

Drug-Eluting Balloon or Stent In Femoropopliteal Lesions: *How Far Are We?*

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We Know What Works...

and what doesn't

- Sirolimus, everolimus ineffective
- Systemic paclitaxel ineffective
- Paclitaxel effective
 - Delivered by balloon
 - Delivered by stent

Tepe. N Engl J Med 2008;358:689

Werk. Circulation. 2008;118:1358-1365

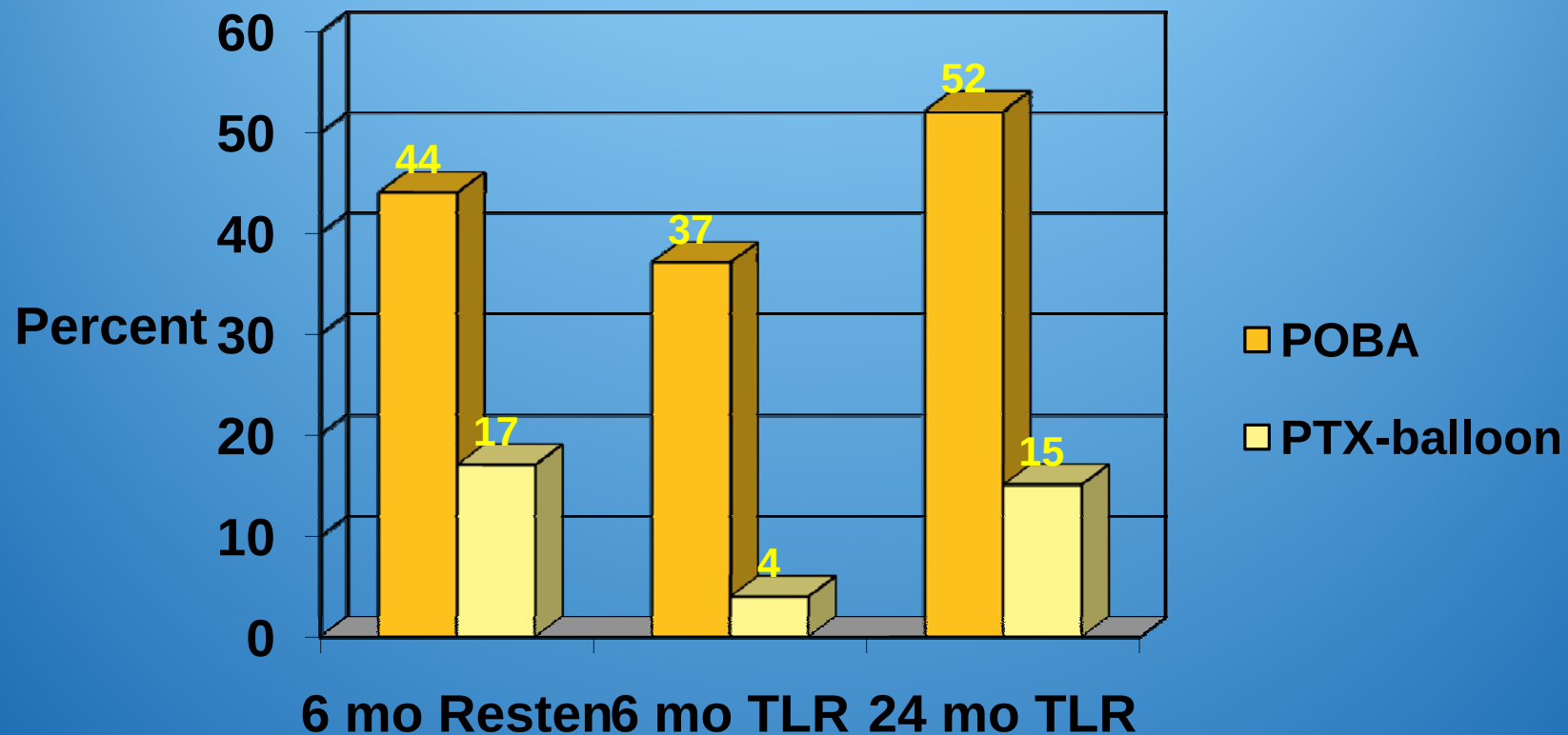
Lammer, J. J Vasc Surg 2011;54:394-401

Paclitaxel Coated Balloon

THUNDER Trial

- 154 patients with femoropopliteal disease
- 3 arm study
 - POBA without paclitaxel (PTX)
 - PTX in contrast medium
 - PTX coated balloons
- Balloons coated with 3 μg per sq mm

