# Differential Rates and Clinical Significance of Periprocedural Myocardial Infarction After Stenting or Bypass Surgery for Multivessel Coronary Disease According to Various Definitions

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# COI Disclosure

***Name of First Author: Min Soo Cho***

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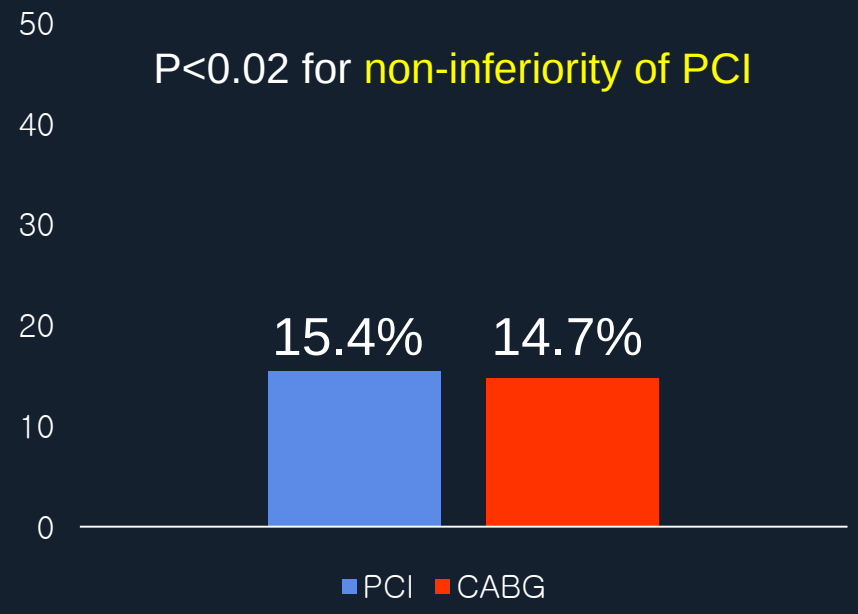
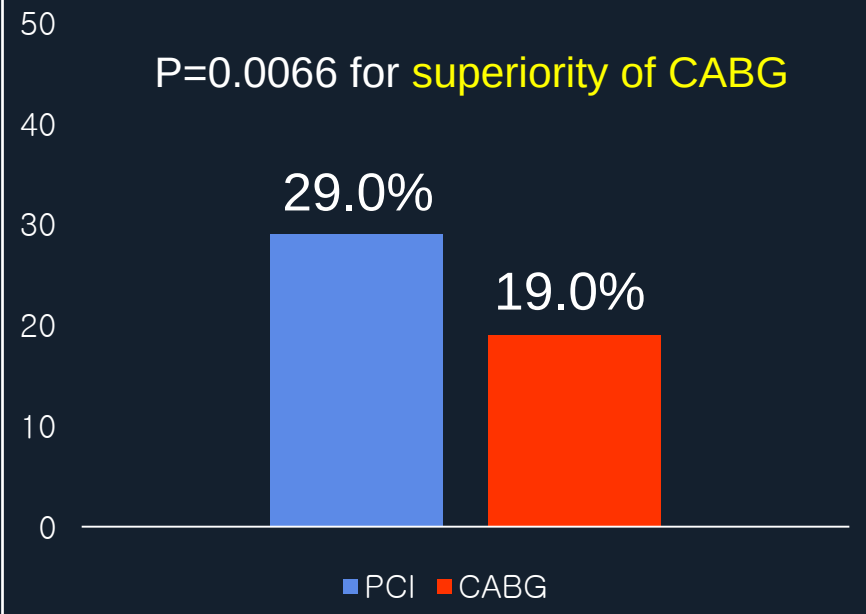
# Background

- Recent clinical trials comparing PCI vs. CABG adopted a composite endpoint consisted of death, MI and CVA.
- However, definition of MI has considerably varied, and uniform criteria are still unsettled.
- Especially, non-uniform definition of periprocedural MI can penalize the one specific group and lead to an imprecise estimate of the relative treatment effects of PCI and CABG.

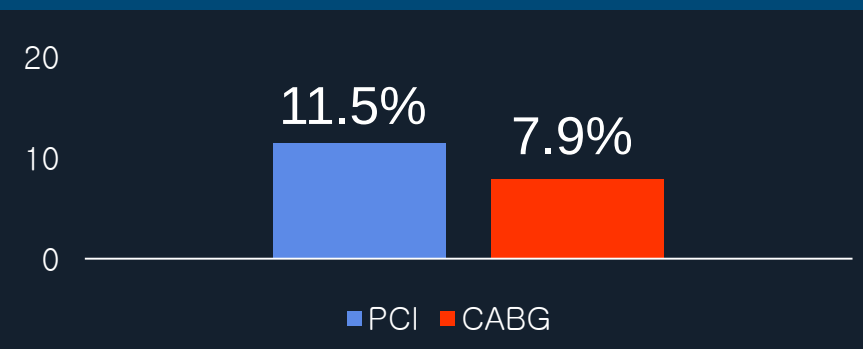
# EXCEL vs. NOBLE

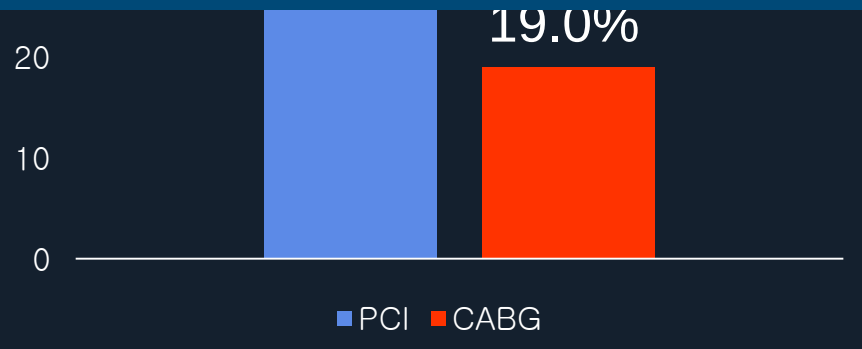
| Death, MI (Procedural or non-procedural),and Stroke<br><br>at 3 years | Death, MI (non-procedural), stroke, and any revascularization<br><br>at 5 years |
|---|---|
|  |  |

