POSTOPERATIVE OUTCOMES IN VASCULAR SURGERY PATIENTS UNDERGOING AMPUTATION

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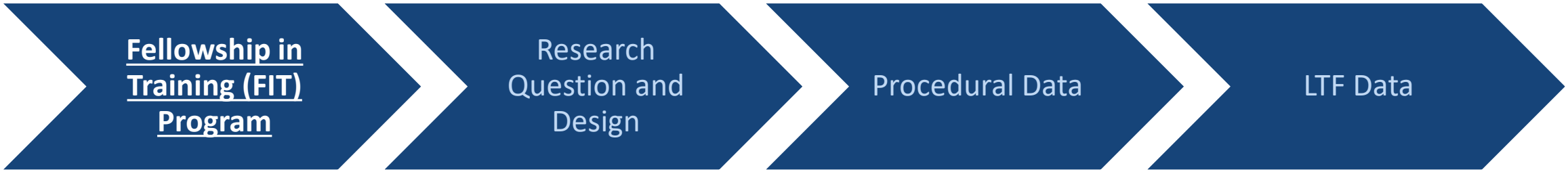
VASCULAR REGIONAL MEETING

OCTOBER 20, 2023

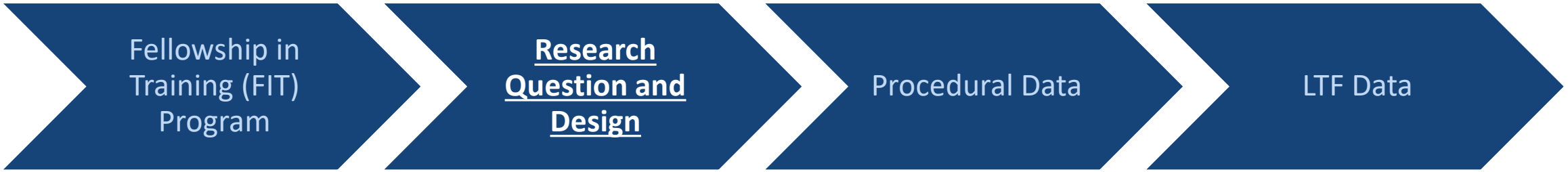

Fellowship in Training (FIT) Program
Research Question and Design
Procedural Data
LTF Data

Quality Fellowship in Training (FIT) Program

- Designed to introduce residents and fellows in vascular programs to the VQI through the SVS Patient Safety Organization (PSO)
- Uses a mentor-directed approach with the goal to review comparative data including center level quality improvement processes
- Opportunities include engagement in quality charter development, QI research initiatives using VQI data, exposure to the VQI research advisory committee (RAC) and a comprehensive lecture series
  - Project Design, Submitting to RAC – Regional vs National, Data Analysis, Paper Writing, Paper Review, Navigating the IRB, Managing a Multi-Center Consortium, Designing a Randomized Trial

FIT Mentor and Trainee

- FIT Mentor
  - Active VQI member with familiarity with the Quality Improvement
  - Agrees to a minimum of quarterly meetings with the Trainee
  - Encourages FIT participation in Regional Meetings
  - Review and approve project design and plan
  - Review and facilitate RAC proposal
  - Interpretation of project results
  - Review and approve any abstract, presentation or publication
- FIT Trainee
  - Resident/fellow (any year)
  - Specialties: General Surgery, Vascular Surgery, Vascular Medicine, Cardiology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Original Research Question

In patient's with prior bypass procedures who then undergo amputation, does graft remnant lead to higher rates of post-operative complications?

Rubin, 1988:

- 75 nonfunctional prosthetic bypass grafts, partial excision vs infrainguinal graft removal at time of lower extremity amputation
- Partial excision group: delayed wound healing (47% vs 8%) and stump infection (39% vs 78%)

Mertens, 1995:

- Included infrainguinal arterial prosthetic graft infections, sorted into incomplete vs complete excision
- 82% of the incomplete excision group required subsequent operations for continued sepsis (vs 13% complete excision group)

Research Question

Altered question, due to limited data regarding graft remnant in VQI:

Does the presence of a prior bypass graft increase the chances of post-operative complication in a patient undergoing amputation?

