
















# Next Generation Drug-coated Balloon: Clinical Results in Common to Complex Patients

Prakash Krishnan, MD  
Mount Sinai Medical Center, NY

# Robust Clinical Program Underway

<b>ILLUMENATE</b> FIH		80 Patients	3 Sites	
<b>ILLUMENATE</b> EU RCT		327 Patients	18 Sites	
<b>ILLUMENATE</b> Pivotal		300 Patients	43 Sites	
<b>ILLUMENATE</b> Global		371 Patients	37 Sites	
ISR Cohort		130 Patients	25 Sites	
<b>ILLUMENATE</b> PK		25 Patients	2 Sites	
<b>SAVER</b>  <small>Stentless Vascular e-Registry</small>		5000+ Patients	>200 Sites	



Europe



United States



Australia / New Zealand

# ILLUMENATE RCTs

2 Trials, 628 Patients

	ILLUMENATE EU RCT	ILLUMENATE PIVOTAL
<b>Principal Investigators</b>	H. Schröder (Berlin, Germany)	S. Lyden (Cleveland, OH, US) P. Krishnan (New York, NY, US)
<b>N Patients</b>	<b>328</b>	<b>300</b>
<b>N Sites</b>	<b>18</b>	<b>43</b>
<b>Patient Population</b>	Claudication and Rest pain	
<b>Objectives</b>	Demonstrate safety and efficacy of the Stellarex DCB vs. standard PTA for the treatment of fem-pop arterial disease	
<b>Primary Safety Endpoint</b>	Freedom from 30-day device- and procedure-related death and freedom from 12-month target limb major amputation and clinically-driven TLR	
<b>Primary Effectiveness Endpoint</b>	Primary patency at 12 months defined as freedom from restenosis (determined by duplex ultrasound PSVR $\leq 2.5$ ) and freedom from clinically-driven TLR	

# ILLUMENATE RCTs

2 Trials, Same Rigor

**ILLUMENATE EU RCT**

**ILLUMENATE US Pivotal**

**Angiographic Core laboratory \***

---

**Duplex Core laboratory \***

---

**Clinical Event Committee \***

---

**External Monitoring with 100% source data verification**

---

\* blinded to the assigned treatment

## Stellarex Drug-Coated Balloon for Treatment of Femoropopliteal Disease Twelve-Month Outcomes From the Randomized ILLUMENATE Pivotal and Pharmacokinetic Studies

**BACKGROUND:** Drug-coated balloons (DCBs) are a predominant revascularization therapy for symptomatic femoropopliteal artery disease. Because of the differences in recipients, patient dose, and coating morphologies, varying clinical outcomes have been observed with different DCBs. We report the results of 2 studies investigating the pharmacokinetic and clinical outcomes of a new DCB to treat femoropopliteal disease.

**METHODS:** In the ILLUMENATE Pivotal Study Prospective, Randomized, Single-Blink, U.S. Multi-Center Study to Evaluate Treatment of Obstructive Superficial Femoral Artery or Popliteal Lesions With a Novel Drug-Coated Balloon Device, Angioplasty balloons, 300 asymptomatic patients (Studyford) (day 2–4) were randomly assigned to DCB (n=100) or standard angioplasty (control) (n=100). The primary safety end point was freedom from death and procedure-related death through 30 days, and freedom from target limb major amputation and clinically driven target lesion revascularization through 12 months. The primary effectiveness end point was primary patency. In the ILLUMENATE PK study (Pharmacokinetic Study of the Stellarex Drug-Coated Angioplasty Balloon), packed platelet concentrations were measured after late DCB deployment and at prespecified times (at 1, 4, 24 hours and at 7 and 14 days postprocedural) until no longer detectable.

**RESULTS:** In the ILLUMENATE Pivotal Study, baseline characteristics were similar between groups. 50% had diabetes mellitus, 41% were women, mean age, length was 6.3 cm, and 44% were severely calcified. The primary safety and patency rate was 90.1% for DCB versus 83.3% for PTA. PTA (20%) for angioplasty and the primary patency rate was significantly higher with DCB (76.3% for DCB versus 57.6% for PTA, P=0.003). Primary patency per Kaplan-Meier estimate at day 305 was 62.3% for DCB versus 70.9% for PTA (P=0.002). The rate of clinically driven target lesion revascularization was significantly lower in the DCB cohort (7.9% versus 16.8%, P=0.02). Improvements in ankle-brachial index, Subjective pain, and quality of life were comparable, but the PTA cohort required twice as many revascularizations. Pharmacokinetic outcomes showed that all patients had detectable packed platelets after DCB deployment that declined within the first hour (54.4±116.9 ng/mL to 1.4±1.0 ng/mL).

**CONCLUSIONS:** The data demonstrate superior safety and effectiveness of the Stellarex DCB in comparison with PTA, and plasma levels of packed platelets fall to low levels within 1 hour.

**CLINICAL TRIAL REGISTRATION:** URL: <http://clinicaltrials.gov>; Unique identifiers: NCT01804208 and NCT01912937.

Prakash Krishnan, MD  
Peter Faries, MD  
Khanwar Hussain, MD  
Ash Jain, MD  
Ramesh Sachar, MD  
William E. Bachinsky, MD  
Joseph Cardenas, MD  
Martin Werner, MD  
Mustapha Mustapha, MD  
J. A. Mustapha, MD  
Catherine Mena-Hurtado, MD  
Michael R. Jaff, MD  
Andrew H. Holden, MD  
Sean P. Lyden, MD

Correspondence to Prakash Krishnan, MD, Mount Sinai Medical Center, One Gustave L. Levy Place, Box 1059, New York, NY 10029 (e-mail: prakash.krishnan@mssm.edu).

Source of funding: see page 1113.

Key Words: angioplasty • drug-coated balloon • interventional • pharmacokinetics • platelets • revascularization • stenosis • symptomatic arterial disease

© 2017 The Authors. Circulation is published on behalf of the American Heart Association, Inc., by Wolters Kluwer Health | Lippincott Williams & Wilkins. This article is distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided that the original work is properly cited. All rights reserved. No part may be reproduced without prior written permission of Wolters Kluwer Health | Lippincott Williams & Wilkins.

# ILLUMENATE Pivotal

Krishnan P, Faries P, Niazi K, Jain A, Sachar R, Bachinsky WB, Cardenas J, Werner M, Brodmann M, Mustapha JA, Mena-Hurtado C, Jaff MR, Holden AH and Lyden SP. Stellarex Drug-Coated Balloon for Treatment of Femoropopliteal Disease: Twelve-Month Outcomes From the Randomized ILLUMENATE Pivotal and Pharmacokinetic Studies. *Circulation*. 2017;136:1102-1113.

# ILLUMENATE Pivotal

## Baseline Patient Characteristics

	Stellarex	PTA	p
Age (years)	68.3 ± 10.3 (200)	69.8 ± 9.8 (100)	0.225
Rutherford Clinical Category			0.735
2	31.5% (63/200)	35.0% (35/100)	
3	64.5% (129/200)	60.0% (60/100)	
4	4.0% (8/200)	5.0% (5/100)	
ABI	0.75±0.21 (193)	0.76± 0.2 (100)	0.508
Hypertension	93.5% (187/200)	94.0% (94/100)	0.867
Hyperlipidemia	88.0% (176/200)	90.0% (90/100)	0.606
Coronary Artery Disease	45.0% (90/200)	48.0% (48/100)	0.623
Previous or Current Smoker	84.0% (168/200)	75.0% (75/100)	0.061

Krishnan P, Faries P, Niazi K, et al. Stellarex Drug-Coated Balloon for Treatment of Femoropopliteal Disease: 12-Month Outcomes from the Randomized ILLUMENATE Pivotal and Pharmacokinetic Studies. *Circulation*. 2017.