Outcomes After PTX Treatment: THUNDER



Tepe N Engl J Med 2008;358:689

POBA = angioplasty

TLR = Target Lesion Revascularization

Uncoated Balloon

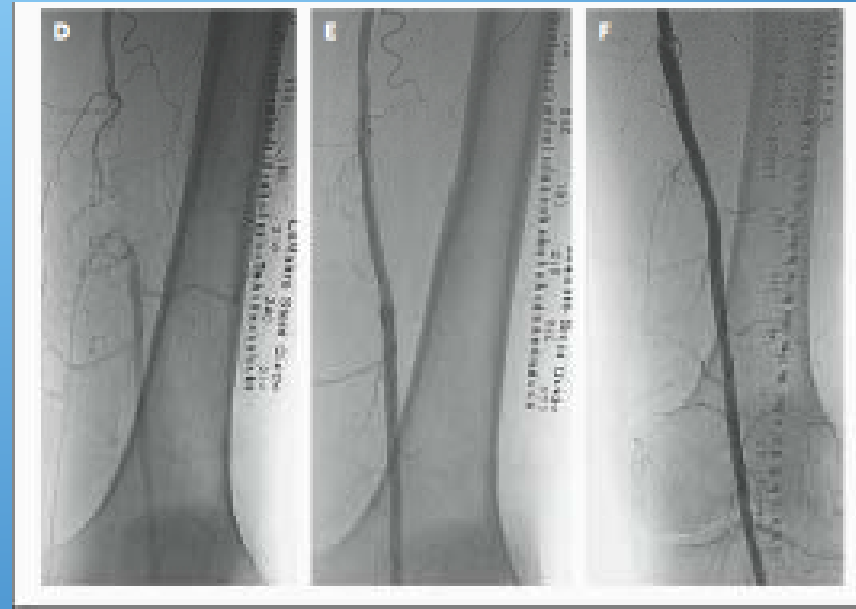


Pre

Post
PTA

6 Mo

PTX Coated Balloon



Pre

Post
PTA

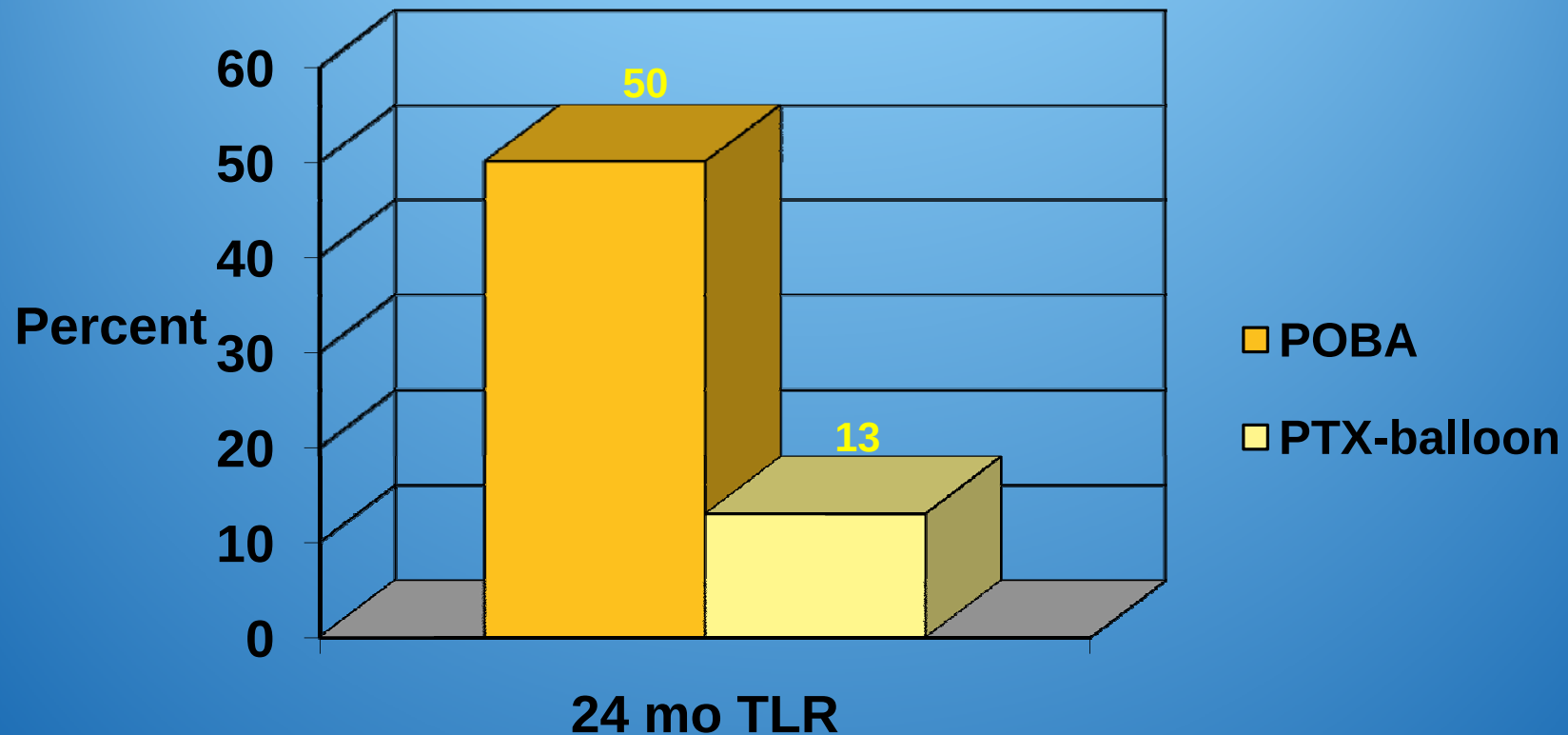
6 Mo

Paclitaxel Coated Balloon

FemPac Trial

- 87 patients with femoropopliteal disease
- 2 arm study
 - POBA without paclitaxel
 - PTX coated balloons
- Balloons coated with 3 μg per sq mm

