Patients with a PDA are at increased risk of ROP

ROP: True or false
Patients with a PDA are at increased risk of ROP  True

Birth weight is a greater predictor for ROP than O2 exposure True; LBW is #1 risk factor

Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship

Infants with a R→L cardiac shunt (and subsequent low O2 sat) are protected from ROP False, and this provides strong evidence that excess PaO2 is not causative

Whites have a greater risk of ROP than blacks True

The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males

Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae
Patients with a **PDA** are at increased risk of ROP **True**

*Why would a Personal Digital Assistant put someone at increased risk of ROP?*

In this context, PDA stands for **quack**
Patients with a **PDA** are at increased risk of ROP **True**

*Why would a Personal Digital Assistant put someone at increased risk of ROP? In this context, PDA stands for **patent ductus arteriosus***
Patients with a PDA are at increased risk of ROP **True**

Birth weight is a greater predictor for ROP than O₂ exposure **True**; LBW is #1 risk factor

Exposure to ambient light has a small but significant effect on ROP development **False**; the Light-ROP study found no relationship

Infants with a R → L cardiac shunt (and subsequent low O₂ sat) are protected from ROP **False**, and this provides strong evidence that excess PaO₂ is not causative

Whites have a greater risk of ROP than blacks **True**

The sexes have roughly equal ROP incidence rates **False**; ROP is significantly more common in males

Once the ROP process starts, it usually progresses to an advanced level **False**; roughly 80% of ROP arrests spontaneously, without significant sequelae
• Patients with a PDA are at increased risk of ROP True
• Birth weight is a greater predictor for ROP than $O_2$ exposure True; LBW is #1 risk factor

(low birth weight)
Q

- Patients with a PDA are at increased risk of ROP True
- Birth weight is a greater predictor for ROP than O₂ exposure True; **LBW is #1 risk factor**
- Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
- Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PaO₂ is not causative
- Whites have a greater risk of ROP than blacks True
- The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
- Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

![ROP: True or false](image)

<table>
<thead>
<tr>
<th>BW (gm)</th>
<th>Risk of severe ROP</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;750</td>
<td>?%</td>
</tr>
<tr>
<td>750-999</td>
<td>?%</td>
</tr>
<tr>
<td>1000-1250</td>
<td>?%</td>
</tr>
</tbody>
</table>
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O$_2$ exposure True; **LBW is #1 risk factor**

<table>
<thead>
<tr>
<th>BW (gm)</th>
<th>Risk of severe ROP</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;750</td>
<td>40%</td>
</tr>
<tr>
<td>750-999</td>
<td>20%</td>
</tr>
<tr>
<td>1000-1250</td>
<td>10%</td>
</tr>
</tbody>
</table>
Patients with a PDA are at increased risk of ROP True

Birth weight is a greater predictor for ROP than O$_2$ exposure True; **LBW is #1 risk factor**

Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship

Infants with a R$\rightarrow$L cardiac shunt (and subsequent low O$_2$ sat) are protected from ROP False, and this provides strong evidence that excess PaO$_2$ is not causative

Whites have a greater risk of ROP than blacks True

The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males

Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

### ROP: True or false

<table>
<thead>
<tr>
<th>BW (gm)</th>
<th>Risk of severe ROP</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;750</td>
<td>40%</td>
</tr>
<tr>
<td>750-999</td>
<td>20%</td>
</tr>
<tr>
<td>1000-1250</td>
<td>10%</td>
</tr>
</tbody>
</table>

Note the pattern…
Q

- Patients with a PDA are at increased risk of ROP True
- Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor

**OK, but which variable is the best predictor of when an infant will develop significant ROP?**
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PaO₂ is not causative
Whites have a greater risk of ROP than blacks True
The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

OK, but which variable is the best predictor of when an infant will develop significant ROP?
Infant age
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than $O_2$ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a $R \rightarrow L$ cardiac shunt (and subsequent low $O_2$ sat) are protected from ROP False, and this provides strong evidence that excess $PaO_2$ is not causative
Whites have a greater risk of ROP than blacks True
The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

OK, but which variable is the best predictor of when an infant will develop significant ROP? Infant age

Can you be more specific? That is, which age is the best predictor--postmenstrual, gestational or chronologic? (And what are these different ages anyway?)
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PaO₂ is not causative
Whites have a greater risk of ROP than blacks True
The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

OK, but which variable is the best predictor of when an infant will develop significant ROP? Infant age

Can you be more specific? That is, which age is the best predictor--postmenstrual, gestational or chronologic? (And what are these different ages anyway?) Development of significant ROP correlates best with the infant’s postmenstrual age. Postmenstrual age equals gestational age at birth + chronologic (postnatal) age. Research indicates that infants rarely develop significant ROP before postmenstrual age 31 weeks. Thus, screening exams before this age have very low yield, and needlessly stress the infant.
Patients with a PDA are at increased risk of ROP True

Birth weight is a greater predictor for ROP than \( \text{O}_2 \) exposure True; LBW is #1 risk factor

Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship

Infants with a R\( \rightarrow \)L cardiac shunt (and subsequent low \( \text{O}_2 \) sat) are protected from ROP False, and this provides strong evidence that excess \( \text{PaO}_2 \) is not causative

Whites have a greater risk of ROP than blacks True

The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males

Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

OK, but which variable is the best predictor of when an infant will develop significant ROP? Infant age

Can you be more specific? That is, which age is the best predictor--postmenstrual, gestational or chronologic? (And what are these different ages anyway?) Development of significant ROP correlates best with the infant’s postmenstrual age. Postmenstrual age equals gestational age at birth + chronologic (postnatal) age. Research indicates that infants rarely develop significant ROP before postmenstrual age 31 weeks. Thus, screening exams before this age have very low yield, and needlessly stress the infant.

What does this indicate about the relationship between timing of ROP development and an infant’s chronologic age?
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PaO₂ is not causative
Whites have a greater risk of ROP than blacks True
The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

ROP: True or false

OK, but which variable is the best predictor of when an infant will develop significant ROP? Infant age

Can you be more specific? That is, which age is the best predictor--postmenstrual, gestational or chronologic? (And what are these different ages anyway?)
Development of significant ROP correlates best with the infant’s postmenstrual age. Postmenstrual age equals gestational age at birth + chronologic (postnatal) age. Research indicates that infants rarely develop significant ROP before postmenstrual age 31 weeks. Thus, screening exams before this age have very low yield, and needlessly stress the infant.