# ILLUMENATE Pivotal

## Baseline Patient Characteristics

	Stellarex	PTA	p
<b>Female</b>	44% (88/200)	36% (36/100)	0.185
<b>Diabetes</b>	49.5% (99/200)	52.0% (52/100)	0.683
<b>Renal Insufficiency</b>	18.0% (36/200)	16.0% (16/100)	0.666
<b>BMI <math>\geq</math> 30</b>	39.5% ( 79 /200)	30.0% (30/100)	0.107

- Particularly high rate of females enrolled and patients with co-morbidities that are challenging to treat

Krishnan P, Faries P, Niazi K, et al. Stellarex Drug-Coated Balloon for Treatment of Femoropopliteal Disease: 12-Month Outcomes from the Randomized ILLUMENATE Pivotal and Pharmacokinetic Studies. *Circulation*. 2017.

# ILLUMENATE Pivotal

## Baseline Angiographic Data: Per Core Lab

	Stellarex	PTA	p
Lesion Length (cm)	8.0 ± 4.5 (199)	8.9 ± 4.6 (100)	0.105
Restenotic <sup>1</sup>	9.5% (19/200)	18.0% (18/100)	0.035
Total Occlusion	19.0% (38/200)	18.0% (18/100)	0.834
Severe Calcification	43.9% (87/198)	43.0% (43/100)	0.877
Diameter Stenosis (%)	73.9 ± 16.9 (200)	74.8 ± 17.0 (100)	0.673
Reference Vessel Diameter (mm)	4.86 ± 0.92 (200)	5.15 ± 1.05 (100)	0.017
0-1 Patent Run-off Vessels	32.5% (54/166)	30.5% (25/82)	0.745

1. Site-reported data

Krishnan P, Faries P, Niazi K, et al. Stellarex Drug-Coated Balloon for Treatment of Femoropopliteal Disease: 12-Month Outcomes from the Randomized ILLUMENATE Pivotal and Pharmacokinetic Studies. *Circulation*. 2017.

**PHILIPS**



# ILLUMENATE Pivotal

## Procedure Characteristics

	Stellarex	PTA	p
Pre-dilatation Performed <sup>1</sup>	100% (200/200)	100% (100/100)	N/A
Study Device Inflation Time <sup>1</sup> (min/lesion)	3.9 ± 2.0 (200)	3.7 ± 2.3 (100)	0.557
Post-DCB/PTA Dissection Grades <sup>2</sup>			
Grade D	20.0% (40/200)	12.0% (12/100)	0.084
Flow-limiting Dissection (Grade E or F)	0.0% (0/193)	0.0% (0/98)	N/A
Bail-out Stent Placement <sup>1</sup>	6.0% (12/200)	6.0% (6/100)	1.000
Post-procedure Diameter Stenosis (%) <sup>2</sup>	25.2 ± 11.7 (199)	27.4 ± 10.1 (100)	0.107

1. Site-reported data

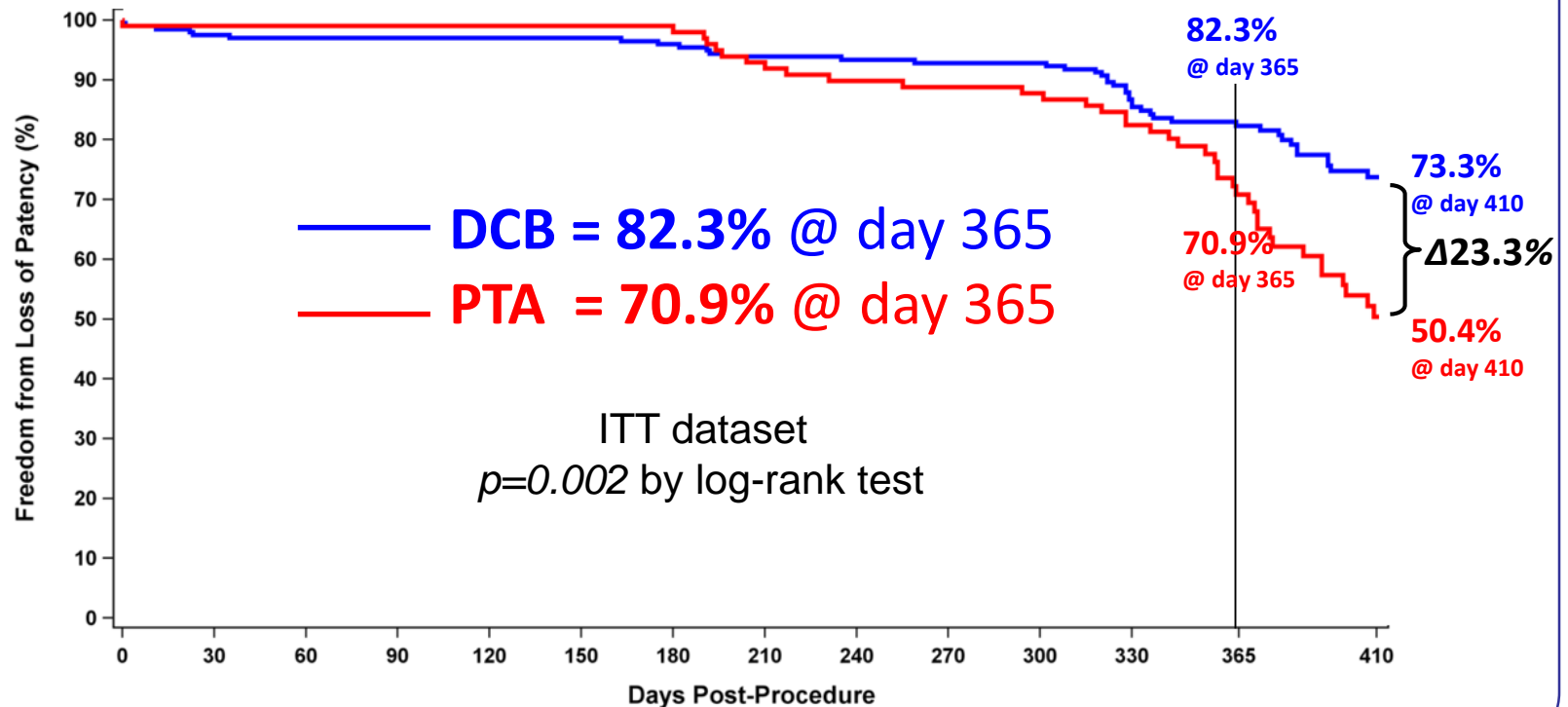
2. Per Angiographic Core Lab

Krishnan P, Faries P, Niazi K, et al. Stellarex Drug-Coated Balloon for Treatment of Femoropopliteal Disease: 12-Month Outcomes from the Randomized ILLUMENATE Pivotal and Pharmacokinetic Studies. *Circulation*. 2017.

**PHILIPS**

# ILLUMENATE US Pivotal

## 82.3% Primary Patency @ 12 months



Primary patency defined as freedom from restenosis determined by duplex ultrasound PSVR  $\leq 2.5$  and freedom from clinically-driven TLR at 12 months. Assessed per lesion. KM estimates reported at day 410 to capture all patients and events within the full 320-410 follow-up window. Rates from the middle of the protocol visit window (365 days) reported for consistency and comparative purposes with other trials.

Krishnan P, Faries P, Niazi K, et al. Stellarex Drug-Coated Balloon for Treatment of Femoropopliteal Disease: 12-Month Outcomes from the Randomized ILLUMENATE Pivotal and Pharmacokinetic Studies. *Circulation*. 2017.

