

OPTIC Study of Intravitreal Gene Therapy With ADVIM-022 for Neovascular Age-related Macular Degeneration

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- On behalf of the OPTIC Investigators -



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Financial Disclosure



Presenter:

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C (Consultant): Adverum, Allergan, Apellis, Genentech, Kodiak Sciences, Regeneron, REGENXBIO

R (Recipient): Akorn, Bausch + Lomb Surgical

Key Learnings from OPTIC Trial in anti-VEGF Experienced nAMD Patients

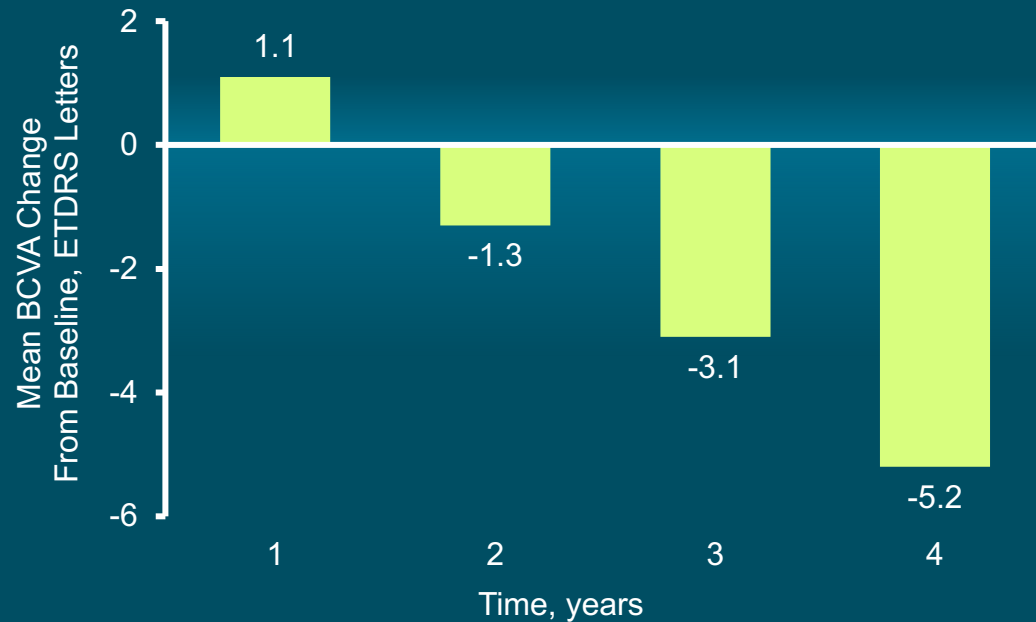


- ADVIM-022 provides durable, sustained efficacy observed with both doses (2×10^{11} vg/eye, 6×10^{11} vg/eye)
 - Patients maintained or gained vision (BCVA), stable to improved retinal anatomy (CST)
 - Aflibercept protein expression within targeted therapeutic range and stable out to 104 weeks
 - 85%-96% reduction in annualized injection frequency
- Well-tolerated safety profile
 - Lower ADVIM-022-related ocular adverse events at 2×10^{11} vg/eye dose
 - Post prophylaxis inflammation at 2×10^{11} vg/eye dose is minimal and occurs in few patients
- Cohort 3 [2×10^{11} vg/eye] informative for Phase 3 dose selection
 - Efficacy (BCVA, CST), reduction in annualized injection frequency and aflibercept protein expression similar to 6×10^{11} vg/eye dose
 - Majority of patients did not require more than 6 weeks of prophylactic steroid eye drops
- Phase 3 trials of ADVIM-022 in treatment naïve patients planned in 4Q21

Real-world anti-VEGF Patient Outcomes

Undertreatment leads to vision loss over time

**98,821 Eyes from 79,885 US Patients
Receiving Routine Intravitreal anti-VEGF Therapy**



# of Injections	7.5	6.7	6.6	6.4
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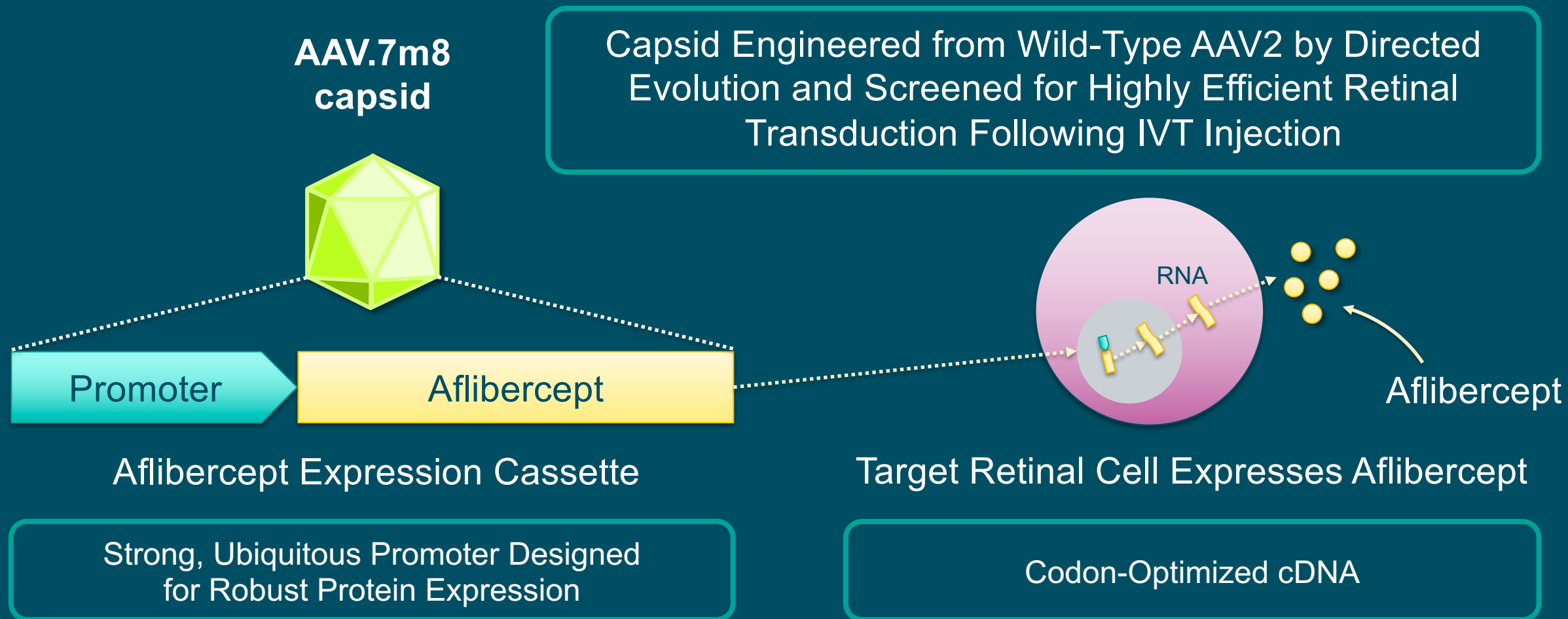
**Development Approach to Deliver
Long-Term Efficacy**

