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Why would a Personal Digital Assistant put someone at increased risk of ROP? In this context, PDA stands for quack
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### ROP: True or false

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Note the pattern…
Q

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OK, but which variable is the best predictor of when an infant will develop significant ROP?
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- Development of significant ROP correlates best with the infant’s **postmenstrual** age.

- Postmenstrual age equals one way of measuring infant age + another age.
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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 $O_2$ 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 atmospheric $O_2$ levels, further development of the retinal vasculature is impaired. 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.
ROP: True or false

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(What happens first?)

strong evidence that excess P_a O₂ is not causative

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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?)

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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.
--Later, the (unvascularized) peripheral retina becomes metabolically active. The lack of vascularization renders the peripheral retina hypoxic, leading to upregulation of VEGF. This causes the vascular tree to start proliferating again.

strong evidence that excess PaO₂ is not causative

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Q/A

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- 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 % 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 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 (zone), appearance (stage), and 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
• **ROP classification**: Based on pathology **location (zone)**, **appearance (stage)**, and **plus disease** status:

  - **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

  - **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 (ONH = optic nerve head)
  - 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
**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**: Residual crescent anterior to Zone 2

**Q**

OD

Zone 1

Zone 2

(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

![Diagram of ROP zones](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: 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
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- **Appearance**
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  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
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  - **Zone 3**: Residual crescent anterior to Zone 2

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

![Image of retina with ROP changes]
**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
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**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 (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

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

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
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- **Appearance**
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- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
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- **Appearance**
  - Stage 1: Demarcation line
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  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
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- **Appearance**
  - Stage 1: Demarcation line
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  - 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 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

What description is usually applied to the Stage 5 total RD?
It is described as a ‘funnel’ RD
ROP stages
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
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- **Appearance**
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- **Appearance**
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**Q**

What are the three basic types of retinal detachment (generally speaking; not specific to ROP)?
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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?
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- **Appearance**
  - Stage 1: Demarcation line
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  - 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
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- **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: *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
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- **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, 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
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  - **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 (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
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  - Stage 4: Subtotal RD
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- **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 **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 two 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
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  - Stage 1: Demarcation line
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  - 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
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  - 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 is occurring
• **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
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  ● **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 \textit{outdated} definition of when to treat ROP (so-called \textit{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*):

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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):

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

1. 
2. 
3.
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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.

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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.
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):

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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

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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:**

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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
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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;
4) A less-than-robust response to conventional laser treatment.

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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!)
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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.
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What is the unconventional treatment for ROP? Intravitreal bevacizumab

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

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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.)
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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

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

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--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).
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- **What is the unconventional treatment for ROP?** Intravitreal bevacizumab.
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What is perhaps the main concern re giving bevacizumab to neonates?

Intravitreal bevacizumab was only 6%.

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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.
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(PPV = Pars plana vitrectomy)
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ROP: Treatment Considerations

Once a decision to treat has been made, how long can it be deferred?
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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, \textit{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?**
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**When?**
- Timing of first screen is a function of pt...
ROP screening

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- If the infant’s gestational age at birth was 27 weeks or younger, perform first screen at postmenstrual age 31 weeks.
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**ROP screening**

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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)

---

**rop: screening and follow-up**

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    - Timing of first screen is a function of **pt age** *(see table)*
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**How Often?**
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- 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(s) of life.
**Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because…

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**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, and/or 
  - pathology
  - 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**
ROP: Macular dragging
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
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- 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 exam finding in pseudo-EOM problem

**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...

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- 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