What does this indicate about the relationship between timing of ROP development and an infant’s chronologic age? It indicates that younger preemies take longer to develop significant ROP than do older preemies. Consider two infants, one born at a gestational age 24 weeks, the other at 27. Neither is expected to develop ROP before postmenstrual age 31 weeks. Thus, the 24-weeker needs to be examined at chronologic age 7 weeks (24+7=31), whereas the 27-weeker should be examined at chronologic age 4 weeks (27+4=31). (We’ll have more to say about ROP screening, and its timing, shortly.)
Q

- Patients with a PDA are at increased risk of ROP **True**
- Birth weight is a greater predictor for ROP than $O_2$ exposure **True; LBW is #1 risk factor**
- Exposure to ambient light has a small but significant effect on ROP development **False**; the *Light-ROP* study found no relationship
- Infants with a R$\rightarrow$L cardiac shunt (and subsequent low $O_2$ sat) are protected from ROP **False**, and this provides strong evidence that excess $PaO_2$ is not causative
- Whites have a greater risk of ROP than blacks **True**
- The sexes have roughly equal ROP incidence rates **False; ROP is significantly more common in males**

ROP: True or false
• Patients with a PDA are at increased risk of ROP True
• Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
• Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Q

- Patients with a PDA are at increased risk of ROP **True**
- Birth weight is a greater predictor for ROP than $O_2$ exposure **True; LBW is #1 risk factor**
- Exposure to ambient light has a small but significant effect on ROP development **False; the Light-ROP study found no relationship**
- Infants with a $R \rightarrow L$ cardiac shunt (and subsequent low $O_2$ sat) are protected from ROP **False**
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PₐO₂ is not causative
Patients with a PDA are at increased risk of ROP True. 
Birth weight is a greater predictor for ROP than \( O_2 \) exposure True; LBW is #1 risk factor. 
Exposure to ambient light has a small but significant effect on ROP development False; the *Light-ROP* study found no relationship. 
Infants with a R\( \rightarrow \)L cardiac shunt (and subsequent low \( O_2 \) sat) are protected from ROP False, and this provides strong evidence that excess \( P_aO_2 \) is not causative. 

*What does the term *Everest in utero* have to do with ROP?*
• Patients with a PDA are at increased risk of ROP True.
• Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor.
• Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship.
• Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PₐO₂ is not causative.

What does the term Everest in utero have to do with ROP?
The term highlights the fact that the gestational environment is profoundly hypoxic compared to life ex utero. Oxygen levels in utero are about what they are at the 26,000 ft level on Everest—the so-called ‘death zone.’ It is under these O₂ conditions that the retinal vasculature is supposed to develop.
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PₐO₂ is not causative

What does the term Everest in utero have to do with ROP? The term highlights the fact that the gestational environment is profoundly hypoxic compared to life ex utero. Oxygen levels in utero are about what they are at the 26,000 ft level on Everest—the so-called ‘death zone.’ It is under these O₂ conditions that the retinal vasculature is supposed to develop.

What does this suggest about premature birth and the pathophysiology of ROP?
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PₐO₂ is not causative

What does the term Everest in utero have to do with ROP?
The term highlights the fact that the gestational environment is profoundly hypoxic compared to life ex utero. Oxygen levels in utero are about what they are at the 26,000 ft level on Everest—the so-called ‘death zone.’ It is under these O₂ conditions that the retinal vasculature is supposed to develop.

What does this suggest about premature birth and the pathophysiology of ROP?
When the preemie experiences normal ex utero O₂ levels, further development of the retinal vasculature is suppressed. This leaves more peripheral retinal areas with inadequate oxygenation. As they mature, these hypoxic retinal cells do what hypoxic retinal cells tend to do—they produce VEGF. The result is the now-familiar cascade of neovascularization, bleeding, and tractional retinal detachment.
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a right-to-left cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PaO₂ is not causative
Whites have a greater risk of ROP than blacks True
The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

In other words, ROP is a biphasic disease:

(What happens first?)

strong evidence that excess PₐO₂ is not causative

What does the term Everest in utero have to do with ROP?
The term highlights the fact that the gestational environment is profoundly hypoxic compared to life ex utero. Oxygen levels in utero are about what they are at the 26,000 ft level on Everest—the so-called ‘death zone.’ It is under these O₂ conditions that the retinal vasculature is supposed to develop.

What does this suggest about premature birth and the pathophysiology of ROP?
When the preemie experiences normal ex utero O₂ levels, further development of the retinal vasculature is suppressed. This leaves more peripheral retinal areas with inadequate oxygenation. As they mature, these hypoxic retinal cells do what hypoxic retinal cells tend to do—they produce VEGF. The result is the now-familiar cascade of neovascularization, bleeding, and tractional retinal detachment.
Patients with a PDA are at increased risk of ROP True

Birth weight is a greater predictor for ROP than O₂ True; LBW is #1 risk factor

Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship

Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PaO₂ is not causative

Whites have a greater risk of ROP than blacks True

The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males

Once the ROP process starts, it usually progresses to an advanced level False; roughly 80% of ROP arrests spontaneously, without significant sequelae

In other words, ROP is a **biphasic disease:**

--First, premature birth (+/- supplemental O₂) exposes the immature retina to vastly higher-than-normal O₂ levels, leading to downregulation of VEGF. This causes the immature retinal vascular tree to stop proliferating.

(What happens later?)

What happens later?)

strong evidence that excess PₐO₂ is not causative

What does the term Everest in utero have to do with ROP?
The term highlights the fact that the gestational environment is profoundly hypoxic compared to life ex utero. Oxygen levels in utero are about what they are at the 26,000 ft level on Everest—the so-called ‘death zone.’ It is under these O₂ conditions that the retinal vasculature is supposed to develop.

What does this suggest about premature birth and the pathophysiology of ROP?
When the preemie experiences normal ex utero O₂ levels, further development of the retinal vasculature is suppressed. This leaves more peripheral retinal areas with inadequate oxygenation. As they mature, these hypoxic retinal cells do what hypoxic retinal cells tend to do—they produce VEGF. The result is the now-familiar cascade of neovascularization, bleeding, and tractional retinal detachment.
Patients with a PDA are at increased risk of ROP: True

Birth weight is a greater predictor for ROP than \( O_2 \): True; LBW is #1 risk factor

Exposure to ambient light has a small but significant effect on ROP: False; the Light-ROP study found no relationship

Infants with a R \( \rightarrow \) L cardiac shunt (and subsequent low \( O_2 \) sat) are protected from ROP: False, and this provides strong evidence that excess \( P_{aO_2} \) is not causative

Whites have a greater risk of ROP than blacks: True

The sexes have roughly equal ROP incidence rates: False; ROP is significantly more common in males

Once the ROP process starts, it usually progresses to an advanced level: False; roughly 80% of ROP arrests spontaneously, without significant sequelae

In other words, ROP is a \textit{biphasic disease}:

\begin{itemize}
  \item First, premature birth (+/- supplemental \( O_2 \)) exposes the immature retina to vastly higher-than-normal \( O_2 \) levels, leading to \textit{downregulation of VEGF}. This causes the immature retinal vascular tree to \textit{stop proliferating}.
  \item Later, the (unvascularized) peripheral retina becomes metabolically active. The lack of vascularization renders the peripheral retina hypoxic, leading to \textit{upregulation of VEGF}. This causes the vascular tree to \textit{start proliferating again}.
\end{itemize}

\textbf{What does the term \textit{Everest in utero} have to do with ROP?}
The term highlights the fact that the gestational environment is profoundly hypoxic compared to life ex utero. Oxygen levels in utero are about what they are at the 26,000 ft level on Everest—the so-called ‘death zone.’ It is under these \( O_2 \) conditions that the retinal vasculature is supposed to develop.

