# Screening Examination of Premature Infants for Retinopathy of Prematurity

<table>
<thead>
<tr>
<th>TARGET POPULATION</th>
<th>Decidable (Y or N)</th>
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<tbody>
<tr>
<td>Eligibility</td>
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</tr>
<tr>
<td>Inclusion Criterion</td>
<td>· Low birth weight preterm infants</td>
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<tr>
<td>Exclusion Criterion</td>
<td>· Term infants</td>
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## RECOMMENDATIONS

**Recommendation**

1. Candidates for retinal screening exams

   **Conditional:** 1.1 Infants with a birth weight of less than 1500 g or gestational age of 30 weeks or less (as defined by the attending neonatologist)

   **IF**
   - Birth Weight
     - **Value:** < 1500 g
   - Gestational Age
     - **Value:** <= 30 weeks

   **THEN**
   - Perform retinal screening examination

   **Evidence Quality:** Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

   **Strength of Recommendation:** Recommendation Strength = A, "Good evidence to support a recommendation for use."

   **Reason:** To detect ROP.

   **Logic:** If (Birth Weight <= 1500 g OR Gestational Age <=30 weeks) THEN perform retinal screening
Conditional: 1.2 Birth weight between 1500 and 2000 g or gestational age of more than 30 weeks with an unstable clinical course, including those requiring cardiorespiratory support and who are believed by their attending pediatrician or neonatologist to be at high risk, should have retinal screening examinations performed after pupillary dilation using binocular indirect ophthalmoscopy to detect ROP.

IF
Birth Weight
   Value: > 1500 AND < 2000 g
Gestational Age
   Value: > 30 weeks
Unstable clinical course
   Value: TRUE
Requiring cardiorespiratory support
   Value: TRUE
High risk
   Value: TRUE
THEN
Should have retinal screening examinations

Evidence Quality: Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

Strength of Recommendation: Recommendation Strength = A, "Good evidence to support a recommendation for use."

Reason: To detect ROP

Logic: If ((Birth Weight > 1500 g AND Birth Weight < 2000 g) AND Gestational Age > 30 weeks ) AND (Unstable clinical course OR Requiring cardiorespiratory support OR High risk ) Then Should have retinal screening examinations

Recommendation
2. Who performs retinal screening examinations

Imperative: 2.1 The International Classification of Retinopathy of Prematurity Revisited should be used to classify, diagram, and record these retinal findings at the time
of examination.

IF

Inclusion Criterion:

· Low birth weight preterm infants

Exclusion Criterion: Term infants

THEN

“The International Classification of Retinopathy of Prematurity Revisited”9 should be used to classify, diagram, and record these retinal findings at the time of examination.

Evidence Quality: Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

Strength of Recommendation: Recommendation Strength = A, "Good evidence to support a recommendation for use."

Reason:

Logic:

Cost:

Imperative: 2.2 Skills and documentation

IF

Inclusion Criterion:

· Low birth weight preterm infants

Exclusion Criterion: Term infants

THEN

Retinal examinations in preterm infants should be performed by an ophthalmologist who has sufficient knowledge and experience to enable accurate identification of the location and sequential retinal changes of ROP.

Evidence Quality:

Strength of Recommendation:

Reason:

Logic:

Cost:
Recommendation
3. Schedule for retinal examination

Conditional: 3.1. 22 weeks Gestational Age

IF

Gestational Age

Value: 22 weeks

THEN

Initial retinal exam at 31 weeks postmenstrual or 9 weeks chronologic


Strength of Recommendation: Recommendation Strength = A, "Good evidence to support a recommendation for use."

Reason:

Logic:

If Gestational Age = 22 weeks Then Initial retinal exam at 31 weeks postmenstrual or 9 weeks chronologic

Conditional: 3.2. 23 weeks Gestational Age

IF

Gestational Age

Value: 23 weeks
THEN
Initial retinal exam at 31 weeks postmenstrual or 8 weeks chronologic

Evidence Quality: Same as 3.1

Strength of Recommendation: Same as 3.1

Reason:

Logic: If Gestational Age = 23 weeks Then Initial retinal exam at 31 weeks postmenstrual or 8 weeks chronologic

Conditional: 3.3. 24 weeks Gestational Age

IF
Gestational Age

Value: 24 weeks

THEN
Initial retinal exam at 31 weeks postmenstrual or 7 weeks chronologic


Strength of Recommendation: Recommendation Strength = A, "Good evidence to support a recommendation for use."