# EXCEL vs. NOBLE

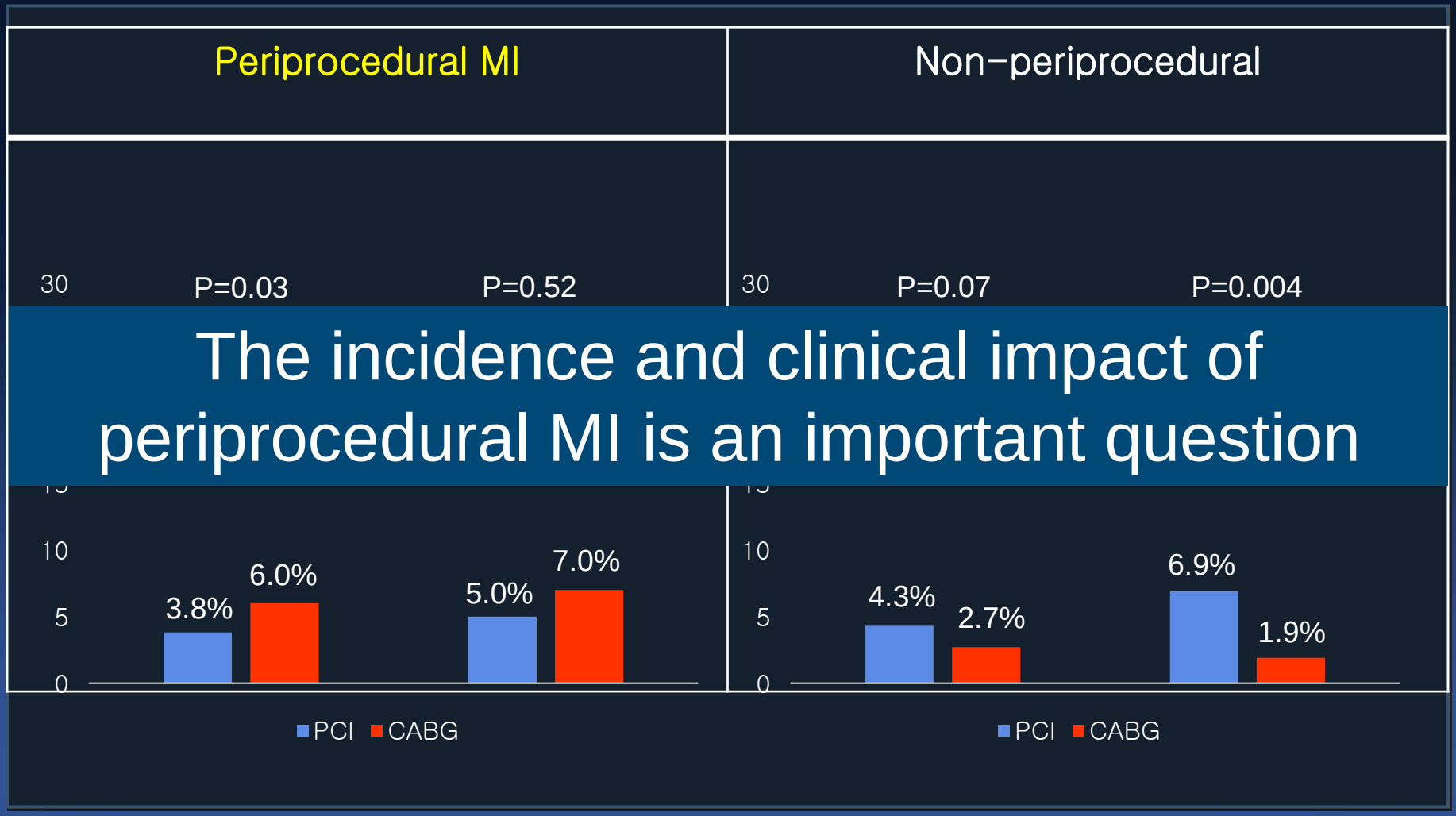
| Death, MI (~~Procedural or~~ non-procedural),and Stroke<br><br>during 30 days – 3 years | Death, MI (non-procedural), stroke, and any revascularization<br><br>at 5 years |
|---|---|