Gene Therapy

**In-Office Intravitreal Injection
to Establish an Intraocular
anti-VEGF Biofactory**

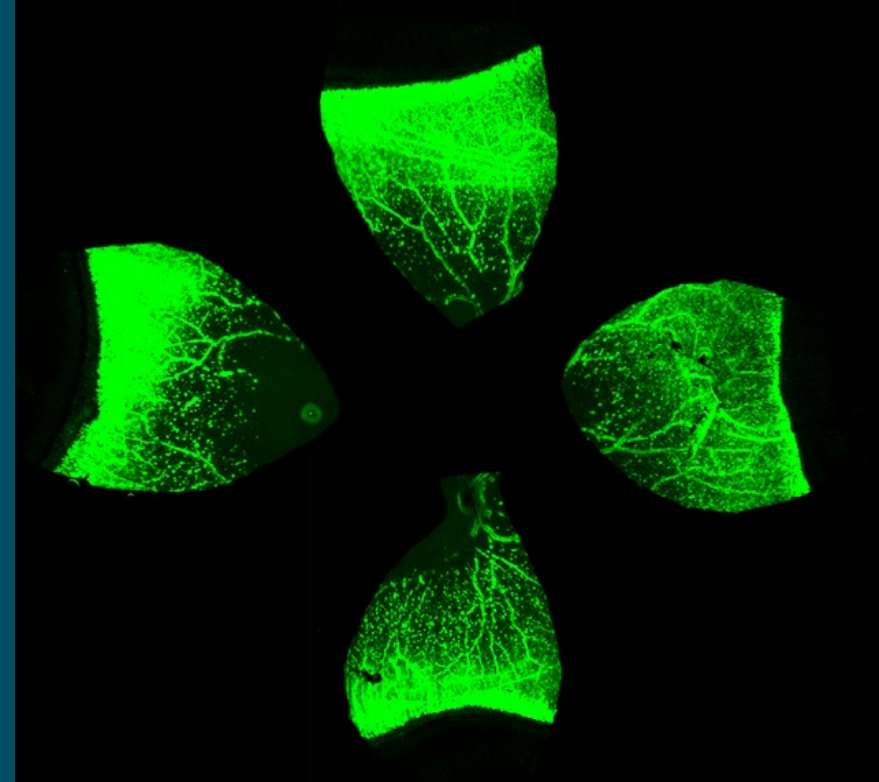
ADVM-022: 7m8 Adeno-Associated Virus Gene Therapy Vector

Designed for continuous delivery of aflibercept by intravitreal injection



Intravitreal Injection of AAV.7m8 Results in Robust Cellular Transduction and Protein Expression in the Eye

- Advanced AAV.7m8 vector developed using directed evolution to:
 - Enable efficient intravitreal delivery^{1,3}
 - Increase transduction of retinal cells^{1,3}
 - Increase protein expression¹
- Protein expression in NHPs:
 - Photoreceptors, ganglion cells^{1–3}
 - Bipolar cells, Müller cells, optic nerve²
 - Ciliary epithelium, iris pigment epithelium²



Green Fluorescent Protein Expression In
Non-Human Primate Retina¹

OPTIC Study: Evaluating ADVM-022 in Treatment Experienced Patients with nAMD



Status	Primary Objective	Secondary Objective
4 cohorts fully enrolled - Follow-up to 104 weeks	Assess the safety and tolerability of a single IVT injection of ADVM-022	- Evaluate vision maintenance (BCVA) - Evaluate anatomy (SD-OCT) - Assess the need for supplemental therapy



Prophylaxis Steroid Regimen	
Cohort 1 (n=6) 6 x 10 ¹¹ high dose	Oral*, 13d
Cohort 2 (n=6) 2 x 10 ¹¹ low dose	Oral*, 13d
Cohort 3 (n=9) 2 x 10 ¹¹ low dose	Eye Drops**, 6wks
Cohort 4 (n=9) 6 x 10 ¹¹ high dose	Eye Drops**, 6wks

Supplemental Aflibercept (2 mg IVT) Criteria:

1. Loss of ≥10 letters in BCVA (ETDRS) from baseline that is attributed to intraretinal or subretinal fluid observed by the investigator
2. Increase in central subfield thickness >75 μm from baseline
3. Presence of vision-threatening hemorrhage due to AMD

**Subjects received prophylaxis of 60 mg oral prednisone for 6 days starting at Day -3 followed by 7-day taper. **Subjects receive prophylaxis of QID difluprednate eye drops for 3 weeks starting at Day 1 followed by a 3-week taper. BCVA, best-corrected visual acuity; ETDRS, Early Treatment Diabetic Retinopathy Study; IVT, intravitreal therapy; SD-OCT, spectral domain optical coherence tomography; NCT03748784*

OPTIC Patient Status



	Cohort 1 (N=6)	Cohort 2 (N=6)	Cohort 3 (N=9)	Cohort 4 (N=9)
ADVM-022 Dose, vg/eye	High Dose 6×10^{11}	Low Dose 2×10^{11}	Low Dose 2×10^{11}	High Dose 6×10^{11}
Steroid Prophylaxis	Oral 13-day course	Oral 13-day course	Eye drops 6-week course	Eye drops 6-week course
Follow-Up, Weeks	Completed (all with 104 weeks)	64–92 weeks (median 88)	48–72 weeks (median 68)	32–44 weeks (median 36)
Baseline Characteristics	✓	✓	✓	✓
Safety Data	✓	✓	✓	✓
Efficacy Data†	✓	✓	✓	✓
Aqueous anti-VEGF Protein Expression Data	✓	N/A	✓	✓

†Includes BCVA and CST outcomes and need for supplemental anti-VEGF injection

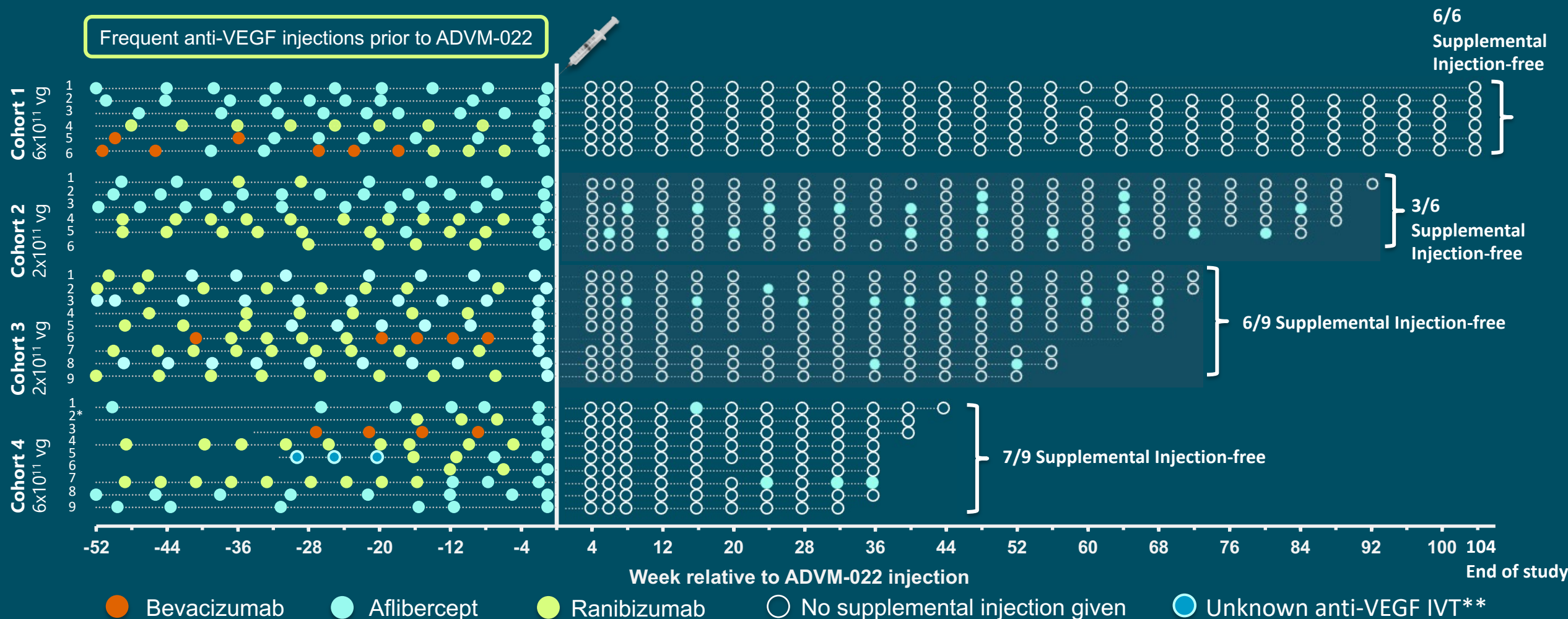
Neovascular AMD Study Population Previously Required Frequent Injections to Maintain Vision