Data Inclusion / Exclusion

Inclusion Criteria: All ages, hip disarticulations, AKA, TKA, BKA; indications included tissue loss, nonhealing wounds

Exclusion Criteria: Amputations below the ankle (toe amputation, TMA, disarticulations); indications including infection and diabetic neuropathy


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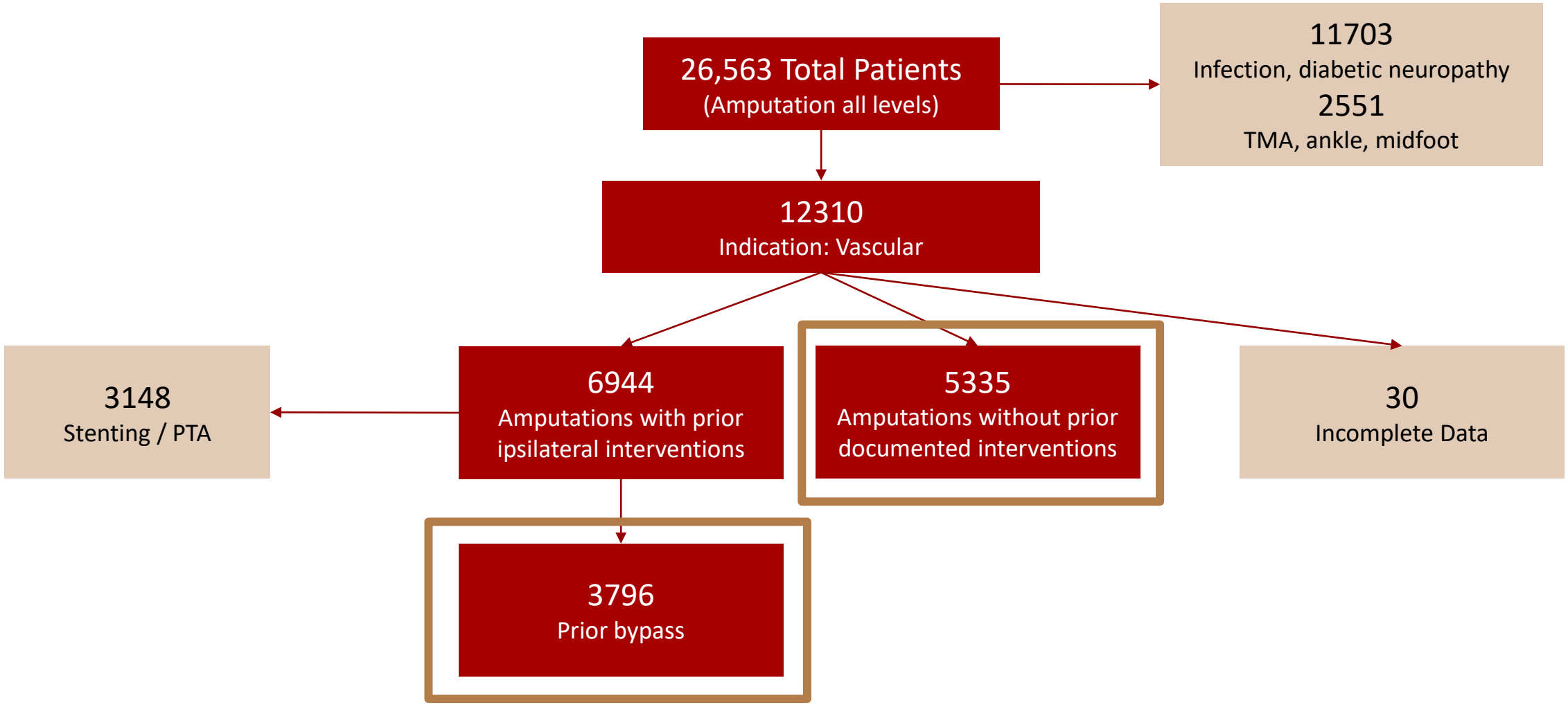
Data Selection



Surgical Outcomes

	Bypass (n = 3796)	No Bypass (n = 5335)	p-value
Post-operative Complication (%)	15.6 (n = 592)	16.9 (n = 901)	0.1
Surgical Site Infection (%)	1.1 (n = 42)	0.56 (n = 30)	0.005
Return to OR (%)	7.38 (n = 280)	7.4 (n = 395)	0.99

