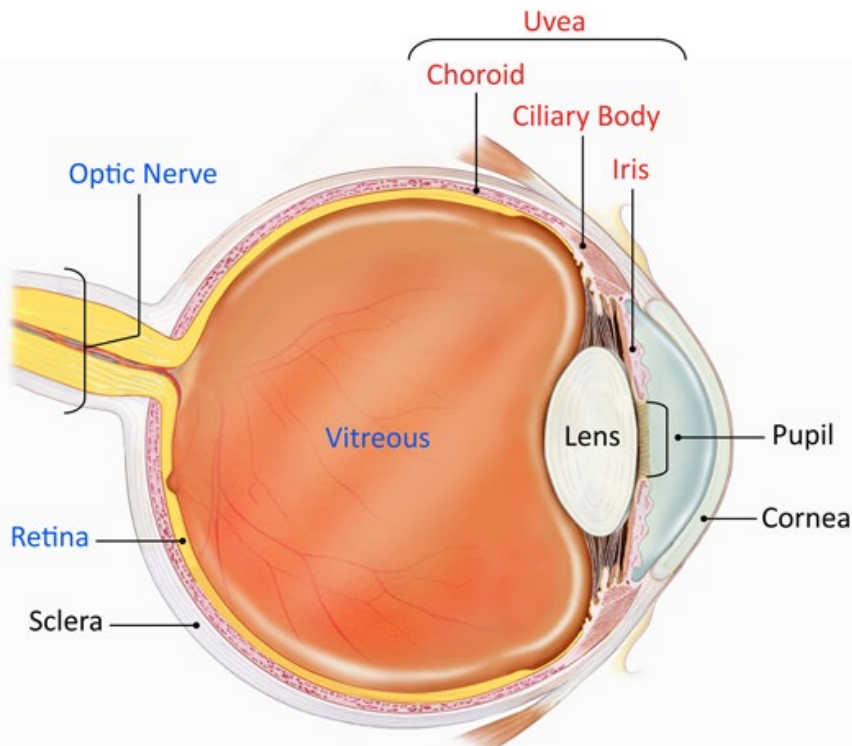
Swelling to the optic nerve which carries light signals from the back of your eye so you can see.

Optic Neuropathy

Damage to the optic nerve from any cause.

Anterior Uveitis

Inflammation of the iris near the front of the eye. The iris defines eye color, secretes nutrients to keep the lens healthy, and controls the amount of light that enters the eye by adjusting the size of the pupil



Causative Agents



**Ethambutol
(EMB)**

- Bacteriostatic
- Aids in the prevention of RIF resistance when INH resistance is suspected



**Linezolid
(LZD)**

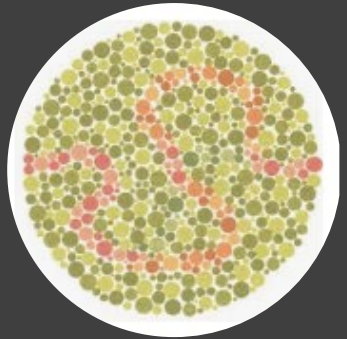
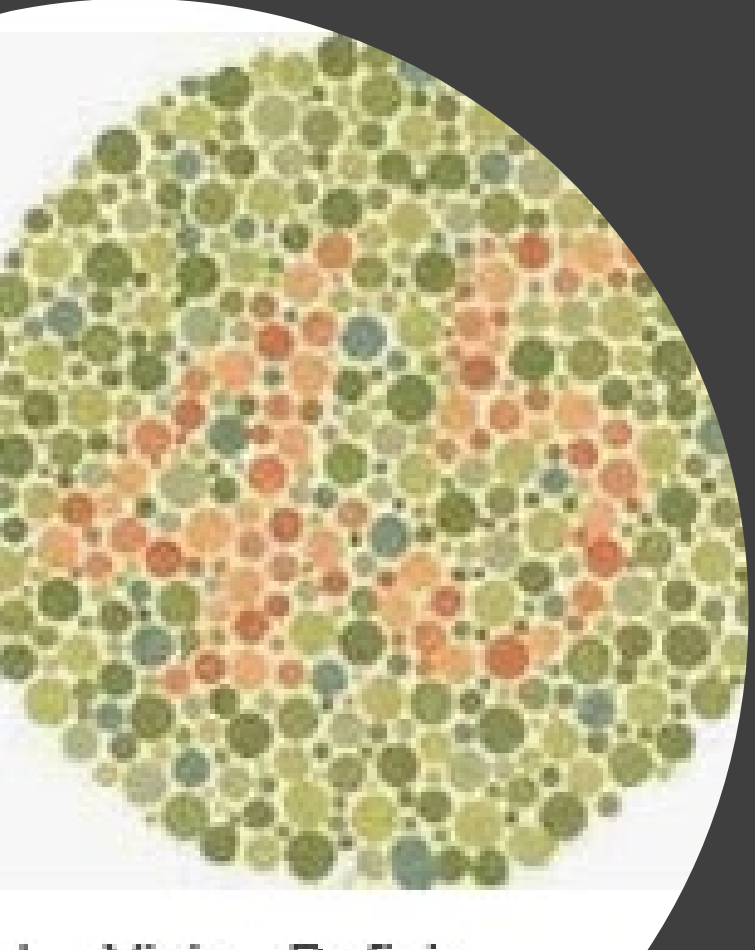
- Bactericidal
- Should not be administered with monoamine oxidase inhibitors (MAOIs).



