



***Does PCI Reduce Mortality?  
A Meta-Analysis of 17 Studies Comparing  
PCI vs. Medical Therapy***

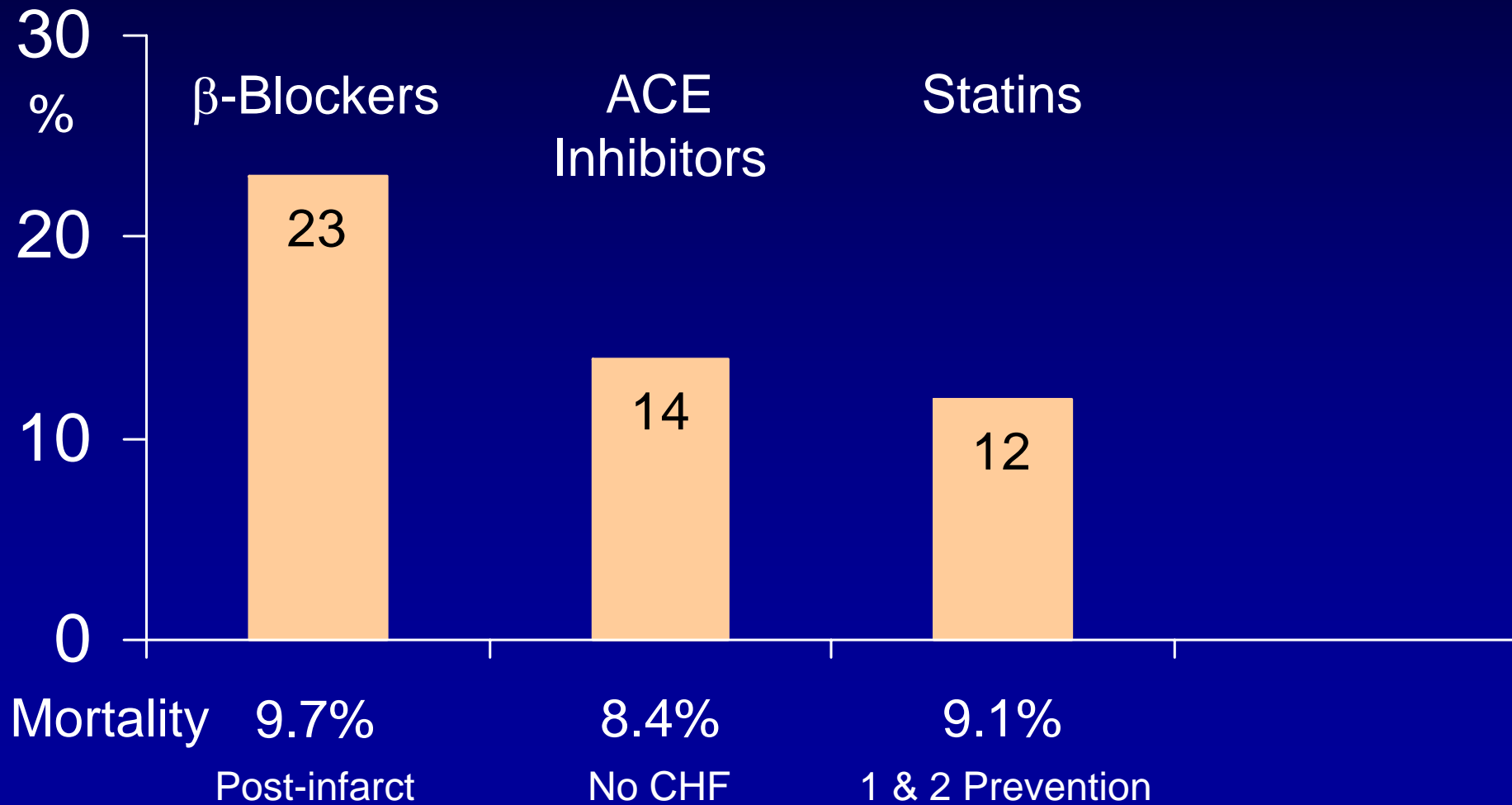
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# Reduction in Mortality With Modern Therapies in Patients With CAD



*Dagenais et al, Lancet 2006*  
*Freemantle et al, BMJ 1999*  
*CCT Coll, Lancet 2005*



