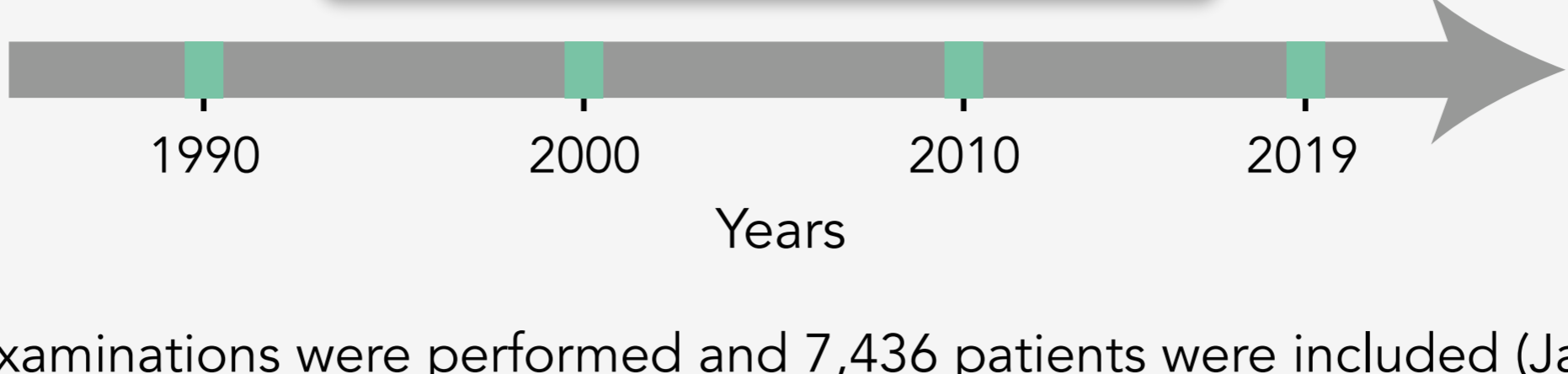


Retinopathy of Prematurity: Advances in the Screening and Treatment of Retinopathy of Prematurity Using a Single Center Approach

Berrocal AM, Fan KC, Al-Kharsan H, et al. *Am J Ophthalmol.* 2022;233:189-215. doi:10.1016/j.ajo.2021.07.016

The aim of this retrospective study was to focus on the longitudinal evaluation of high-risk infants for the development of retinopathy of prematurity (ROP) at a single tertiary neonatal intensive care unit (NICU), and to evaluate evolving demographics of ROP and the transition of treatment-warranted disease using an integrated screening/treating surgeon approach enabling reduction in bias often associated with extended study timelines.

A consecutive retrospective review of all infants screened for ROP between 1990 and 2019 was performed, comprised of inborn infants meeting birth criteria of <32 weeks' GA or BW of 1500 g.



A total of 25,567 examinations were performed and 7,436 patients were included (Jackson Memorial Hospital NICU).

GA = gestational age; BW = birthweight; g = grams.

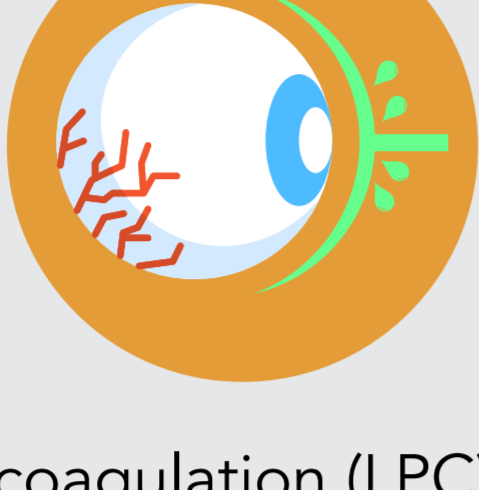
Screening data collected included:

- Laterality of eye
- Presence of ROP
- Zone
- Stage
- Number of clock hours of involvement
- Presence of plus disease
- Presence of tunica vasculosa lentis
- Degree of fundus pigmentation
- Concurrent ocular comorbidities
- Clarity of view during examination