Baseline Characteristics	Cohort 1 6E11 (N=6)	Cohort 2 2E11 (N=6)	Cohort 3 2E11 (N=9)	Cohort 4 6E11 (N=9)
Mean (range) Age, Years	79.0 (62–88)	79.8 (74–90)	77.4 (65–90)	79.9 (68–88)
Mean (range) Years Since nAMD Diagnosis	4.5 (0.9–10.6)	4.1 (0.5–6.8)	3.3 (0.7–8.0)	3.2 (0.2–8.0)
Mean (range) Number anti-VEGF Injections Since Initial Diagnosis*	38.2 (7–109)	34.0 (4–69)	24.8 (9–70)	28.5 (2–58)**
Mean (range) Number anti-VEGF Injections in 12 Months Prior to ADVIM-022	9.2 (8–11)	9.2 (5–11)	9.1 (7–10)	7.1 (3–12)**
Mean (range) BCVA, ETDRS Letters Approximate Snellen Equivalent	65.8 (57–77) 20/50	64.7 (53–72) 20/50	65.9 (53–75) 20/50	65.0 (54–77) 20/50
Mean (range) CST, μm	369.2 (293–561)	307.7 (235–339)	473.4 (301–857)	398.6 (255–538)

*Not including the mandated aflibercept at Screening; **Excluding Patient #2 with incomplete prior anti-VEGF data.

BCVA, best corrected visual acuity; CST, central subfield thickness; ETDRS, Early Treatment Diabetic Retinopathy Study
nAMD, neovascular age-related macular degeneration; VEGF, vascular endothelial growth factor

Majority of Patients are Supplemental Injection Free after a Single IVT Injection of ADVM-022 in OPTIC



Five patients were diagnosed <1 year prior to ADVM-022 injection: one each in Cohorts 2 and 3, three in Cohort 4.

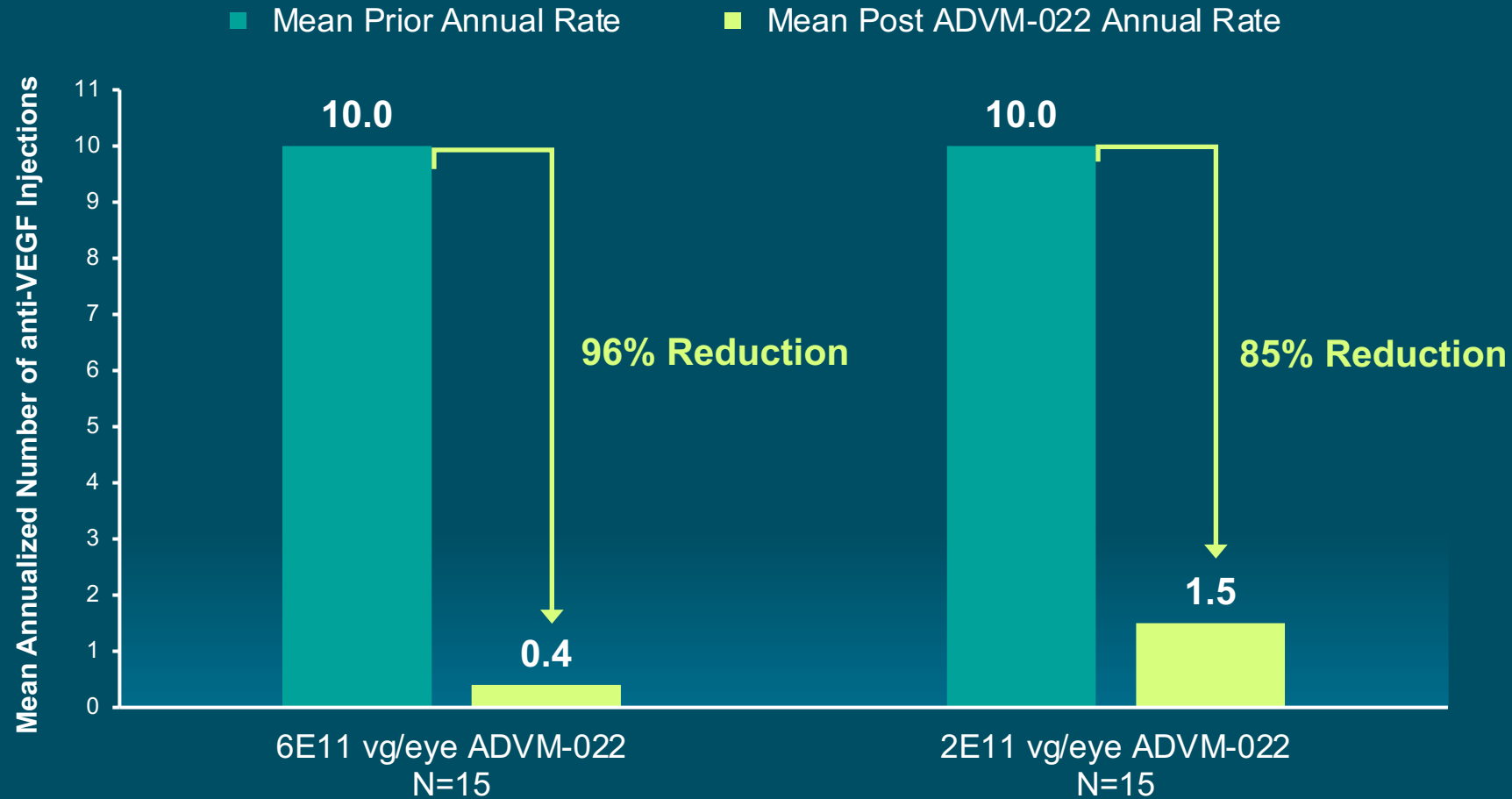
Cohort 2, Patient 6 death due to lung malignancy; *Incomplete prior data for Cohort 4, Patient 2.

**Received in a clinical trial not yet unmasked (NCT03790852).

Cohort 4, Patient 4 had a port delivery system (PDS) implanted 3 years prior to Screening (explanted 1.5 years later).