**Rifabutin
(RFB)**

Uveitis

- Alternative for drug-drug interaction or intolerance to RIF
- Often used in place of RIF in HIV co-infected patients



Clinical Manifestations of Visual Changes



Clinical Manifestations

- Pain when moving eyes
- Blurred vision
- Decreased visual acuity
- Central scotomas (floaters, blind spot)
- Loss of red-green color vision
- Eye redness
- Light sensitivity



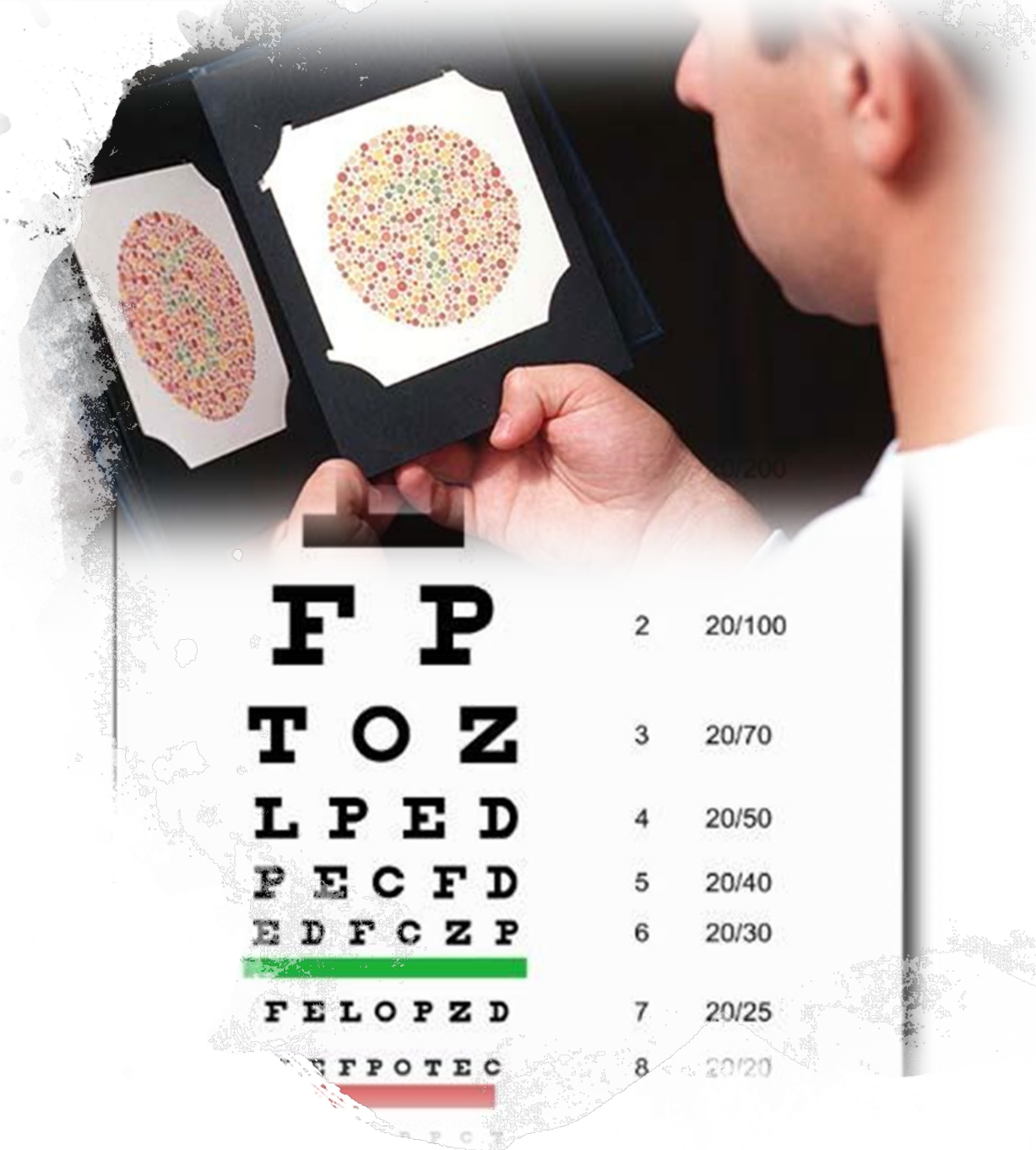
Tool Utilization:

Ishihara Plates:

- Color vision deficiency assessment
- Baseline and monthly

Snellen or Tumbling “E” Chart:

- Visual acuity assessment
- Baseline and monthly



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 * 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
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)** [†]									
Bruises, red/purple spots on skin [†]									
Change in heart rate**									
Change in urine output									
Convulsions**									
Dark urine (coffee colored) or change in color [†]									
Ears ringing/fullness/hearing loss** - AK,CAP,KM, SM									
Eye pain/irritation (redness, excessive tears)									
Fever or chills [†]									
Flu-like symptoms [†]									
Headaches (chronic)									
Increased gas/stomach cramps**									
Jaundice (yellow skin/eyes)									
Joint pain/swelling (chronic) - PZA									
Light colored stools									
Loss of appetite [†]									
Malaise/fatigue									
Memory Loss**									
Mood changes/depression**									
Musculoskeletal Pain [†]									
Nausea/vomiting [†]									
Numbness/tingling/pain, arms, legs [†]									
Nervousness/Giddiness/Restlessness									
Skin discoloration**									
Skin rashes/itching [†]									
Sleep problems**									
Sores on lips or inside mouth [†]									
Shortness of breath [†]									
Teeter/Fall to Left or Right when standing (eyes closed)									
Unusual bleeding (nose, gums, stool, urine, etc.) or easy bruising - RIF, RPT [†]									
Vertigo/dizziness/fainting [†]									
Visual problems/changes in vision*** - EMB, RBT									
Weakness, tiredness [†]									
Weave/Stagger when walking (normal gait)									
Use of over the counter drugs, ip. Tylenol products?									

Ask women about signs of pregnancy

Drug Issued	Mfg/Lot#/Exp	Route/Frequency	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount

Name/Title												
Interpreter												
Next Appt.												

TB205- Clinical Assessment for TB Medication Toxicity- Revised 8/2017 (Continued on Reverse)

Form:
TB 205



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 ≤ 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
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	Tricolor	X								
			Protan		Deutan					
			Strong	Mild	Strong	Mild				
12	35	5	(3) 5	5	5	5 (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 [] E² [] Other, Specify:
Corrective Lenses: [] - Yes [] - No

Distance Acuity	Date	Date	Date	Date	Date	Date	Date	Date	Date
Right Eye	20/	20/	20/	20/	20/	20/	20/	20/	20/
Left Eye	20/	20/	20/	20/	20/	20/	20/	20/	20/
Both Eyes	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
500 Hz	R	L	R	L	R	L	R	L	R
1000 Hz	R	L	R	L	R	L	R	L	R
2000 Hz	R	L	R	L	R	L	R	L	R
4000 Hz	R	L	R	L	R	L	R	L	R
Initials									

TB205- 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

Nursing considerations:

Changes in vision from baseline

- Stop offending medication
- Refer patient to ophthalmologist
- Do not restart likely offending medication unless another cause of the neuritis or vision problem is identified
- Exception – RBF may be reinstated at a lower dose

Ethambutol

- The dosing interval of EMB should be adjusted if the creatinine clearance is <50 mL/min to minimize ocular toxicity.
- If neuritis is severe consider discontinuing EMB and INH.