**PHILIPS**

## ORIGINAL RESEARCH ARTICLE

Editorial: see p 223

Henrik Schroeder, M  
Martin Werner, MD  
Dirk-Roelofs Meyer, M  
Pieter Reilmer, MD  
Karsten Krüger, MD  
Michael R. Jaff, DO  
Marianne Brodmann  
For the ILLUMINATE  
BCCT Investigators

Correspondence to: Hans Schneider, MD, Center for

**Correspondence to:** Hans Schroeder, MD, Center for Diagnostic Radiology and Minimally Invasive Therapy, Jewish Hospital, Hertz-Gal Strasse 1, 13347 Berlin, Germany. E-mail: hans.schroeder@radiologie.de

is an open access article in terms of the Creative Commons Attribution Non-Commercial NoDerivs License, which permits use, distribution, and reproduction in any medium, provided

original work is properly cited, use is noncommercial, and modifications or adaptations

June 6, 2012 10:00 AM

# ILLUMENATE EU RCT

## Baseline Patient Characteristics

	Stellarex	PTA	p
<b>Age (years)</b>	66.8 ± 9.2 (222)	69.0 ± 8.6 (72)	0.079
<b>Male</b>	72.1% (160/222)	68.1% (49/72)	0.514
<b>Rutherford Clinical Category</b>			0.525
2	15.4% (34/221)	21.1% (15/71)	
3	82.8% (183/221)	77.5% (55/71)	
4	1.8% (4/221)	1.4% (1/71)	
<b>Diabetes</b>	37.4% (83/222)	36.1% (26/72)	0.846
<b>Hypertension</b>	77.9% (173/222)	83.3% (60/72)	0.326
<b>Hyperlipidemia</b>	61.7% (137/222)	68.1% (49/72)	0.332
<b>Smoking Status</b>			0.188
Never Smoked	10.8% (24/222)	16.7% (12/72)	
Previous or Current	89.2% (198/222)	83.3% (60/72)	
<b>ABI</b>	0.72 ± 0.21 (212)	0.69 ± 0.26 (68)	0.250

Schroeder H, Werner M, Meyer DR, et al. Low-Dose Paclitaxel-Coated vs. Uncoated PTA for Femoropopliteal Peripheral Artery Disease: One-Year Results of the ILLUMENATE European Randomized Clinical Trial. *Circulation*. 2017;135(23):2227-2236.

# ILLUMENATE EU RCT

## Baseline Angiographic Data

	Stellarex	PTA	p
<b>Lesion Length (cm)</b>	7.2 ± 5.2 (250)	7.1 ± 5.3 (79)	0.878
<b>Lesion Type<sup>1</sup></b>			
<i>De Novo</i>	92.1% (234/254)	89.9% (71/79)	0.529
Restenotic	7.9% (20/254)	10.1% (8/79)	
<b>Total Occlusion</b>	19.2% (48/250)	19.0% (15/79)	0.967
<b>Calcification</b>			0.775
None/Mild	55.8% (140/251)	59.5% (47/79)	
Moderate	31.5% (79/251)	30.4% (24/79)	
Severe	12.7% (32/251)	10.1% (8/79)	
<b>Diameter Stenosis (%)</b>	78.7 ± 16.0 (250)	80.8 ± 15.7 (79)	0.297
<b>Reference Vessel Diameter (mm)</b>	5.02 ± 0.79 (250)	4.77 ± 0.69 (79)	0.012
<b># of Patent Run-off Vessels</b>			0.229
0	8.5% (18/211)	5.9% (4/68)	
1	19.0% (40/211)	13.2% (9/68)	
2	32.2% (68/211)	45.6% (31/68)	
3	40.3% (85/211)	35.3% (24/68)	

Per Core Lab Adjudication

\* Per Site Assessment

Schroeder H, Werner M, Meyer DR, et al. Low-Dose Paclitaxel-Coated vs. Uncoated PTA for Femoropopliteal Peripheral Artery Disease: One-Year Results of the ILLUMENATE European Randomized Clinical Trial. *Circulation*. 2017;135(23):2227-2236.

**PHILIPS**

# ILLUMENATE EU RCT

## Procedural Characteristics

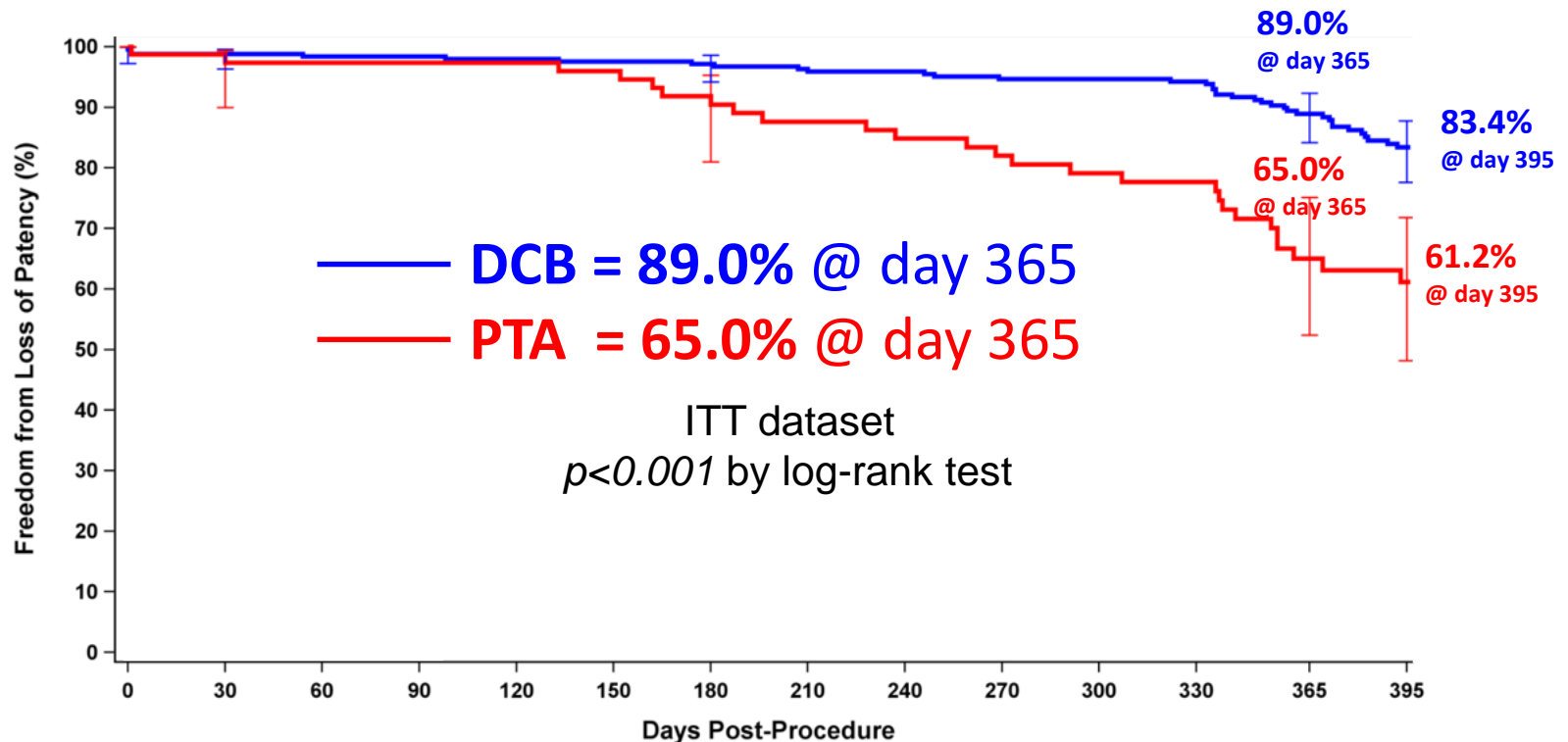
	Stellarex	PTA	p
<b>Pre-dilatation Performed<sup>1</sup></b>	100% (254/254)	98.7% (78/79)	0.237
<b>Post-DCB Dissection Grades</b>			
<b>Grade A-C</b>	61.1% (151/247)	74.0% (57/77)	0.095
<b>Grade D-F</b>	1.2% (3/247)	0.0% (0/77)	
<b>Flow-limiting Dissection</b>	0.4% (1/247)	0.0% (0/77)	1.000
<b>Bail-out Stent Placement<sup>1</sup></b>	15.4% (39/254)	11.4% (9/79)	0.381
<b>Post-procedure Diameter Stenosis (%)</b>	23.6 ± 11.4 (251)	23.1 ± 10.3 (78)	0.724