\textbf{What does this suggest about premature birth and the pathophysiology of ROP?}
When the preemie experiences normal ex utero \( O_2 \) levels, further development of the retinal vasculature is suppressed. This leaves more peripheral retinal areas with inadequate oxygenation. As they mature, these hypoxic retinal cells do what hypoxic retinal cells tend to do—they produce VEGF. The result is the now-familiar cascade of neovascularization, bleeding, and tractional retinal detachment.
Q

- Patients with a PDA are at increased risk of ROP True
- Birth weight is a greater predictor for ROP than O_2 exposure True; LBW is #1 risk factor
- Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
- Infants with a R→L cardiac shunt (and subsequent low O_2 sat) are protected from ROP False, and this provides strong evidence that excess P_aO_2 is not causative
- Whites have a greater risk of ROP than blacks
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PₐO₂ is not causative
Whites have a greater risk of ROP than blacks True
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PₐO₂ is not causative
Whites have a greater risk of ROP than blacks True
The sexes have roughly equal ROP incidence rates
• Patients with a PDA are at increased risk of ROP True
• Birth weight is a greater predictor for ROP than O_2 exposure True; LBW is #1 risk factor
• Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
• Infants with a R→L cardiac shunt (and subsequent low O_2 sat) are protected from ROP False, and this provides strong evidence that excess P_{aO_2} is not causative
• Whites have a greater risk of ROP than blacks True
• The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
Patients with a PDA are at increased risk of ROP True
Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PₐO₂ is not causative
Whites have a greater risk of ROP than blacks True
The sexes have roughly equal ROP incidence rates False; ROP is significantly more common in males
Once the ROP process starts, it usually progresses to an advanced level
- Patients with a PDA are at increased risk of ROP **True**
- Birth weight is a greater predictor for ROP than O₂ exposure **True**; LBW is #1 risk factor
- Exposure to ambient light has a small but significant effect on ROP development **False**; the *Light-ROP* study found no relationship
- Infants with a R→L cardiac shunt (and subsequent low O₂ sat) are protected from ROP **False**, and this provides strong evidence that excess PₐO₂ is not causative
- Whites have a greater risk of ROP than blacks **True**
- The sexes have roughly equal ROP incidence rates **False**; ROP is significantly more common in males
- Once the ROP process starts, it usually progresses to an advanced level **False**; roughly 80% of ROP arrests spontaneously, without significant sequelae
• **ROP classification**: Based on pathology location (called…), appearance (called…), and disease status: another criterion (two words)
• **ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

  - **Location**
    - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
    - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
    - Zone 3: Residual crescent anterior to Zone 2

  - **Appearance**
    - Stage 1: Demarcation line
    - Stage 2: Elevated line ('ridge') +/- small tufts of neo
    - Stage 3: Ridge with extensive neo growing through ILM
    - Stage 4: Subtotal RD
    - Stage 5: Total RD
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

**Location**
- Zone 1
- Zone 2
- Zone 3
• **ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

  • **Location**
    - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
    - Zone 2
    - Zone 3

  (ONH = optic nerve head)
- **ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

  - **Location**
    - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
    - Zone 2: 
    - Zone 3

  - Zone 2: 

![Diagram](image-url)
• **ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

• **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**
• **ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

  - **Location**
    - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
    - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
    - **Zone 3**: 

  

  ![Diagram showing zones 1, 2, and 3 of ROP classification]

  

  (OD)
- **ROP classification**: Based on pathology [location](zone), [appearance](stage), and [plus disease](status):
  - **Location**
    - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
    - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
    - **Zone 3**: Residual crescent anterior to Zone 2
- **ROP classification**: Based on pathology location, appearance (stage), and plus disease status:
  
  - **Location**
    - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
    - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
    - **Zone 3**: Residual crescent anterior to Zone 2
  
  - **Appearance**
    - **Stage 1**:
    - **Stage 2**
    - **Stage 3**
    - **Stage 4**
    - **Stage 5**
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2
  - Stage 3
  - Stage 4
  - Stage 5
• **ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Ridge +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD
- **ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

  - **Location**
    - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
    - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
    - **Zone 3**: Residual crescent anterior to Zone 2

  - **Appearance**
    - **Stage 1**: Demarcation line
    - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
    - **Stage 3**
    - **Stage 4**
    - **Stage 5**

(neo = short for ‘neovascularization’)
**ROP classification**: Based on pathology **location (zone)**, **appearance (stage)**, and **plus disease** status:

- **Location**
  - *Zone 1*: Circle around ONH w/ radius 2x disc-fovea distance
  - *Zone 2*: Edge of Zone 1 to nasal ora, and around temporally
  - *Zone 3*: Residual crescent anterior to Zone 2

- **Appearance**
  - *Stage 1*: Demarcation line
  - *Stage 2*: Elevated line (‘ridge’) +/- small tufts of neo
  - *Stage 3*: Ridge with extensive neo growing through ILM
  - *Stage 4*
  - *Stage 5*
**ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

**Location**
- **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
- **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
- **Zone 3**: Residual crescent anterior to Zone 2

**Appearance**
- **Stage 1**: Demarcation line
- **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
- **Stage 3**: Ridge with extensive neo growing through ILM
- **Stage 4**
- **Stage 5**

(ILI = internal limiting membrane)
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: 
  - **Stage 5**
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Subtotal RD (RD = retinal detachment)
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5

**Stage 4 is divided into two substages:**
- 4a: RD with macula...
- 4b: RD with macula...
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- Location
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- Appearance
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5

Stage 4 is divided into two substages:
4a: RD with macula…on
4b: RD with macula…off
**ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD
ROP classification: Based on pathology (location), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD

What description is usually applied to the Stage 5 total RD?
ROP classification: Based on pathology \textit{location} (zone), \textit{appearance} (stage), and \textit{plus} disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

What description is usually applied to the Stage 5 total RD? It is described as a ‘funnel’ RD
**ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD

What are the three basic types of retinal detachment (generally speaking; not specific to ROP)?
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

What are the three basic types of retinal detachment (generally speaking; not specific to ROP)?
Rhegmatogenous, exudative and tractional
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1:** Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2:** Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3:** Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1:** Demarcation line
  - **Stage 2:** Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3:** Ridge with extensive neo growing through ILM
  - **Stage 4:** Subtotal RD
  - **Stage 5:** Total RD

What are the three basic types of retinal detachment (generally speaking; not specific to ROP)?
Rhegmatogenous, exudative and tractional

Which sort of RD occurs in ROP?
Tractional RD (TRD)
ROP classification: Based on pathology location, appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD

What are the three basic types of retinal detachment (generally speaking; not specific to ROP)?
Rhegmatogenous, exudative and tractional

Which sort of RD occurs in ROP?
Tractional RD (TRD)
**ROP classification**: Based on pathology location (zone), appearance (stage), and **plus disease** status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

- **Presence/absence of plus disease**
  - *Plus* disease = two/words retinal vessels
ROP classification: Based on pathology (location), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD

- **Presence/absence of plus disease**
  - *Plus* disease = Dilated/tortuous retinal vessels
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD

- **Presence/absence of plus disease**
  - *Plus disease* = Dilated/tortuous retinal vessels

*How dilated/tortuous do the vessels need to be to qualify as plus disease?*
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line ('ridge') +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

- **Presence/absence of plus disease**
  - Plus disease = Dilated/tortuous retinal vessels

How dilated/tortuous do the vessels need to be to qualify as plus disease? A standardized photo exists indicating the 'official' amount needed.
**ROP classification**: Based on pathology **location**, **appearance**, and **plus disease** status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

- **Presence/absence of plus disease**
  - *Plus* disease = Dilated/tortuous retinal vessels