Rifabutin

- Consider other etiologies, especially in HIV (+) individuals.
- Exclude bacterial and viral infections.
- Doses >300 mg daily can cause panuveitis that is reversible with dose adjustments.



Nursing Considerations:

- **Conduct baseline visual acuity assessment**
 - Snellen chart and Ishihara plates
- **Monthly monitoring:**
 - Visual acuity and color discrimination assessment (TB-205)
 - Serum glucose and HgbA1c – educate and encourage improving glucose control
 - Creatinine clearance
- **Educate** patients to report **any** changes in vision
- Improve nutrition



Note: Often times visual symptoms subside after the offending medication is stopped as soon as a toxicity is recognized. **Early detection is key to preventing permanent visual changes.**

Practicum: *Vision Screening*



E	1	20/200
F P	2	20/100
T O Z	3	20/70
L P E D	4	20/50
P E C F D	5	20/40
E D F C Z P	6	20/30
FELOPZD	7	20/25
DEFPOTEC	8	20/20
LEFODPCT	9	
FDPLTCED	10	
FEZOLCTPD	11	

Ishihara Testing

- **Materials and Preparation:**

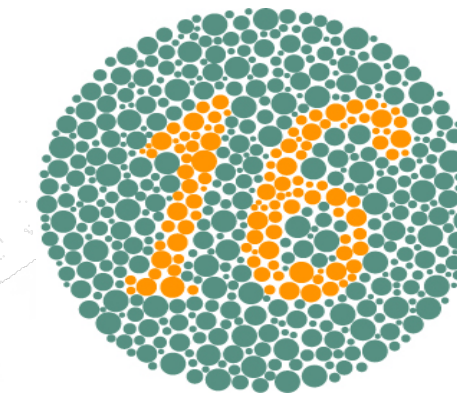
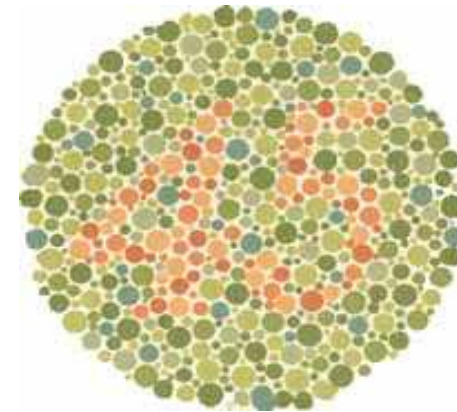
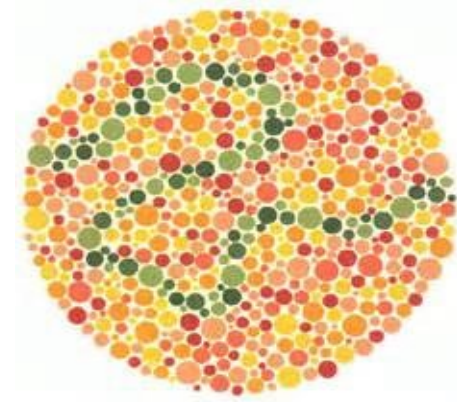
- Ishihara's Test for Color Deficiency, 14 plates edition.
- *Ishihara's Design Charts for the Colour Deficiency of Unlettered Person's.*
- Well lit room (natural day light preferred)
- Comfortable chair for patient

- **Instructions:**

- Hold 75 cm from the patient (~arm length)
- Sit and tilt plate at right angle to patients line of vision
- Screen all plates

- **Documentation:**

- Baseline and monthly
- Mark (X) if plate cannot be read
- Must pass 10 or 11 plates for test to be regarded as normal
- Refer for evaluation if 7 or less plates are read as normal



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 ≤ 7 plates are read as normal.