# Spectrum of Clinical Presentation of Patients with CAD

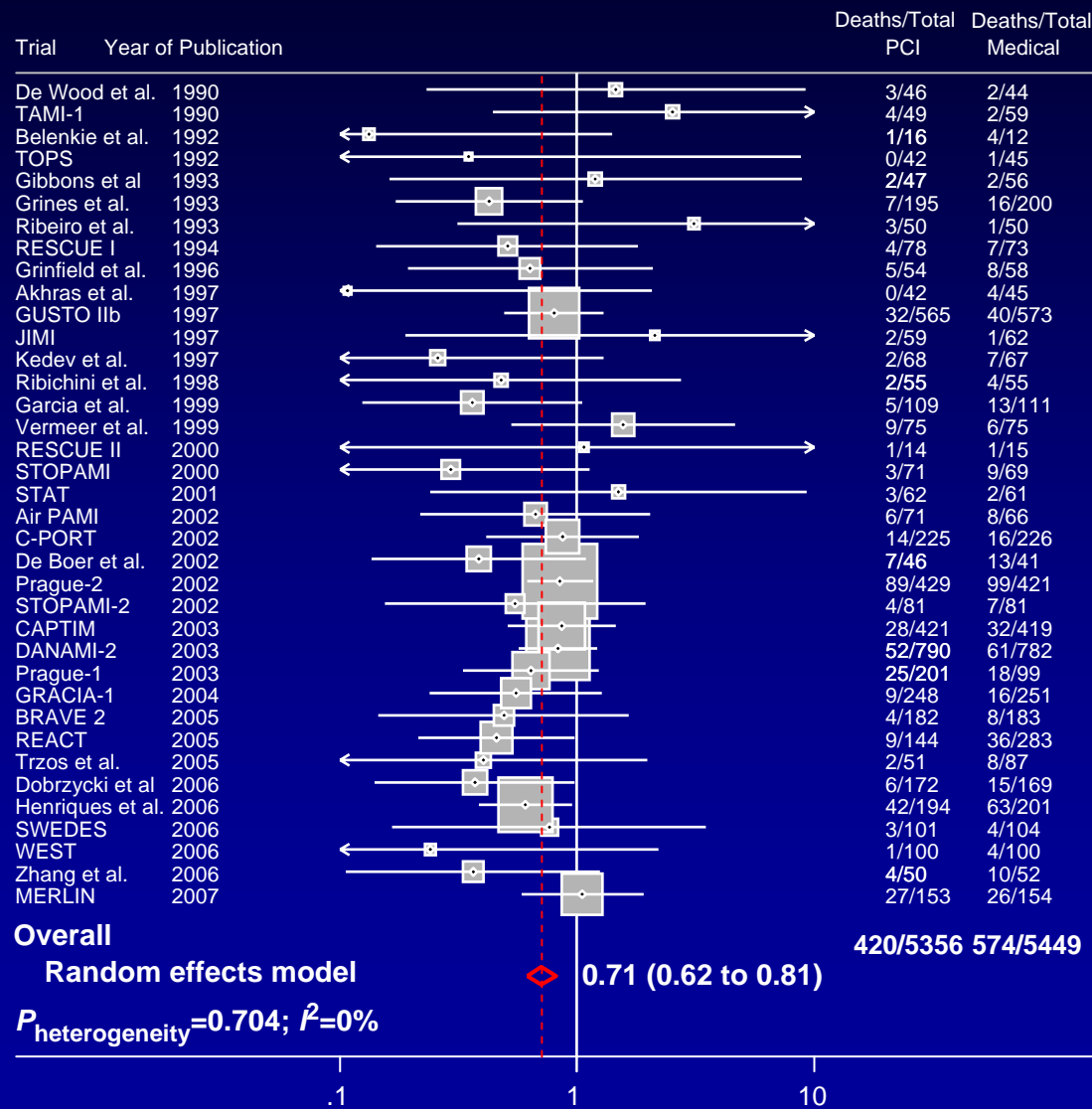


- STEMI
- NSTEMI Acute Coronary Syndromes
- Stable CAD

# PCI vs. Medical Treatment (incl. Lysis) in STEMI: Mortality



37 Trials  
10 805 Pts

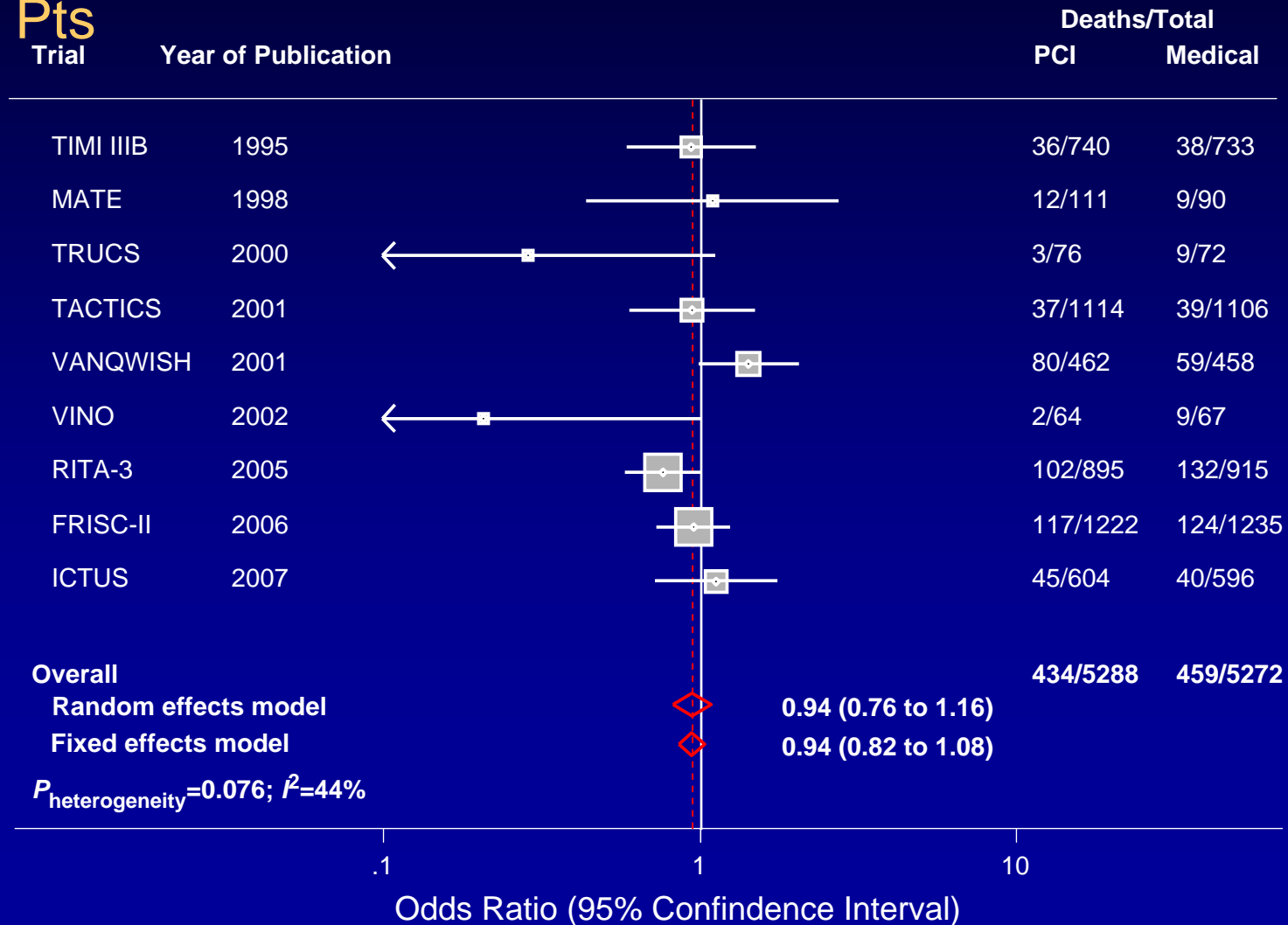


# PCI vs. Medical Treatment in NSTEMI ACS: Mortality



9 Trials

10 560 Pts



# Spectrum of Clinical Presentation of Patients with ACS



- STEMI
- NSTEMI Acute Coronary Syndromes
- Stable CAD

# Better Relief of Angina by PCI



Trial	QOL	Angina	ETT
ACME	PCI better	PCI better	PCI better
ACME 2	↔	↔	↔
MASS		PCI better	
ACIP		PCI better	PCI better
RITA 2	PCI better	PCI better	
AVERT	PCI better	PCI better	PCI better
MASS II	PCI better	PCI better	
TIME	PCI better	PCI better	PCI better