1. Site-reported data

Schroeder H, Werner M, Meyer DR, et al. Low-Dose Paclitaxel-Coated vs. Uncoated PTA for Femoropopliteal Peripheral Artery Disease: One-Year Results of the ILLUMENATE European Randomized Clinical Trial. *Circulation*. 2017;135(23):2227-2236.

# ILLUMENATE EU RCT

## 89% Primary Patency @ 12 Months



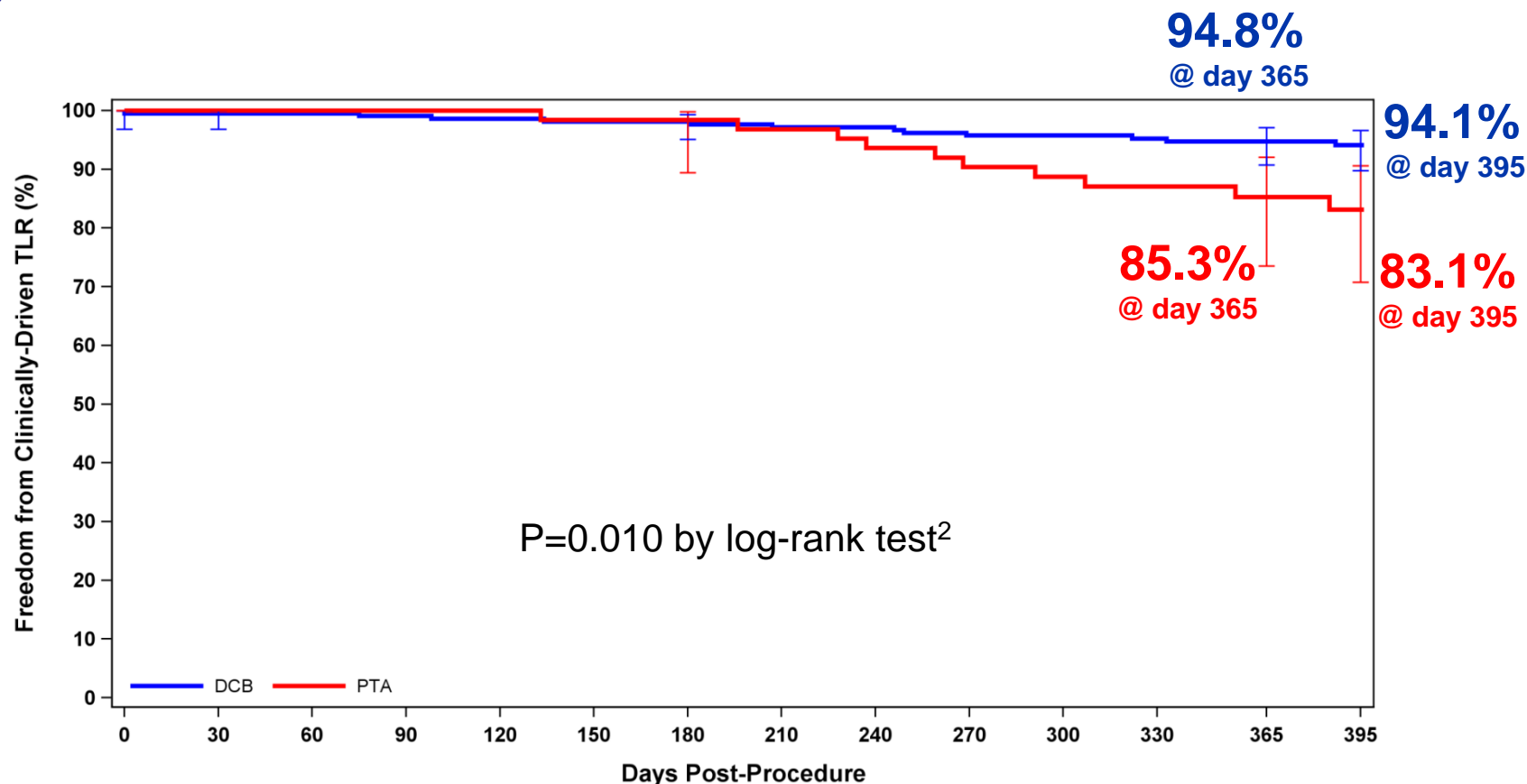
Primary patency defined as freedom from restenosis (determined by duplex ultrasound with PSVR  $\leq 2.5$ ) and freedom from clinically-driven TLR at 12 months. Assessed per lesion. KM estimates reported at day 395 to capture all patients and events within the full (and legitimate) 335-395 follow-up window. Rates from the middle of the protocol visit window (365 days) reported for consistency and comparative purposes with other trials.

Schroeder H, Werner M, Meyer DR, et al. Low-Dose Paclitaxel-Coated vs. Uncoated PTA for Femoropopliteal Peripheral Artery Disease: One-Year Results of the ILLUMENATE European Randomized Clinical Trial. *Circulation*. 2017;135(23):2227-2236.