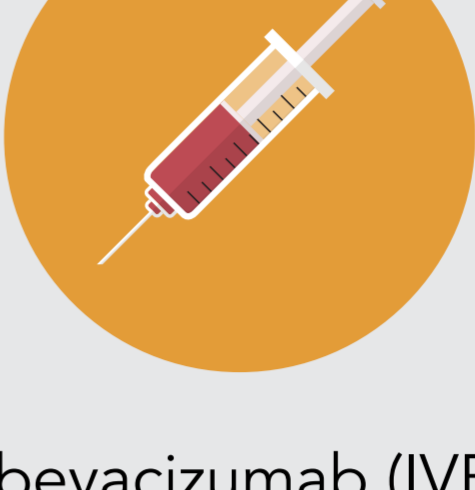
Each child was identified with the most advanced stage and zone reached at any time during the study window.

Classification and treatment

Disease classification and diagnosis were determined according to ICROP standards. Plus disease was classified based on standards used by the ETROP and CRYO-ROP, which defined plus as a degree of vascular dilation and tortuosity of the posterior retinal blood vessels in >2 quadrants.



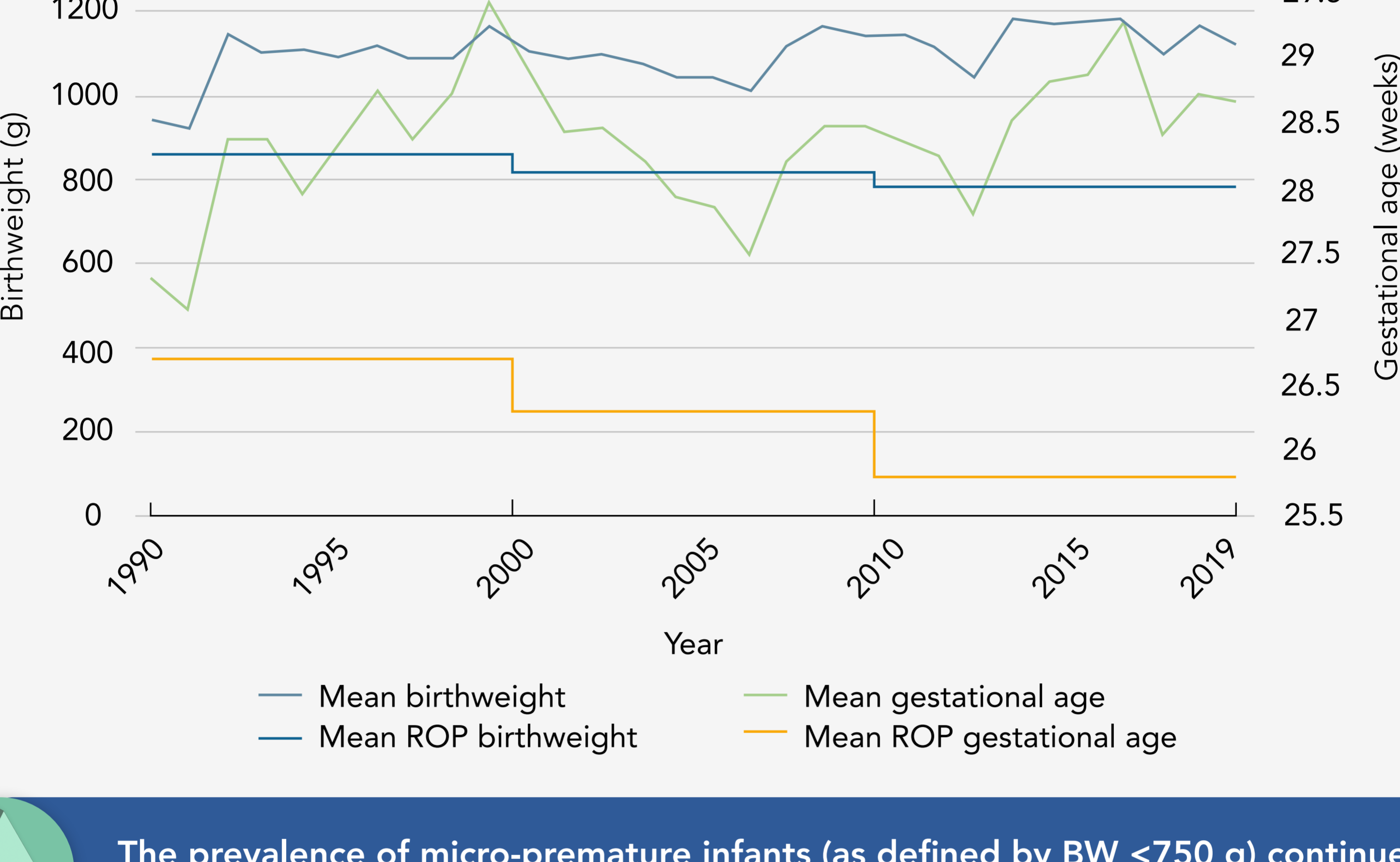
Laser photocoagulation (LPC) procedures were performed under intravenous sedation, with ongoing NICU monitoring at the bedside.