*How dilated/tortuous do the vessels need to be to qualify as plus disease? A standardized photo exists indicating the ‘official’ amount needed*

*What if the vessels are definitely dilated/tortuous, but not to the extent indicated in the standardized photo?*
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

- **Presence/absence of plus disease**
  - *Plus* disease = Dilated/tortuous retinal vessels

How dilated/tortuous do the vessels need to be to qualify as plus disease?
A standardized photo exists indicating the ‘official’ amount needed

What if the vessels are definitely dilated/tortuous, but not to the extent indicated in the standardized photo?
This is referred to as Pre-Plus disease
ROP classification: Based on pathology \textit{location} (zone), \textit{appearance} (stage), and \textit{plus disease} status:

- **Location**
  - Zone 1: Circle around ONH with radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line ('ridge') +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

- **Presence/absence of plus disease**
  - \textit{Plus} disease = Dilated/tortuous retinal vessels
    - Indicates \underline{two different words} is taking place
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: Total RD

- **Presence/absence of plus disease**
  - *Plus disease* = Dilated/tortuous retinal vessels
    - Indicates arteriovenous shunting is taking place
• **ROP classification**: Based on pathology location (zone), appearance (stage), and **plus disease** status:

  ● **Location**
    - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
    - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
    - **Zone 3**: Residual crescent anterior to Zone 2

  ● **Appearance**
    - **Stage 1**: Demarcation line
    - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
    - **Stage 3**: Ridge with extensive neo growing through ILM
    - **Stage 4**: Subtotal RD
    - **Stage 5**: Total RD

  ● **Presence/absence of plus disease**
    - **Plus disease** = Dilated/tortuous retinal vessels
      - Indicates arteriovenous shunting is taking place
      - Strong indicator that disease progression is occurring
**ROP classification**: Based on pathology location, appearance, and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD

- **Presence/absence of plus disease**
  - *Plus disease* = Dilated/tortuous retinal vessels
    - Indicates arteriovenous shunting is taking place
    - Strong indicator that disease progression is occurring
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of *Stage 3* disease (or worse) in Zone I or II, associated with *plus disease*
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of *Stage 3* disease (or worse) in Zone I or II, associated with *plus disease*

What was the name of the study from which these (now considered outdated) treatment guidelines were developed?
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with *plus disease*

What was the name of the study from which these (now considered outdated) treatment guidelines were developed?

The **CRYO-ROP** study
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What’s wrong with these criteria for treatment? Why don’t we use them anymore?
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1 with Plus disease or
2. Zone 1, Stage 3, with or without Plus disease or
3. Zone 2, Stage 2 or 3, with Plus disease
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?
Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease
This is the outdated definition of when to treat ROP (so-called Threshold disease):
- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?
Treatment is indicated if the ROP meets one of three criteria:
1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease

What was the name of the study from which these treatment guidelines were developed?

ET-ROP (Early Treatment of Retinopathy of Prematurity) study
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease

or

2. Zone 1, Stage 3, with or without Plus disease

or

3. Zone 2, Stage 2 or 3, with Plus disease

What was the name of the study from which these treatment guidelines were developed? The ET-ROP (Early Treatment of Retinopathy of Prematurity) study
ROP: Treatment Considerations

- This is the outdated definition of when to treat ROP (so-called Threshold disease):
  - 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

The motivating factor behind the ET-ROP was to see whether earlier intervention could improve upon these dismal results.

What's wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease ('Rush disease')
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease

What was the name of the study from which these treatment guidelines were developed? The ET-ROP (Early Treatment of Retinopathy of Prematurity) study.
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease

Per the ET-ROP, disease meeting these criteria are known as what ‘type’ of ROP?
This is the outdated definition of when to treat ROP (so-called Threshold disease):
- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease

Per the ET-ROP, disease meeting these criteria are known as what ‘type’ of ROP?
Type I
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

Note that disease meeting ET-ROP criteria for treatment would not have met threshold under CRYO-ROP criteria. For this reason, the new criteria are sometimes referred to as *‘pre-threshold Type I ROP’*.

What are the new criteria?

*Treatment is indicated if the ROP meets one of three criteria:*

1. Zone 1, any Stage, with Plus disease  
   or
2. Zone 1, Stage 3, with or without Plus disease  
   or
3. Zone 2, Stage 2 or 3, with Plus disease

Per the ET-ROP, disease meeting these criteria are known as what ‘type’ of ROP? *Type I*
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

By what special name is ‘Zone 1 + Plus disease’ known?

Rush disease

Why is it called Rush disease?

Because these eyes are at especially high risk of very rapid progression to TRD

Which infants are at particular risk for developing Rush disease?

Those weighing under 1000 grams

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

By what special name is ‘Zone 1 + Plus disease’ known?

Rush disease

Which infants are at particular risk for developing Rush disease?

Those weighing under 1000 grams
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

By what special name is ‘Zone 1 + Plus disease’ known?
Rush disease

Why is it called Rush disease?

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

**By what special name is ‘Zone 1 + Plus disease’ known?**
Rush disease

**Why is it called Rush disease?**
Because these eyes are at especially high risk of very rapid progression to TRD

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

By what special name is ‘Zone 1 + Plus disease’ known?

Rush disease

Why is it called Rush disease?

Because these eyes are at especially high risk of very rapid progression to TRD

Which infants are at particular risk for developing Rush disease?

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

By what special name is ‘Zone 1 + Plus disease’ known? Rush disease

Why is it called Rush disease?

Because these eyes are at especially high risk of very rapid progression to TRD

Which infants are at particular risk for developing Rush disease?

Those weighing under 1000 grams
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What’s wrong with these criteria for treatment? Why don’t we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

By what special name is ‘Zone 1 + Plus disease’ known?

Rush disease

Why is it called Rush disease?

Because these eyes are at especially high risk of very rapid progression to TRD.

Which infants are at particular risk for developing Rush disease?

Those weighing under 1000 grams.

Another term is used for aggressive posterior ROP--what is it?

Aggressive Posterior ROP (APROP)

Is APROP simply another name for Rush disease?

While the terms are sometimes used interchangeably, the clinical appearance and behavior of APROP can differ from that of Rush disease. APROP is characterized by the presence of neovascular fronds lying flat on the retinal surface (ie, without a ridge) in Zone 1 or posterior Zone 2. Active A-V shunting is the rule. APROP is notorious for three unfortunate tendencies:

1. Direct progression from Stage 1 to Stage 3 disease;
2. Very rapid progression (Stage 1 to 3 or even 4 in a matter of days);
3. A proclivity to recur despite seemingly adequate treatment; and
Another term is used for aggressive posterior ROP—what is it?
It is called **Aggressive Posterior ROP (APROP)**

---

**By what special name is ‘Zone 1 + Plus disease’ known?**
Rush disease

**Why is it called Rush disease?**
Because these eyes are at especially high risk of very rapid progression to TRD

**Which infants are at particular risk for developing Rush disease?**
Those weighing under 1000 grams

---

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease
This is the outdated definition of when to treat ROP (so-called Threshold disease):

5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

Another term is used for aggressive posterior ROP—what is it? It is called Aggressive Posterior ROP (APROP).

Is APROP simply another name for Rush disease?

By what special name is ‘Zone 1 + Plus disease’ known? Rush disease

Why is it called Rush disease?
Because these eyes are at especially high risk of very rapid progression to TRD.