Data cut: March 10, 2021

85%-96% Reduction in Annualized anti-VEGF Injection Following ADVM-022

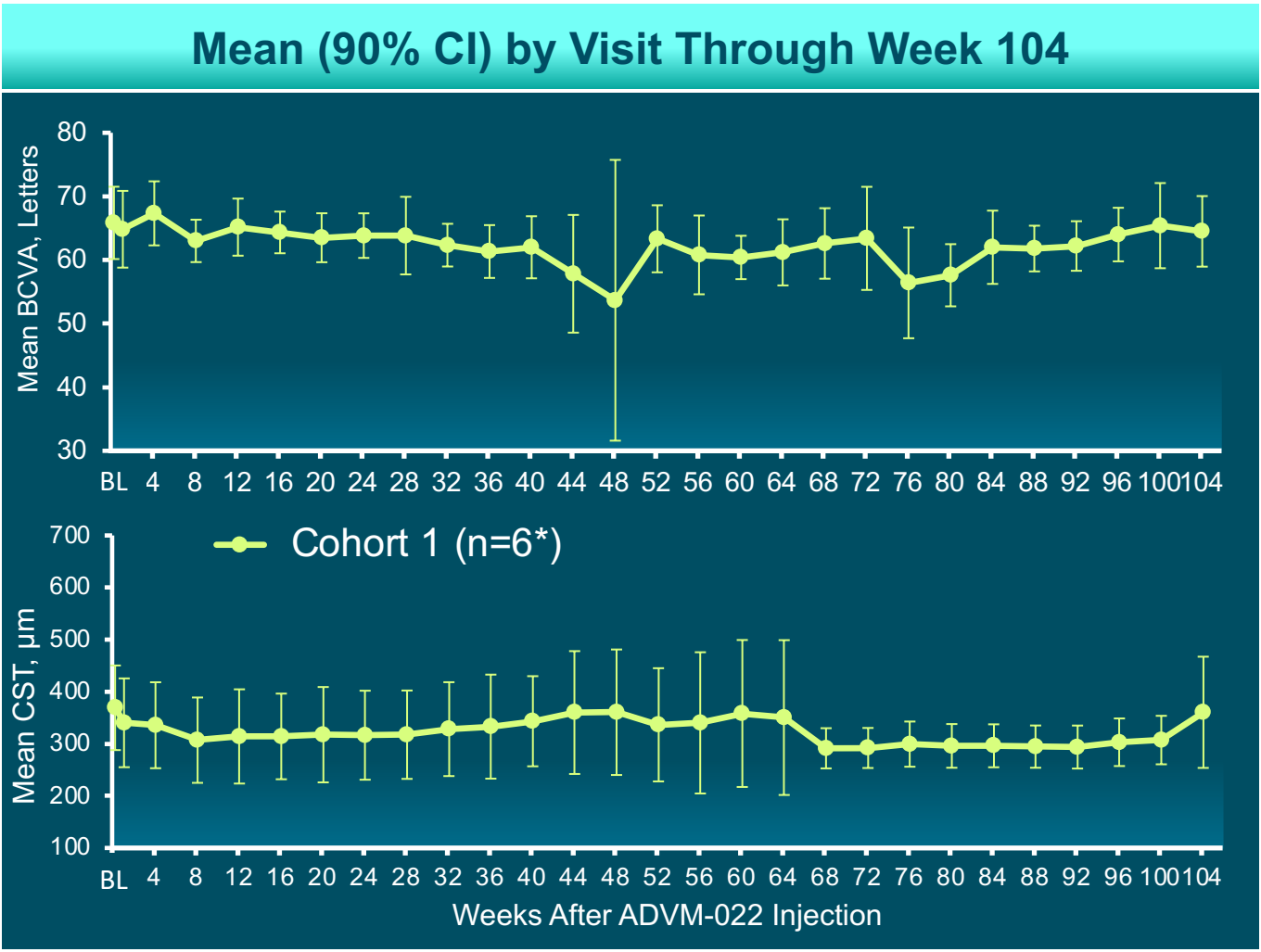


Annualized rate (Prior) = (number of IVTs in 12 months prior to ADVM-022) / (days from the first IVT in the past 12 months to ADVM-022 / 365.25).

Annualized rate (Post) = (numbers of aflibercept IVTs since ADVM-022) / (days from ADVM-022 to the last study follow-up / 365.25).

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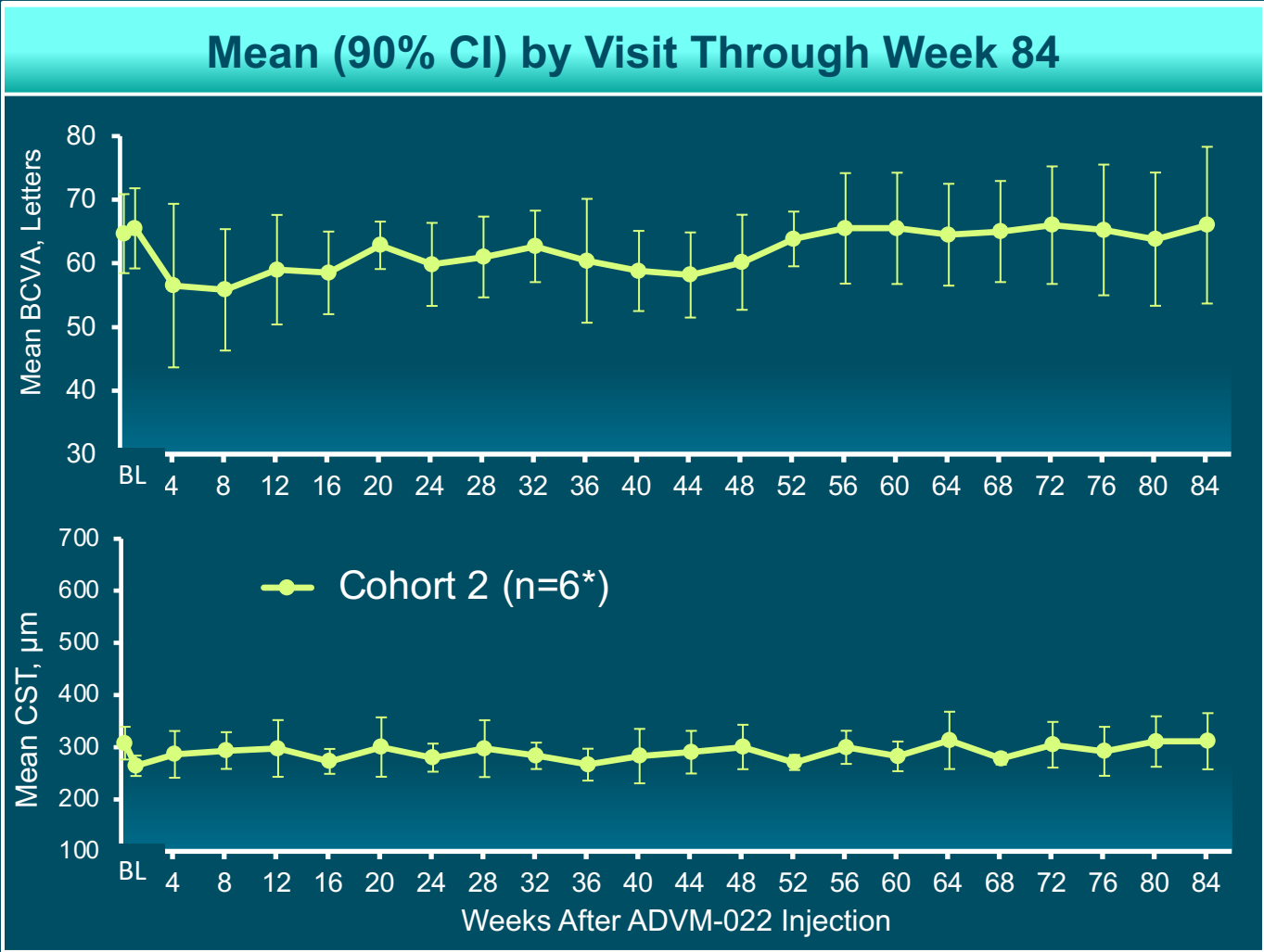
Cohort 1 [6E11]: BCVA and CST Stable, Zero Supplemental Injections



Latest Outcomes at Week 104	
Follow-Up	All with 104 weeks (median 104)
Supplemental-Free Patients	100% (6/6)
Mean BCVA Change from Baseline	
All Patients	−1.3 Letters
Mean CST Change from Baseline	
All Patients	−8.7 μm

*One patient had low BCVA and no CST values at 44 and 48 weeks due to retinal detachment; n=5 from Week 56 to 100
Aflibercept 2 mg IVT administered at baseline, 7–15 days prior to ADVM-022 IVT (Day 1);
BCVA, best corrected visual acuity; CST, central subfield thickness; BL, baseline
Error bars are 90% CIs of the mean absolute BCVA and CST using T-distribution