Intravitreal bevacizumab (IVB) injections were performed at the bedside using topical anesthesia only, following strict standardized protocols.

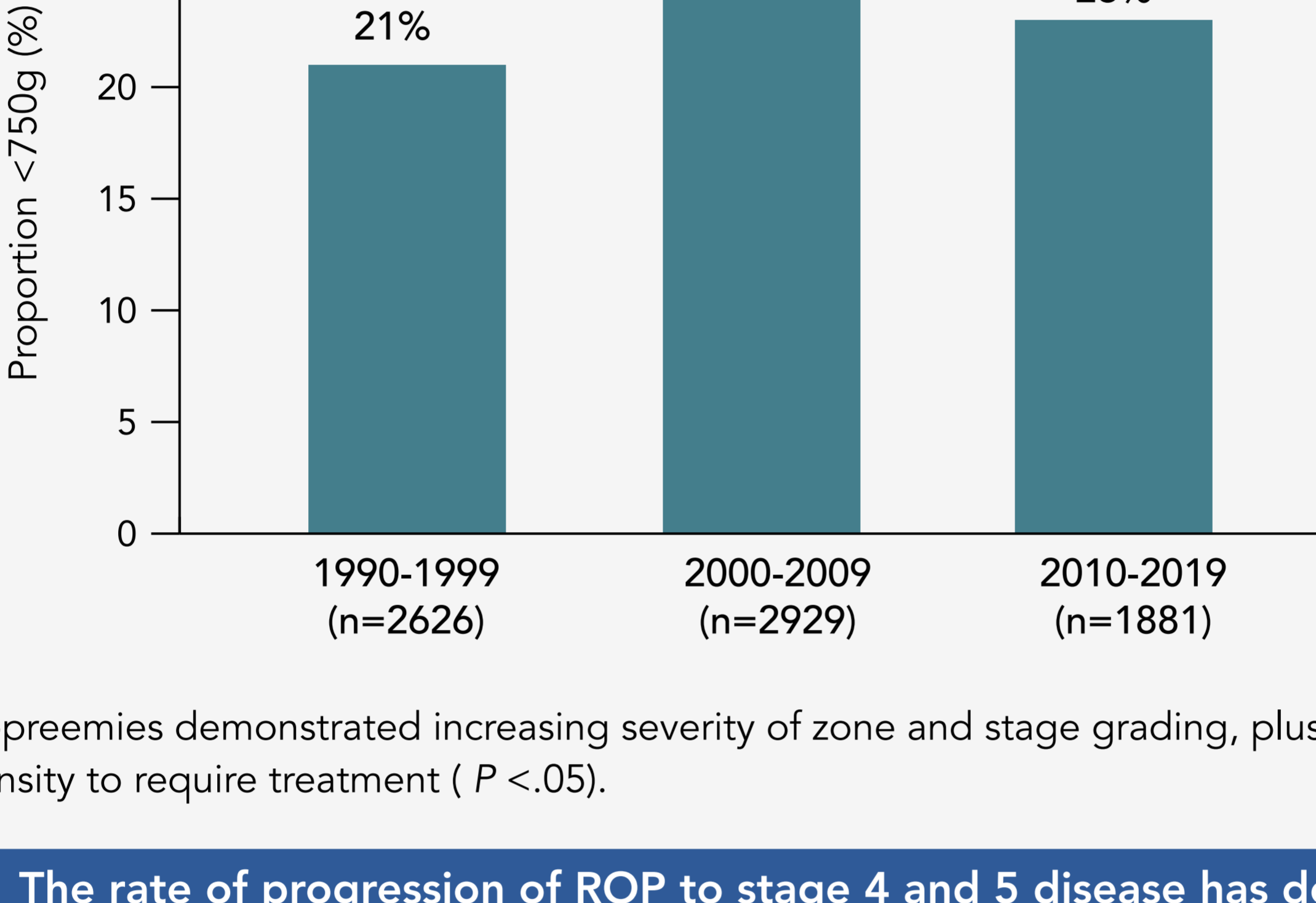
Although the mean BW and GA increased over 3 decades, patients with ROP demonstrated increasingly lower BW and GA over time.