Outcomes After PTX Treatment FemPac

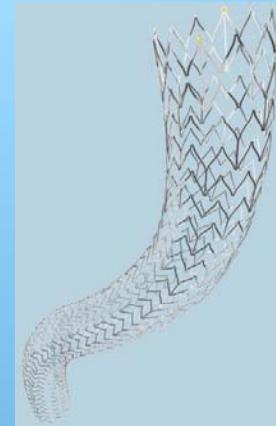


Werk, M. Circulation. 2008;118:1358-1365

POBA = angioplasty

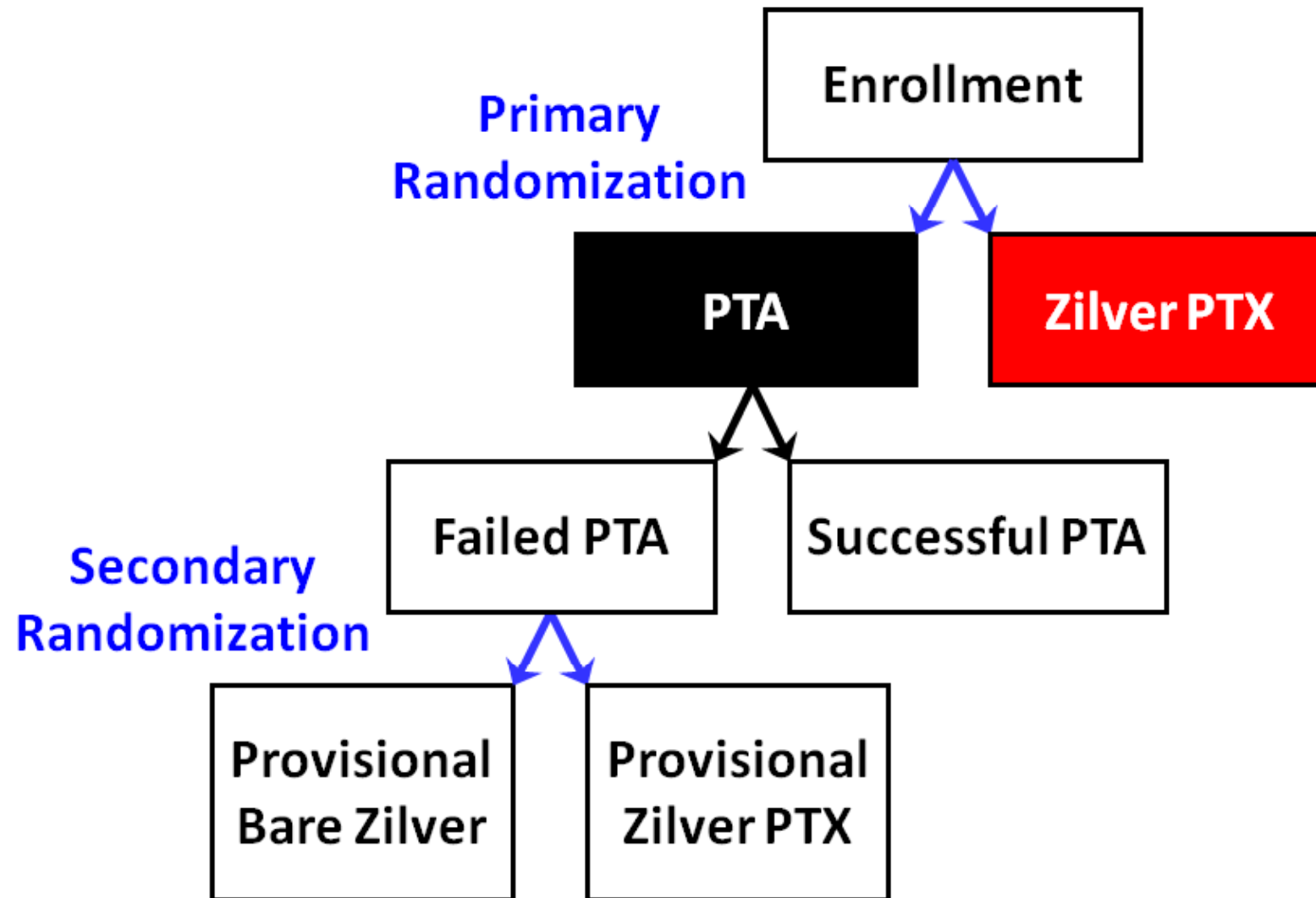
TLR = Target Lesion Revascularization

Zilver PTX Clinical Trials