Which infants are at particular risk for developing Rush disease?
Those weighing under 1000 grams.

1. Zone 1, any Stage, with Plus disease
or
2. Zone 1, Stage 3, with or without Plus disease
or
3. Zone 2, Stage 2 or 3, with Plus disease
Another term is used for aggressive posterior ROP—what is it?
It is called **Aggressive Posterior ROP** (APROP)

**Is APROP simply another name for Rush disease?**
While the terms are sometimes used interchangeably, the clinical appearance and behavior of APROP can differ from that of Rush dz. APROP is characterized by the presence of neovascular fronds lying flat on the retinal surface (ie, without a ridge) in Zone 1 or posterior Zone 2. Active A-V shunting is the rule. APROP is notorious for four unfortunate tendencies:

1. Direct progression from Stage 1 to Stage 3 disease;
2. Very rapid progression (Stage 1 to 3 or even 4 in a matter of days);
3. A proclivity to recur despite seemingly adequate treatment; and

---

**By what special name is ‘Zone 1 + Plus disease’ known?**
Rush disease

**Why is it called Rush disease?**
Because these eyes are at especially high risk of very rapid progression to TRD.

**Which infants are at particular risk for developing Rush disease?**
Those weighing under 1000 grams

**ROP: Treatment Considerations**

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease
Another term is used for aggressive posterior ROP--what is it?
It is called **Aggressive Posterior ROP (APROP)**

Is APROP simply another name for Rush disease?
While the terms are sometimes used interchangeably, the clinical appearance and behavior of APROP can differ from that of Rush dz. APROP is characterized by the presence of neovascular fronds lying flat on the retinal surface (ie, without a ridge) in Zone 1 or posterior Zone 2. Active A-V shunting is the rule. APROP is notorious for four unfortunate tendencies:
1) Progressing directly from Stage 1 to Stage 3 disease;
2) very rapid progression--Stage 1 to 3 (or even 4) in a matter of days;
3) a proclivity to recur despite seemingly adequate treatment; and
4) a less-than-robust response to conventional laser treatment

By what special name is ‘Zone 1 + Plus disease’ known?
**Rush disease**

Why is it called Rush disease?
Because these eyes are at especially high risk of very rapid progression to TRD

Which infants are at particular risk for developing Rush disease?
Those weighing under 1000 grams

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease
This is the outdated definition of when to treat ROP (so-called Threshold disease):
- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?
Treatment is indicated if the ROP meets one of three criteria:
1. Zone 1, any Stage, with Plus disease
or
2. Zone 1, Stage 3, with or without Plus disease
or
3. Zone 2, Stage 2 or 3, with Plus disease

What is the conventional treatment for ROP?
Ablation (via either cryo or laser) of the avascular retina
Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes. That’s not a very good outcome, so these criteria have been revised.

**What are the new criteria?**

*Treatment is indicated* if:

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease

**What is the conventional treatment for ROP?**

Ablation (via either cryo or laser) of the avascular retina.
What's wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the conventional treatment for ROP?

Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser?
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease or
2. Zone 1, Stage 3, with or without Plus disease or
3. Zone 2, Stage 2 or 3, with Plus disease

What is the conventional treatment for ROP? Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have a cardiopulmonary arrest)!
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What is the conventional treatment for ROP?
Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser?
Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
This is the outdated definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)

What are the other advantages of laser over cryo?

- Less trauma to tissue
- --
- --
- --
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What are the other advantages of laser over cryo?

--Less trauma to tissue
--Easier to treat locations

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

---

**ROP: Treatment Considerations**

- **What is the treatment for ROP?**
  - Ablation (via either cryo or laser) of the avascular retina

- **Which is preferred, cryo or laser?**
  - Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)

- **What are the other advantages of laser over cryo?**
  - Less trauma to tissue
  - Easier to treat posterior locations

---
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What are the other advantages of laser over cryo?
--Less trauma to tissue
--Easier to treat posterior locations
--Less another bad thing

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

- Treatment is indicated if the ROP meets one of three criteria:
  1. Zone 1, any Stage, with Plus disease
  2. Zone 1, Stage 3, with or without Plus disease
  3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What are the other advantages of laser over cryo?

- Less trauma to tissue
- Easier to treat posterior locations
- Less painful

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What are the other advantages of laser over cryo?

- Less trauma to tissue
- Easier to treat posterior locations
- Less painful
- Less refractive error later in life

Which is preferred, cryo or laser?

Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
ROP: Treatment Considerations

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What are the other advantages of laser over cryo?
- Less trauma to tissue
- Easier to treat posterior locations
- Less painful
- Less myopia later in life

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
This is the outdated definition of when to treat ROP (so-called Threshold disease):
- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What's wrong with these criteria for treatment? Why don't we use them anymore?
Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if:

What are the other advantages of laser over cryo?

- Less trauma to tissue
- Easier to treat posterior locations
- Less painful
- Less myopia later in life

Which is preferred, cryo or laser?

Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)

Although it must be stressed that laser treatment is not wholly benign--issues with intra-operative apnea and/or adverse cardiac events have been reported, as have sequelae including cataract and glaucoma.
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the conventional treatment for ROP? Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the conventional treatment for ROP?

Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser?

Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What is the unconventional treatment for ROP? Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?

What is the conventional treatment for ROP?

Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser? Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
or
2. Zone 1, Stage 3, with or without Plus disease
or
3. Zone 2, Stage 2 or 3, with Plus disease

What is the conventional treatment for ROP?
Ablation (via either cryo or laser) of the avascular retina

Which is preferred, cryo or laser?
Most clinicians prefer laser; it is less traumatic to the eye, and less risky (5% of infants undergoing cryo for ROP will have cardiopulmonary arrest!)
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the unconventional treatment for ROP? Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP? The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What sort of ROP was treated with bevacizumab in the BEAT-ROP?
What's wrong with these criteria for treatment? Why don't we use them anymore?
Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?
Treatment is indicated if the ROP meets one of three criteria:
1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):
5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What is the unconventional treatment for ROP?
Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What sort of ROP was treated with bevacizumab in the BEAT-ROP?
Stage 3 in Zone 1 or posterior Zone 2--ie, Aggressive Posterior ROP
What's wrong with these criteria for treatment? Why don’t we use them anymore?
Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the UNconventional treatment for ROP?
Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What sort of ROP was treated with bevacizumab in the BEAT-ROP?
Stage 3 in Zone 1 or posterior Zone 2--ie, Aggressive Posterior ROP

Why was APROP the target disease state?

