

# Screening Examination of Premature Infants for Retinopathy of Prematurity

TARGET POPULATION		Decidable (Y or N)				
Eligibility		<input type="checkbox"/>				
Inclusion Criterion						
· Low birth weight preterm infants		<input type="checkbox"/>				
Exclusion Criterion						
· Term infants		<input type="checkbox"/>				
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		<table><tr><th>Decidable</th><th>Vocab</th></tr><tr><td></td><td></td></tr></table>	Decidable	Vocab		
Decidable	Vocab					
Value: < 1500 g						
Gestational Age		<table><tr><td></td><td></td></tr></table>				
Value: <= 30 weeks						
THEN						
Perform retinal screening examination		<table><tr><th>Executable</th><th>Vocab</th></tr><tr><td></td><td></td></tr></table>	Executable	Vocab		
Executable	Vocab					
Evidence Quality:	Evidence Quality = I, "Evidence from >=1 properly randmoized, 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

Decidable	Vocab

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Executable	Vocab

**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:** 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**

<b>Executable</b>	<b>Vocab</b>
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“The International Classification of Retinopathy of Prematurity Revisited”<sup>9</sup> should be used to classify, diagram, and record these retinal findings at the time of examination.

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**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:**

**Cost:**

**Imperative:** 2.2 Skills and documentation

**IF**

**Inclusion Criterion:**

· Low birth weight preterm infants

**Exclusion Criterion:**Term infants

**THEN**

<b>Executable</b>	<b>Vocab</b>
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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.

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**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

Decidable	Vocab

Executable	Vocab

**Evidence Quality:** NOTE: "This guideline should be considered tentative rather than evidence-based for infants with a gestational age of 22 to 23 weeks because of the small number of survivors in these gestational age categories." Evidence Quality = I, "Evidence from  $\geq 1$  properly randomized, controlled trial. Cryotherapy for Retinopathy of Prematurity Cooperative Group. Multicenter trial of cryotherapy for retinopathy of prematurity: preliminary results. Arch Ophthalmol. 1988;106:471–479. Cryotherapy for Retinopathy of Prematurity Cooperative Group. Multicenter trial of cryotherapy for retinopathy of prematurity: ophthalmological outcomes at 10 years. Arch Ophthalmol. 2001;119:1110–1118. Reynolds JD, Hardy RJ, Kennedy KA, Spencer R, van Heuven WA, Fielder AR. Lack of efficacy of light reduction in preventing retinopathy of prematurity. Light Reduction in Retinopathy of Prematurity (LIGHT-ROP) Cooperative Group. N Engl J Med. 1998;338:1572–1576 any required treatment.

**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

Decidable	Vocab

	<b>THEN</b> Initial retinal exam at 31 weeks postmenstrual or 8 weeks chronologic	<b>Executable</b>	<b>Vocab</b>
<b>Evidence Quality:</b>	Same as 3.1		
<b>Strength of Recommendation:</b>	Same as 3.1		
<b>Reason:</b>			
<b>Logic:</b>	If Gestational Age = 23 weeks Then Initial retinal exam at 31 weeks postmenstrual or 8 weeks chronologic		
 <b>Conditional:</b> 3.3. 24 weeks Gestational Age			
	<b>IF</b> Gestational Age	<b>Decidable</b>	<b>Vocab</b>
	<b>Value:</b> 24 weeks		
	<b>THEN</b> Initial retinal exam at 31 weeks postmenstrual or 7 weeks chronologic	<b>Executable</b>	<b>Vocab</b>
<b>Evidence Quality:</b>	NOTE: "This guideline should be considered tentative rather than evidence-based for infants with a gestational age of 22 to 23 weeks because of the small number of survivors in these gestational age categories." Evidence Quality = I, "Evidence from $\geq 1$ properly randomized, controlled trial. Cryotherapy for Retinopathy of Prematurity Cooperative Group. Multicenter trial of cryotherapy for retinopathy of prematurity: preliminary results. Arch Ophthalmol. 1988;106:471–479. Cryotherapy for Retinopathy of Prematurity Cooperative Group. Multicenter trial of cryotherapy for retinopathy of prematurity: ophthalmological outcomes at 10 years. Arch Ophthalmol. 2001;119:1110–1118. Reynolds JD, Hardy RJ, Kennedy KA, Spencer R, van Heuven WA, Fielder AR. Lack of efficacy of light reduction in preventing retinopathy of prematurity. Light Reduction in Retinopathy of Prematurity (LIGHT-ROP) Cooperative Group. N Engl J Med. 1998;338:1572–1576 any required treatment.		
<b>Strength of Recommendation:</b>	Recommendation Strength = A, "Good evidence to support a recommendation for use."		
<b>Reason:</b>			
<b>Logic:</b>	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