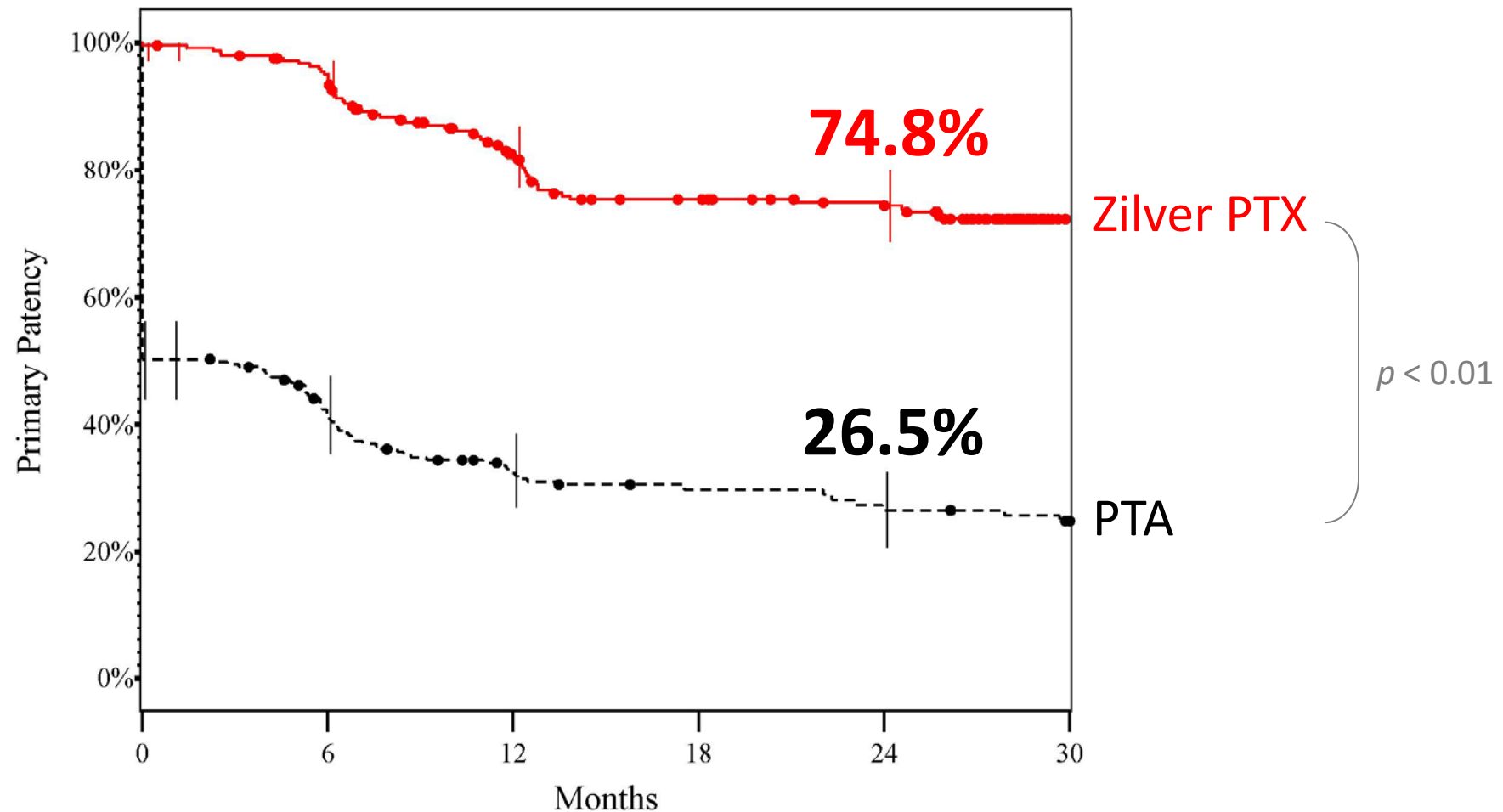
- Randomized trial
 - Paclitaxel coated stent vs. balloon angioplasty
 - Provisional stenting for PTA failures
- Nonrandomized registry
 - “All comers”
 - Much more complex anatomy