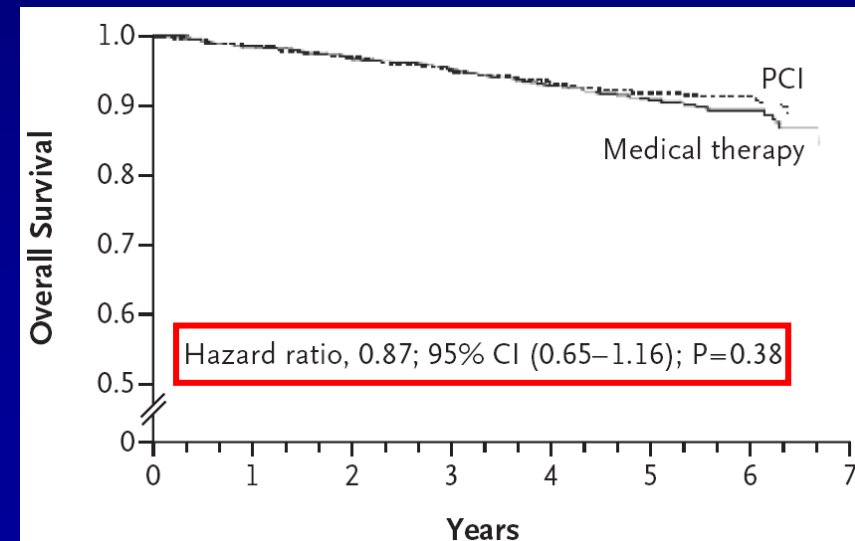
# Does PCI Improve Survival in Stable CAD? - The Most Recent Anti-PCI Courage -



## The NEW ENGLAND JOURNAL of MEDICINE

### Optimal Medical Therapy with or without PCI for Stable Coronary Disease

William E. Boden, M.D., Robert A. O'Rourke, M.D., Koon K. Teo, M.B., B.Ch., Ph.D., Pamela M. Hartigan, Ph.D., David J. Maron, M.D., William J. Kostuk, M.D., Merrill Knudtson, M.D., Marcin Dada, M.D., Paul Casperson, Ph.D., Crystal L. Harris, Pharm.D., Bernard R. Chaitman, M.D., Leslee Shaw, Ph.D., Gilbert Gosselin, M.D., Shah Nawaz, M.D., Lawrence M. Title, M.D., Gerald Gau, M.D., Alvin S. Blaustein, M.D., David C. Booth, M.D., Eric R. Bates, M.D., John A. Spertus, M.D., M.P.H., Daniel S. Berman, M.D., G.B. John Mancini, M.D., and William S. Weintraub, M.D., for the COURAGE Trial Research Group\*







To assess and compare long-term outcomes in randomized trials of

PCI

vs.

Medical therapy

in patients with stable CAD



## Inclusion criteria

- Randomized trials comparing a PCI-based invasive treatment strategy with a medical treatment strategy in patients with CAD.
- Search Period Jan 1, 1980 through August 20, 2007.

## Exclusion criteria

- Acute coronary syndromes (with or without ST-segment elevation on ECG, with or without troponin or cardiac enzyme elevations) within the first one week from presentation.
- Lack of symptoms or signs of myocardial ischemia.



## Outcomes of Interest:

### **Primary End Point**

- All-cause death

### **Secondary End Points**

- Cardiac Death
- MI

# Does PCI Improve Survival in Stable CAD?

## - Available Evidence -



### 17 Trials with 7513 Pts

<i>Study</i>	<i>Enrollment</i>	<i>Year of Publication</i>	<i>No of Pts</i>
Sievers et al.	NA	1993	88
ACME-1	1987-1990	1997	227
ACME-2	1987-1990	1997	101
ACIP	1991-1993	1997	558
Dakik et al.	1995-1996	1998	44
AVERT	1995-1996	1999	341
MASS	1988-1991	1999	144
Bech et al.	NA	2001	181
ALKK	1994-1997	2003	300
RITA-2	1992-1996	2003	1018
TIME	1996-2000	2004	301
Hambrecht et al.	1997-2001	2004	101
DANAMI	1990-1994	2006	1008
INSPIRE	1999-2002	2006	205
MASS II	1995-2000	2006	408
SWISSI II	1991-1997	2007	201
COURAGE	1999-2004	2007	2287
<b>Total</b>			<b>7513</b>