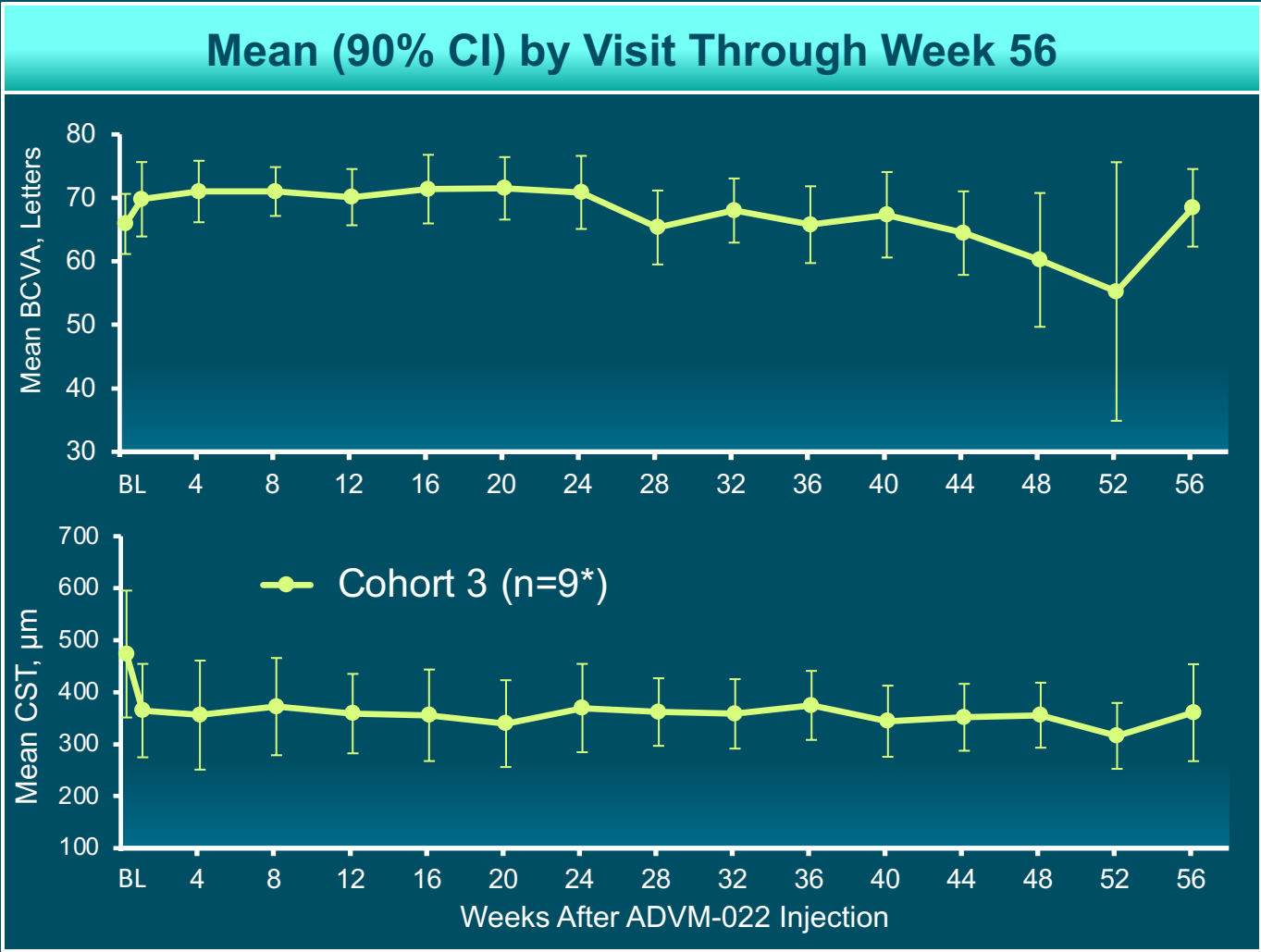
Cohort 2 [2E11]: BCVA and CST Maintained Over Time



Latest Outcomes (as of 3/10/2021)	
Follow-Up	64**–92 weeks (median 88)
Supplemental-Free Patients	50% (3/6)
Mean BCVA Change from Baseline	
All Patients	–1.5 Letters
Supplemental-Free Patients	–1.0 Letters
Mean CST Change from Baseline	
All Patients	–28.2 μm
Supplemental-Free Patients	–30.3 μm

*n=5 for Week 36, 40, 68 to 84 visits (n=4 at Week 76).
**A patient missed visits after Week 64 due to worsening of COPD and died of lung malignancy at ~76 weeks.
Aflibercept 2 mg IVT administered at baseline, 7–15 days prior to ADVM-022 IVT (Day 1).
BCVA, best corrected visual acuity; CST, central subfield thickness; BL, baseline
Error bars are 90% CIs of the mean absolute BCVA and CST using T-distribution

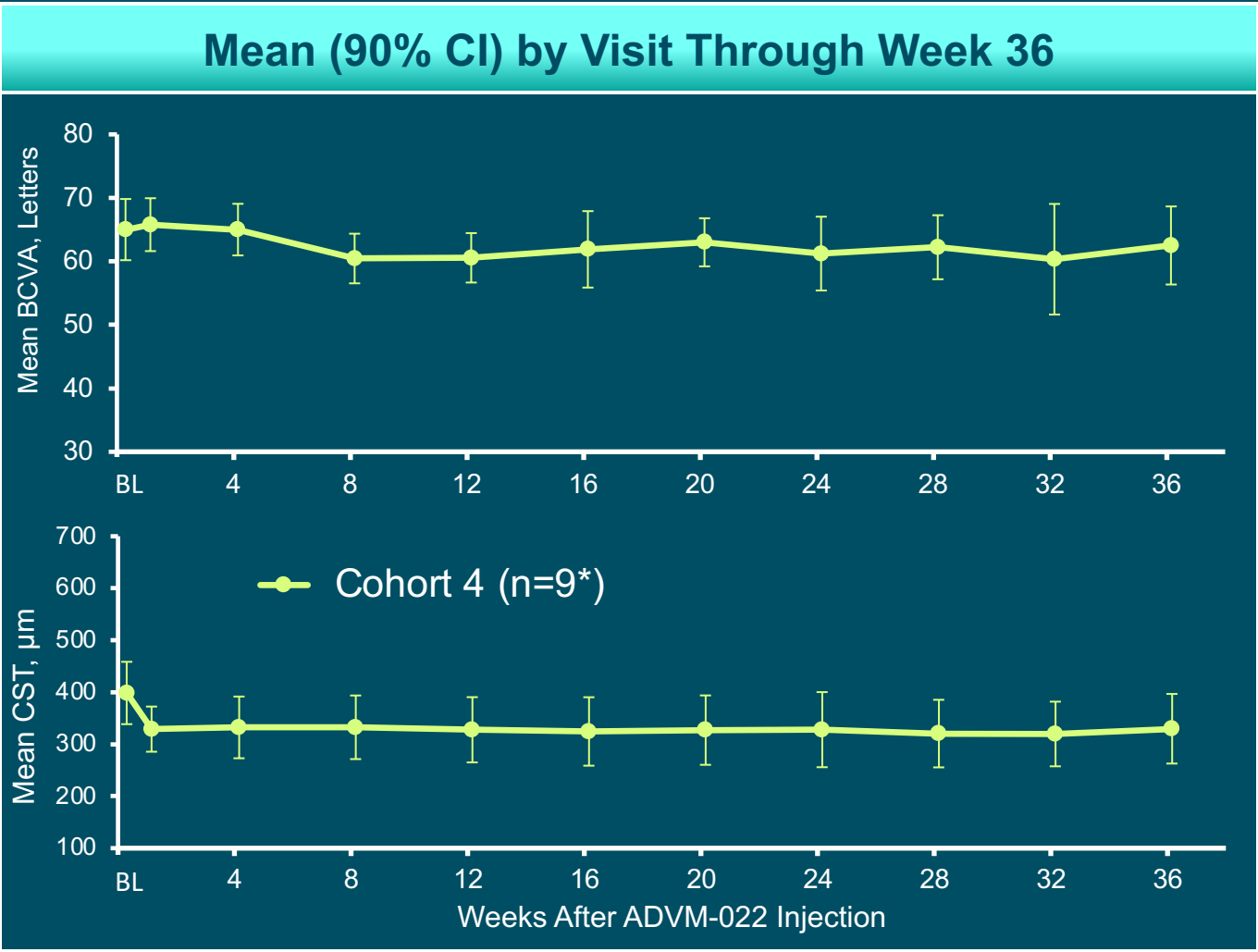
Cohort 3 [2E11]: BCVA Maintained and CST Improved