The primary composite endpoint is very sensitive to the definition of MI



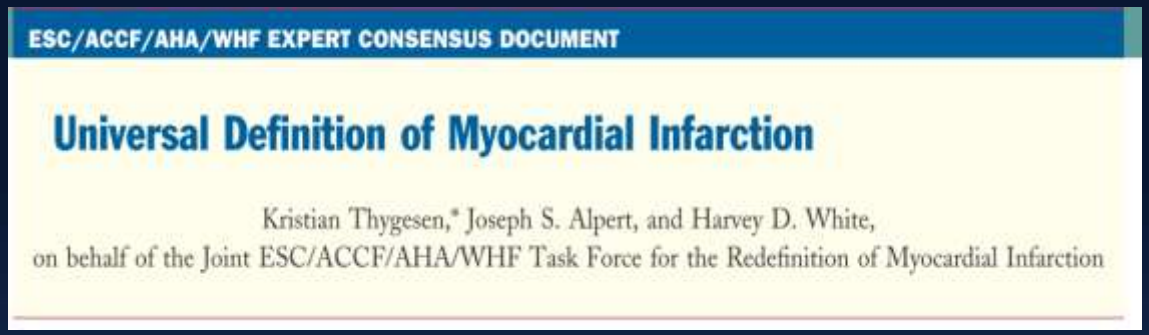



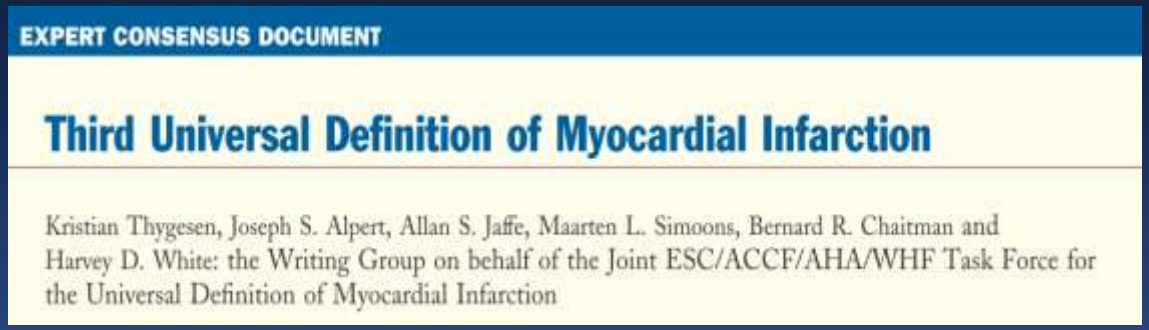
# Myocardial infarction in EXCEL and NOBLE

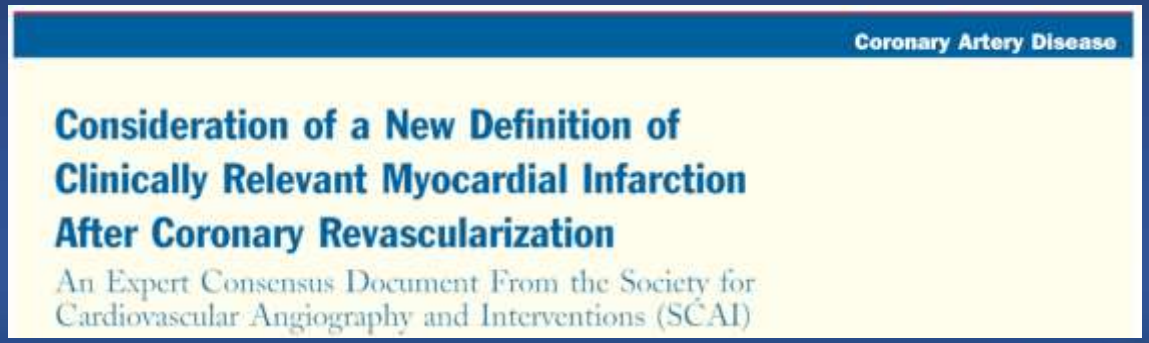



The incidence and clinical impact of periprocedural MI is an important question

# Peri-MI definitions



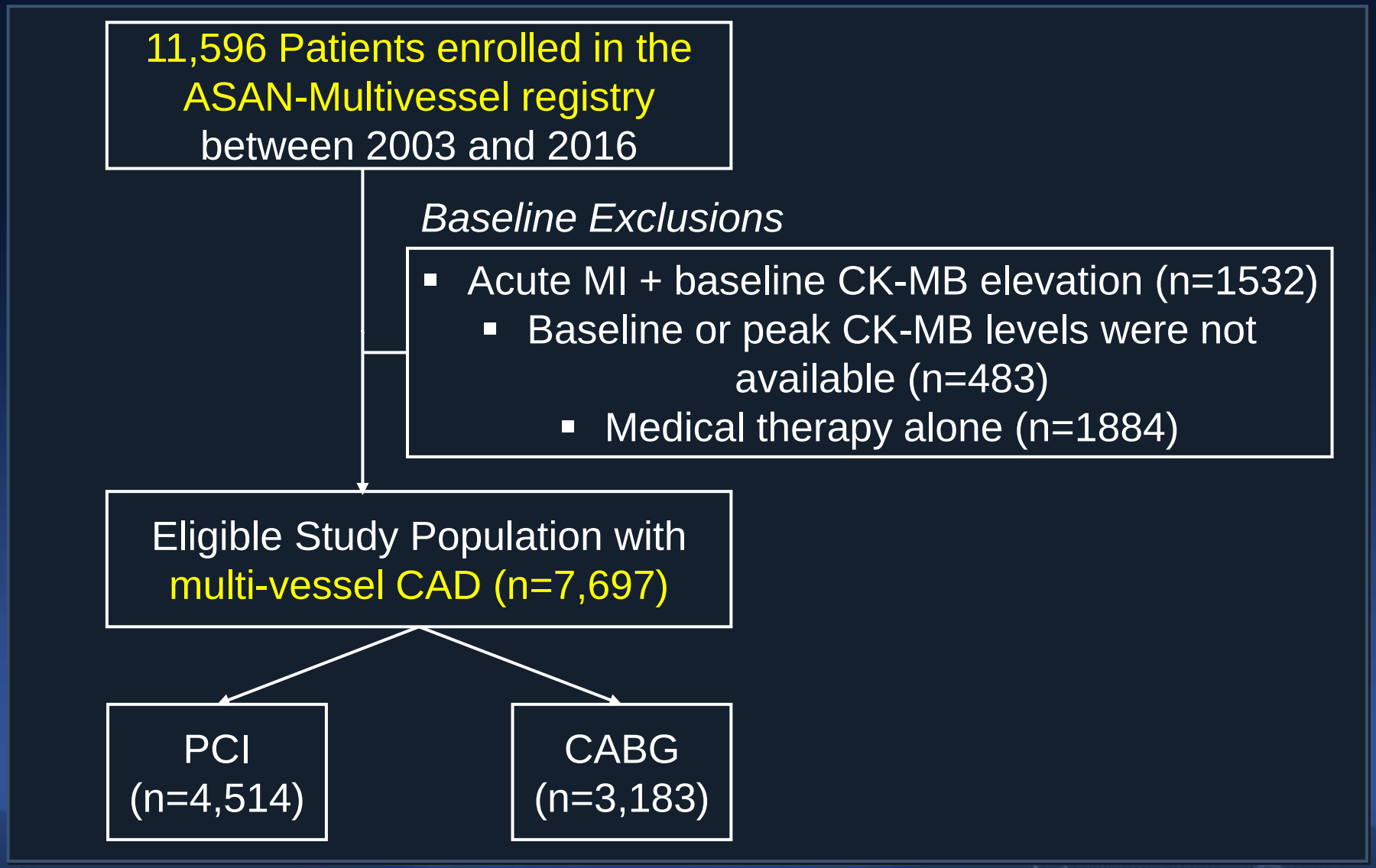



# Objective

- We estimated the differential incidence and prognostic significance of periprocedural MI potentially affected by different criteria.