# Does PCI Improve Survival in Stable CAD?

## - Available Evidence -



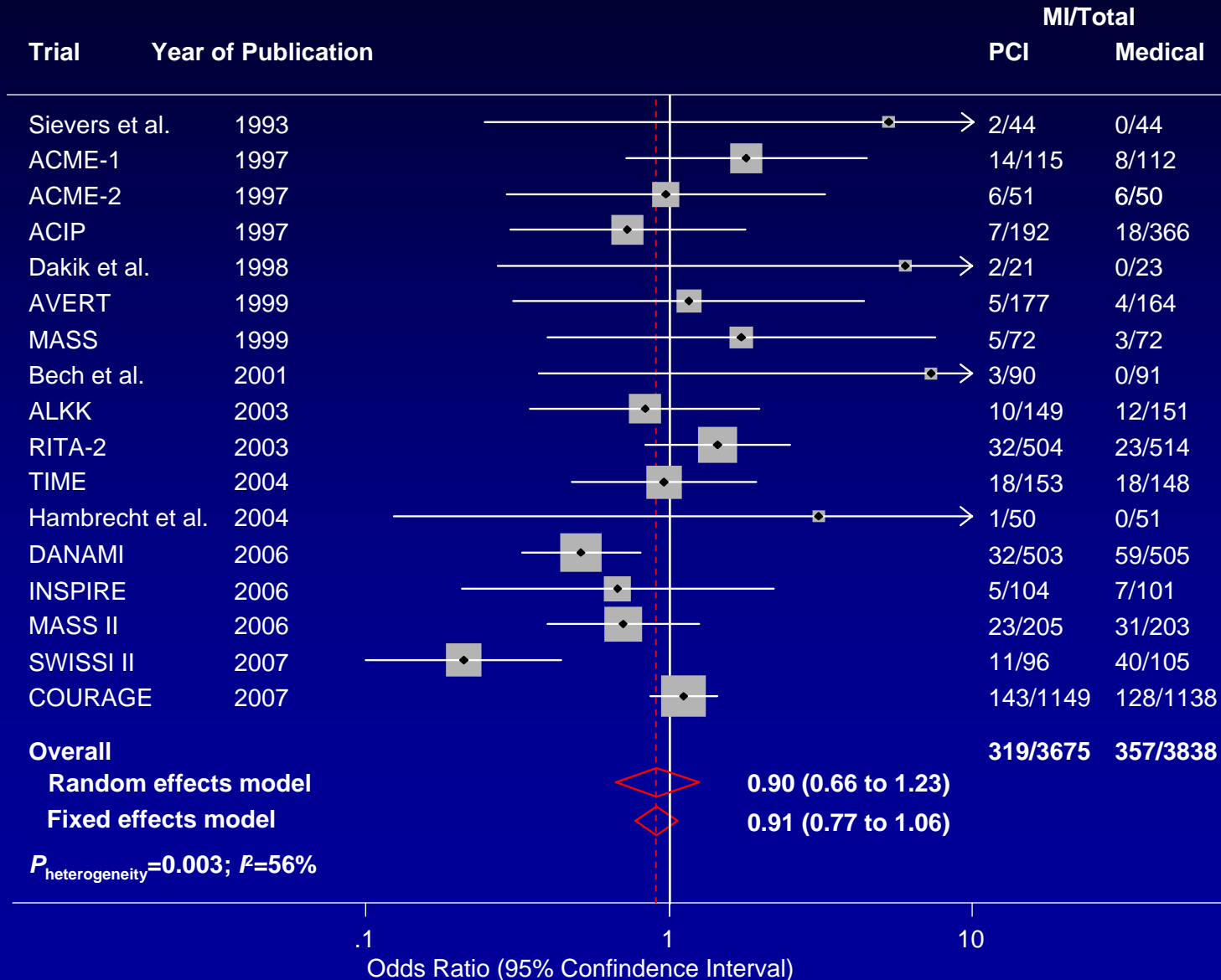
### 17 Trials with 7513 Pts

Study	Age	Women	Prior MI	Protocol PCI (CABG) in the PCI Group	Stents in the PCI Group	Non-protocol PCI (CABG) in the Medical Group	Months of FU
Sievers et al.	56	NR	55	100 (0)	0	20 (5)	24
ACME-1	60	0	34	96 (0)	0	41 (11)	60
ACME-2	60	0	45	100 (0)	0	40 (30)	60
ACIP	62	14	40	89 (41)	0	29 (22)	24
Dakik et al.	54	41	100	100 (0)	29	9 (9)	12
AVERT	58	16	42	94 (0)	28	12 (1)	20
MASS	65	42	0	100 (0)	0	17 (11)	60
Bech et al.	61	36	25	100 (0)	46	7 (0)	24
ALKK	57	13	100	93 (0)	16	24 (NR)	52
RITA-2	58	18	47	93 (0)	8	35 (12)	84
TIME	80	42	47	71 (20)	44	42 (NR)	48
Hambrecht et al.	60	0	46	100 (0)	100	6 (0)	12
DANAMI	57	18	100	82 (29)	0	20 (NR)	28
INSPIRE	64	24	100	67 (26)	39	26 (10)	60
MASS II	60	32	46	95 (0)	68	24 (15)	60
SWISSI II	55	12	100	100 (0)	0	44 (NR)	122
COURAGE	61	15	38	96 (0)	90*	31 (7)	54