Latest Outcomes (as of 3/10/2021)	
Follow-Up	48–72 weeks (median 68)
Supplemental-Free Patients	67% (6/9)
Mean BCVA Change from Baseline	
All Patients	+1.4 Letters
Supplemental-Free Patients	+4.3 Letters
Mean CST Change from Baseline	
All Patients	−134.4 μm
Supplemental-Free Patients	−181.7 μm

*n=8 for Week 4, 16 and 20; n=7 at Week 24; n=8 (BCVA) and 5 (CST) at Week 52; n=7 (BCVA) and 6 (CST) at Week 56.
Aflibercept 2 mg IVT administered at baseline, 7–15 days prior to ADVM-022 IVT (Day 1)
BCVA, best corrected visual acuity; CST, central subfield thickness; BL, baseline
Error bars are 90% CIs of the mean absolute BCVA and CST using T-distribution

Cohort 4 [6E11]: BCVA and CST Maintained Over Time

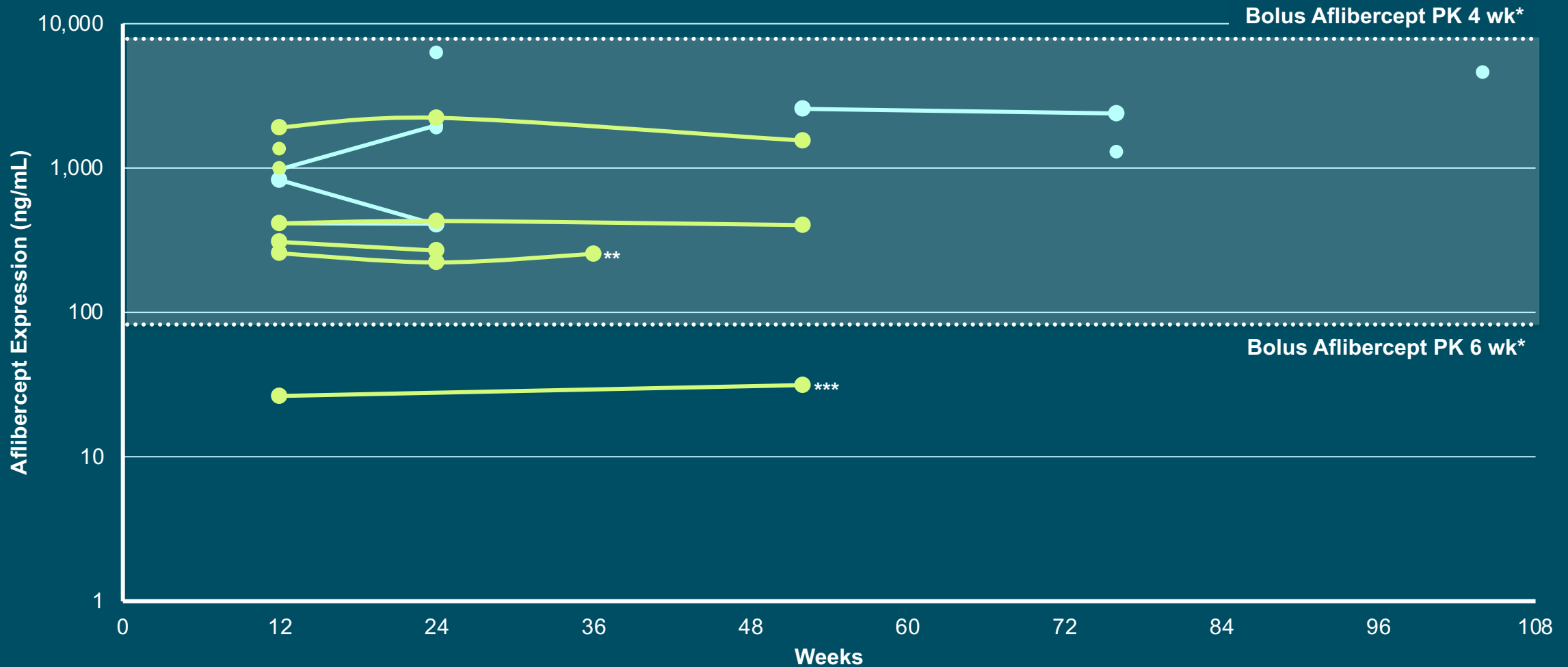


Latest Outcomes (as of 3/10/2021)	
Follow-Up	32–44 weeks (median 36)
Supplemental-Free Patients	78% (7/9)
Mean BCVA Change from Baseline	
All Patients	−0.2 Letters
Supplemental-Free Patients	−0.4 Letters
Mean CST Change from Baseline	
All Patients	−77.1 μm
Supplemental-Free Patients	−77.3 μm

*n=8 at Weeks 20 and 36
Aflibercept 2 mg IVT administered at baseline, 7–15 days prior to ADVM-022 IVT (Day 1)
BCVA, best corrected visual acuity; CST, central subfield thickness; BL, baseline
Error bars are 90% CIs of the mean absolute BCVA and CST using T-distribution

Robust Aflibercept Expression Levels Observed for Both Doses

Within modeled therapeutic range, reaching top of dose response curve



*Modeled based on Do et al. Retina 2020; 40:643-647.

** Patient rescued at Week 36

*** Patient rescued at Week 24. Sample collected 28 weeks after supplemental injection.

Protocol amendment for aqueous sample collection for patients that consented. No samples available from Cohort 2.

To isolate the effect of ADV-002, samples that were collected within 2 months of supplemental aflibercept are not shown.

Data cut: March 10, 2021

Safety Summary Across Cohorts

- No ADVM-022-related non-ocular adverse events
 - A patient (Cohort 2) died of lung malignancy ~76 weeks
- Inflammation when observed is mild and responsive to steroid eye drops
 - Immune response occurs early and is well controlled with steroid eye drops
 - Ocular inflammation is minimal at 2×10^{11} vg/eye dose and is responsive to steroid eye drops
- No clinical or fluorescein* evidence of posterior inflammation
 - No vasculitis, retinitis, choroiditis, vascular occlusions or endophthalmitis
- All ADVM-022-related ocular AEs were mild (80%) to moderate (20%)
 - One AE of special interest of moderate recurrent uveitis deemed to be related to ADVM-022 was responsive to steroid eye drops (Cohort 1)
- One unrelated ocular SAE of retinal detachment surgically repaired and resolved (Cohort 1)
- Two patients had mild AEs of IOP elevation that resolved
 - One patient had two mild IOP elevations (highest 24 mmHg) that were both treated with Combigan® eye drops
 - One case in a patient on Combigan® for ocular hypertension at baseline which resolved with no change to treatment

*Fluorescein angiography of posterior pole

IOP, intraocular pressure; AEs, adverse events; SAEs, serious AEs

Adverse Events Across Cohorts

ADVM-022 related events were mild (80%) or moderate (20%)

Adverse Events		Cohort 1 (N=6)		Cohort 2 (N=6)		Cohort 3 (N=9)		Cohort 4 (N=9)	
		6×10 ¹¹ vg/eye Oral steroids 13-day prophylaxis		2×10 ¹¹ vg/eye Oral steroids 13-day prophylaxis		2×10 ¹¹ vg/eye Steroid eye drops 6-week prophylaxis		6×10 ¹¹ vg/eye Steroid eye drops 6-week prophylaxis	
		Subjects	Events	Subjects	Events	Subjects	Events	Subjects	Events
Ocular	Serious	2	2*	0	0	0	0	0	0
	ADVM-022 Related**	6	32	5	21	5	15	8	32
	Total Ocular	6	57	6	37	8	37	8	43
Non-Ocular†	Serious ‡	1	1	2	5	2	2	0	0
	Total Non-Ocular†	5	20	6	14	6	12	3	4

*Retinal detachment (unrelated to ADVM-022) and recurrent moderate uveitis (likely related to ADVM-022)

** ADVM-022 related ocular events were mild (80%) or moderate (20%)

†None of the non-ocular AEs were ADVM-022 related

‡Serious non-ocular AEs included lumbar spinal stenosis (1) in Cohort 1; COPD (1), pneumonia (1, fatal), lung neoplasm malignant (1), pneumothorax (1), and hypertensive emergency (1) in Cohort 2; and COPD exacerbation (1), and stable angina pectoris (1) in Cohort 3