Zilver PTX Study Design



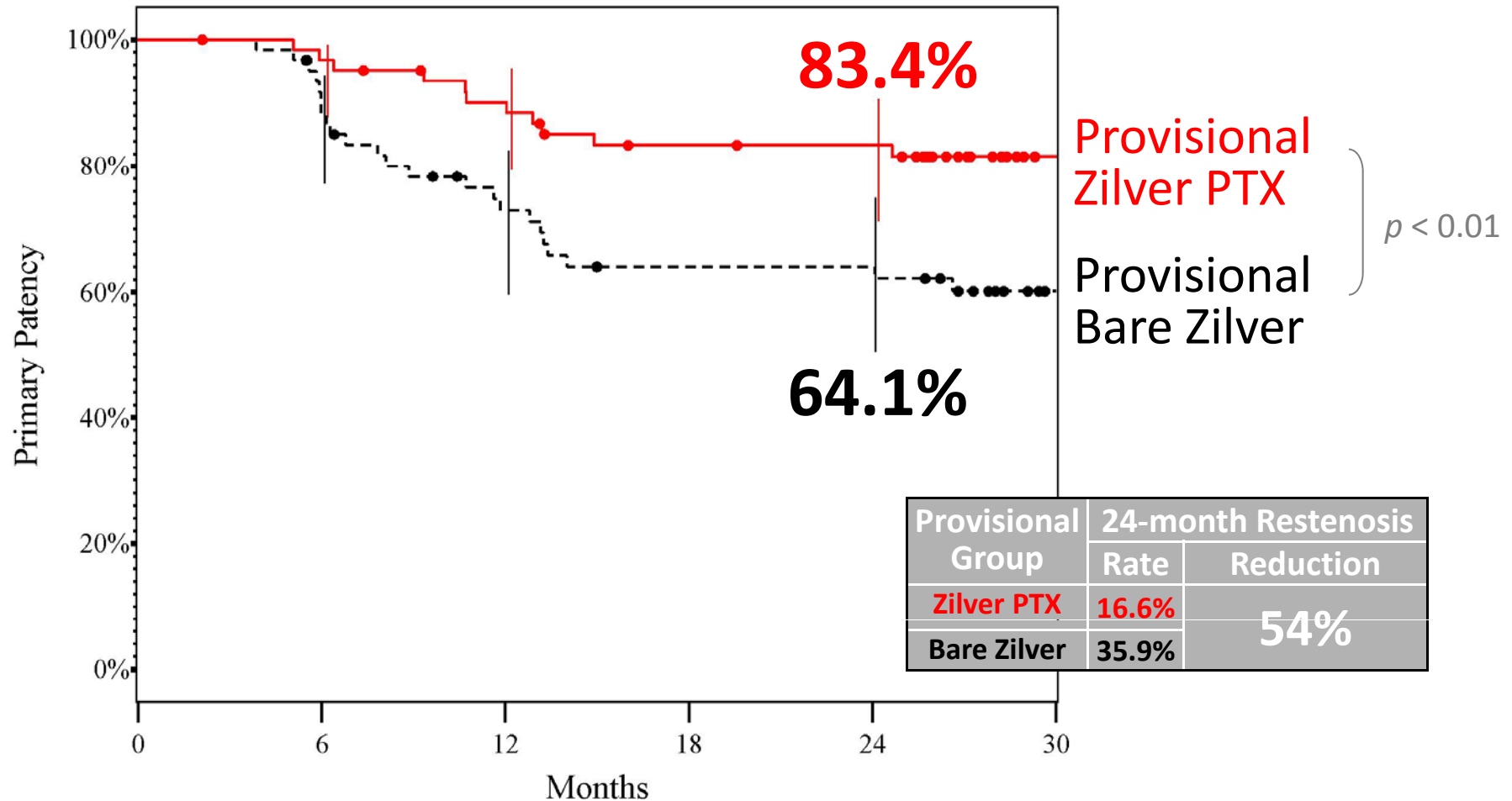
24-Month Effectiveness

Primary Patency (PSVR < 2.0): Zilver PTX vs. PTA



Proven Drug Effect at 24-Months

Patency (PSVR < 2.0): Provisional Zilver PTX vs. BMS

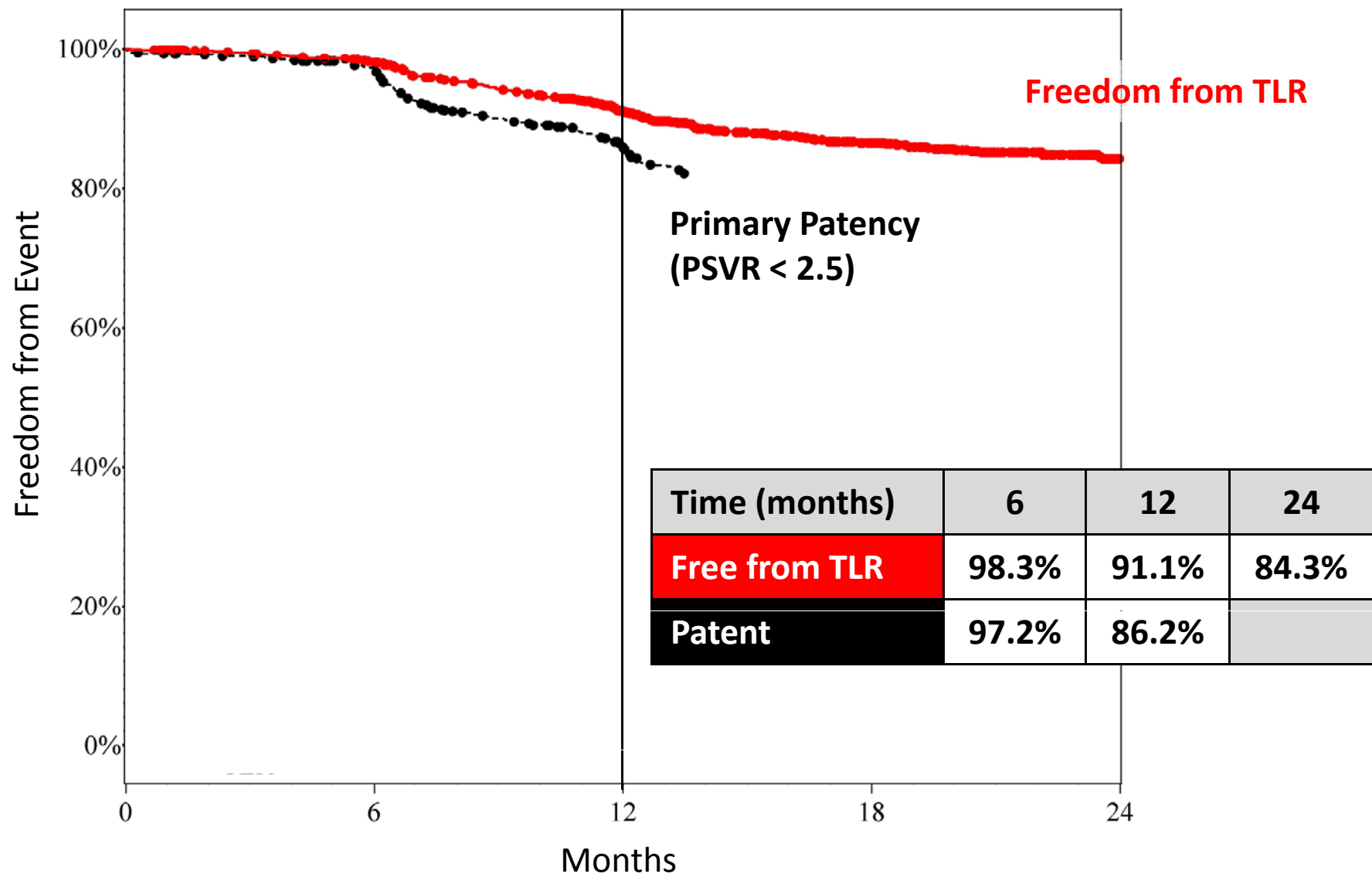


Zilver PTX Registry

Baseline Lesion Characteristics

Lesions		900
Lesion length (mm)		100 ± 82
Diameter stenosis		85 ± 16%
TASC 2000 class	A	26%
	B	29%
	C	25%
	D	14%
Lesions > 7 cm		48%
Lesions > 15 cm		22%
Total occlusions		38%
Restenosis (all)		24%
In-stent restenosis (ISR)		14%

Long-term Effectiveness



Remarkable Consistency

- Multiple vendors had promising results with PTX