Age is expressed in years, all other data are %

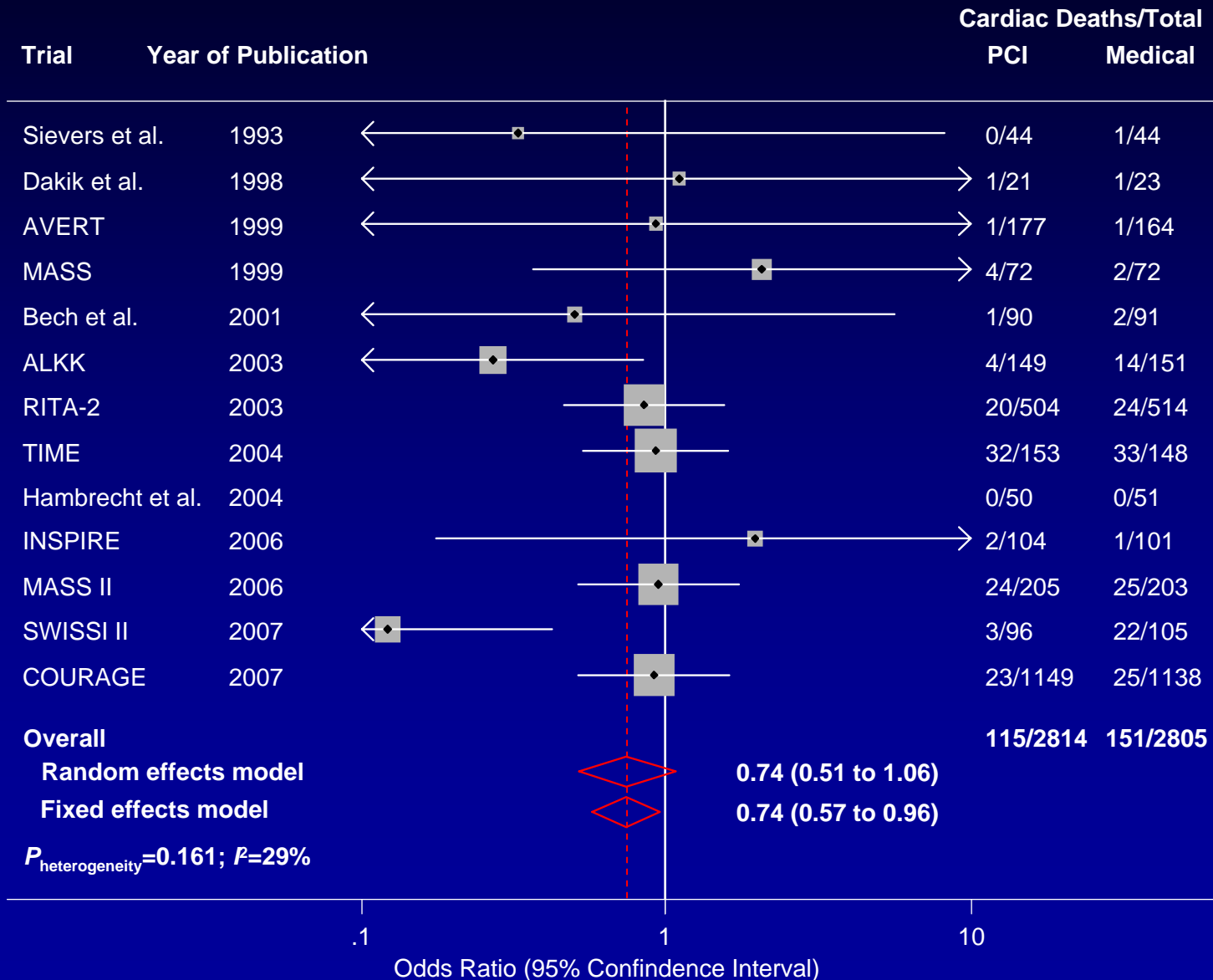
\*DES in <3%

# PCI vs. Medical Treatment - Secondary End Point of MI -



# PCI vs. Medical Treatment

## - Secondary End Point of Cardiac Death -



# PCI vs. Medical Treatment - Primary End Point of All-Cause Death -



## Meta-Regression Analysis of Potential Confounders Regarding Treatment Effect

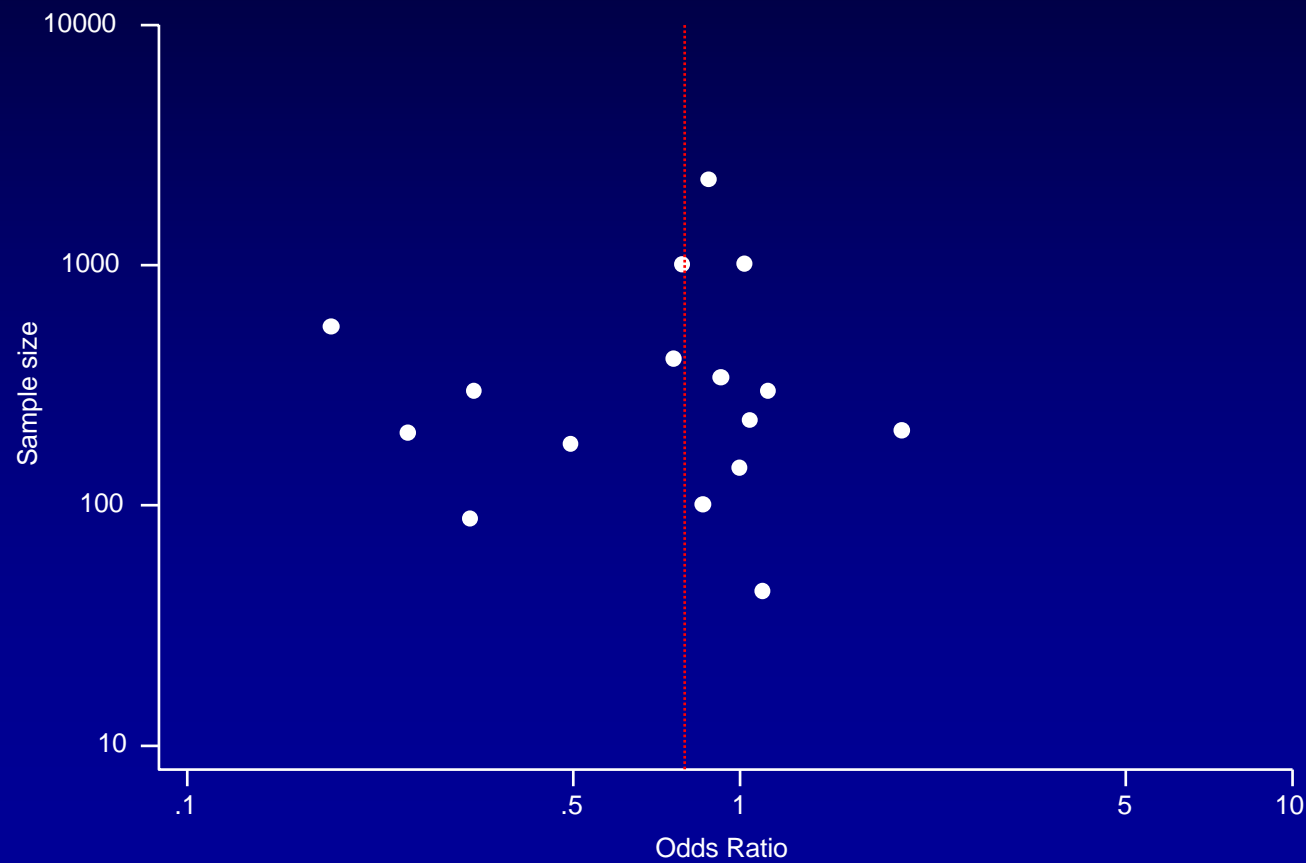
<u>Covariate</u>	<u>P value</u>
Year of trial completion	0.982
Sample size of the trial	0.634
Proportion of pts with prior myocardial infarction	0.119
Stent use in the PCI group	0.936
CABG use in the PCI group	0.392
Use of PCI/CABG in the medical group	0.652