**PHILIPS**

# ILLUMENATE EU RCT

## CD-TLR<sup>1</sup> Free at 12 Months: 94.8%

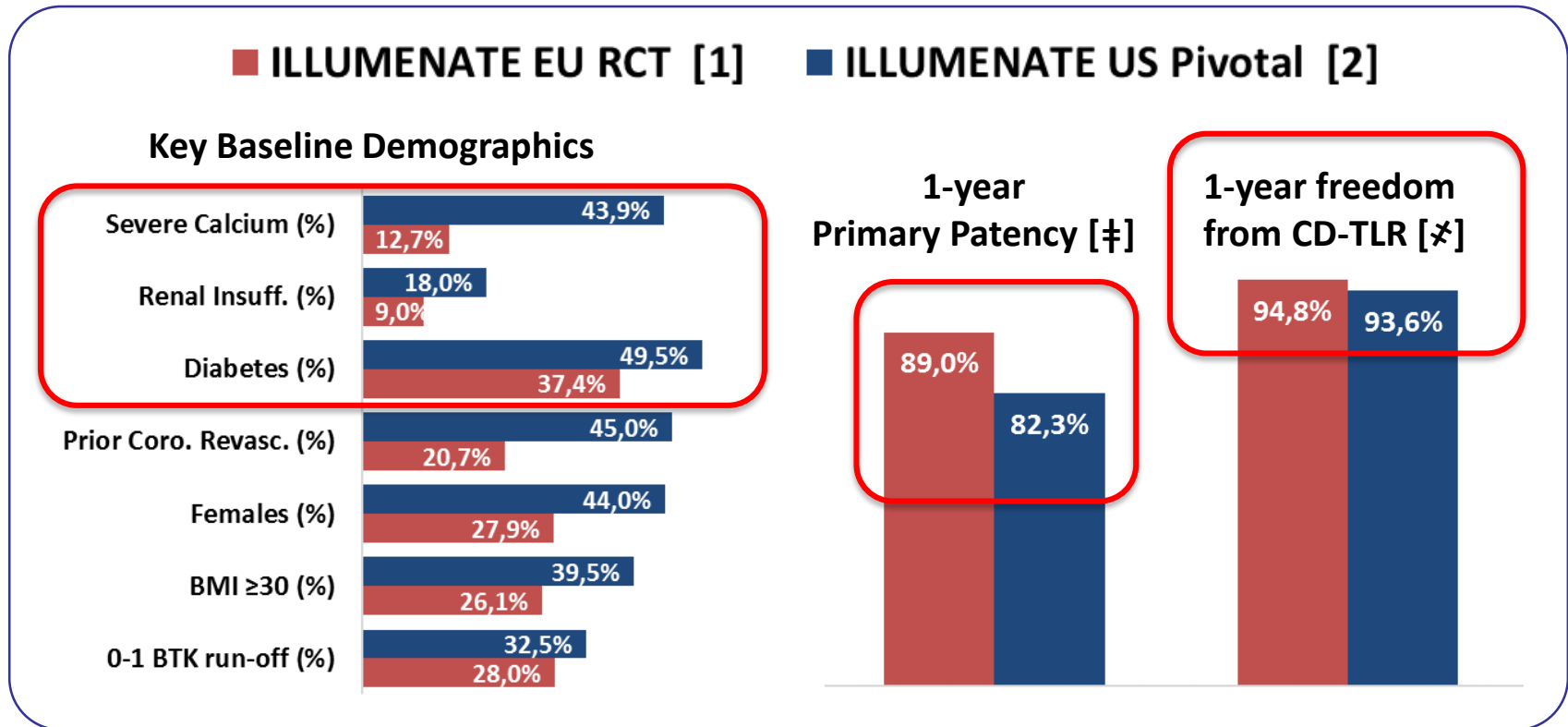


1. Clinically-driven TLR defined as reintervention due to PSVR $\geq$ 2.5 (or >50% stenosis via angio) due to an increase in the RCC >1 category or deterioration in the ABI by >0.15 compared to maximum early post-procedural level. Per subject analysis.
2. Descriptive, post-hoc analyses; Hypothesis testing was not pre-specified. Log-rank p-value is post-hoc.
3. As-treated data set is considered the primary data set for the endpoint



# ILLUMENATE RCTs in context

## Top Tier Outcomes across different patient complexities



[‡] Core-lab adjudicated (VascCore Core laboratory - Boston, MA, USA) Duplex derived Primary Patency based on PSVR  $\leq 2.5$  . KM survival estimates at 365 days

[✖] freedom from CEC adjudicated clinically driven TLR by KM survival estimates at 365 days

1. Schroeder H. et al. Low-Dose Paclitaxel-Coated vs. Uncoated PTA for Femoropopliteal Peripheral Artery Disease: One-Year Results of the ILLUMENATE European Randomized Clinical Trial. *Circulation*. 2017;135(23):2227-2236.

**PHILIPS**

# Level 1 Evidence: DCB Pivotal RCTs in context

## Similar patient characteristics across 3 of 4 Trials

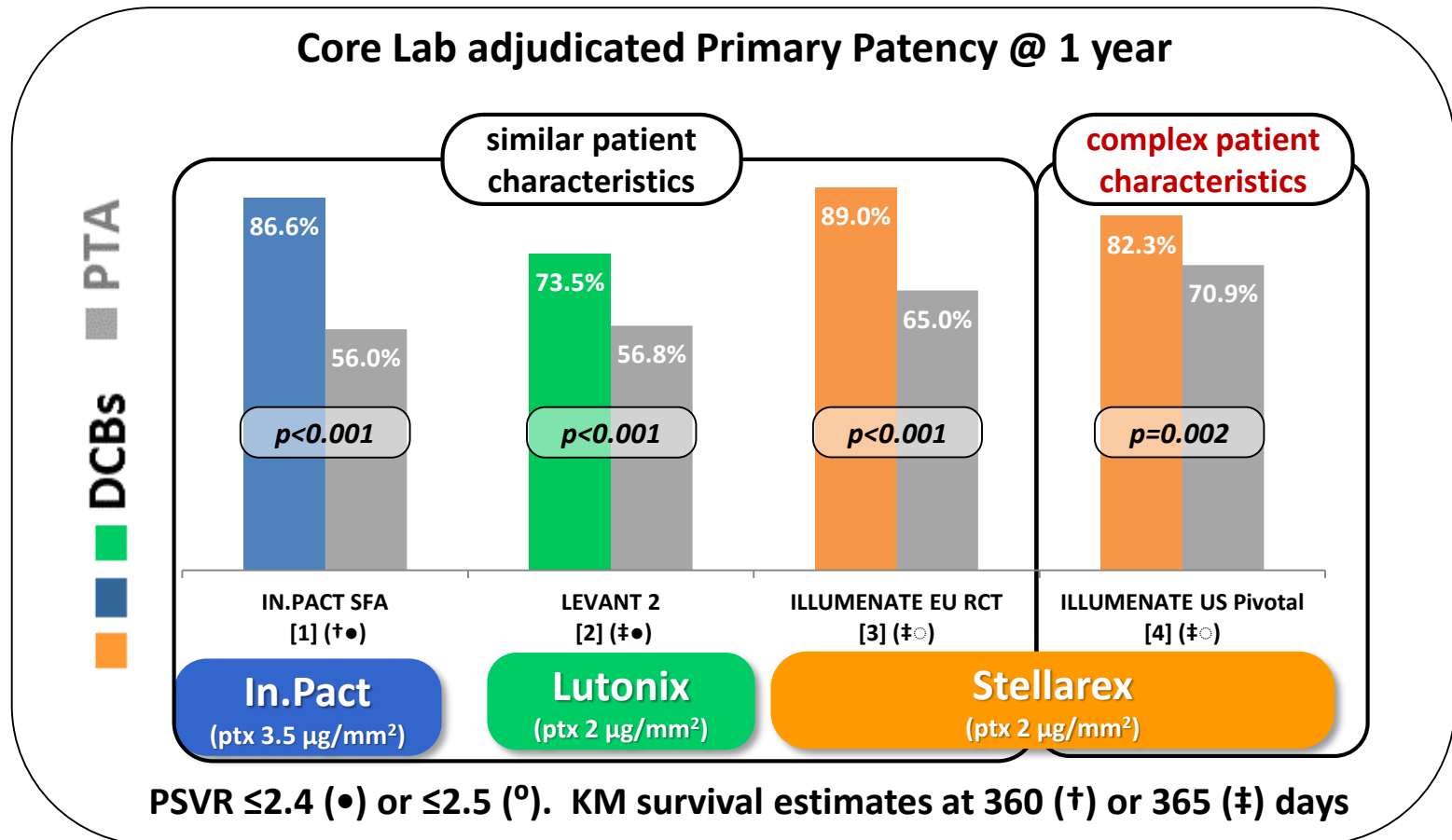
	IN.PACT SFA <sup>[1]</sup>	LEVANT 2 <sup>[2]</sup>	ILLUMENATE EU RCT <sup>[3]</sup>	ILLUMENATE US Pivotal <sup>[4]</sup>
<b>Females</b>	35.0%	38.9%	27.9%	<b>44.0%</b>
<b>Diabetes</b>	40.5%	43.4%	37.4%	<b>49.5%</b>
<b>Renal Insuff.</b>	8.3%	NA	9.0%	<b>18.0%</b>
<b>RC≥3</b>	62.3%	70.6%	<b>84.6%</b>	68.5%
<b>Lesion length</b>	8.9 cm	6.3 cm	7.2 cm	8.0 cm
<b>Severe Calcium*</b>	8.1%	10.4%	12.7%	<b>43.9%</b>
<b>CTOs</b>	<b>25.8%</b>	20.6%	19.2%	19.0%