Change of BW and GA over time (1990 to 2019)



The prevalence of micro-premature infants (as defined by BW <750 g) continues to rise over time.

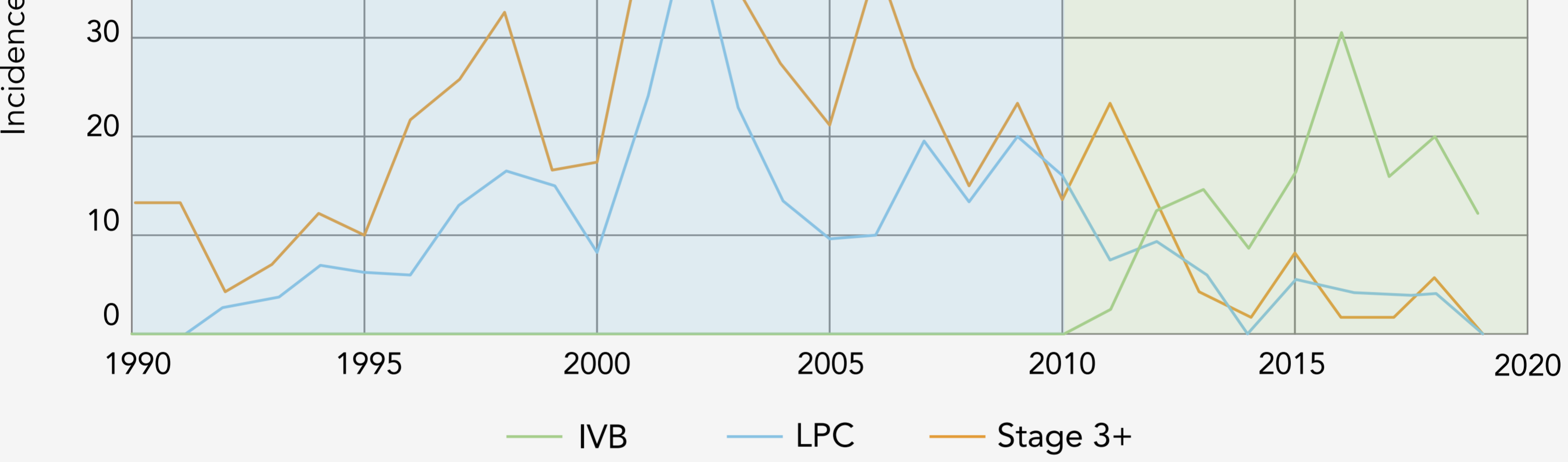
Prevalence of micropremature infants over time (1990 to 2019)



Micro-preemies demonstrated increasing severity of zone and stage grading, plus disease, and propensity to require treatment ($P < .05$).

The rate of progression of ROP to stage 4 and 5 disease has decreased over time, and there has been an associated increased adoption of intravitreal bevacizumab (IVB) as primary and salvage therapy.