# PCI vs. Medical Treatment - Primary End Point of All-Cause Death -



## Relation Between Sample Size and Treatment Effect Size

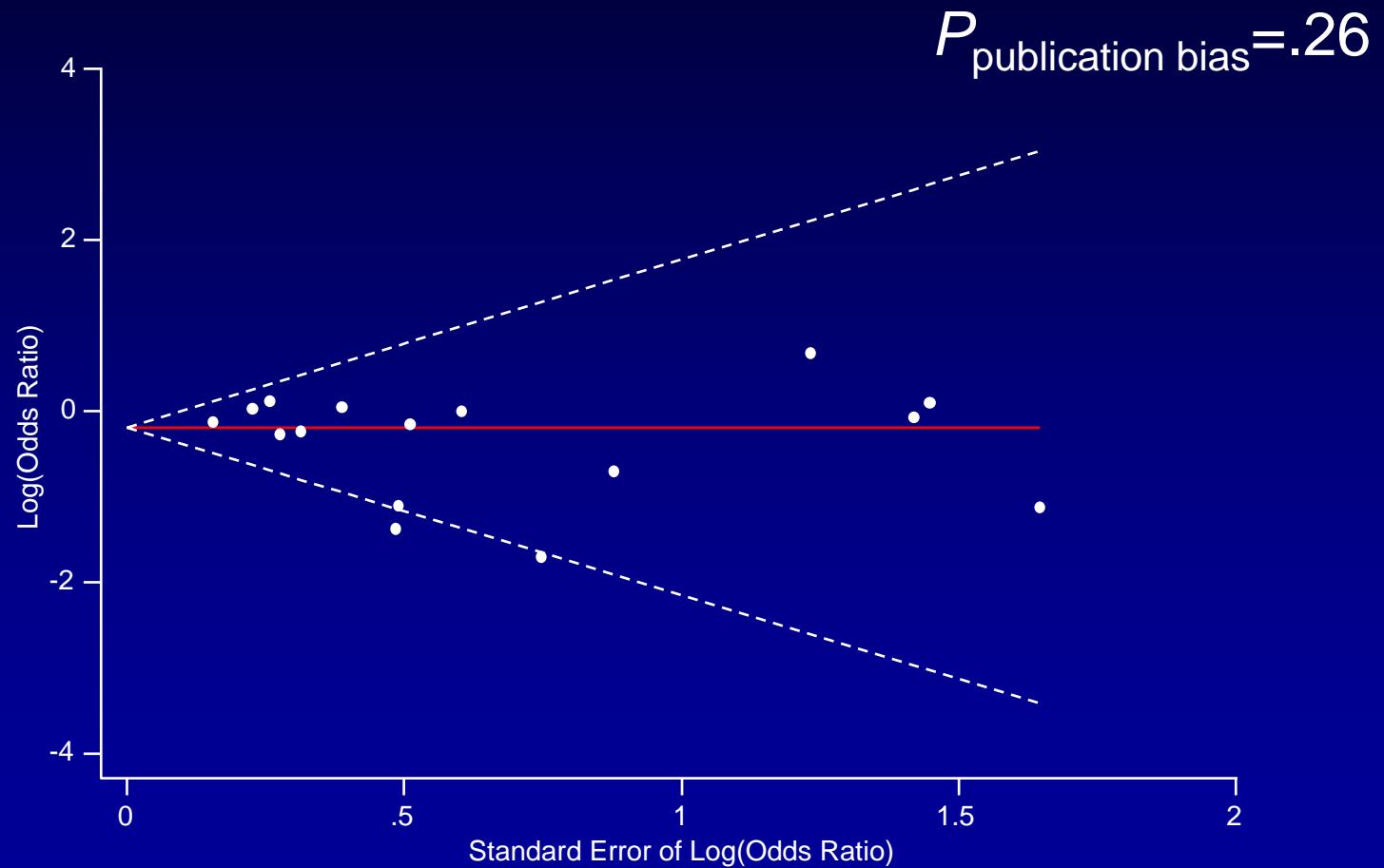


# PCI vs. Medical Treatment

## - Primary End Point of All-Cause Death -

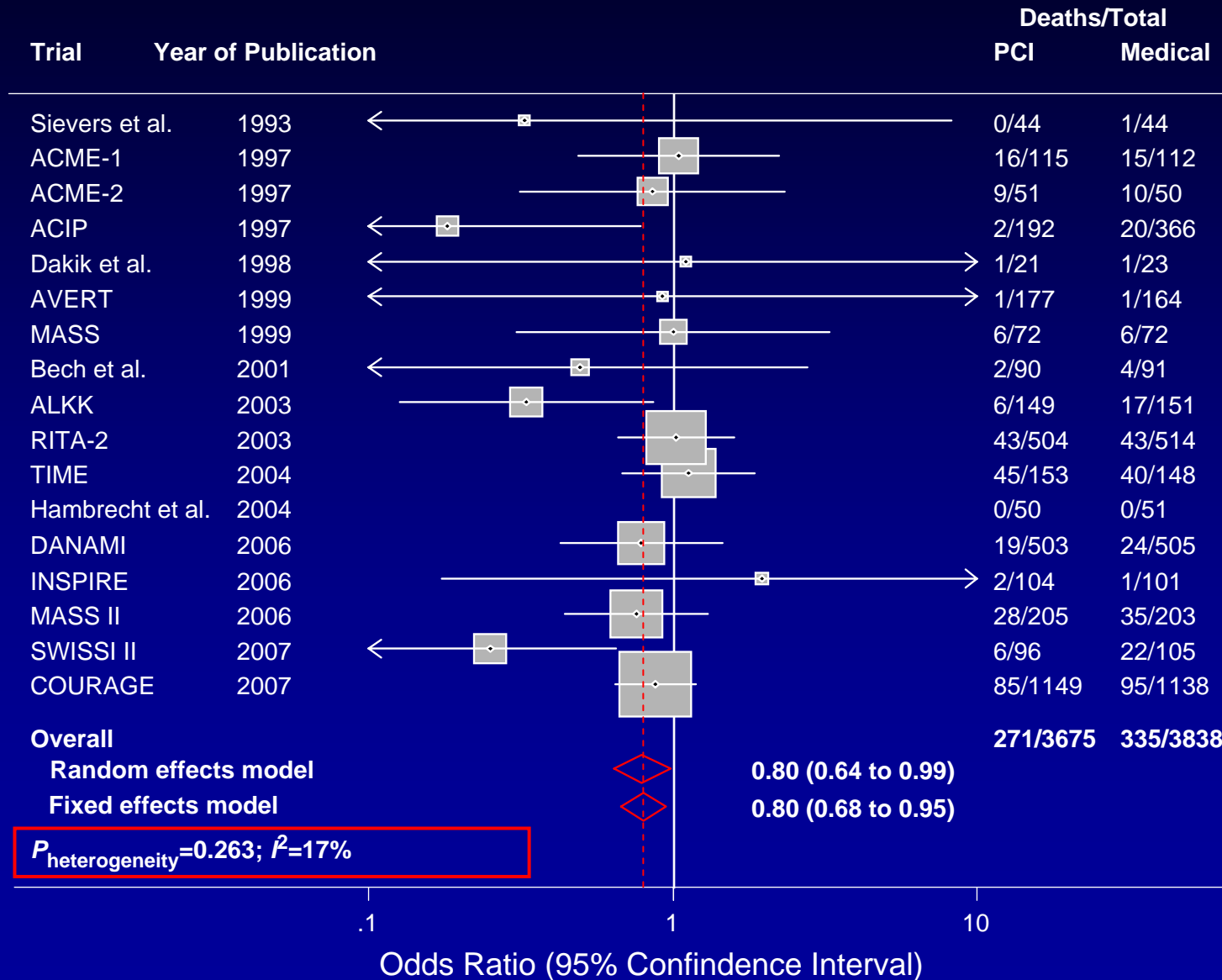


### Assessment of Publication Bias

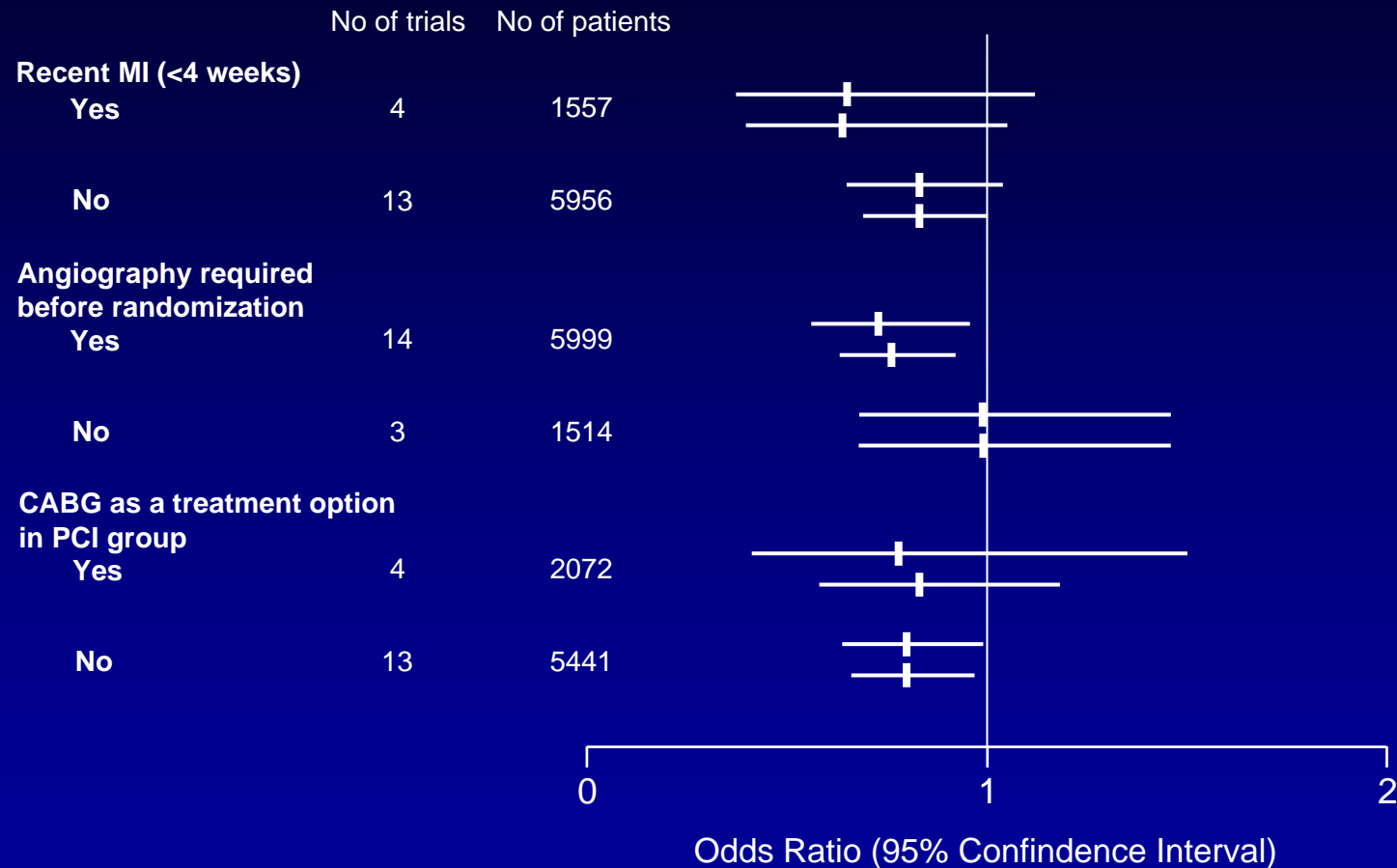


# PCI vs. Medical Treatment

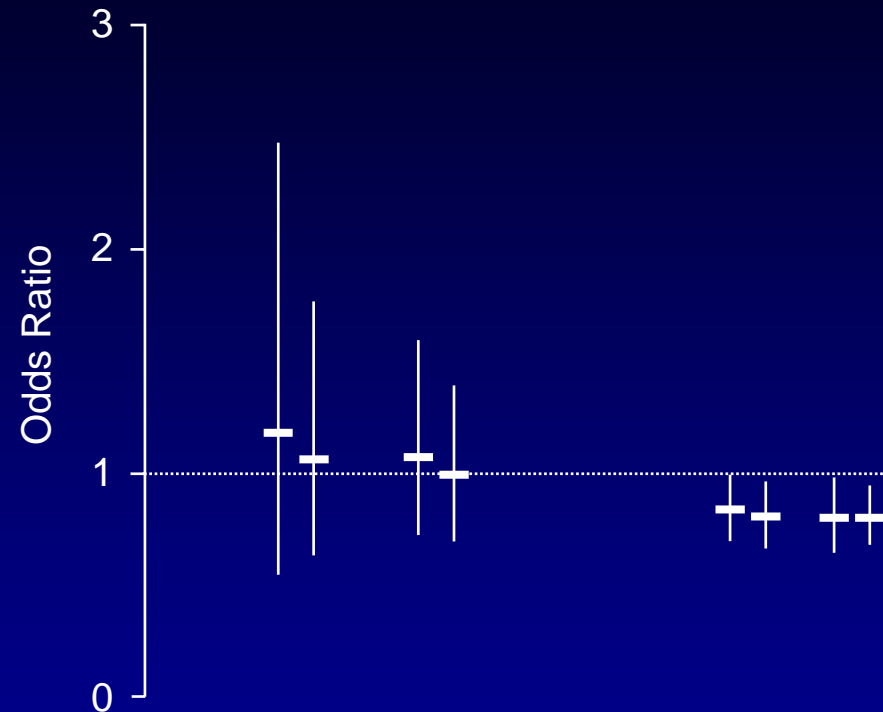
## - Primary End Point of All-Cause Death -