3. Zone 2, Stage 2 or 3, with Plus disease
What’s wrong with these criteria for treatment? Why don’t we use them anymore?
Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the unconventional treatment for ROP?
Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What sort of ROP was treated with bevacizumab in the BEAT-ROP?
Stage 3 in Zone 1 or posterior Zone 2--ie, Aggressive Posterior ROP

Why was APROP the target disease state?
As mentioned previously, APROP is notorious for its poor response to conventional laser tx (CLT)
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

ROP: Treatment Considerations

Another term is used for aggressive posterior ROP--what is it?
It is called **Aggressive Posterior ROP (APROP)**

Is APROP simply another name for Rush disease?
While the terms are sometimes used interchangeably, the clinical appearance and behavior of APROP can differ from that of Rush dz. APROP is characterized by the presence of neovascular fronds lying flat on the retinal surface (ie, without a ridge) in Zone 1 or posterior Zone 2. Active A-V shunting is the rule. **APROP is notorious for four unfortunate tendencies:**

1. Progressing directly from Stage 1 to Stage 3 disease;
2. very rapid progression--Stage 1 to 3 (or even 4) in a matter of days;
3. a proclivity to recur despite seemingly adequate treatment; and
4. **a less-than-robust response to conventional laser treatment**

What sort of ROP was treated with bevacizumab in the BEAT-ROP?
Stage 3 in Zone 1 or posterior Zone 2--ie, Aggressive Posterior ROP

Why was APROP the target disease state?
As mentioned previously, **APROP is notorious for its poor response to conventional laser tx (CLT)**

3. Zone 2, Stage 2 or 3, with Plus disease
What’s wrong with these criteria for treatment? Why don’t we use them anymore?
Recurrent indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the unconventional treatment for ROP? Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What sort of ROP was treated with bevacizumab in the BEAT-ROP? Stage 3 in Zone 1 or posterior Zone 2--ie, Aggressive Posterior ROP

Why was APROP the target disease state?
As mentioned previously, APROP is notorious for its poor response to conventional laser tx (CLT)

What was the treatment protocol?

Pts received a single intravitreal injection of 0.625 mg bevacizumab. (Note that this is ½ the usual adult dose.)
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What is the UNconventional treatment for ROP?
Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What sort of ROP was treated with bevacizumab in the BEAT-ROP?
Stage 3 in Zone 1 or posterior Zone 2—ie, Aggressive Posterior ROP

Why was APROP the target disease state?
As mentioned previously, APROP is notorious for its poor response to conventional laser tx (CLT)

What was the treatment protocol?
Pts received a single intravitreal injection of 0.625 mg bevacizumab (note that this is ½ the usual adult dose), or CLT.
What’s wrong with these criteria for treatment? Why don’t we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

- Treatment is indicated if the ROP meets one of three criteria:
  - Zone 1, any Stage, with Plus disease
  - Zone 1, Stage 3, with or without Plus disease
  - Zone 2, Stage 2 or 3, with Plus disease

What is the unconventional treatment for ROP?

Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?

The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What’s the key finding of the BEAT-ROP trial?

In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about eyes with posterior Zone 2 APROP?

The recurrence rates did not differ statistically.

What about post-treatment development of the immature retina?

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the unconventional treatment for ROP? Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP? The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What was the key finding of the BEAT-ROP trial? In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease): 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

ROP: Treatment Considerations

- What is the unconventional treatment for ROP? Intravitreal bevacizumab

- What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP? The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

- What was the key finding of the BEAT-ROP trial? In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

- What about in eyes with posterior Zone 2 APROP?
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What is the unconventional treatment for ROP?
Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What’s wrong with these criteria for treatment? Why don’t we use them anymore?
Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What was the key finding of the BEAT-ROP trial?
In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?
The recurrence rates did not differ statistically.
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What is the unconventional treatment for ROP? Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP? The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What was the key finding of the BEAT-ROP trial? In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP? The recurrence rates did not differ statistically

What about post-treatment development of the immature peripheral retina?
What's wrong with these criteria for treatment? Why don't we use them anymore?
Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?
Treatment is indicated if the ROP meets one of three criteria:
1. Zone 1, any Stage, with Plus disease
or
2. Zone 1, Stage 3, with or without Plus disease
or
3. Zone 2, Stage 2 or 3, with Plus disease

What is the unconventional treatment for ROP?
Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What’s the key finding of the BEAT-ROP trial?
In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?
The recurrence rates did not differ statistically

What about post-treatment development of the immature peripheral retina?
Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore?
Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?
Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?
The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What was the key finding of the BEAT-ROP trial?
In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?
The recurrence rates did not differ statistically.

What about post-treatment development of the immature peripheral retina?
Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised. What are the new criteria? Treatment is indicated if the ROP meets one of three criteria: 1. Zone 1, any Stage, with Plus disease or 2. Zone 1, Stage 3, with or without Plus disease or 3. Zone 2, Stage 2 or 3, with Plus disease.

What is the conventional treatment for ROP? Intravitreal bevacizumab.

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP? The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial.

What was the key finding of the BEAT-ROP trial? In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP? The recurrence rates did not differ statistically.

What about post-treatment development of the immature peripheral retina? Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

ROP: Treatment Considerations

What is the unconventional treatment for ROP? Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP? The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What was the key finding of the BEAT-ROP trial? In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP? The recurrence rates did not differ statistically.

What about post-treatment development of the immature peripheral retina? Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.

So that’s it then--bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

Q

(Identify five specific criticisms re the BEAT-ROP trial)
So that’s it then—bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

--Dosing
--Length of follow-up
--Generalizability
--Functionality
--Safety

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.

(Identify five specific criticisms re the BEAT-ROP trial)
So that's it then--bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of **criticisms of the BEAT-ROP trial specifically**, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

---Dosing. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about # of that of an adult eye, and some experts believe the study dose was unnecessarily high.

---Length of follow-up

---Generalizability

---Functionality

---Safety

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

The outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

---

**ROP: Treatment Considerations**

What is the conventional treatment for ROP?

Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?

The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What was the key finding of the BEAT-ROP trial?

In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?

The recurrence rates did not differ statistically.

What about post-treatment development of the immature peripheral retina?

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.

---

So that’s it then--bevacizumab is the tx of choice for Zone 1 APROP, right?

Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

---

**--Dosing.** As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

**--Length of follow-up**

---

**--Generalizability**

---

**--Functionality**

---

**--Safety**

---

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
So that’s it then—bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

---Dosing. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab—half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

---Length of follow-up. BEAT-ROP infants were followed until age # weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to % of recurrences after bevacizumab.

---Generalizability

---Functionality

---Safety

Peripheral vasculization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

---

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

---

**ROP: Treatment Considerations**

---

What is the conventional treatment for ROP?

Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?

The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What was the key finding of the BEAT-ROP trial?

In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?

The recurrence rates did not differ statistically.

What about post-treatment development of the immature peripheral retina?

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.

---

So that’s it then--bevacizumab is the tx of choice for Zone 1 APROP, right?

Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

--Dosing. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

--Length of follow-up. BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

--Generalizability

--Functionality

--Safety
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

---

So that's it then--bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of **criticisms of the BEAT-ROP trial specifically**, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

--Dosing. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

--**Length of follow-up.** BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

--**Generalizability**

Another, smaller study found that recurrence after bevacizumab occurred as late as 69 weeks postmenstrual age.

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
So that's it then--bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

--Dosing. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

--Length of follow-up. BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

--Generalizability

Another, smaller study found that recurrence after bevacizumab occurred as late as 69 weeks postmenstrual age.

In addition to the late age at which they occur, in what other important manner can recurrences after bevacizumab differ from those after CLT?

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

---

**The BEAT-ROP trial**:

1. 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

---

**ROP: Treatment Considerations**

---

What is the conventional treatment for ROP?

Intravitreal bevacizumab

What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?

The BEAT-ROP (Bevacizumab Eliminates Angiogenic Threat in ROP) trial

What was the key finding of the BEAT-ROP trial?

In eyes with Zone 1 APROP, the rate of recurrence after CLT was 42%, whereas the rate after intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?