Medical Outcomes

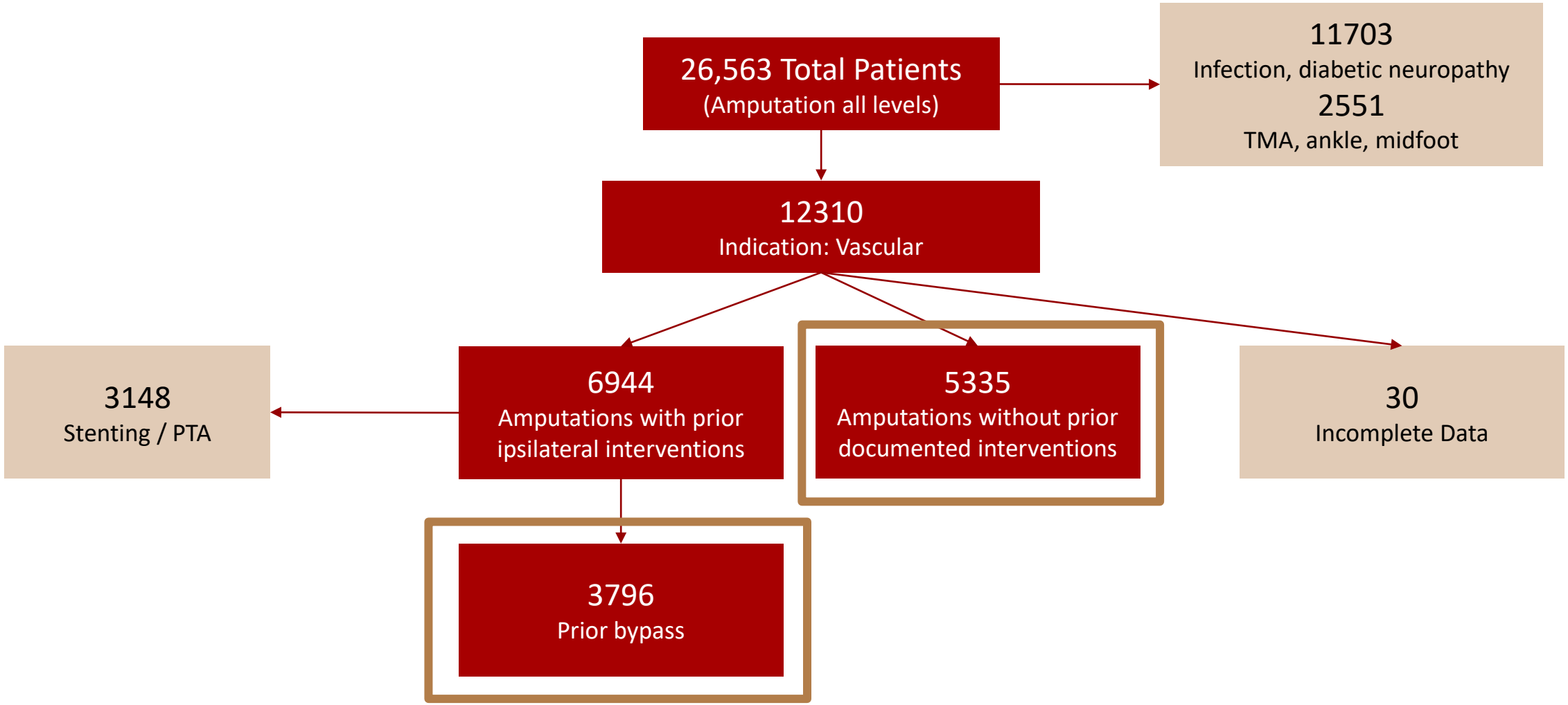
	Bypass (n = 3796)	No Bypass (n = 5335)	p-value
MI (%)	1.84 (n = 70)	1.99 (n = 106)	0.68
Dysrhythmia (%)	2.66 (n = 101)	3.84 (n = 205)	0.002
Congestive Heart Failure (%)	1.26 (n = 48)	1.56 (n = 83)	0.28
Respiratory (%)	1.26 (n = 48)	1.35 (n = 72)	0.79
Renal (%)	3.58 (n = 136)	3.43 (n = 183)	0.74