# Methods

# Study Population



# Diagnosis of peri-procedural MI

- Routine measurements of CK-MB (mass assay) were performed in all patients who underwent PCI or CABG
- All of the criteria of each MI definitions were applicated strictly beyond CK-MB level.
- 2nd universal definition of (2nd) peri-MI
  - PCI : CK-MB > 3xURL
  - CABG : CK-MB >5xURL + ECG (Q or LBBB)
- 3rd universal definition of (3rd) peri-MI
  - PCI : CK-MB > 5xURL + ECG or Imaging or CAG criteria
  - CABG : CK-MB > 10xURL + ECG or Imaging or CAG criteria
- SCAI definition of peri-MI
  - PCI or CABG :
    - CK-MB > 10xURL
    - CK-MB > 5xURL + ECG (Q or LBBB)

# Revascularization

- The revascularization method was chosen at the discretion of the treating physicians.
- PCI procedures were performed according to standardized guidelines.
- The aspirin was continued indefinitely and ADP inhibitors were continued until 1 month for BMS and 12 months for DES.
- Surgical revascularization was performed using standard bypass procedures.
- The graft was selected by the attending surgeon. Whenever possible, the LIMA was used to revascularize the LAD.

# Study outcome

Primary outcome

- Major cardiovascular events (MCE)
  - Death from cardiovascular causes and spontaneous MI