- Stent or no stent
- Reduction in restenosis durable to at least 5 years
- Similar outcomes in infrapopliteal, coronary ISR, and other applications

Leading to the conclusion...

It's Worth \$225,000,000!

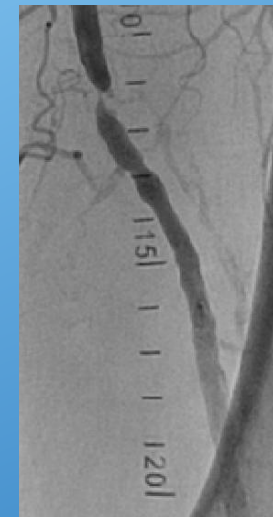
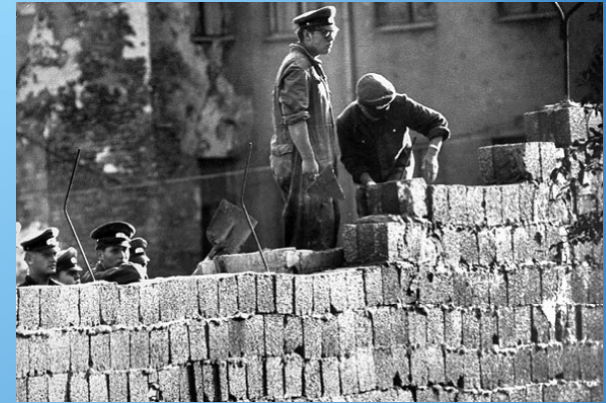


Why Doesn't Everyone Receive Drug-Eluting Therapies?

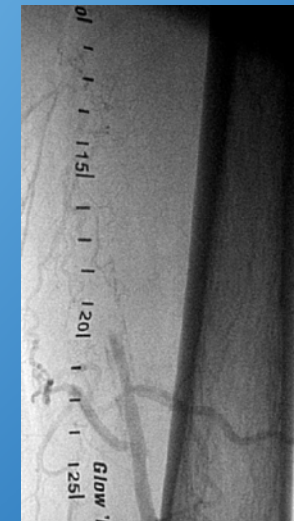
- Technical
- Financial
- Governmental
- Health care delivery system

Technical Barriers: Balloons

- Balloon must give “stand alone” result
- Minimum: 2 balloons/case
- Most chronic occlusions don’t qualify
- Most long, diffuse disease doesn’t qualify
 - THUNDER 7.4 cm
 - FemPac 5.7 cm