Reason:

Logic: If Gestational Age = 24 weeks Then Initial retinal exam at 31 weeks postmenstrual or 7 weeks chronologic
Conditional: 3.4. 25 weeks Gestational Age

IF
Gestational Age

Value: 25 weeks

THEN
Initial retinal exam at 31 weeks postmenstrual or 6 weeks chronologic

Evidence Quality: Same as 3.3
Strength of Recommendation: Same as 3.3
Reason:
Logic: If Gestational Age = 25 weeks Then Initial retinal exam at 31 weeks postmenstrual or 6 weeks chronologic

Conditional: 3.5 26 weeks Gestational Age

IF
Gestational Age

Value: 26 weeks

THEN
Initial retinal exam at 31 weeks postmenstrual or 5 weeks chronologic

Evidence Quality: Same as 3.3
Strength of Recommendation: Same as 3.3
Reason:
Logic: If Gestational Age = 26 weeks Then Initial retinal exam at 31 weeks postmenstrual or 5 weeks chronologic

Conditional: 3.6. 27 weeks Gestational Age
### Conditional: 3.7. 28 weeks Gestational Age

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<tr>
<th>IF</th>
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<tbody>
<tr>
<td>Gestational Age</td>
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</tr>
<tr>
<td><strong>Value:</strong> 28 weeks</td>
<td></td>
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<td>THEN</td>
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<tr>
<td>Initial retinal exam at 32 weeks postmenstrual or 4 weeks chronologic</td>
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**Evidence Quality:** Same as 3.3  
**Strength of Recommendation:** Same as 3.3

**Reason:**  
**Logic:** If Gestational Age = 28 weeks Then Initial retinal exam at 32 weeks postmenstrual or 4 weeks chronologic
Initial retinal exam at 33 weeks postmenstrual or 4 weeks chronologic

**Evidence Quality:** Same as 3.3

**Strength of Recommendation:** Same as 3.3

**Reason:**

**Logic:** If Gestational Age = 29 weeks Then Initial retinal exam at 33 weeks postmenstrual or 4 weeks chronologic

**Conditional:** 3.9. 30 weeks Gestational Age

**IF**

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**Value:** 30 weeks

**THEN**

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Initial retinal exam at 34 weeks postmenstrual or 4 weeks chronologic

**Evidence Quality:** Same as 3.3

**Strength of Recommendation:** Same as 3.3

**Reason:**

**Logic:** If Gestational Age = 30 weeks Then Initial retinal exam at 34 weeks postmenstrual or 4 weeks chronologic

**Conditional:** 3.10. 31 weeks Gestational Age

**IF**

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**Value:** 31 weeks

**THEN**

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Initial retinal exam at 35 weeks postmenstrual or 4 weeks chronologic

**Evidence Quality:** Same as 3.3
Strength of Recommendation: Same as 3.3

Reason:

Logic: If Gestational Age = 31 weeks Then Initial retinal exam at 35 weeks postmenstrual or 4 weeks chronologic

Conditional: 3.11. 32 weeks Gestational Age

IF
Gestational Age

Value: 32 weeks

THEN
Initial retinal exam at 36 weeks postmenstrual or 4 weeks chronologic

Evidence Quality: Same as 3.3

Strength of Recommendation: Same as 3.3

Reason:

Logic: If Gestational Age = 32 weeks Then Initial retinal exam at 36 weeks postmenstrual or 4 weeks chronologic