Results: [N] = Normal [A] = Abnormal

Ishihara Plate #	Normal Reading	Red/Green Deficiency	Date 1-7-19	Date 2-7-19	Date 3-7-19	Date 4-7-19	Date 5-7-19	Date	Date	Date	Date
1	12	12	12	12	12						
2	8	3	8	8	8						
3	5	2	5	5	5						
4	29	70	29	29	29						
5	74	21	74	74	74						
6	7	X	7	7	7						
7	45	X	45	45	45						
8	2	X	2	2	2						
9	X	2	X	X	X						
10	16	X	16	16	16						
11	Traceable	X	Traceable	Traceable	Traceable						
		Protan	Deutan								
		Strong	Mild	Strong	Mild						
12	35	5	(3) 5	3	3 (5)	35	35	35			
13	96	6	(9) 6	9	9 (6)	96	96	96			
14	Can trace 2 lines	Purple	Purple (Red)	Red	Red (Purple)	Traceable x 2 lines	Traceable x 2 lines	Traceable x 2 lines			
Results						N	N	N			
Initials						M.M.	M.M.	M.M.			

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 ≤ 7 plates are read as normal.

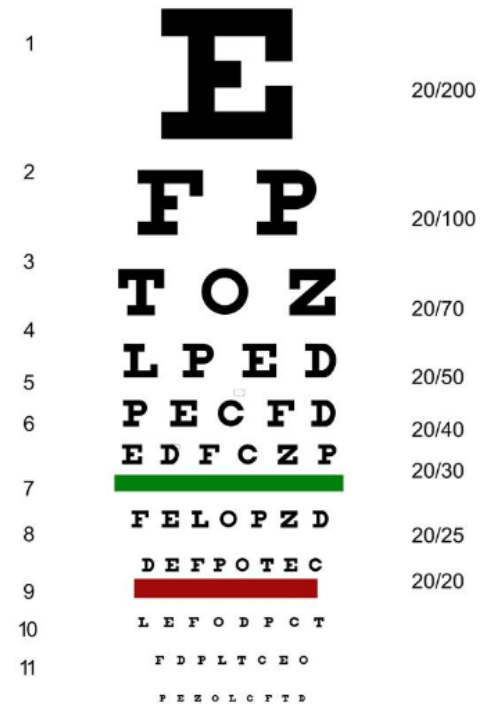
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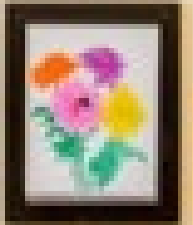
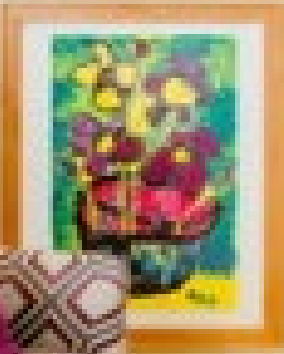
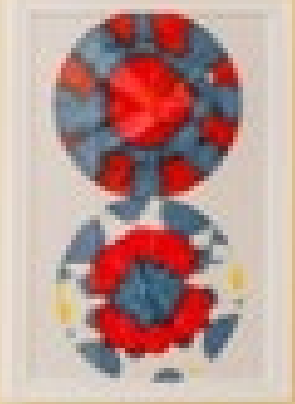
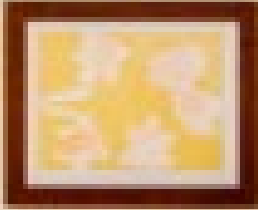
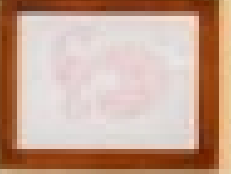
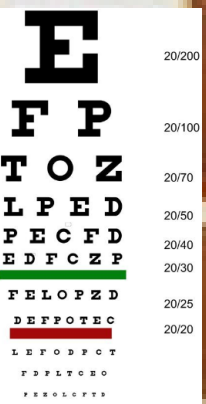
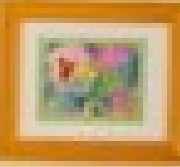
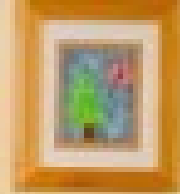
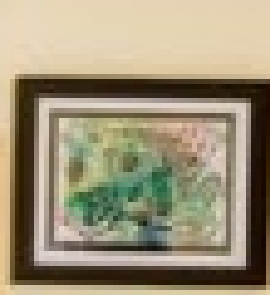
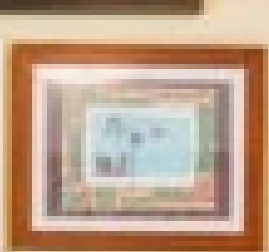
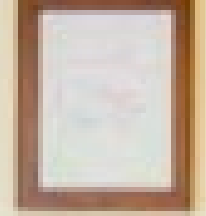
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1	12	12	N	N	N						
2	8	3	N	N	N						
3	5	2	N	N	N						
4	29	70	N	N	N						
5	74	21	N	N	N						
6	7	X	N	N	N						
7	45	X	N	N	N						
8	2	X	N	N	N						
9	X	2	N	N	N						
10	16	X	N	N	N						
11	Traceable	X	Traceable	Traceable	Traceable						
		Protan	Deutan								
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12	35	5	(3) 5	3	3 (5)	N	N	N			
13	96	6	(9) 6	9	9 (6)	N	N	N			
14	Can trace 2 lines	Purple	Purple (Red)	Red	Red (Purple)	Traceable x 2 lines	Traceable x 2 lines	Traceable x 2 lines			
Results						N	N	N			
Initials						M.M.	M.M.	M.M.			