Initial Conclusions

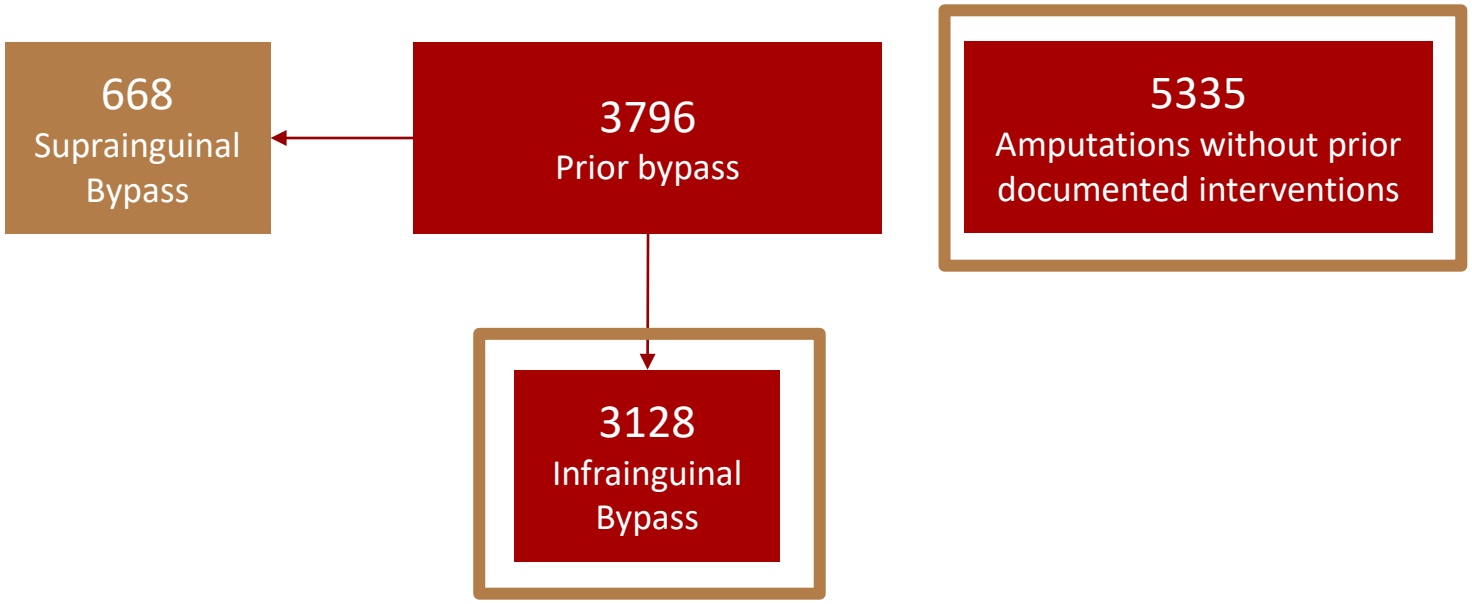
- Post-operative complication is higher in patients without prior bypass, but without statistical significance
  - Higher dysrhythmia (3.5 vs 2.8%)
- Surgical site infection is higher in patients with prior bypass surgeries (1.1 vs 0.5%)

- **What happens if we remove patients with suprainguinal bypasses, leaving only infrainguinal bypasses behind?**

Data Selection, Refined



Data Selection, Refined



Surgical Outcomes

	Infrainguinal Bypass (n = 3128)	No Bypass (n = 5335)	p-value
Post-operative Complication (%)	15.2 (n = 476)	16.9 (n = 901)	0.047
Surgical Site Infection (%)	1.27 (n = 40)	0.56 (n = 30)	0.0007
RTOR (%)	7 (n = 219)	7.4 (n = 395)	0.51

Medical Outcomes

	Infrainguinal Bypass (n = 3128)	No Bypass (n = 5335)	p-value
MI (%)	2.17 (n = 68)	1.99 (n = 106)	0.61
Dysrhythmia (%)	2.74 (n = 86)	3.84 (n = 205)	0.009
CHF (%)	1.2 (n = 38)	1.56 (n = 83)	0.23
Respiratory Complication (%)	1.2 (n = 38)	1.35 (n = 72)	0.66
Renal (%)	3.4 (n = 107)	3.43 (n = 183)	0.96

Initial Conclusions, Refined

- Post-operative complication is higher in patients without prior bypass (16.9 vs 15.2%)
  - Higher dysrhythmia (3.8 vs 2.7%)
  - If we remove dysrhythmias, POC is equivalent
- Surgical site infection is higher in patients with prior bypass surgeries (1.3 vs 0.5%)

- **What if we match the patients IDs from the amputation dataset to the patient IDs from the bypass dataset to extract graft type?**
- **How does this data change over time, using the long-term follow up dataset?**

Matching Amputation and Graft Databases

3128 IDs (Amputation Database) +

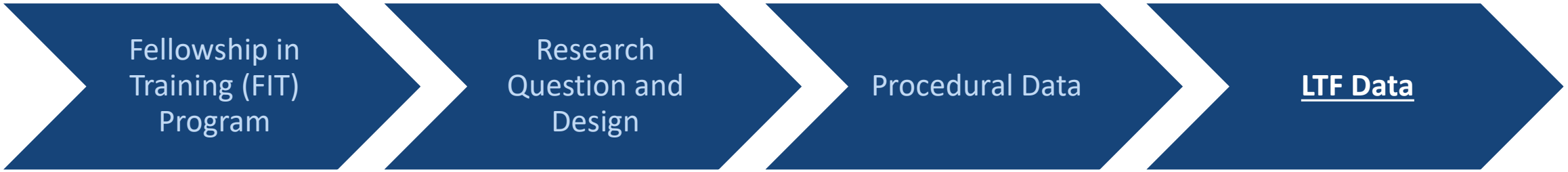
75831 IDs (Bypass Database)