Secondary outcome

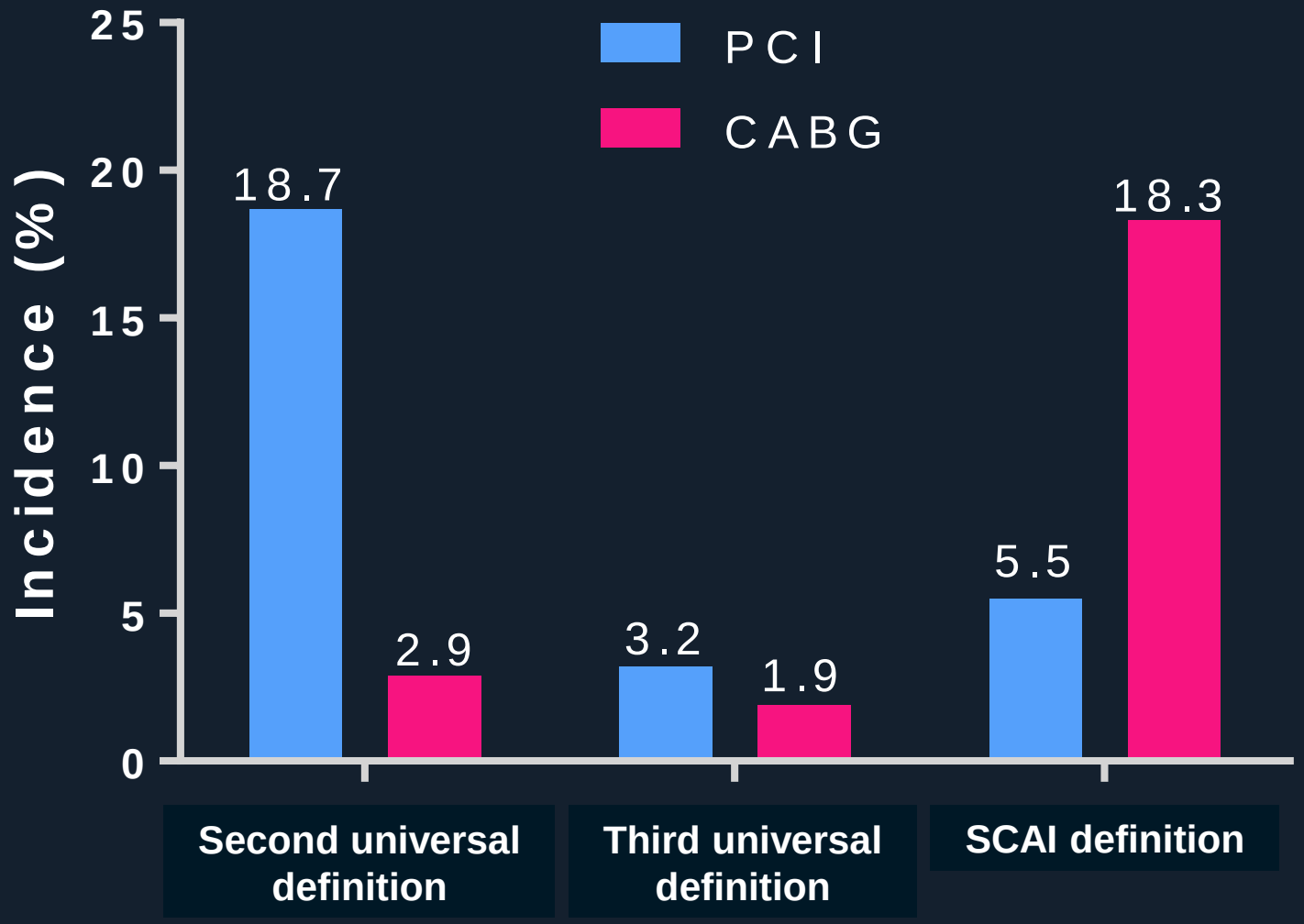
- All cause death

# Results

# Baseline Clinical Characteristics

| Characteristic | PCI (N = 4514) | CABG (N = 3183) | P Value |
|---|---|---|---|
| Age (years) | 63.0 ± 9.6 | 63.4 ± 8.9 | 0.05 |
| Male sex | 3248 (72.0) | 2336 (73.4) | 0.17 |
| Diabetes | 1597 (35.4) | 1391 (43.7) | <0.001 |
| Prior MI | 299 (6.6) | 294 (9.2) | <0.001 |
| Congestive heart failure | 77 (1.7) | 109 (3.4) | <0.001 |
| Renal failure | 144 (3.2) | 139 (4.4) | 0.008 |
| Unstable angina | 1553 (34.4) | 1702 (53.5) | <0.001 |
| 2VD | 2802 (62.1) | 656 (20.6) | <0.001 |
| 3VD | 1712 (37.9) | 2527 (79.4) | |
| Left main disease | 696 (15.4) | 984 (30.9) | <0.001 |
| CTO | 225 (5.0) | 316 (9.9) | <0.001 |

# Incidence of peri-MI according to the definition

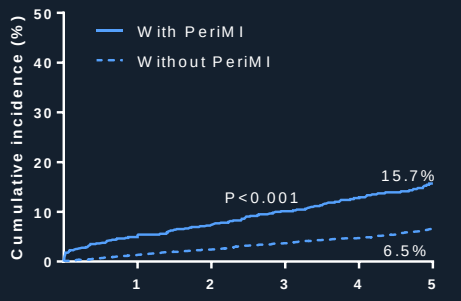


# Unadjusted Kaplan-Meier Curve

## Major Cardiovascular Events

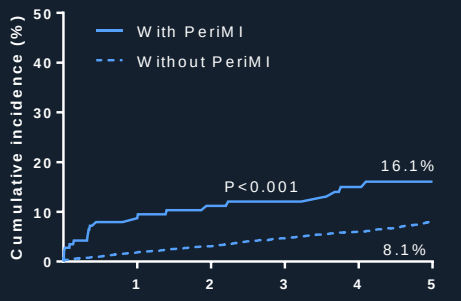
### (A) PCI Stratum

**Second universal definition of MI**



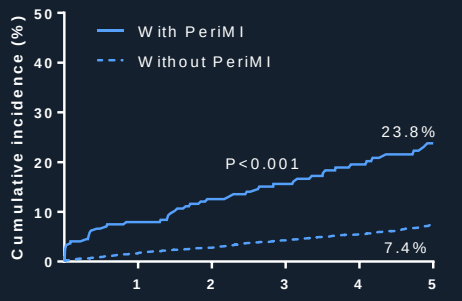

| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 842 | 719 | 637 | 558 | 459 | 368 |
| Without PeriMI | 3672 | 3121 | 2772 | 2447 | 2035 | 1661 |

**Third universal definition of MI**




| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 145 | 119 | 104 | 94 | 81 | 71 |
| Without PeriMI | 4369 | 3721 | 3305 | 2911 | 2413 | 1958 |

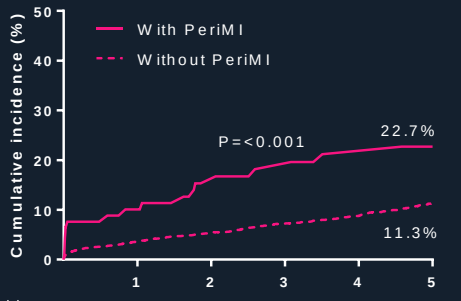
**SCAI definition of MI**




| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 248 | 210 | 179 | 160 | 127 | 100 |
| Without PeriMI | 4266 | 3630 | 3230 | 2845 | 2367 | 1929 |

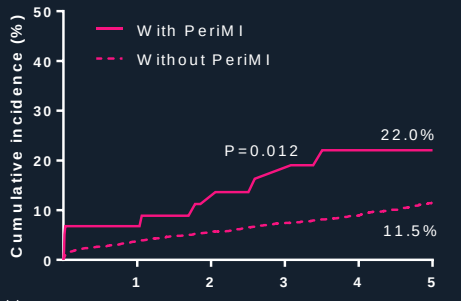
### (B) CABG Stratum

**Second universal definition of MI**



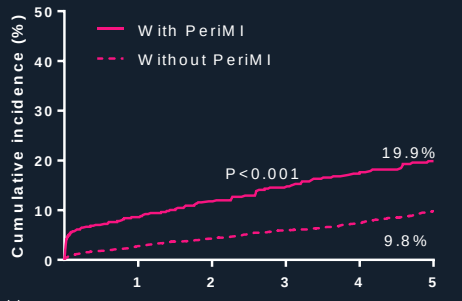

| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 92 | 72 | 62 | 56 | 51 | 48 |
| Without PeriMI | 3091 | 2578 | 2261 | 1995 | 1726 | 1453 |

**Third universal definition of MI**




| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 59 | 45 | 37 | 31 | 26 | 25 |
| Without PeriMI | 3124 | 2578 | 2261 | 1995 | 1726 | 1453 |

**SCAI definition of MI**



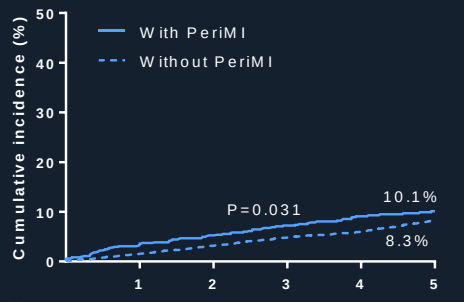

| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 582 | 454 | 398 | 351 | 305 | 271 |
| Without PEriMI | 2601 | 2196 | 1925 | 1700 | 1472 | 1230 |