\* different Ca++ definitions may apply across trials

1. Tepe G et al. Drug-coated balloon versus standard percutaneous transluminal angioplasty for the treatment of superficial femoral and popliteal peripheral artery disease: 12-month results from the IN.PACT SFA randomized trial. *Circulation*. 2015 Feb 3;131(5):495-502
2. K.Rosenfield et al. Trial of a Paclitaxel-Coated Balloon for Femoropopliteal Artery Disease. *N Engl J Med* 2015
3. Schroeder H, Werner M, Meyer DR, et al. *Circulation*. 2017;135(23):2227-2236.
4. Krishnan P, Faries P, Niazi K, et al. *Circulation*. Published online July 2017. <https://doi.org/10.1161/CIRCULATIONAHA.117.028893>

# Level 1 Evidence: DCB Pivotal RCTs in context

ILLUMENATE EU RCT: 1<sup>st</sup> trial showing highest rates of Primary Patency vs. DCB Pivotal RCTs of similar design and patient profiles



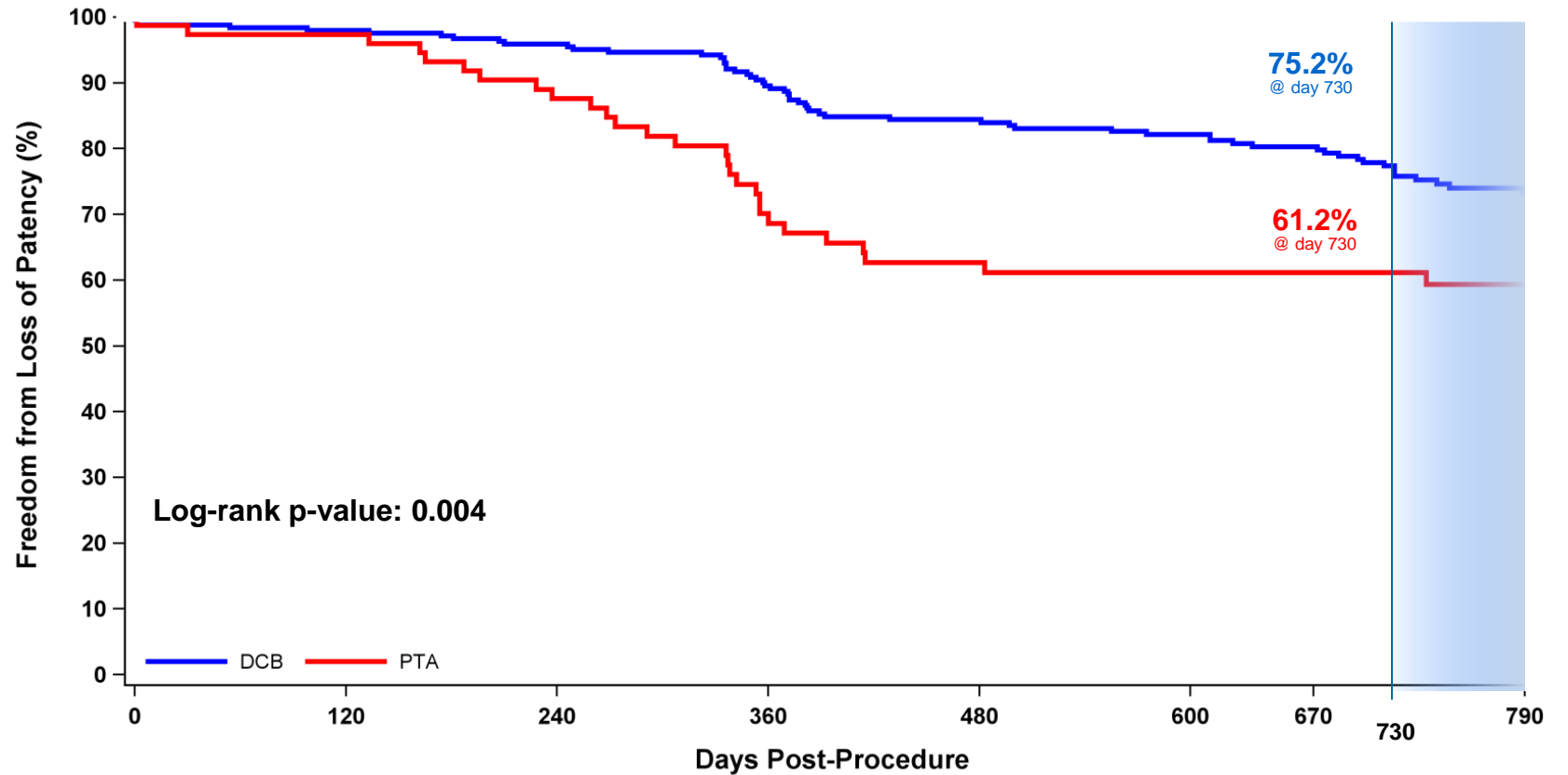
1. Tepe G et al. IN.PACT SFA Trial Investigators Circulation 2015 + G.Tepe, Charing Cross 2014 oral presentation + Jaff M. Drug-coated Balloon Treatment for Patients with Intermittent Claudication: Insights from the IN.PACT Global Full Clinical Cohort. (Updated data from IN.PACT SFA presented on slide 12) Oral Presentation, VIVA 2016
2. K.Rosenfield et al. Trial of a Paclitaxel-Coated Balloon for Femoropopliteal Artery Disease. N Engl J Med 2015
3. Schroeder H, Werner M, Meyer DR, et al. *Circulation*. 2017;135(23):2227-2236.
4. Krishnan P, Faries P, Niazi K, et al. *Circulation*. Published online July 2017. <https://doi.org/10.1161/CIRCULATIONAHA.117.028893>

# ILLUMENATE EU RCT

## 2-Year Outcomes

# 2-year Primary Patency

## ILLUMENATE EU RCT Study



Days  
DCB Event Free  
PTA Event Free

365  
89.2%  
68.7%

730 790  
75.2% 73.3%  
61.2% 59.3%

**PHILIPS**

# 2-year Primary Patency

(exact rate through 790 days)

Primary Efficacy Endpoint <sup>1</sup>	DCB	PTA	Difference [95% CI] <sup>3</sup>	p-value <sup>3</sup>
Patency at 24 Months	75.9% (145/191)	61.0% (36/59) <sup>2</sup>	14.9% [1.1%, 28.7%]	0.025