Matched IDs, Removed duplicates, Matched laterality, Compared dates

837 Vein Grafts, 798 Non-autologous Grafts

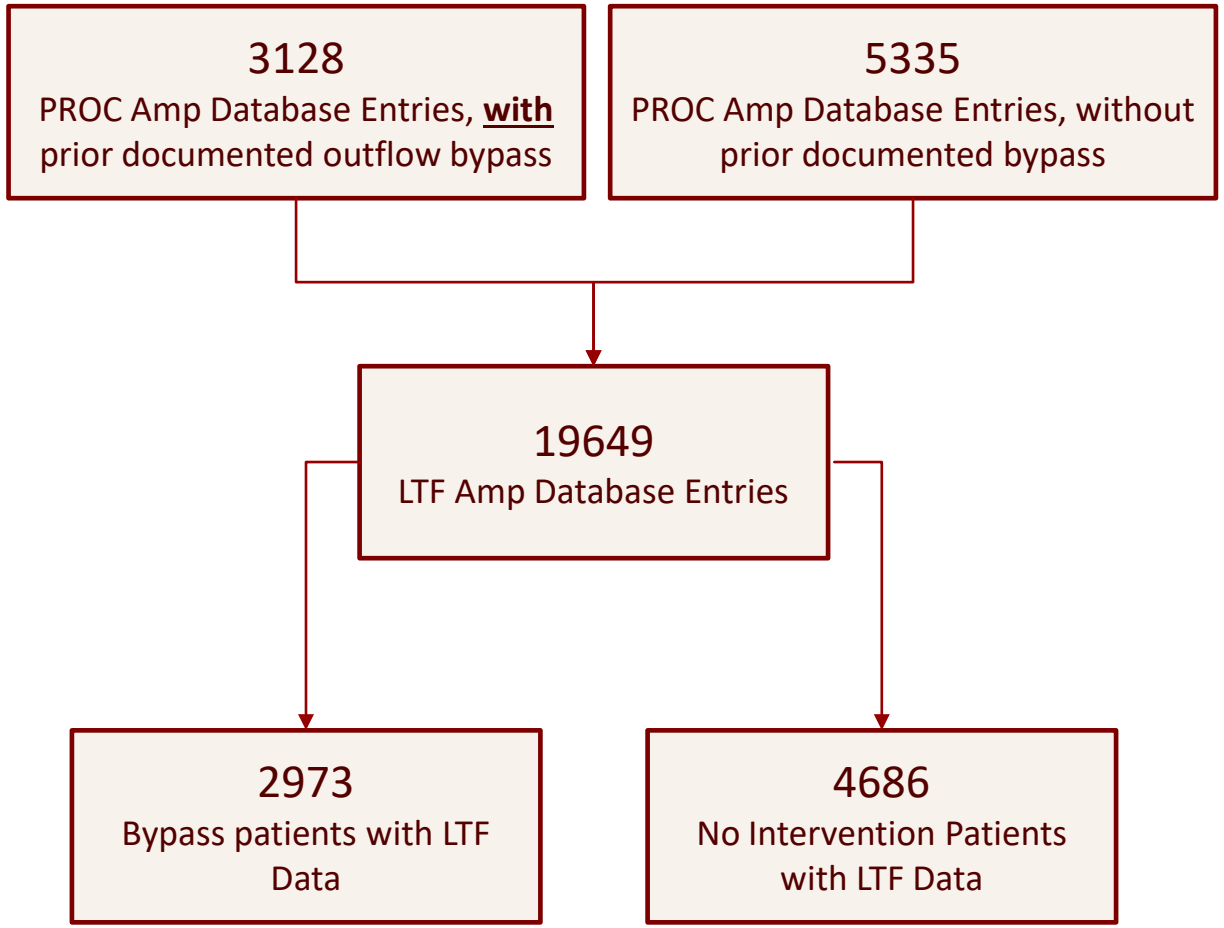
No differences were noted between non-autologous conduit and vein conduit

	Non-autologous Conduit (n = 798)	Vein Conduit (n = 837)	p-value
Post-op Complication (%)	15 (n = 120)	12.8 (n = 107)	p = 0.21
Surgical Site Infection (%)	2 (n = 16)	1.2 (n = 10)	p = 0.26
Return to the OR (%)	7.1 (n = 57)	6.6 (n = 55)	p = 0.72