# Unadjusted Kaplan-Meier Curve

## All cause death

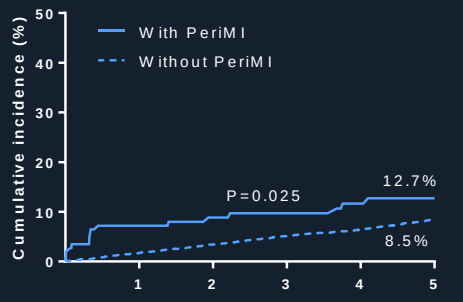
### (A) PCI Stratum

**Second universal definition of MI**



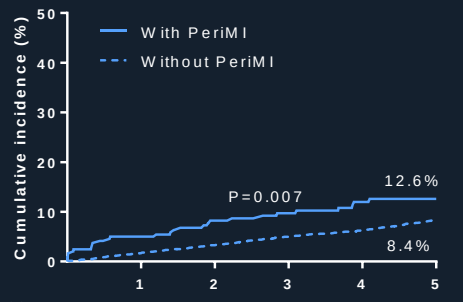

| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 842 | 736 | 661 | 585 | 487 | 401 |
| Without PeriMI | 3672 | 3125 | 2775 | 2451 | 2041 | 1668 |

**Third universal definition of MI**




| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 145 | 122 | 109 | 99 | 86 | 75 |
| Without PeriMI | 4369 | 3728 | 3326 | 2917 | 2443 | 1994 |

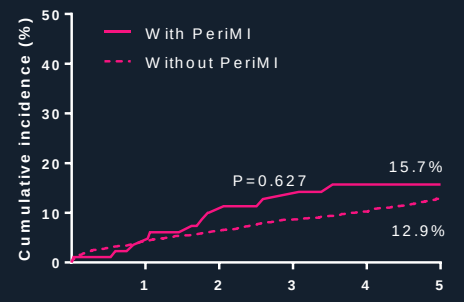
**SCAI definition of MI**




| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 248 | 219 | 192 | 175 | 144 | 119 |
| Without PeriMI | 4266 | 3654 | 3243 | 2863 | 2387 | 1950 |

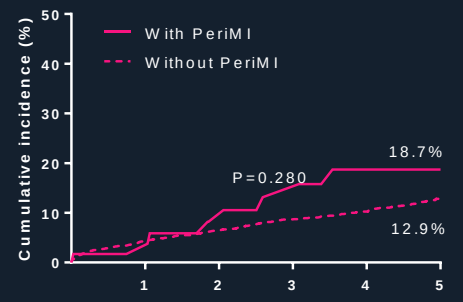
### (B) CABG Stratum

**Second universal definition of MI**



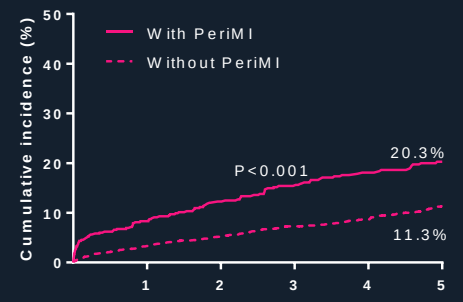

| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 92 | 78 | 68 | 62 | 57 | 54 |
| Without PeriMI | 3091 | 2593 | 2275 | 2008 | 1742 | 1470 |