Snellen Eye Test

Materials and preparations:

- Snellen or Tumbling "E" chart with screening distance of 10 or 20 feet
- Quiet area
- Room that accommodates for screening distance at 10 or 20 feet.
- Uncluttered, nonpatterned wall for chart placement
- Well lit area, without shadows or glare
- Measuring tape
- Masking tape
- Eye Occluder
- Pointer
- Screening form (TB-205)





Instructions:



- Place chart on a wall at the patient's eye level
- Measure 10 or 20 feet from wall and place tape on floor to mark a line
- Have patient stand with heels on the marked line (if seated, align back of chair with line).
- Determine the "beginning" or "practice line"
- Typically for persons 5 years and older beginning line is 20/40. Move up or down a line depending if the patient successfully reads line.
- Screen right eye first, then left, then both.

- Have the patient cover left eye with occluder and remind to keep both eyes open, then repeat with other eye.
- Place tip of pointer directly below each symbol to be read
 - Use linear method and follow a snake-like pattern).
- Record the last line read accurately.
 - If only 1 letter is missed continue to next line
 - To pass a line, the patient must identify one more than half of the symbols on the line.
- If initial screen was conducted with corrective lenses, follow-up screens must be done the same.
- Change of 1 or more lines from the initial screen must be reported to the physician **immediately**.

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 1-7-19	Date 2-7-19	Date 3-7-19	Date	Date	Date	Date	Date	Date
Right Eye	20/30	20/30	20/40	20/	20/	20/	20/	20/	20/
Left Eye	20/30	20/30	20/30	20/	20/	20/	20/	20/	20/
Both Eyes	20/30	20/30	20/30	20/	20/	20/	20/	20/	20/
Results	P	P	P						
Initials	M.M.	M.M.	M.M.						

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 1-7-19	Date 2-7-19	Date 3-7-19	Date	Date	Date	Date	Date	Date
Right Eye	20/30	20/30	20/30 -2	20/	20/	20/	20/	20/	20/
Left Eye	20/30	20/30	20/30	20/	20/	20/	20/	20/	20/
Both Eyes	20/30	20/30	20/30	20/	20/	20/	20/	20/	20/
Results	P	P	P						
Initials	M.M.	M.M.	M.M.						

One more than half the letters on the line ($\frac{1}{2} + 1$):

T O Z 3 20/70

1.5

$$2 + 1 = 3 \text{ pass}$$

P E C F D 5 20/40

2.5

$$3 + 1 = 4 \text{ pass}$$

E D F C Z P 6 20/30

$$3 + 1 = 4 \text{ pass}$$

Snellen Eye Test

- If 3 letters on line = must read 3
- If 4 letters on line = must read 3
- If 5 letters on line = must read 4
- If 6 letters on line = must read 4
- If 7 letters on line = must read 5
- If 8 letters on line = must read 5

Use the method that works best for
you and
be **consistent.**

References

- Curry International Tuberculosis Center and California Department of Public Health, 2016: *Drug-resistant tuberculosis: a survival guide for clinicians, 3rd ed.* [pages 99-148].
- Kokkada, S. B., Barthakur, R., Natarajan, M., Palaian, S., Chhetri, A. K., & Mishra, P. (2005). Ocular side effects of antitubercular drugs - a focus on prevention, early detection and management. *Kathmandu Univ Med J (KUMJ)*, 3(4), 438-441.