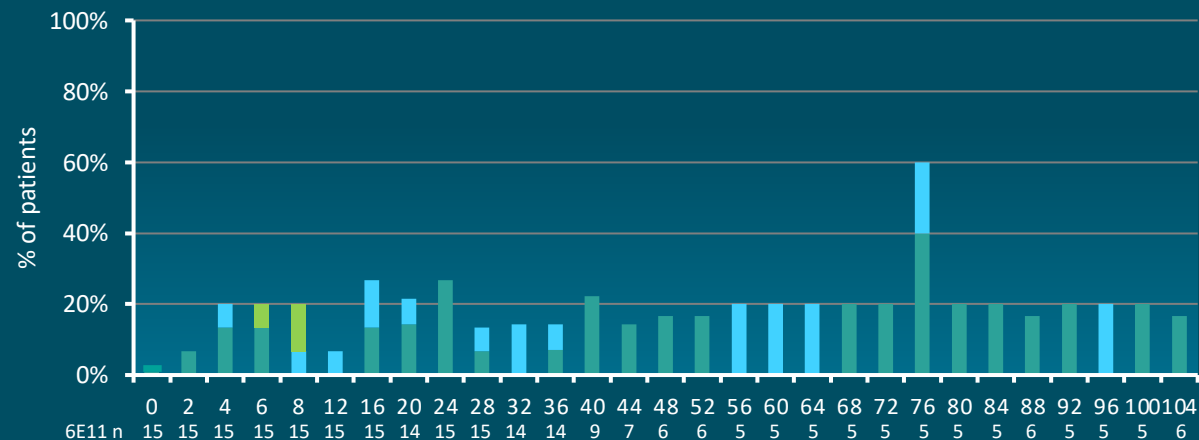
Data cut: March 10, 2021

Lower Immune Response with 2×10^{11} vg/eye dose

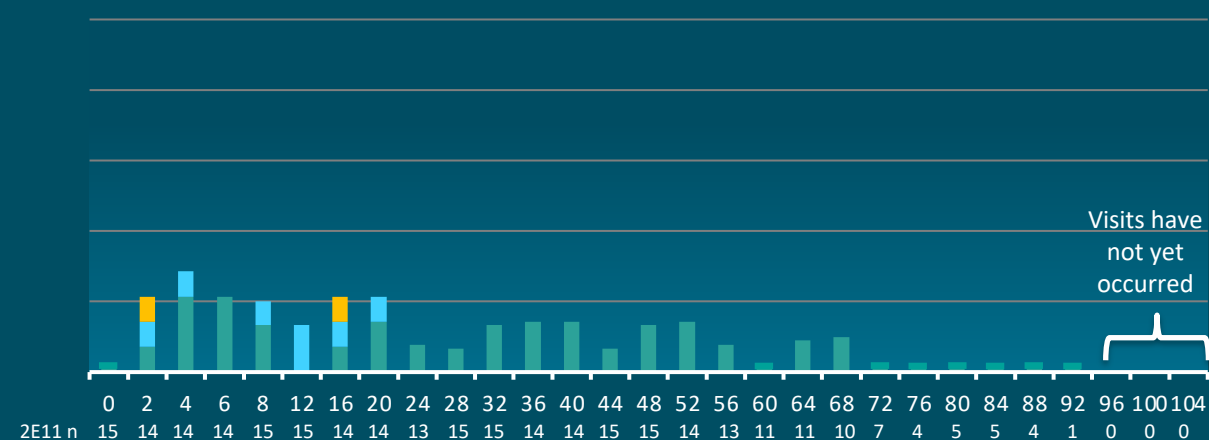
Frequency and severity of inflammation decreases over time

Cell Grades 0.5+ 1+ 2+ 3+ 4+

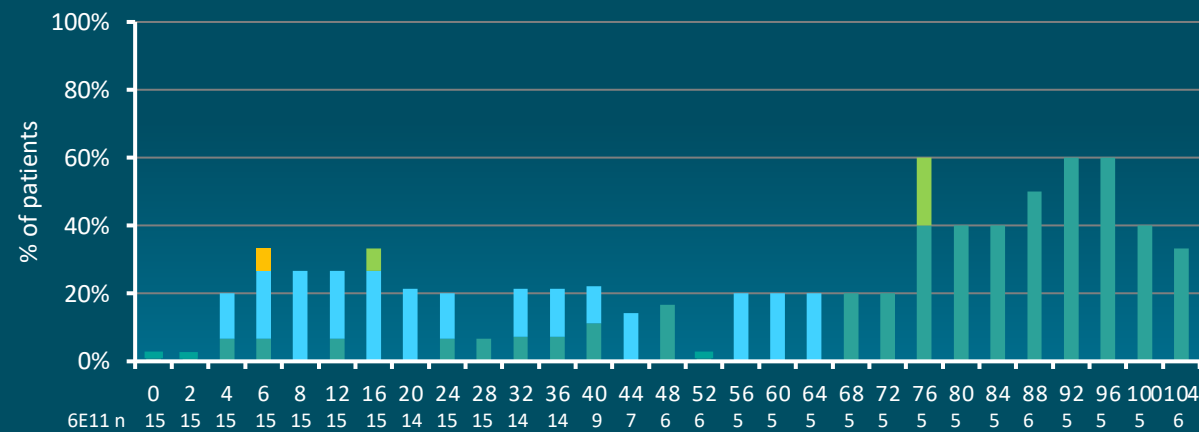
AC Cells (6×10^{11} vg/eye); Cohort 1 & 4



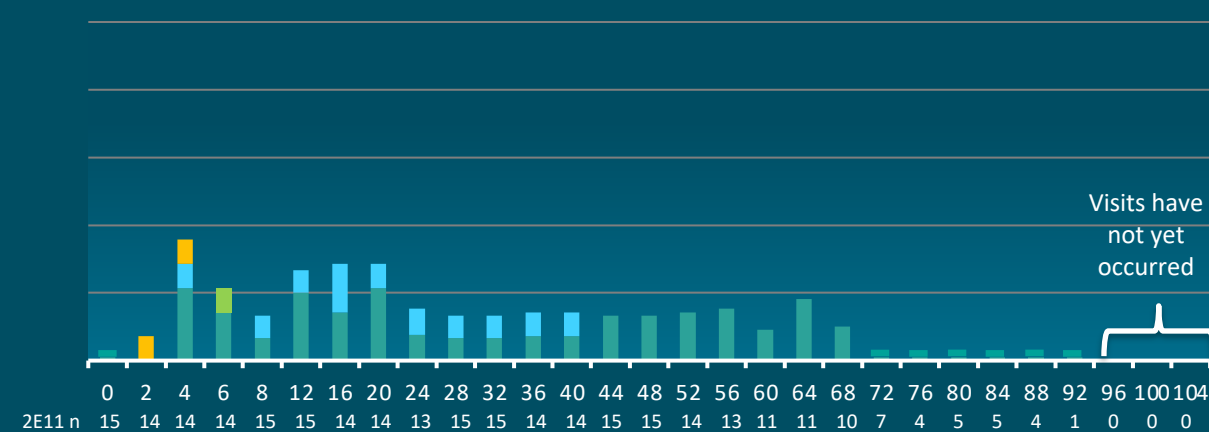
AC Cells (2×10^{11} vg/eye); Cohort 2 & 3



VC Cells (6×10^{11} vg/eye); Cohort 1 & 4



VC Cells (2×10^{11} vg/eye); Cohort 2 & 3



Cell grades as assessed by slit lamp

Grade categories are based on the Standardization of Uveitis Nomenclature (SUN) criteria for aqueous cells and National Institutes of Health (NIH) guidelines for vitreous cells.