ROP treatment incidence by year



There are several reasons for the increased adoption of IVB over laser photocoagulation. Most important are the positive outcomes of avoiding stage 4 and 5 disease when anti-vascular endothelial growth factor (VEGF) has been used as a primary therapy for treatment-warranted ROP. In addition, the increased adoption of IVB is driven by the recognized concerns associated with laser, including, but not limited to, severe visual field constriction, high myopic refractive error, macular dragging, vitreous hemorrhage, and development of cataract.

Characteristics of eyes receiving anti-VEGF versus laser.

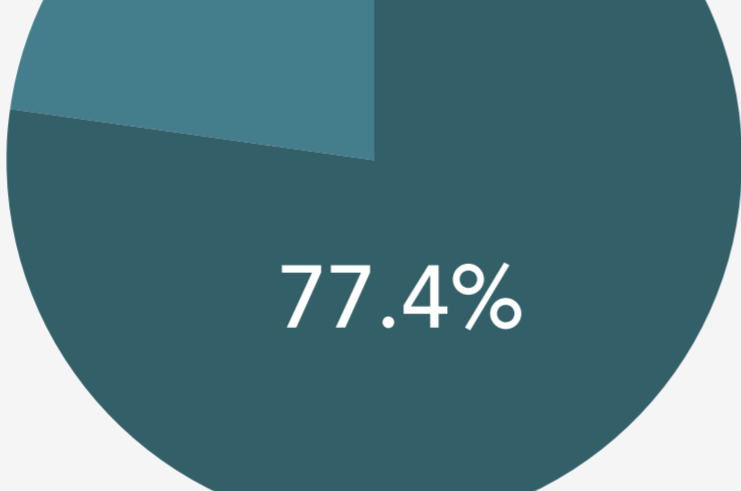
Characteristic	Primary Treatment		P Value
	Laser (n = 190)	IVB (n = 60)	
Birthweight, mean, SD, g	679 ± 169.3	593.4 ± 114.7	.0003 ^a
Gestational age, mean, SD, wk	24.9 ± 1.6	24.4 ± 1.1	.031 ^a
Adjusted age of treatment, mean, SD, wk	37.7 ± 3.25	35.9 ± 2.28	<.001 ^a
Micro-premature infants (<750 g BW)	128 (67.4%)	56 (93.3%)	.001 ^b
Progression to stage 4 or 5 ROP	3.4%	0.0%	

^a t-Test comparison of mean average of ROP infants who received treatment versus non-treated.

^b χ^2 Comparison of ROP infants who received treatment versus non-treated.

SD = Standard deviation.