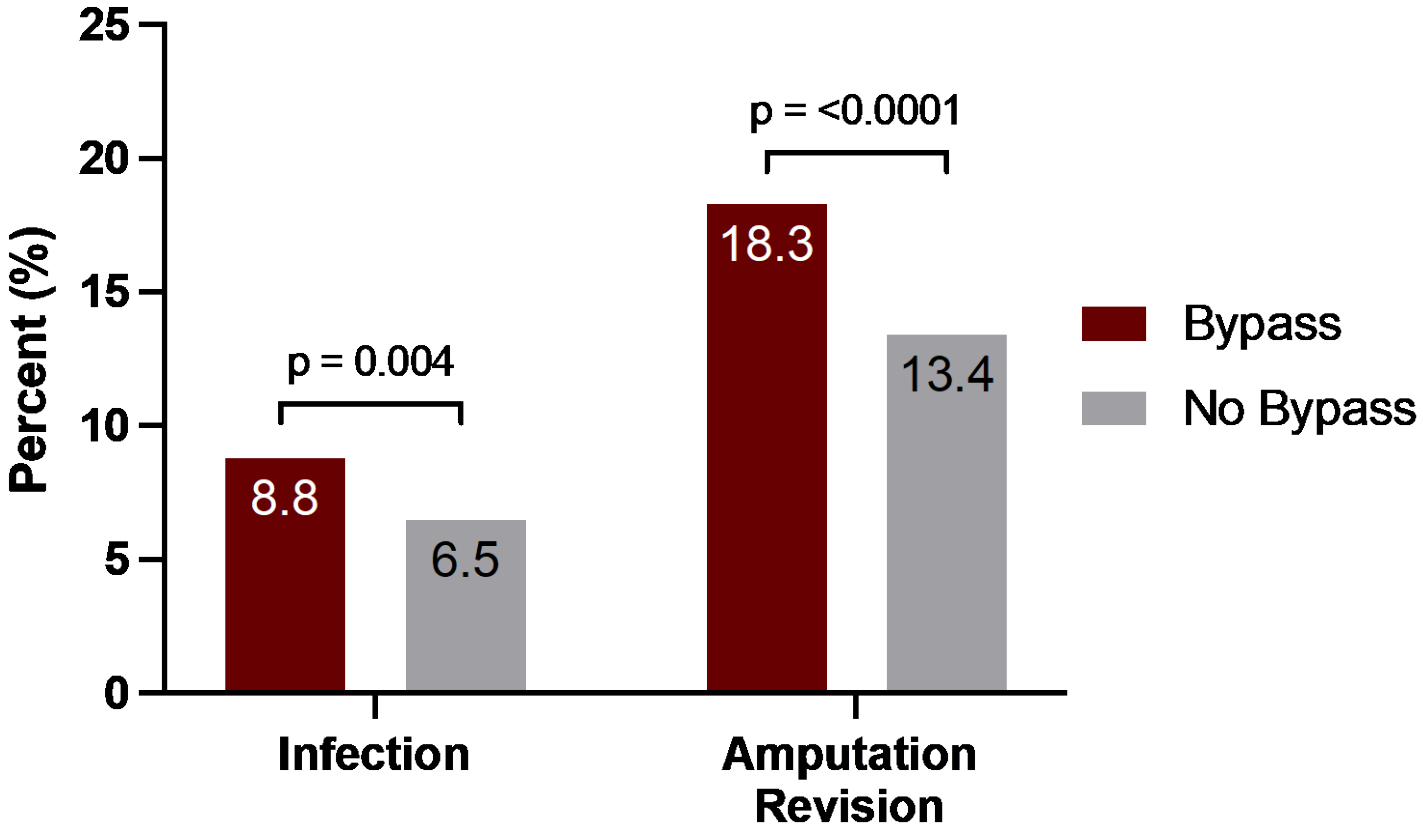


How does this data change over time, using the long-term follow up dataset?