**Third universal definition of MI**



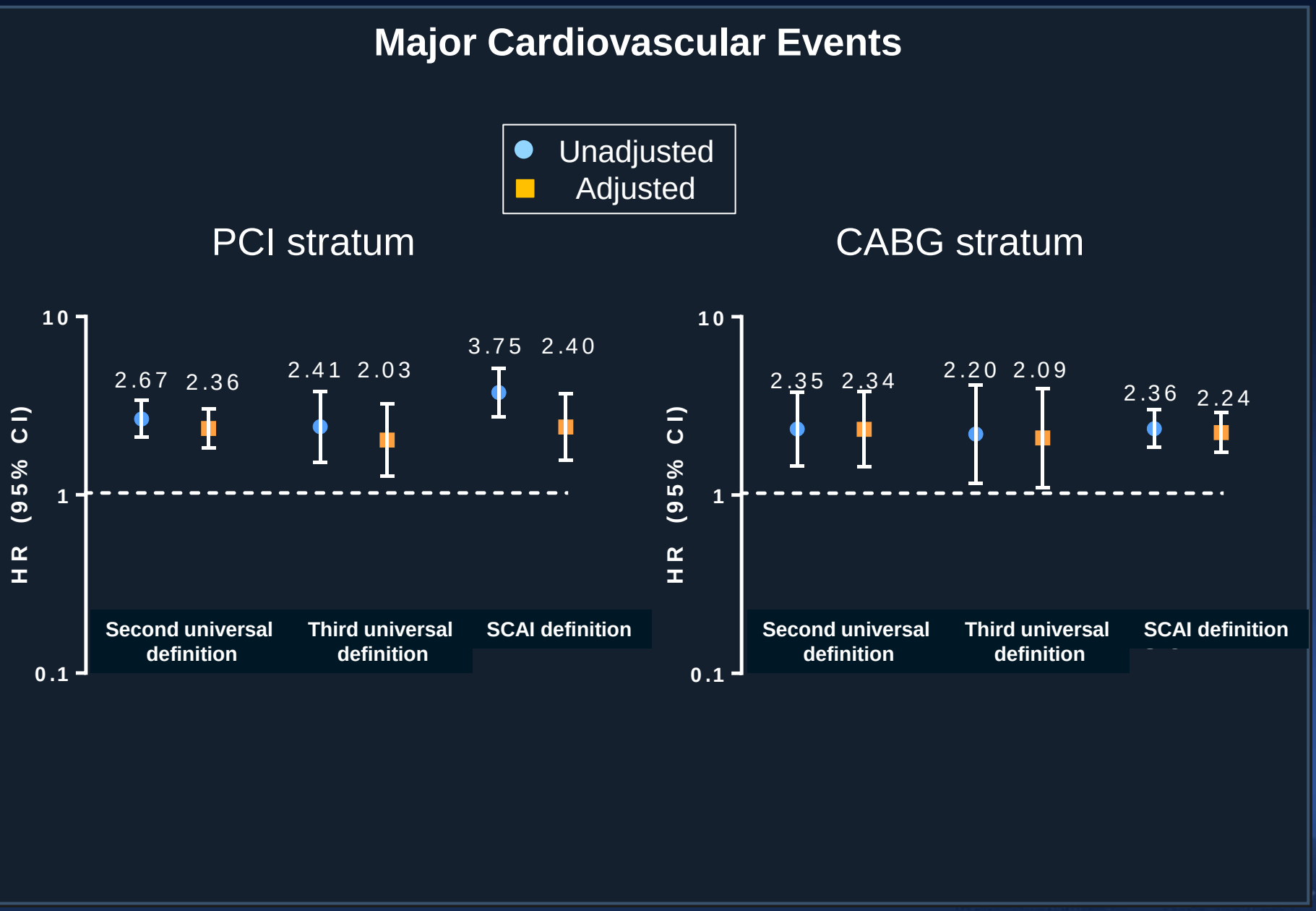

| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 59 | 48 | 40 | 34 | 29 | 27 |
| Without PeriMI | 3124 | 2621 | 2303 | 2036 | 1770 | 1497 |

**SCAI definition of MI**

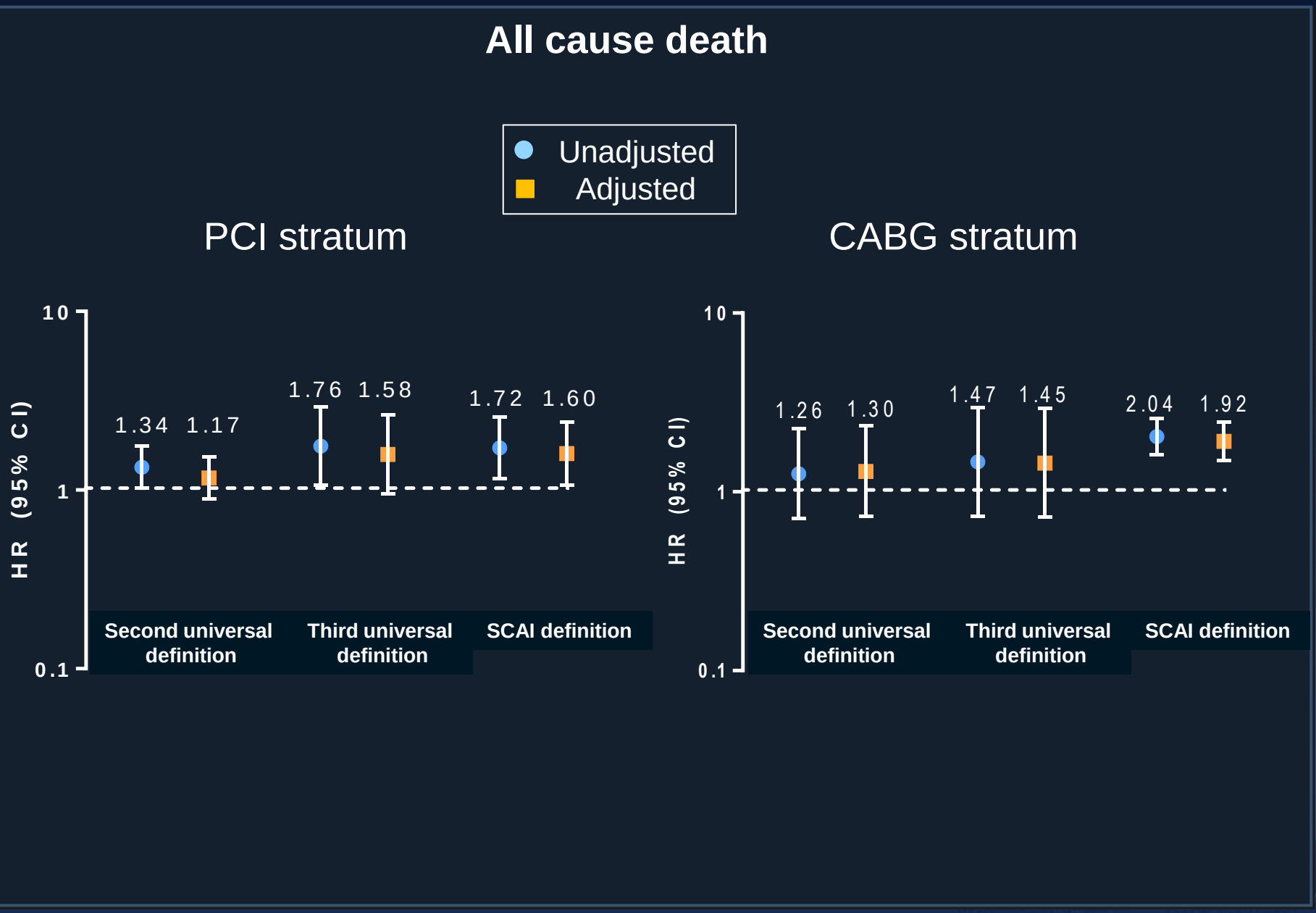



| Number at risk | | | | | | |
|---|---|---|---|---|---|---|
| With periMI | 582 | 464 | 408 | 360 | 314 | 281 |
| Without PEriMI | 2601 | 2205 | 1935 | 1710 | 1484 | 1243 |