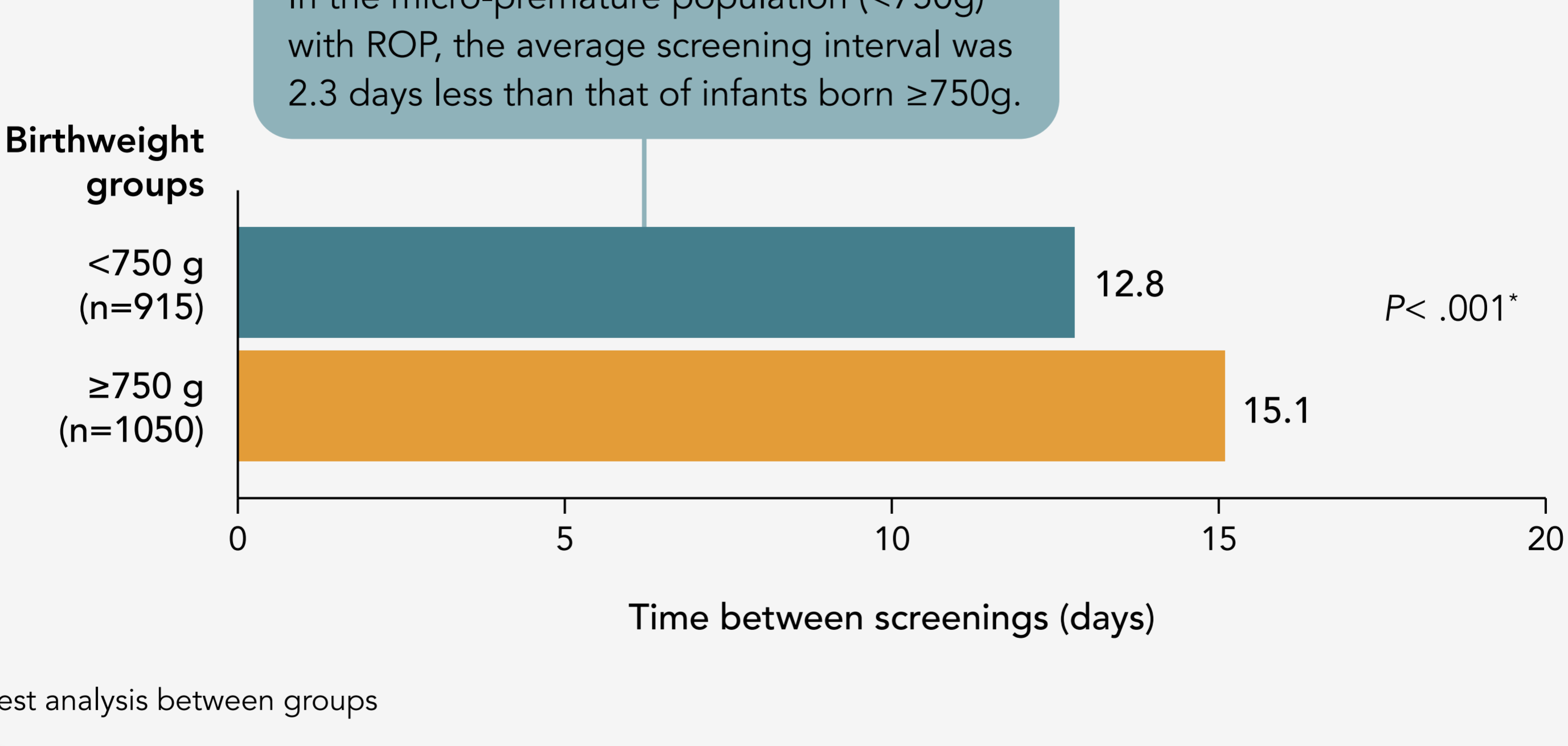
Micro-premature infants require more treatment.



Overall, 77.4% of infants requiring treatment were micro-premature at birth. Micro-premature infants experience more severe ROP and plus disease.

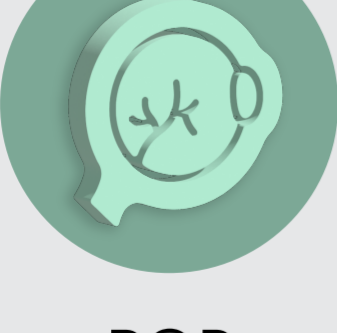
Micro-premature infants undergo more frequent screening.

The clinical relevance of increasing ROP incidence combined with more aggressive disease in micro-preemies is reflected by the changing patterns of diagnosis and treatment in these infants.



*t-Test analysis between groups

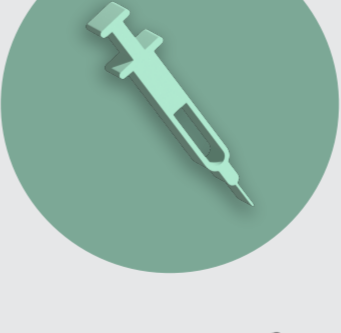
Lighter fundus pigmentation (FP) is independently associated with several factors



ROP



More aggressive features of ROP



Treatment of ROP



A higher chance of treatment with IVB (OR = 2.67, $P < .01$)

OR = Overall response.

There were certain study limitations



Ethnicity was not an identified variable throughout the study, although the unit's population is predominantly Hispanic, Caribbean, and African American.

Conclusions

Micro-prematurity is one of the significant risk factors for treatment-warranted ROP that continues to increase as neonatal care improves.

Without a specific focus on the micro-premature infant, ophthalmologists may overlook these high-risk ROP infants, who often will progress to treatment-warranted ROP. In the study population, micro-premature infants, and especially those with gestational age <27 weeks, almost exclusively comprised the groups of infants with plus disease and treatment-warranted ROP.