Decidable	Vocab

Executable	Vocab

**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

Decidable	Vocab

Executable	Vocab

**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

	<b>IF</b>	<b>Decidable</b>	<b>Vocab</b>
	Gestational Age		
	<b>Value:</b> 27 weeks		
	<b>THEN</b>	<b>Executable</b>	<b>Vocab</b>
	Initial retinal exam at 31 weeks postmenstrual or 4 weeks chronologic		
<b>Evidence Quality:</b>	Same as 3.3		
<b>Strength of Recommendation:</b>	Same as 3.3		
<b>Reason:</b>			
<b>Logic:</b>	If Gestational Age = 27 weeks Then Initial retinal exam at 31 weeks postmenstrual or 4 weeks chronologic		
<b>Conditional:</b>	3.7. 28 weeks Gestational Age		
	<b>IF</b>	<b>Decidable</b>	<b>Vocab</b>
	Gestational Age		
	<b>Value:</b> 28 weeks		
	<b>THEN</b>	<b>Executable</b>	<b>Vocab</b>
	Initial retinal exam at 32 weeks postmenstrual or 4 weeks chronologic		
<b>Evidence Quality:</b>	Same as 3.3		
<b>Strength of Recommendation:</b>			
<b>Reason:</b>	Same as 3.3		
<b>Logic:</b>	If Gestational Age = 28 weeks Then Initial retinal exam at 32 weeks postmenstrual or 4 weeks chronologic		
<b>Conditional:</b>	3.8. 29 weeks Gestational Age		
	<b>IF</b>	<b>Decidable</b>	<b>Vocab</b>
	Gestational Age		
	<b>Value:</b> 29 weeks		
	<b>THEN</b>	<b>Executable</b>	<b>Vocab</b>

Initial retinal exam at 33 weeks postmenstrual or 4 weeks chronologic

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**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**  
Gestational Age

Decidable	Vocab

**Value:** 30 weeks

**THEN**  
Initial retinal exam at 34 weeks postmenstrual or 4 weeks chronologic

Executable	Vocab

**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**  
Gestational Age

Decidable	Vocab

**Value:** 31 weeks

**THEN**  
Initial retinal exam at 35 weeks postmenstrual or 4 weeks chronologic

Executable	Vocab

**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

Decidable	Vocab

Executable	Vocab

**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

Decidable	Vocab

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**Value:** TRUE  
Zone II

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

Executable	Vocab

**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:** 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

Decidable	Vocab

**Value:** TRUE  
Zone I

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**Value:** TRUE  
Zone II

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Stage 2 ROP

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**Value:** FALSE  
Regressing ROP

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

Executable	Vocab

**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

Decidable	Vocab

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Executable	Vocab

**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

Decidable	Vocab
Executable	Vocab

**Evidence Quality:** Same as 4.1

**Strength of** 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.<sup>14</sup>

<b>Executable</b>	<b>Vocab</b>
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**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:****Cost:****Recommendation**

5. New considerations for ablative care

**Conditional:** Ablative treatment initiated**IF**

Zone I

Zone II

ROP

Plus Disease

Decidable	Vocab

Stage I  
 Stage 2  
 Stage 3  
**THEN**  
 Ablative treatment

<b>Executable</b>	<b>Vocab</b>

**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 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**

<b>Executable</b>	<b>Vocab</b>
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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.

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**Evidence Quality:** Evidence Quality = I, "Evidence from  $\geq 1$  properly randomized, controlled trial.1. Cryotherapy for Retinopathy of Prematurity Cooperative Group. Multicenter trial of cryotherapy for retinopathy of prematurity: preliminary results. Arch Ophthalmol. 1988;106: 471–4797. Early Treatment for Retinopathy of Prematurity Cooperative

Group. Revised indications for the treatment of retinopathy of prematurity: results of the early treatment for retinopathy of prematurity randomized trial. Arch Ophthalmol. 2003;121: 1684–16949. International Committee for the Classification of Retinopathy of Prematurity. The International Classification of Retinopathy of Prematurity revisited. Arch Ophthalmol. 2005;123:991–999

**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

**IF**

Zone III

**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.

Decidable	Vocab

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Executable	Vocab

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**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

**IF**

Full retinal vascularization

**Value:** TRUE

**THEN**

Conclusion of acute retinal screening examinations.

Decidable	Vocab

Executable	Vocab

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

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

**Reason:**

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

**Conditional:** 6.3 Exam conclusion finding 3

**IF**

Postmenstrual age

**Value:** = 45

Prethreshold disease

**Value:** If (Stage 3 ROP AND Zone 2) OR (ROP AND Zone 1)

ROP

Worse ROP

**THEN**

Conclusion of acute retinal screening examinations.

Decidable	Vocab

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Executable	Vocab

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

**Strength of Recommendation:** Evidence Quality = I, "Evidence from  $\geq 1$  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.

Decidable	Vocab
Executable	Vocab

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

**Strength of Recommendation:** Evidence Quality = I, "Evidence from  $\geq 1$  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**

Executable	Vocab

**Evidence Quality:** No citations included in this section.

**Strength of** No citations included in this section.

**Recommendation:**

**Reason:**

**Logic:**

**Cost:**

**Imperative:** 7.2. The possible consequences of serious ROP should be discussed at the time that a significant risk of poor visual outcome develops.

**IF**

**Inclusion Criterion:**

· Low birth weight preterm infants

**Exclusion Criterion:** Term infants

**THEN**

Executable	Vocab

**Evidence Quality:** No citations included in this section.

**Strength of Recommendation:** 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.

**IF**

**Inclusion Criterion:**

· Low birth weight preterm infants

**Exclusion Criterion:** Term infants

**THEN**

Executable	Vocab

**Evidence Quality:** No citations included in this section.

**Strength of Recommendation:** No citations included in this section.

**Reason:**

**Logic:**

**Cost:**

## Recommendation

### 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**

Executable	Vocab

**Evidence Quality:**

**Strength of Recommendation:**

**Reason:**

**Logic:**

**Cost:**