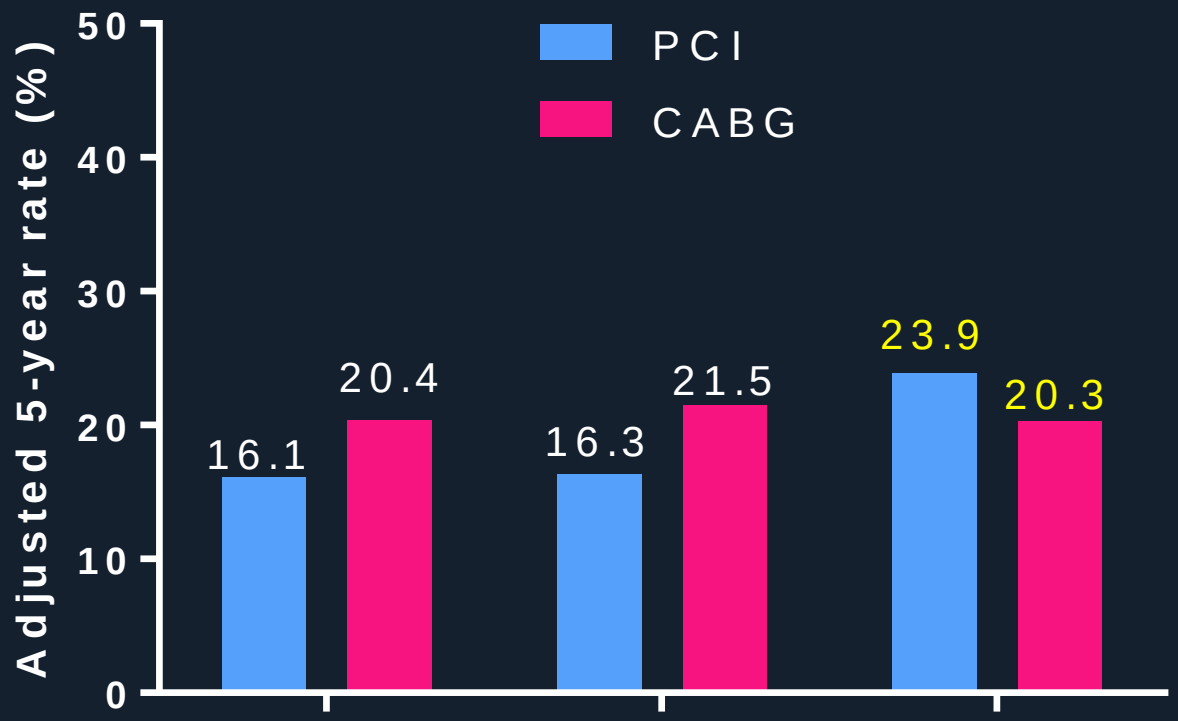
# Unadjusted and adjusted hazard ratio



# Unadjusted and adjusted hazard ratio

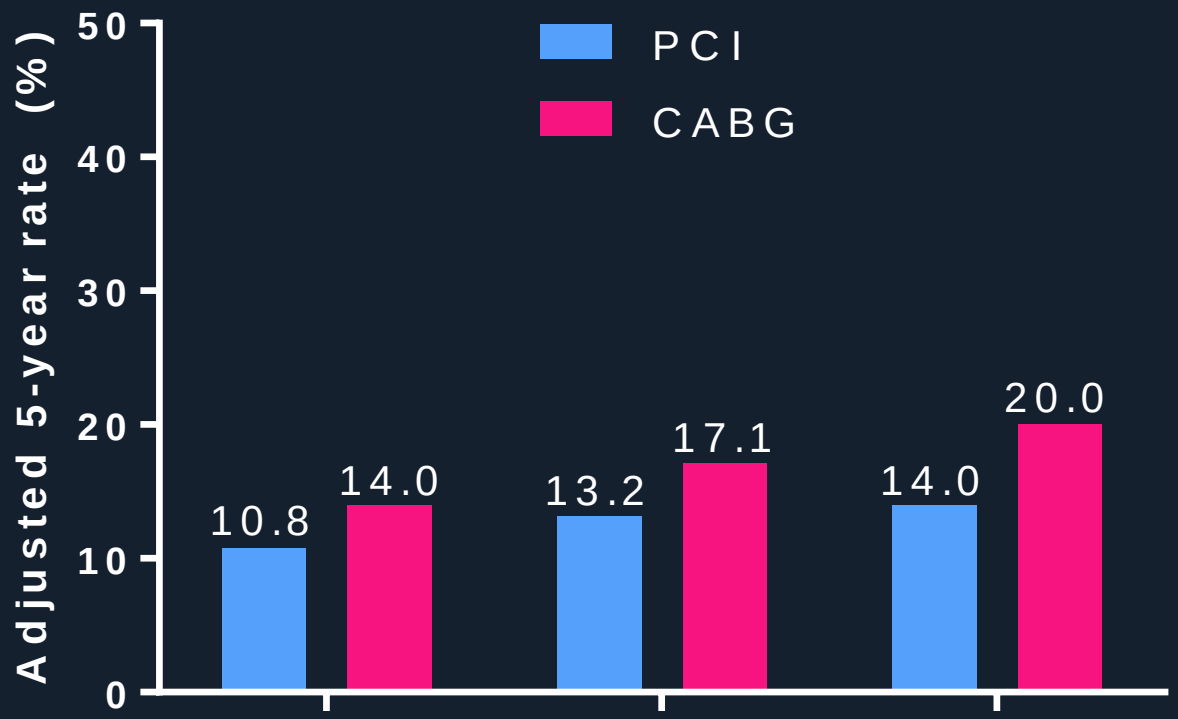


# Adjusted 5-year event rate after peri-MI




| | Second universal definition | Third universal definition | SCAI definition |
|---|---|---|---|
| Hazard ratio | 0.79 (0.44-1.42) | 0.71 (0.29-1.74) | 1.50 (1.02-2.20) |

# Adjusted 5-year event rate after peri-MI




| | | | |
|---|---|---|---|
| Hazard ratio | 0.63 (0.30-1.29) | 0.66 (0.22-2.01) | 0.74 (0.47-1.17) |
| | Second universal definition | Third universal definition | SCAI definition |

# Conclusion

- There were substantial differences in incidence and prognostic impact of periprocedural MI after PCI and CABG according to various definitions of MI.
- Further research warrants to implement more applicable definition of periprocedural MI not penalizing a specific revascularization group.