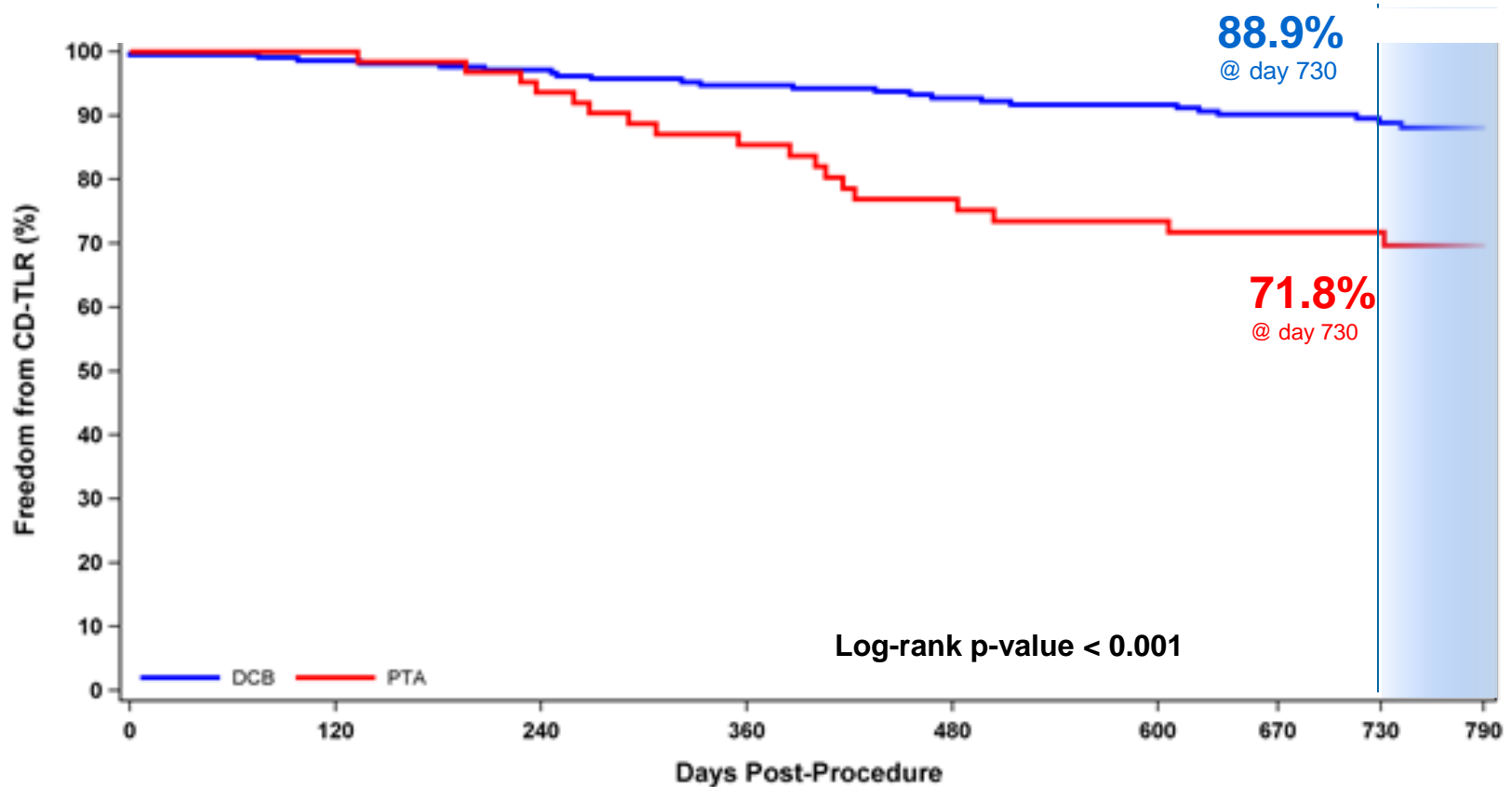
1. Patency is defined as absence of target lesion restenosis (as assessed by the duplex ultrasound core laboratory based on PSVR  $\leq 2.5$ ) and freedom from clinically-driven target lesion revascularization (CD-TLR) through 790 days.

2. The original 12 month patency rate for the PTA arm was 60.6% (40/66). When 3 additional subjects are included as success carried backwards due to newly available 2 year data, the post-hoc 12 month rate is 64.2% (43/67).

3. Confidence interval of the difference is asymptotic. p-value was based on the chi-square test.

# 2-year Freedom from CD-TLR

## ILLUMENATE EU RCT Study



Days  
DCB Event Free  
PTA Event Free

365  
94.8%  
85.4%

730  
88.9%  
71.8%

790  
88.1%  
69.7%

# Key Safety Endpoints at 2 Years\*

## ILLUMENATE EU RCT Study

	DCB	PTA	P-value
<b>All-Cause Death</b>	<b>6.5% (13/199)</b>	<b>5.1% (3/59)</b>	<b>1.000</b>
<b>Major Adverse Events<sup>1</sup></b>	<b>14.0% (27/193)</b>	<b>31.7% (19/60)</b>	<b>0.002</b>
Cardiovascular Death	1.6% (3/191)	1.7% (1/59)	1.000
Target Limb Amputation	1.1% (2/188)	0.0% (0/58)	1.000
Clinically-driven TLR	12.1% (23/190)	30.5% (18/59)	<0.001

\*Includes all MAEs reported through 790 days post-procedure

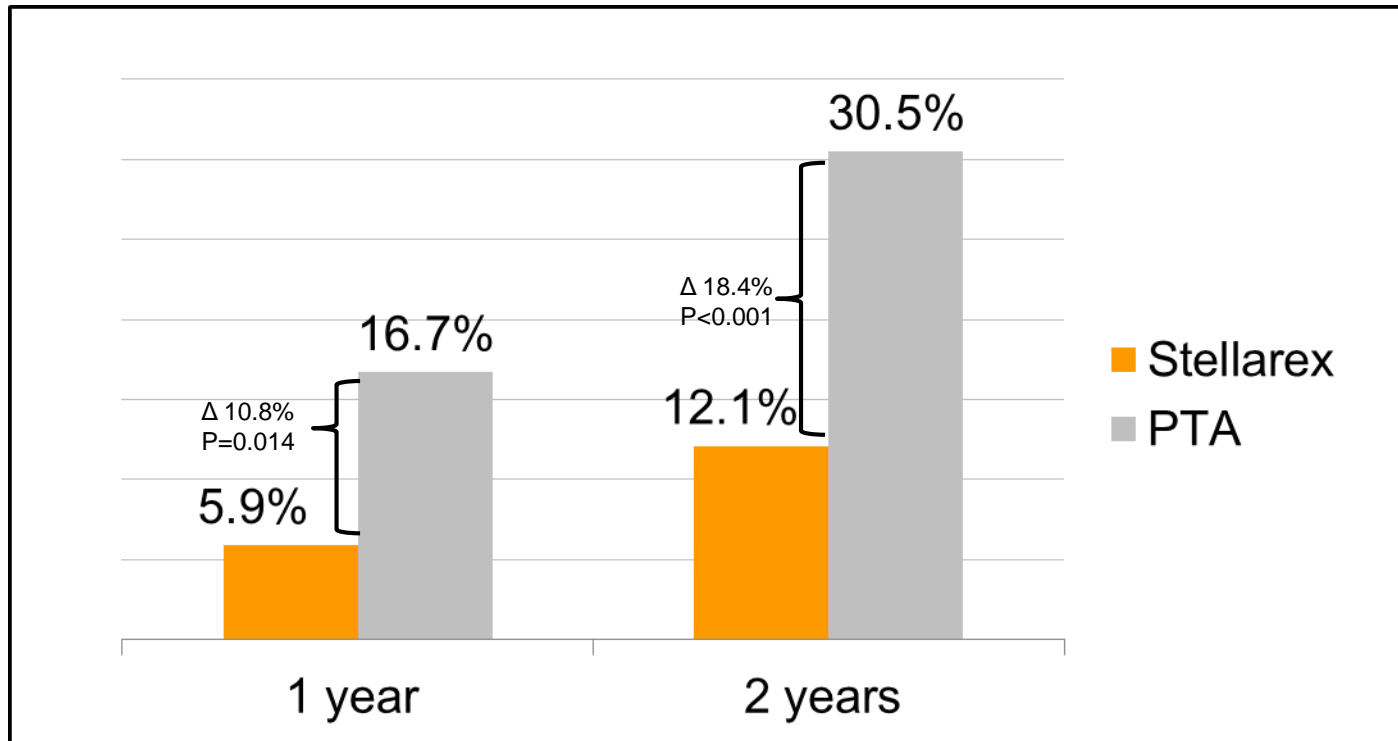
1. Sum of the components may not add up to the overall rate as some subjects may experience more than one event type. Numbers are % (n/N) The numerator is the number of subjects with an event prior to the close of the visit window. The denominator includes subjects with an event or those without an event having follow-up on or past the opening of the visit window.