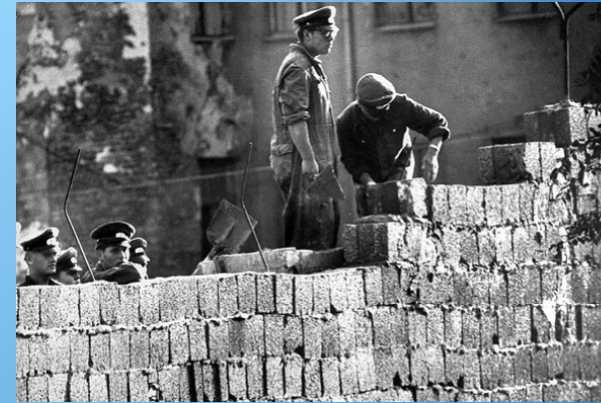
Focal
Stenosis



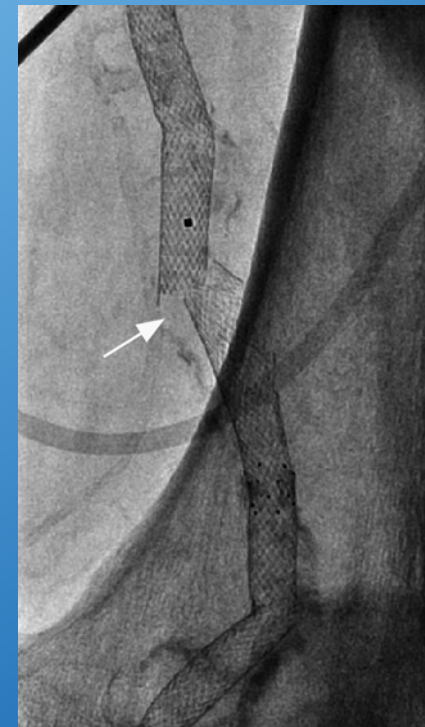
Long
Occlusion

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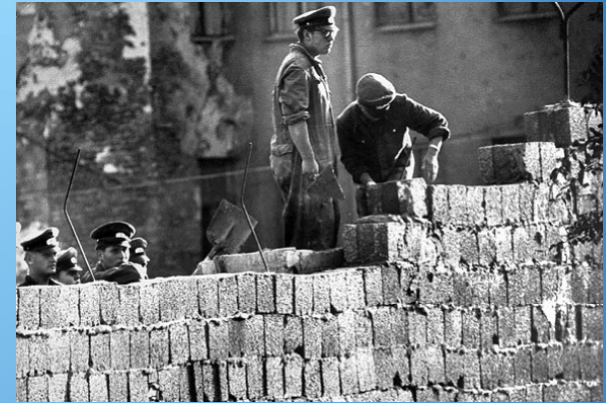
Technical Barriers: Stents



- Lag between clinical trial devices and best commercially available stents
- Likely first US approval:
 - 6 french delivery system
 - 80 mm maximum stent length
- More stents = more cost, more fractures



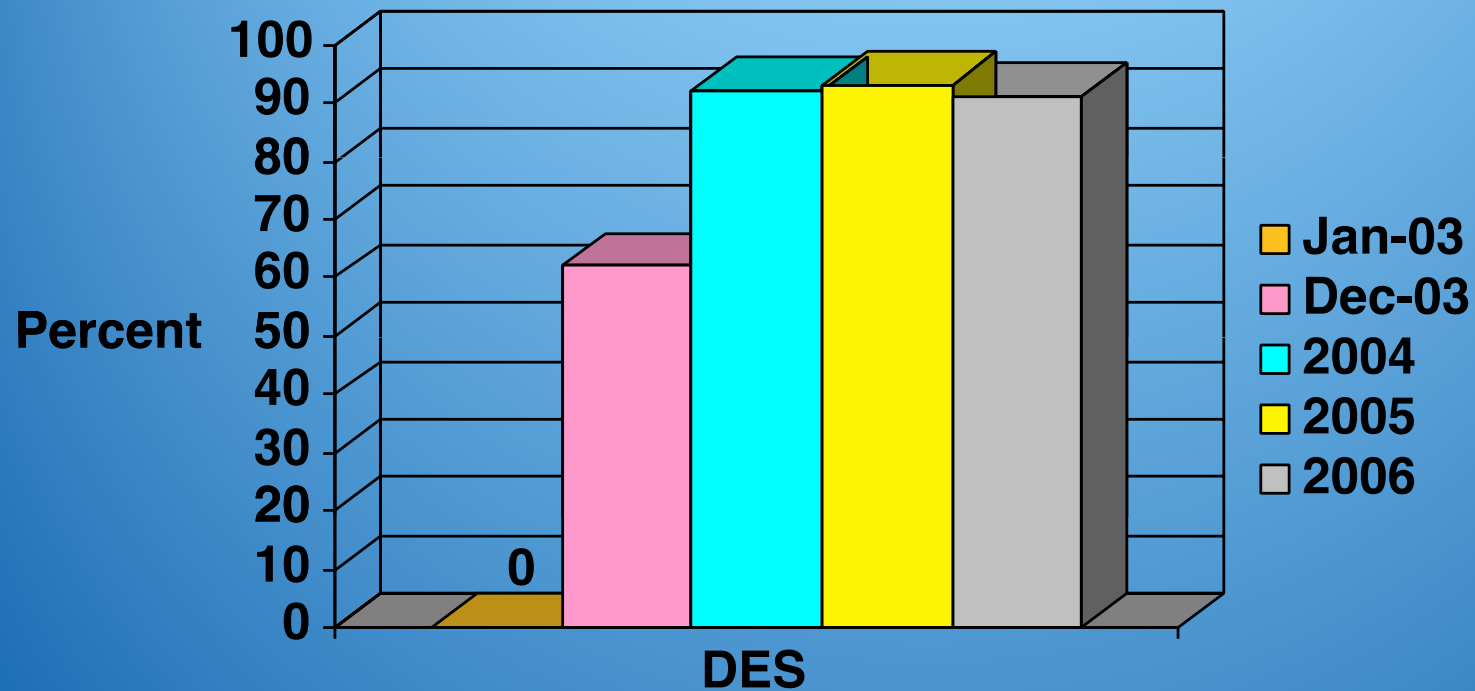
Financial Barriers



- Paclitaxel-coated balloons and stents cost more
- Cost is multiplied in longer lesions

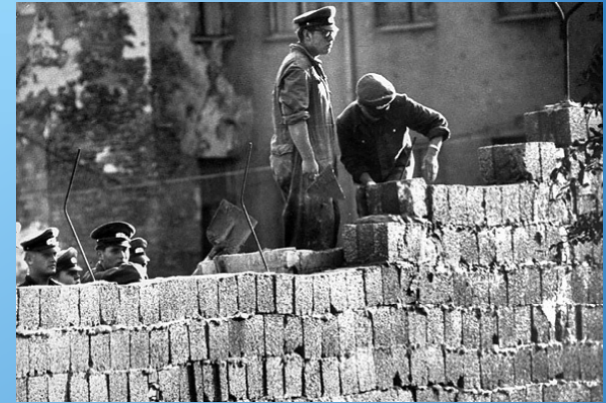
Does the Country Matter?