The recurrence rates did not differ statistically.

What about post-treatment development of the immature peripheral retina?

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.

---

So that's it then--bevacizumab is the tx of choice for Zone 1 APROP, right?

Not quite. There are a host of **criticisms of the BEAT-ROP trial specifically** as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

---

**--Dosing.** As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

**--Length of follow-up.** BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, **there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.**

**--Generalizability.**

Another, smaller study found that recurrence after bevacizumab occurred as late as 69 weeks postmenstrual age.

In addition to the late age at which they occur, in what other important manner can recurrences after bevacizumab differ from those after CLT?

Recurrences after CLT always occur at the ridge where neovascularization first occurred. However, some cases of post-bevacizumab recurrence develop at new locations well anterior to the original ridgeline. It is speculated that the location of these recurrences demarcate regions of retina for which ischemia (and VEGF production) outlasted the presence of therapeutic levels of bevacizumab in the eye.

---

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
So that's it then--bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of **criticisms of the BEAT-ROP trial specifically**, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

**--Dosing.** As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

**--Length of follow-up.** BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

**--Generalizability.** In the BEAT-ROP cohort, >ethnicity% of the infants were ethnicity. It is not clear to what extent (if any) this limits the applicability of the data to preemies of other ethnic backgrounds.

**--Functionality**

---

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.

---
ROP: Treatment Considerations

So that’s it then--bevacizumab is the tx of choice for Zone 1 APROP, right?
Not quite. There are a host of **criticisms of the BEAT-ROP trial specifically**, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

---Dosing. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

---Length of follow-up. BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

---Generalizability. In the BEAT-ROP cohort, >50% of the infants were Hispanic. It is not clear to what extent (if any) this limits the applicability of the data to preemies of other ethnic backgrounds.

---Functionality

---Safety

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
So that's it then--bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of **criticisms of the BEAT-ROP trial specifically**, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

---**Dosing**. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

---**Length of follow-up**. BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

---**Generalizability**. In the BEAT-ROP cohort, >50% of the infants were Hispanic. It is not clear to what extent (if any) this limits the applicability of the data to preemies of other ethnic backgrounds.

---**Functionality**. While the peripheral retina has a more normal appearance after bevacizumab than it does after CLT, the BEAT-ROP made no attempt to assess whether it actually worked better. (BEAT-ROP researchers are planning a follow-up study to include detailed evaluation of visual function and retinal structure.)

---**Safety**

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

ROP: Treatment Considerations

---Dosing. As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

---Length of follow-up. BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

---Generalizability. In the BEAT-ROP cohort, >50% of the infants were Hispanic. It is not clear to what extent (if any) this limits the applicability of the data to preemies of other ethnic backgrounds.

---Functionality. While the peripheral retina has a more normal appearance after bevacizumab than it does after CLT, the BEAT-ROP made no attempt to assess whether it actually worked better. (BEAT-ROP researchers are planning a follow-up study to include detailed evaluation of visual function and retinal structure.)

---Safety. The BEAT-ROP was not powered to detect safety issues. There were a total of # participant deaths during the trial--# in the bevacizumab arm and # in the CLT. This difference did not reach statistical significance (but again, the study was underpowered in this respect).

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

---

**ROP: Treatment Considerations**

---**Dosing.** As mentioned, the BEAT-ROP used 0.625 mg of bevacizumab--half the adult dose. However, the vitreous volume of a preemie eye is only about 1/3 that of an adult eye, and some experts believe the study dose was unnecessarily high.

---**Length of follow-up.** BEAT-ROP infants were followed until age 54 weeks (postmenstrual). While this interval is adequate to capture most cases of post-CLT recurrence, there is evidence suggesting it may miss up to 50% of recurrences after bevacizumab.

---**Generalizability.** In the BEAT-ROP cohort, >50% of the infants were Hispanic. It is not clear to what extent (if any) this limits the applicability of the data to preemies of other ethnic backgrounds.

---**Functionality.** While the peripheral retina has a more normal appearance after bevacizumab than it does after CLT, the BEAT-ROP made no attempt to assess whether it actually worked better. (BEAT-ROP researchers are planning a follow-up study to include detailed evaluation of visual function and retinal structure.)

---**Safety.** The BEAT-ROP was not powered to detect safety issues. There were a total of seven participant deaths during the trial--five in the bevacizumab arm and two in the CLT. This difference did not reach statistical significance (but again, the study was underpowered in this respect).

Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes.
So that’s it then--bevacizumab is the tx of choice for Zone 1 APROP, right?
Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

Intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?
The recurrence rates did not differ statistically

What about post-treatment development of the immature peripheral retina?
Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes
So that’s it then--bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

**Systemic effects.** As of this writing, there are no data describing 1) how much of the intravitreal bevacizumab ‘escapes’ into the systemic circulation, 2) the extent to which systemic VEGF levels are affected, or 3) what effect (if any) the systemic bevacizumab has on developing organ systems. For example: Of the five infants in the bevacizumab treatment arm of the BEAT-ROP who died, four died of lung complications. Animal-model studies of VEGF’s role in organogenesis indicate it plays a role in development of the pulmonary vascular tree and alveoli. Is there a causal connection here? No one knows. (The BEAT-ROP researchers are currently gathering long-term follow-up data including looking for systemic developmental effects.)

On the other hand, there is no reason to think CLT has any long-term effects outside the eye.

Intravitreal bevacizumab was only 6%.

What about in eyes with posterior Zone 2 APROP?
The recurrence rates did not differ statistically

What about post-treatment development of the immature peripheral retina?
Peripheral vascularization proceeded in an apparently normal fashion in the bevacizumab eyes, but not in the CLT eyes
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
or
2. Zone 1, Stage 3, with or without Plus disease
or
3. Zone 2, Stage 2 or 3, with Plus disease

This is the outdated definition of when to treat ROP (so-called Threshold disease):

5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

---

What if the pt develops a TRD--how is that managed?

PPV and/or scleral buckle

Is it effective?

Not so much. Only 30% of cases achieve anatomic reattachment; of these, only 25% are still attached at 5 years, and only 10% have ambulatory vision.
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What if the pt develops a TRD--how is that managed?

PPV and/or scleral buckle

(PPV = Pars plana vitrectomy)
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What if the pt develops a TRD--how is that managed? PPV and/or scleral buckle

Is it effective? Not so much. Only 30% of cases achieve anatomic reattachment; of these, only 25% are still attached at 5 years, and only 10% have ambulatory vision.
What's wrong with these criteria for treatment? Why don't we use them anymore?

Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease

or

2. Zone 1, Stage 3, with or without Plus disease

or

3. Zone 2, Stage 2 or 3, with Plus disease

What if the pt develops a TRD--how is that managed?

PPV and/or scleral buckle

Is it effective?

Not so much. Only 30% of cases achieve anatomic reattachment; of these, only 25% are still attached at 5 years, and only 10% have ambulatory vision.
What's wrong with these criteria for treatment? Why don't we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That's not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

Once a decision to treat has been made, how long can it be deferred?

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
   or
3. Zone 2, Stage 2 or 3, with Plus disease
What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria?

Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

Once a decision to treat has been made, how long can it be deferred? When possible, treatment should be initiated within **72 hours**
ROP screening

Who?