# Clinically-driven TLR

## ILLUMENATE EU RCT Study

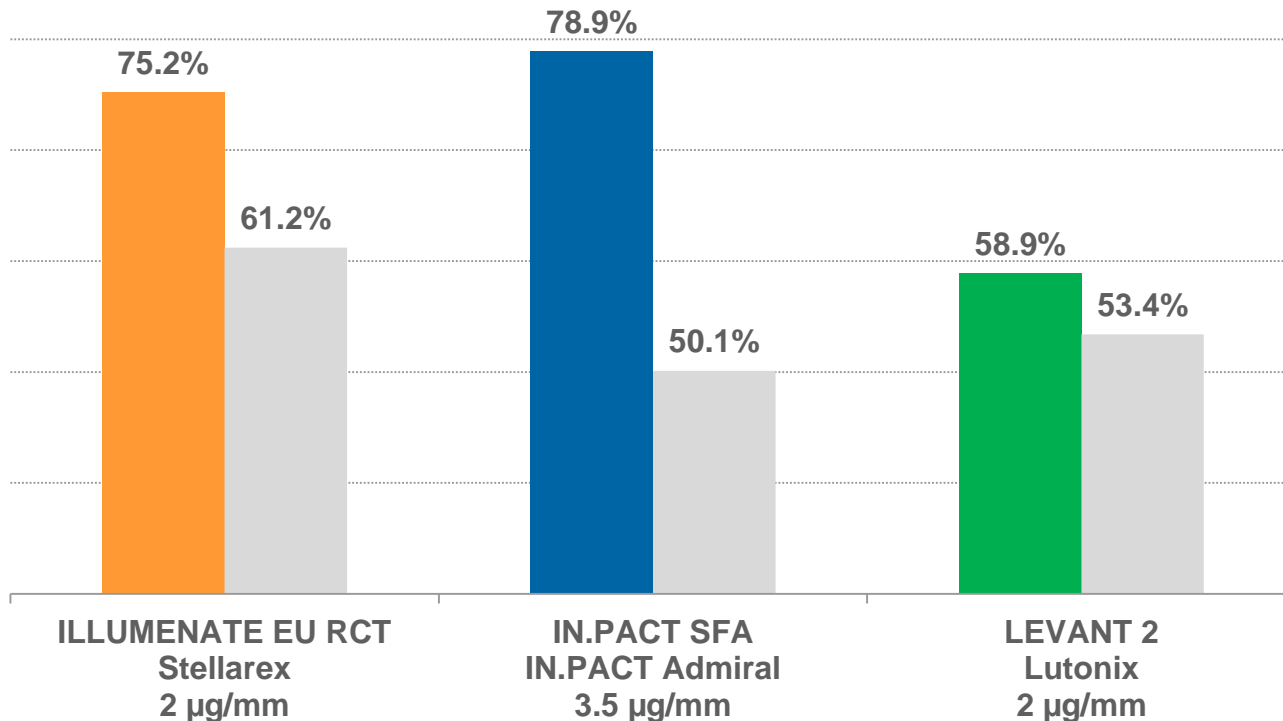
- Significant treatment effect observed out to 2 years
- Treatment effect increased from 1 to 2 years



# Data in Context

## DCB Primary Patency Rates at 2 Years

Core lab adjudicated patency, KM estimates

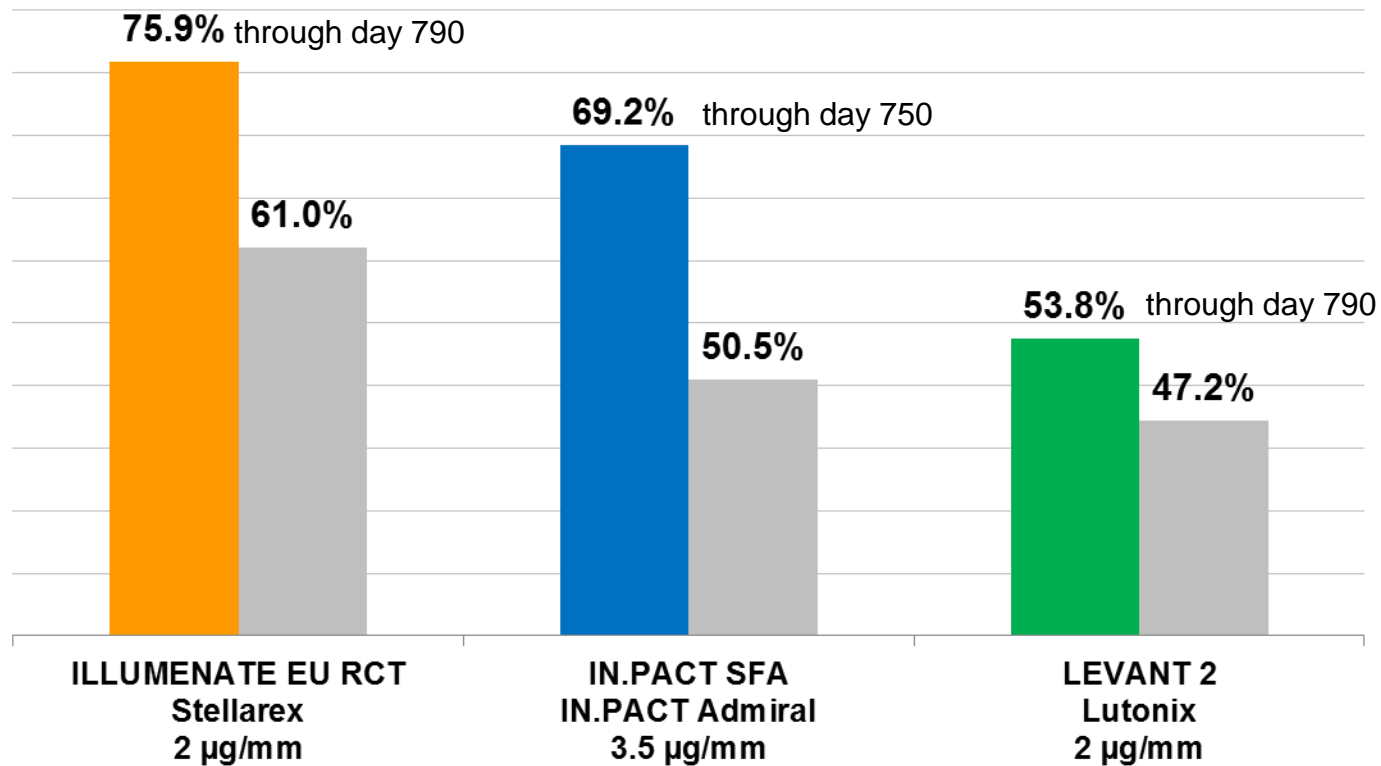


Laird et al. J Am Coll Cardio 2015;66:2329-38  
Laurich C. Oral Presentation. SVS. 2015

# Data in Context

## DCB Primary Patency Rates at 2 Years

Core lab adjudicated patency, exact rates



# Key Take-Aways

- Stellarex is backed by solid and broad level 1 evidence based on 2 randomized trials
- Durable treatment effect was demonstrated, with no indication of late catch-up at 2 years
- Stellarex is the first low-dose DCB to demonstrate a significant treatment effect at 2 years