# Treatment Effect of PCI on Mortality in Various Subsets



# Length of Follow-Up and Treatment Effect of PCI on Mortality

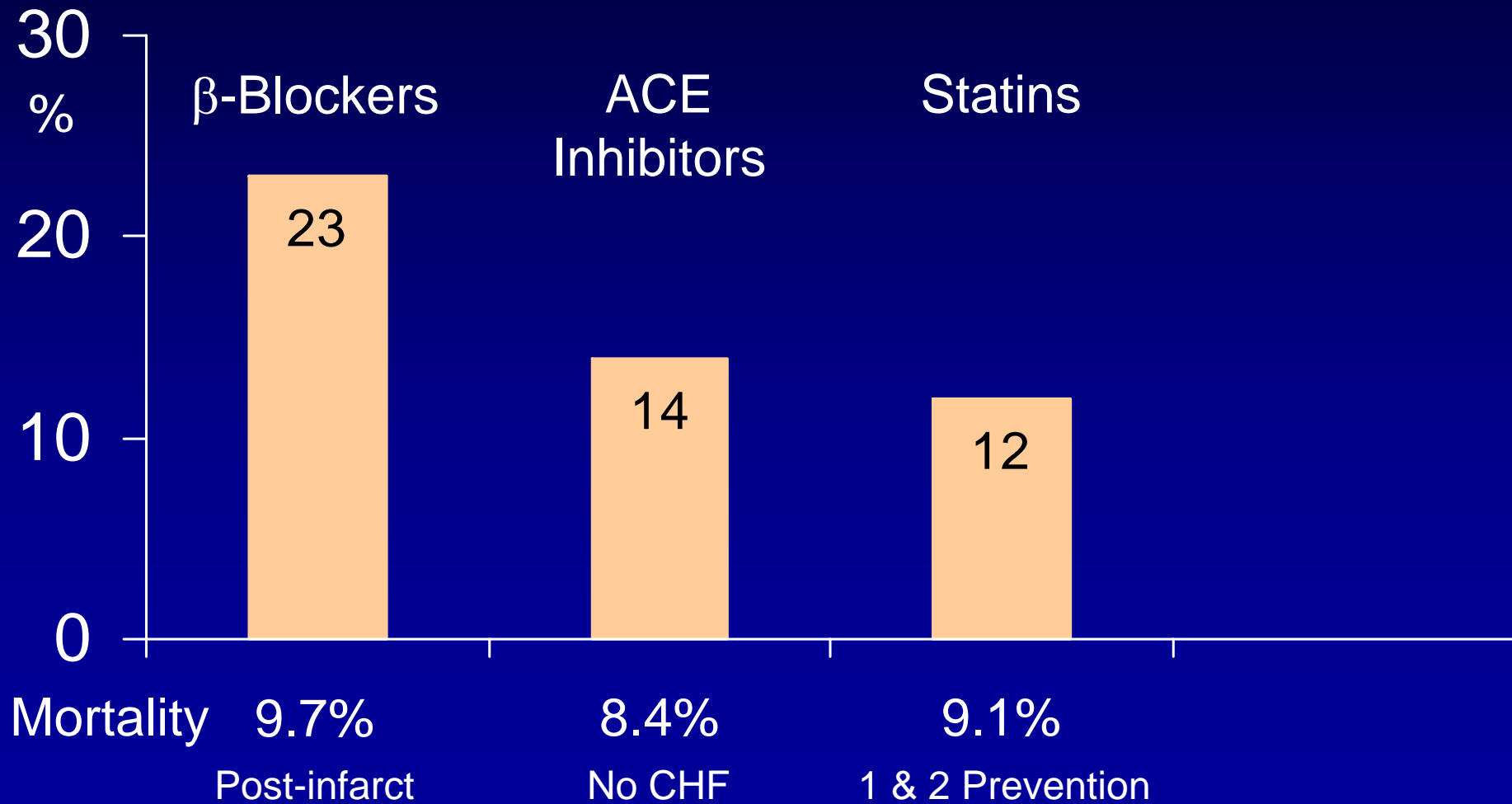


Upper range of FU (years)	up to 1	up to 3	up to 5	up to 10
Mean length of FU (months)	11	21	44	51
No of patients	2241	5222	6495	7513

# Reduction in Mortality With Modern Therapies in Patients With CAD



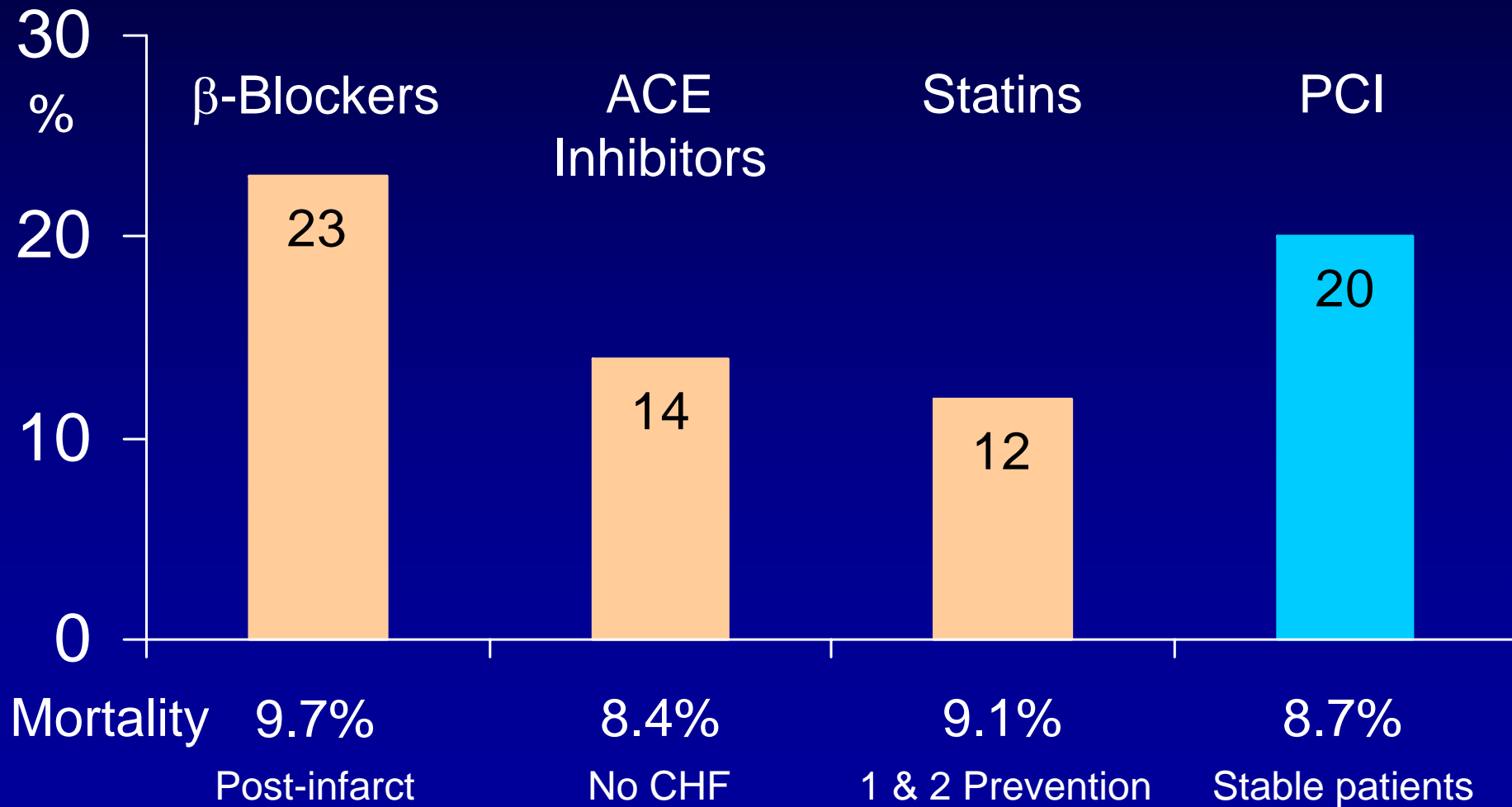
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# Reduction in Mortality With Modern Therapies in Patients With CAD



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## In comparison with medical treatment alone:

- PCI (balloon angioplasty/BMS) reduces the risk of death in patients with stable CAD.
- This reduction is apparently the result of lowering the risk of cardiac death.
- Risk reduction seems to increase with extension of follow-up.
- The additional impact of a large use of DES remains to be evaluated in future studies on PCI.