Coronary Drug Eluting Stent Adoption: US



Average cost:
DES \$2287
BMS \$850

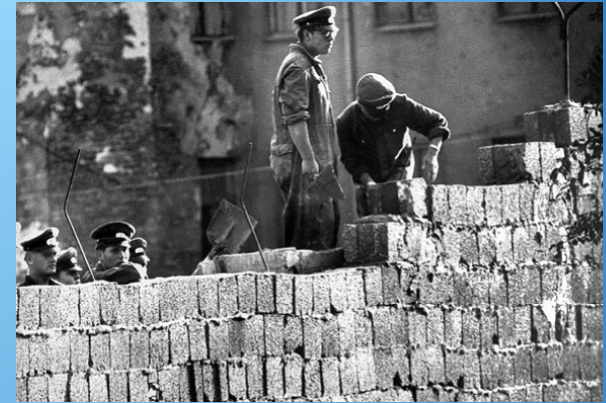
Governmental Barriers



- Drug eluting balloons
 - Multiple have CE Mark
 - First approval 2008
- Zilver PTX
 - CE Mark 2009
 - Japanese approval 2012
 - Korea: approved but not reimbursed

Governmental Barriers

United States



- Zilver PTX
 - FDA “approvable” ...but not approved
 - Not commercially available
- Drug eluting balloons
 - Not approved
 - Only accessible through clinical trials with strict enrollment criteria

LEVANT 2

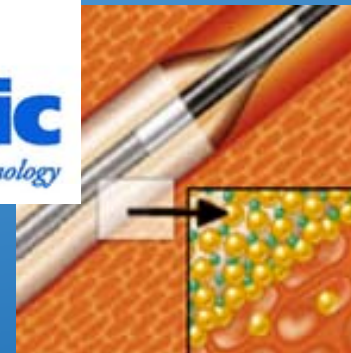
- Randomized PTX coated versus standard balloon
- First patient July 25, 2011
- Enrollment **ahead** of schedule
 - 371/476 as of April 24
 - 78%

The BARD logo is displayed in white, stylized capital letters on a green rectangular background.The LUTONIX logo features a blue circular icon with a stylized 'L' and the word 'LUTONIX' in blue capital letters, with a small 'TM' trademark symbol.

MOXY Paclitaxel Coated Balloon

IN.PACT SFA II

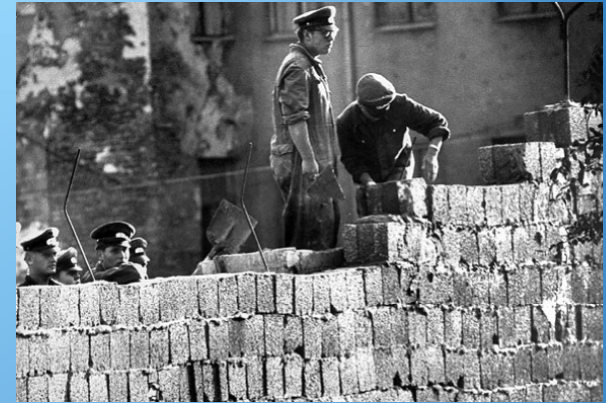
- IN.PACT Admiral
- Coating: urea + paclitaxel
- First US enrollment reported April 13, 2012
- Target enrollment: 450
- Randomized
- De novo and non-stented restenosis



IN.PACT
Paclitaxel Coated
Balloon

Health Care Delivery System Barriers

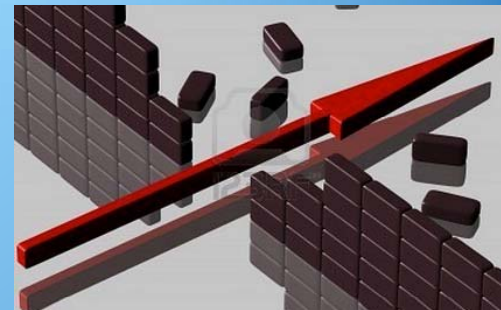
Incentives are not aligned!



- Insurers
 - Derive benefit from drug eluting technology
 - Have no involvement with purchase decisions
- Hospitals
 - Pay more for drug eluting technology
 - Derive no financial benefit
 - Lose revenue (through fewer restenosis cases)



Breaking Through the Barriers



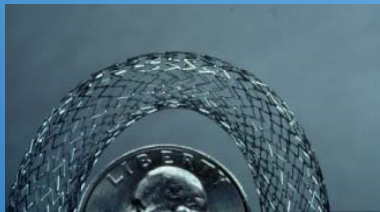
- ClearWay balloon
 - Atrium Medical
 - “Secretes” medication into vessel wall
 - FDA approved
- Commercially available paclitaxel
- No requirement for clinical trial
- No requirement for IRB approval

Latif, F. Catheter Cardiovasc Interv 2008;72:294-298

Hawkins, B. Circ Cardiovasc Interv 2011;4:297-302

New Combinations

limitless possibilities



Summary

- Solid data support PTX coated balloons in short stenoses
- Solid data support PTX coated stents in simple and complex disease
- Remarkable number of ongoing trials
- Combination therapies carry promise