Aqueous cells (AC): 0.5+: 1-5 cells 1+: 6-15 cells 2+: 16-25 cells 3+: 26-50 cells 4+: >50 cells

Vitreous cells (VC): 0.5+: 1-10 cells 1+: 11-20 cells 2+: 21-30 cells 3+: 31-100 cells 4+: >100 cells; Rare cells are captured as 0.5+ for this analysis

Data cut: March 10, 2021

AC – Inflammation was Mild and Decreasing Over Time in Cohort 3 [2×10^{11} vg/eye dose, 6-week steroid drops prophylaxis]

	Week																			
		0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
Patients	C3-1	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0
	C3-2	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0
	C3-3*	0	0.5	0	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5*	0	0.5	0.5	
	C3-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C3-5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C3-6	0	-	0	0	-	-	-	0	0	0	0	0	0	-	-	-	-		
	C3-7**	0	0	0.5	0	0.5	0	0	0	0	0	0	0	0	0	0**				
	C3-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	C3-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0					

*Cataract surgery before Week 56

**Cataract surgery before Week 56

AC Grade 0 0.5+ 1+ 2+ 3+ 4+

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Data cut: March 10, 2021

VC – Inflammation was Mild and Decreasing Over Time in Cohort 3 *[2×10¹¹ vg/eye dose, 6-week steroid drops prophylaxis]*

	Week																				
Patients		0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	
	C3-1	0	0.5	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	
	C3-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C3-3*	0	0.5	0	0.5	0.5	0.5	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5*	0	0.5	0.5		
	C3-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	C3-5	0	1	0.5	0.5	0.5	0.5	0.5	0	0	0	0	0	0	0	0	0	0	0		
	C3-6	0	-	0	0	-	-	-	0	0	0	0	0	0	0	-	-	-	-		
	C3-7**	0	0	0	0		1	0.5	0	0	0	0	0	0	0	0	0**				
	C3-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	C3-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					

*Cataract surgery before Week 56

**Cataract surgery before Week 56

VC Grade 0 0.5+ 1+ 2+ 3+ 4+

Cell grades as assessed by slit lamp

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Data cut: March 10, 2021

Steroid Eye Drops Post Prophylaxis Decrease Over Time in Cohort 3 *[2×10^{11} vg/eye dose, 6-week steroid drops prophylaxis]*

	6-week prophylaxis steroid eye drops																				
	Week																				
Patients		0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	
	C3-1	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C3-2	4	2	0	0	0	0	0	0	2	3	3	3	0	0	0	0	0	0	0	
	C3-3*	4	3	2	4	2	4	4	4	4	4	4	4	4	4	4*	3	3	2		
	C3-4	4	2	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0		
	C3-5	4	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	C3-6	4	2	0	0	0	0	0	0	0	0	0	0	0							
	C3-7**	4	2	2	1	4	4	3	3	1	1	1	0.5	0.5	0.5	1**					
	C3-8	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0					
	C3-9	4	2	0	0	0	0	0	0	0	0	0	0	0	0						

*Cataract surgery before Week 56

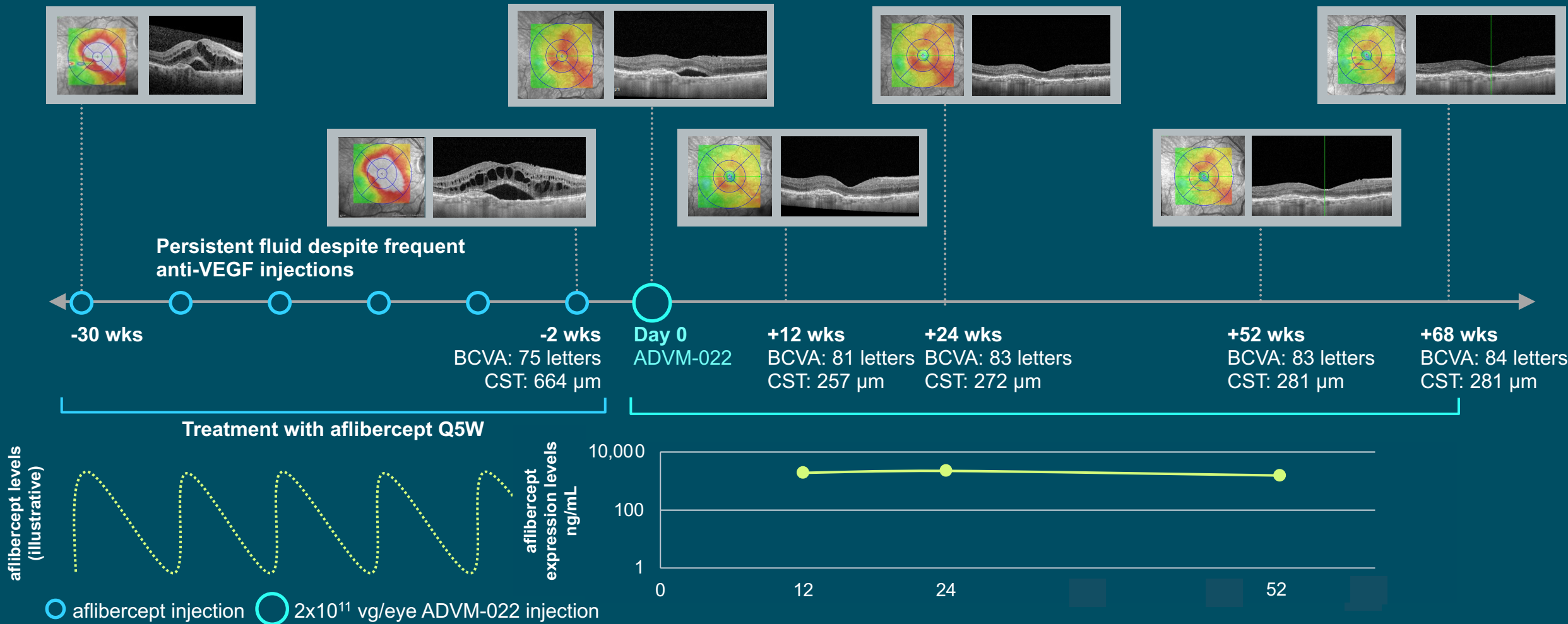
**Cataract surgery before Week 56

0.5 represents drops every other day

of daily drops 0 0.5 1 2 3 4

Rapid and Sustained Improvements to Ocular Anatomy and Vision after Single IVT Injection of ADVIM-022 [2E11]

Patient Case from Cohort 3 [2E11]: 82-year-old male with 19 IVTs prior to study with 9 IVTs in the last 12 months



Key Learnings from OPTIC Study Sets the Direction for Accelerated Global Phase 3 Trials



- ADVIM-022 provides durable, sustained efficacy observed with both doses (2×10^{11} vg/eye, 6×10^{11} vg/eye)
 - Patients maintained or gained vision (BCVA), stable to improved retinal anatomy (CST)
 - Aflibercept protein expression within targeted therapeutic range and stable out to 104 weeks
 - 85%-96% reduction in annualized injection frequency
- Well-tolerated safety profile
 - Lower ADVIM-022-related ocular adverse events at 2×10^{11} vg/eye dose
 - Post prophylaxis inflammation at 2×10^{11} vg/eye dose is minimal and occurs in few patients
- Cohort 3 [2×10^{11} vg/eye] informative for Phase 3 dose selection
 - Efficacy (BCVA, CST), reduction in annualized injection frequency and aflibercept protein expression similar to 6×10^{11} vg/eye dose
 - Majority of patients did not require more than 6 weeks of prophylactic steroid eye drops
- Global Phase 3 trials of ADVIM-022 in treatment naïve patients planned in 4Q21

Investigators, Study Teams and Participants

- David Boyer MD
- Brandon Busbee MD
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- Brian Joondeph MD
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- James Major MD
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- Carl Regillo MD
- Charles Wykoff MD, PhD
- Mehdi Gasmi PhD
- Szilard Kiss MD
- Julie Clark, MD
- Carol Hoang PharmD
- Adam Turpcu PhD
- Carol Chung PhD



Thank you