Recommendation
4. Follow-up examinations

Conditional: 4.1. 1 week or less follow-up

IF
Stage 1 ROP

Value: TRUE

Stage 2 ROP

Value: TRUE

Stage 3 ROP

Value: TRUE

Zone I
**Value:** TRUE
Zone II

**Value:** TRUE
THEN
1-week or less follow-up

**Evidence Quality:** Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

**Strength of Recommendation:** Recommendation Strength = A, "Good evidence to support a recommendation for use."

**Reason:** To detect ROP

**Logic:** If ((Stage 1 ROP OR Stage 2 ROP) AND Zone I) OR (Stage 3 ROP AND Zone II) Then 1-week or less follow-up

**Conditional:** 4.2. 1 to 2 week follow-up

**IF**
Immature vascularization

**Value:** TRUE
Zone I

**Value:** TRUE
Zone II

Stage 2 ROP

**Value:** FALSE
Regressing ROP

**THEN**
1- to 2-week follow-up

**Evidence Quality:** Same as 4.1

**Strength of Recommendation:** Same as 4.1

**Reason:** To detect ROP

**Logic:** If (Immature vascularization AND Zone I AND ROP = FALSE) OR (Stage 2 ROP AND Zone II) OR (Regressing ROP AND Zone I) Then 1 to 2 week follow-up
### Conditional: 4.3. 2 week follow-up

**IF**
- Stage 1 ROP
  - **Value:** TRUE
- Zone II
  - **Value:** TRUE
- Regressing ROP
  - **Value:** TRUE

**THEN**
- 2-week follow up

**Evidence Quality:** Same as 4.1

**Strength of Recommendation:** Same as 4.1

**Reason:** To detect ROP

**Logic:** If (Stage 1 ROP AND Zone II) OR (Regressing ROP AND Zone II) Then 2-week follow up

### Conditional: 4.4. 2-3 week follow-up

**IF**
- Immature vascularization
- Stage 1 ROP
- Stage 2 ROP
- ROP
- Regressing ROP
- Zone III

**THEN**
- 2-3 week follow up

**Evidence Quality:** Same as 4.1

**Strength of Recommendation:** Same as 4.1
Recommendation:

Reason: To detect ROP

Logic: If (Immature vascularization AND Zone II AND ROP = FALSE) OR ((Stage 1 ROP OR Stage 2 ROP) AND Zone III) OR (Regressing ROP and Zone III) Then 2-3 week follow-up

Imperative: Presence of plus disease

IF

Inclusion Criterion:
· Low birth weight preterm infants

Exclusion Criterion: Term infants

THEN

The presence of plus disease (defined as dilation and tortuosity of the posterior retinal blood vessels, see below) in zones I or II suggests that peripheral ablation, rather than observation, is appropriate.14

Evidence Quality: Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

Strength of Recommendation: Recommendation Strength = A, "Good evidence to support a recommendation for use."

Reason:

Logic:

Cost:

Recommendation
5. New considerations for ablative care

Conditional: Ablative treatment initiated

IF
Zone I
Zone II
ROP
Plus Disease
Stage I
Stage 2
Stage 3

THEN
Ablative treatment

Evidence Quality: Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

Strength of Recommendation: Recommendation Strength = A, "Good evidence to support a recommendation for use."

Reason:
Logic: If (Zone I = TRUE AND ROP = TRUE AND (Stage I OR Stage 2 OR Stage 3) AND Plus Disease = TRUE) OR (Zone I AND ROP AND NOT (Stage I OR Stage 2 OR Stage 3) AND Plus Disease = FALSE) OR (Zone II = TRUE and (Stage I OR Stage 2) AND Plus Disease = TRUE) Plus Disease Stage I Stage 2 Stage 3 Then Ablative treatment

Imperative: Practitioners involved in the ophthalmologic care of preterm infants should be aware that the retinal findings that require strong consideration of ablative treatment were revised recently according to the Early Treatment for Retinopathy of Prematurity Randomized Trial study.

IF

Inclusion Criterion: · Low birth weight preterm infants

Exclusion Criterion: Term infants

THEN
Practitioners involved in the ophthalmologic care of preterm infants should be aware that the retinal findings that require strong consideration of ablative treatment were revised recently according to the Early Treatment for Retinopathy of Prematurity Randomized Trial study.


**Strength of Recommendation:** Recommendation Strength = A, "Good evidence to support a recommendation for use."

**Reason:**

**Logic:**

**Cost:**

### Recommendation

6. The conclusion of retinal screening exams

**Conditional:** 6.1 Exam conclusion finding 1

<table>
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**Value:** TRUE

- Previous ROP
- Zone I
- Zone II

**THEN**

Conclusion of acute retinal screening examinations.