LTF Data Selection



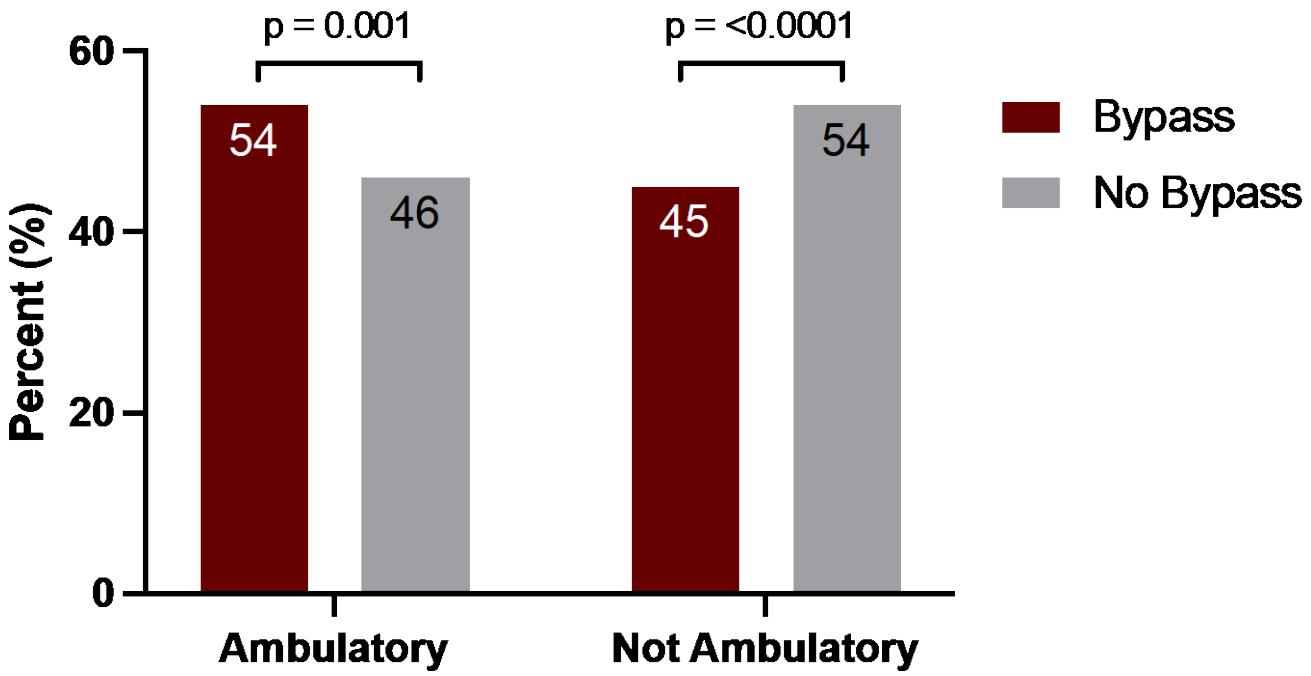
Long-term data shows an increase in infection *and* revision for patients with a prior bypass



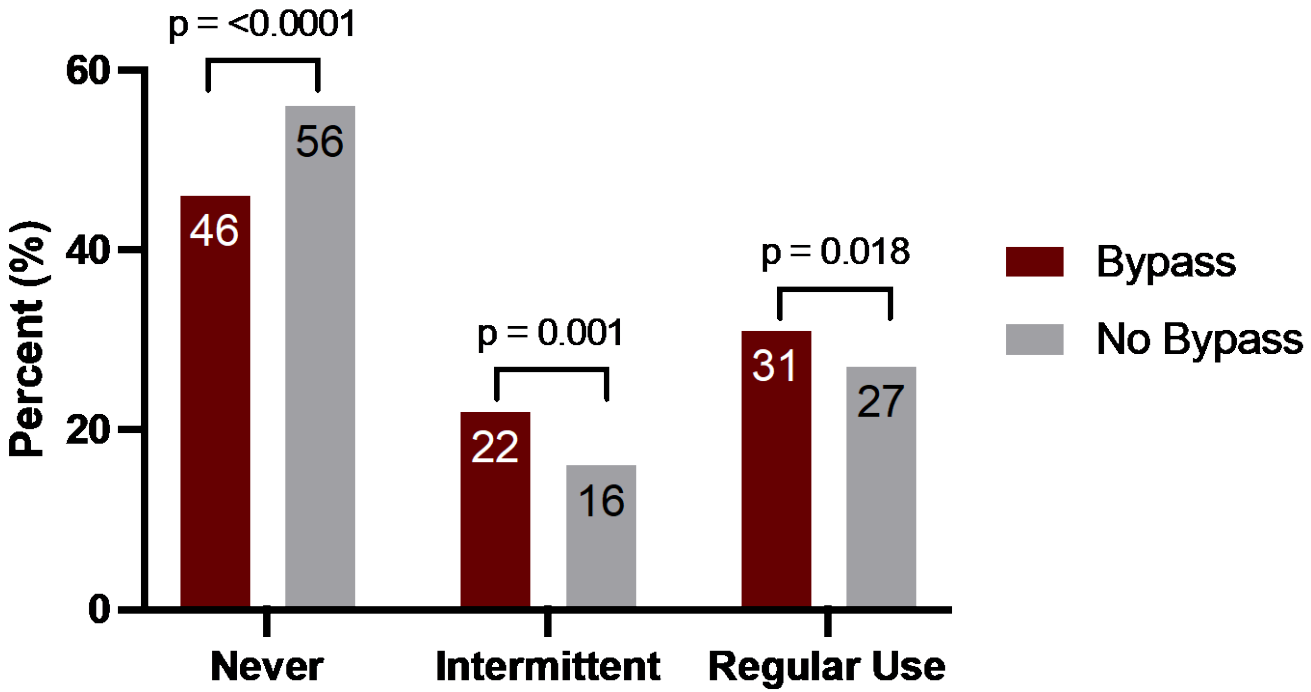
Indication For Revision

		Bypass (n = 2694) n = 314*	No Bypass (n = 4686) n = 346*	p-value
Indication for Revision	Non-healing (%)	56 (n = 177)	62 (n = 216)	0.0018
	Infection (%)	26 (n = 84)	26 (n = 90)	0.9
	Progression of Disease (%)	16.8 (n = 53)	11.5 (n = 40)	0.064