- Screen all infants…
  - …with a birth weight of less than # gm
ROP screening

Who?
- Screen all infants…
  - …with a birth weight of less than 1500 gm
ROP screening

Who?

- Screen all infants…
  - …with a birth weight of less than 1500 gm, and/or
  - …whose gestational age at birth was \# weeks or less
**ROP screening**

**Who?**

- Screen all infants…
  - …with a birth weight of less than 1500 gm, **and/or**
  - …whose gestational age at birth was **30** weeks or less
ROP screening

Who?

- Screen all infants…
  - …with a birth weight of less than 1500 gm, *and/or*
  - …whose gestational age at birth was 30 weeks or less

What about infants >1500 gm and/or with gestational age >30 weeks? Should they be screened?
ROP screening

Who?

- Screen all infants…
  - …with a birth weight of less than 1500 gm, **and/or**
  - …whose gestational age at birth was **30** weeks or less

What about infants >1500 gm and/or with gestational age >30 weeks? Should they be screened? Not as a general rule. However, the guidelines state that such infants should be screened if/when their neonatologist feels it is indicated.
ROP screening

Who?

- Screen all infants…
  - …with a birth weight of less than 1500 gm, and/or
  - …whose gestational age at birth was 30 weeks or less

When?

- Timing of first screen is a function of pt
- **ROP screening**

  - **Who?**
    - Screen all infants...
    - ...with a birth weight of less than 1500 gm,
    - ...whose gestational age at birth was 30 weeks or less

  - **When?**
    - Timing of first screen is a function of pt age (see table)

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Postmenstrual age</th>
<th>Chronologic age at time of first ROP screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>23</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>26</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>27</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>31</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td>32</td>
<td>36</td>
<td>4</td>
</tr>
</tbody>
</table>
ROP screening

Who?
- Screen all infants…
  - …with a birth weight of less than 1500 gm,
  - …whose gestational age at birth was 30 weeks or less

When?
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening
### ROP screening

#### Who?
- Screen all infants...
  - with a birth weight of less than 1500 gm,
  - and/or whose gestational age at birth was 30 weeks or less.

#### When?
- Timing of first screen is a function of pt age (see table).
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening.

#### How Often?
- A single screening exam is sufficient if the retina is fully vascularized OU.
- Otherwise, 1 - 3 week follow-up is indicated (depending upon exam findings).

### Table: ROP: Screening and Follow-Up

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Postmenstrual age</th>
<th>Chronologic age at time of first ROP screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>23</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>26</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>27</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>31</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td>32</td>
<td>36</td>
<td>4</td>
</tr>
</tbody>
</table>
ROP screening

Who?

- Screen all infants... with a birth weight of less than 1500 gm,
- ... whose gestational age at birth was 30 weeks or less

When?

- Timing of first screen is a function of patient age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

Don’t try and memorize the table! Instead, here is first-screen timing in a nutshell:
ROP screening

Who?
- Screen all infants
  - with a birth weight of less than 1500 gm,
  - whose gestational age at birth was 30 weeks or less

When?
- Timing of first screen is a function of pt age
- Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Postmenstrual age</th>
<th>Chronologic age at time of first ROP screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>23</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>26</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>27</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>31</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td>32</td>
<td>36</td>
<td>4</td>
</tr>
</tbody>
</table>

Don’t try and memorize the table! Instead, here is first-screen timing in a nutshell:
- If the infant’s gestational age at birth was 27 weeks or younger, perform first screen at postmenstrual age 31 weeks,
**ROP screening**

- **Who?**
  - Screen all infants…
  - …with a birth weight of less than 1500 gm,
  - …whose gestational age at birth was 30 weeks or less

- **When?**
  - Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

---

**Table: First-screen timing**

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Postmenstrual age</th>
<th>Chronologic age at time of first ROP screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>23</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>26</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>27</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>31</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td>32</td>
<td>36</td>
<td>4</td>
</tr>
</tbody>
</table>
ROP screening

Who?
- Screen all infants…
  - …with a birth weight of less than 1500 gm, and/or
  - …whose gestational age at birth was 30 weeks or less

When?
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

How Often?
- A single screening exam is sufficient if the retina is
ROP screening

Who?
- Screen all infants...
  - ...with a birth weight of less than 1500 gm, \textit{and/or}
  - ...whose gestational age at birth was 30 weeks or less

When?
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

How Often?
- A single screening exam is sufficient if the retina is fully vascularized OU
**ROP screening**

**Who?**
- Screen all infants…
  - …with a birth weight of less than 1500 gm, and/or
  - …whose gestational age at birth was 30 weeks or less

**When?**
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

**How Often?**
- A single screening exam is sufficient if the retina is fully vascularized OU
- Otherwise, follow-up is indicated (depending upon exam findings)
**ROP screening**

**Who?**

- Screen all infants...
  - ...with a birth weight of less than 1500 gm, and/or
  - ...whose gestational age at birth was 30 weeks or less

**When?**

- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

**How Often?**

- A single screening exam is sufficient if the retina is fully vascularized OU
- Otherwise, 1 - 3 week follow-up is indicated (depending upon exam findings)
Long-term follow-up: A child with ROP needs periodic follow-up beyond the newborn period because...

- Vitreoretinal traction can lead to RD in the 1st or 2nd decade of life.
**Long-term follow-up:** A child with ROP needs periodic follow-up beyond the newborn period because...

- Vitreoretinal traction can lead to RD in 1\textsuperscript{st} or 2\textsuperscript{nd} decade
Long-term follow-up: A child with ROP needs periodic follow-up beyond the newborn period because…

- Vitreoretinal traction can lead to RD in 1st or 2nd decade
- Amblyopia can result from refractive problem, macular pathology, and/or EOM problem
- **Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because...
  - Vitreoretinal traction can lead to RD in 1\textsuperscript{st} or 2\textsuperscript{nd} decade
  - Amblyopia can result from high myopia, macular dragging, and/or strabismus
**Long-term follow-up:** A child with ROP needs periodic follow-up beyond the newborn period because...

- **Vitreoretinal traction** can lead to RD in the **1st or 2nd decade**.
- Amblyopia can result from **high myopia**, macular dragging, and/or **strabismus**.
- Macular dragging can produce a **pseudo EOM problem**.
Long-term follow-up: A child with ROP needs periodic follow-up beyond the newborn period because...

- Vitreoretinal traction can lead to RD in 1st or 2nd decade
- Amblyopia can result from high myopia, macular dragging, and/or strabismus
  - Macular dragging can produce pseudostrabismus
**Long-term follow-up:** A child with ROP needs periodic follow-up beyond the newborn period because...

- Vitreoretinal traction can lead to RD in the 1\textsuperscript{st} or 2\textsuperscript{nd} decade.
- Amblyopia can result from high myopia, macular dragging, and/or strabismus.
  - Macular dragging can produce pseudostrabismus.
    - Will have positive angle kappa, but no shift on cover testing.

**Exam finding in pseudo-EOM problem**

**Exam finding**

**Exam maneuver**
Long-term follow-up: A child with ROP needs periodic follow-up beyond the newborn period because...

- Vitreoretinal traction can lead to RD in 1st or 2nd decade
- Amblyopia can result from high myopia, macular dragging, and/or strabismus
  - Macular dragging can produce pseudostrabismus
    - Will have positive angle kappa, but no shift on cover testing