If there is examiner doubt about the zone or if the postmenstrual age is less than 35 weeks, confirmatory examinations may be warranted.

**Evidence Quality:** Evidence Quality = I, "Evidence from $\geq$1 properly randomized, controlled trial.

**Strength of Recommendation:** Recommendation Strength = A, "Good evidence to support a recommendation for use."

**Reason:**

**Logic:** If (Zone III = TRUE) AND NOT (Previous ROP = TRUE AND (Zone I = TRUE OR Zone II = TRUE)) Then Conclusion of acute retinal screening examinations. If there is examiner doubt about the zone or if the postmenstrual
age is less than 35 weeks, confirmatory examinations may be warranted.

**Conditional:** 6.2 Exam conclusion finding 2

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<tbody>
<tr>
<td>IF</td>
<td></td>
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<tr>
<td>Full retinal vascularization</td>
<td></td>
</tr>
<tr>
<td><strong>Value:</strong> TRUE</td>
<td></td>
</tr>
<tr>
<td>THEN</td>
<td></td>
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<tr>
<td>Conclusion of acute retinal screening examinations.</td>
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**Evidence Quality:** Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

**Strength of Recommendation:** Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

**Reason:**

**Logic:** If Full retinal vascularization = TRUE Then Conclusion of acute retinal screening examinations.

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**Conditional:** 6.3 Exam conclusion finding 3

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<th>Vocab</th>
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<tbody>
<tr>
<td>IF</td>
<td></td>
</tr>
<tr>
<td>Postmenstrual age</td>
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<tr>
<td><strong>Value:</strong> = 45</td>
<td></td>
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<tr>
<td>Prethreshold disease</td>
<td></td>
</tr>
<tr>
<td><strong>Value:</strong> If (Stage 3 ROP AND Zone 2) OR (ROP AND Zone 1)</td>
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</tr>
<tr>
<td>ROP</td>
<td></td>
</tr>
<tr>
<td>Worse ROP</td>
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<td>THEN</td>
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<tr>
<td>Conclusion of acute retinal screening examinations.</td>
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**Evidence Quality:** Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

**Strength of Recommendation:** Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.
Reason:
Logic: If Postmenstrual age ?? 45 weeks AND NOT ((Stage 3 ROP AND Zone II) OR (ROP AND Zone I) OR ("Worse" ROP) Then Conclusion of acute retinal screening examinations.

Conditional: 6.4 Exam conclusion finding 4

IF
Regressing of ROP
THEN
Conclusion of acute retinal screening examinations.

Evidence Quality: Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

Strength of Recommendation: Evidence Quality = I, "Evidence from >=1 properly randomized, controlled trial.

Reason:
Logic: If Regression of ROP = TRUE Then Conclusion of acute retinal screening examinations.

Recommendation
7. Communication with the parents

Imperative: 7.1. Parents should be aware of ROP examinations and should be informed if their child has ROP, with subsequent updates on ROP progression.

IF
Inclusion Criterion:
  · Low birth weight preterm infants

Exclusion Criterion: Term infants
THEN

Evidence Quality: No citations included in this section.
Strength of No citations included in this section.
| Imperative: | 7.2. The possible consequences of serious ROP should be discussed at the time that a significant risk of poor visual outcome develops. |
| Evidence Quality: | No citations included in this section. |

**Reason:**

**Logic:**

**Cost:**

| Imperative: | 7.3. Documentation of such conversations with parents in the nurse or physician notes is highly recommended. |
| Evidence Quality: | No citations included in this section. |

**Reason:**

**Logic:**

**Cost:**
8. Systems recommendations

**Imperative:**
If hospital discharge or transfer to another neonatal unit or hospital is contemplated before retinal maturation into zone III has taken place or if the infant has been treated by ablation for ROP and is not yet fully healed, the availability of appropriate follow-up ophthalmologic examination must be ensured, and specific arrangement for that examination must be made before such discharge or transfer occurs.

**IF**

**Inclusion Criterion:**
- Low birth weight preterm infants

**Exclusion Criterion:** Term infants

**THEN**

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