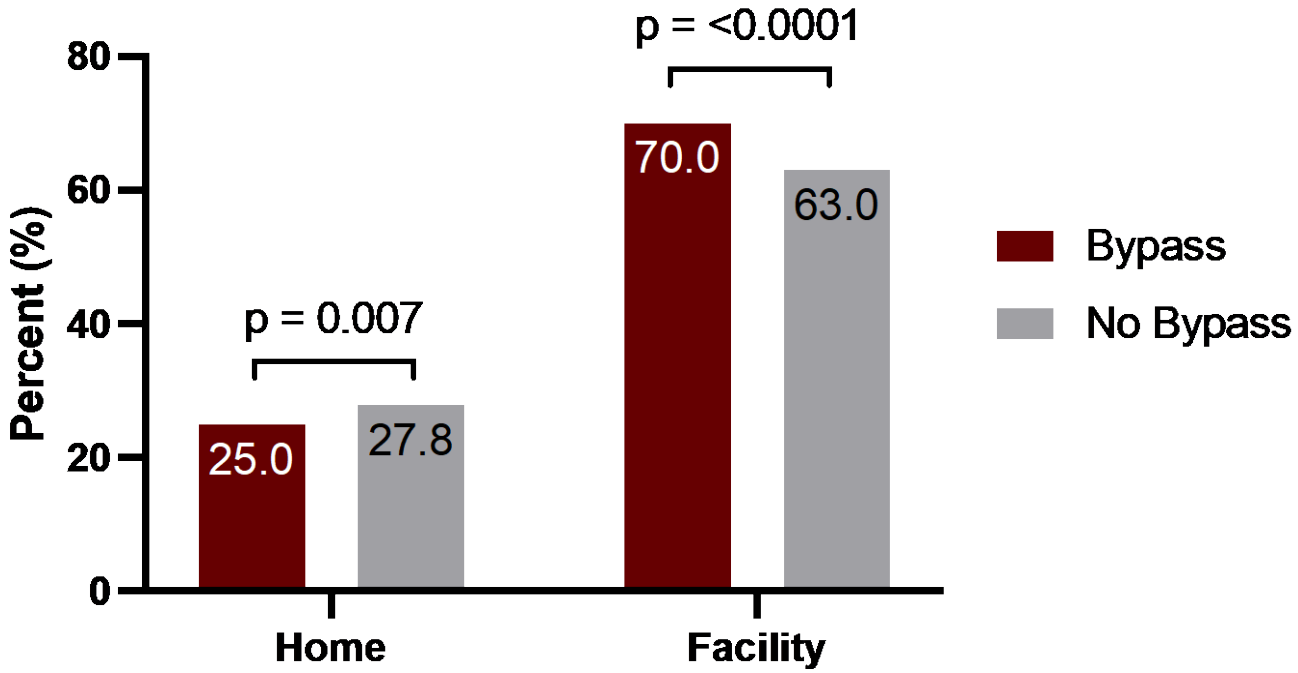
Patients with prior bypasses are more likely to be ambulatory at long-term follow-up and..



Patients with prior bypasses are more likely to be ambulatory at long-term follow-up and.. they are more likely to be using a prosthetic



More prior bypass patients are discharged to an acute rehab or nursing facility after undergoing lower extremity amputation



Limitations

- Patient population is limited to available VQI data
- Limited specialty data
  - No orthopedic contribution to amputation population, possibly skewing toward sicker overall population in VQI
- Limited intraoperative procedural data
  - Bypass patency and removal

Conclusions

Procedural:

Post-operative complication is higher in amputees without prior bypass, namely cardiac dysrhythmias

Surgical site infection is higher in amputees with prior bypass surgeries

LTF:

Patients with prior bypass grafts were more likely to use a prosthetic and be ambulatory at LTF, despite a higher rate of long-term infection and revision

Ongoing work / future studies:

Revisit original question with institutional operative reports

QUESTIONS

Thank you's:

Kyla Bennett

John Rectenwald

Betsy Wymer