National Clinical Guideline Centre

Myocardial infarction with ST-segment elevation

The acute management of myocardial infarction with ST-segment elevation

Clinical guideline 167

Appendices I - P

July 2013

November 2020: NICE's original guidance on Myocardial infarction with ST-segment elevation was published in 2013. See the NICE website for the guideline recommendations and for the 2020 Acute coronary syndromes update. This document preserves evidence reviews and committee discussions from the 2013 guideline.

Commissioned by the National Institute for Health and Care Excellence

Royal College of Physicians
Royal College of Nursing
RCGP Royal College of General Practitioners
The Royal College of Surgeons of England
NICE accredited

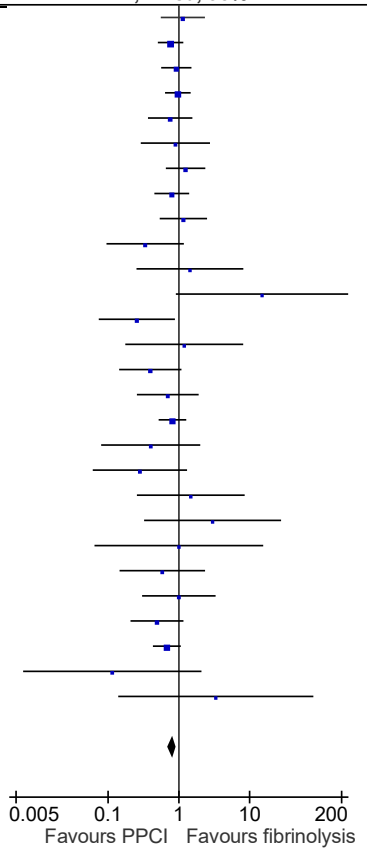
Appendix I: Forest plots

I.1 Time to reperfusion

Figure 2: PPCI versus fibrinolysis for the outcome of short-term all-cause mortality

Study or Subgroup	PPCI Events	PPCI Total	Fibrinolysis Events	Fibrinolysis Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Andersen invasive 2003	15	223	13	220	3.5%	1.14 [0.55, 2.34]
Anderson referral 2003	37	567	48	562	12.9%	0.76 [0.51, 1.15]
Armstrong 2006	23	100	25	100	6.7%	0.92 [0.56, 1.51]
Armstrong 2013	42	946	43	939	11.5%	0.97 [0.64, 1.47]
Aversano 2002	12	225	16	226	4.3%	0.75 [0.36, 1.56]
Berrocal 2003	5	54	6	58	1.5%	0.90 [0.29, 2.76]
Bonnefoy 2002	20	421	16	419	4.3%	1.24 [0.65, 2.37]
Bueno 2011	18	132	23	134	6.1%	0.79 [0.45, 1.40]
de Boer 1994	13	152	11	149	3.0%	1.16 [0.54, 2.50]
de Boer 2002	3	46	8	41	2.3%	0.33 [0.09, 1.18]
DeWood 1992	3	46	2	44	0.5%	1.43 [0.25, 8.18]
Gao 2010	15	210	0	101	0.2%	14.99 [0.91, 247.97]
Garcia 1999	3	109	12	111	3.2%	0.25 [0.07, 0.88]
Gibbons 1993	2	47	2	56	0.5%	1.19 [0.17, 8.14]
Grines 1993	5	195	13	200	3.4%	0.39 [0.14, 1.09]
Grines 2002	6	71	8	66	2.2%	0.70 [0.26, 1.90]
GUSTO IIb 1997	32	565	40	573	10.6%	0.81 [0.52, 1.27]
Kastrati 2002	2	81	5	81	1.3%	0.40 [0.08, 2.00]
Kedev 1997	2	68	7	67	1.9%	0.28 [0.06, 1.31]
Le May 2001	3	62	2	61	0.5%	1.48 [0.26, 8.53]
Ribeiro 1993	3	50	1	50	0.3%	3.00 [0.32, 27.87]
Ribichini 1998	1	55	1	55	0.3%	1.00 [0.06, 15.59]
Schomig 2000	3	71	5	69	1.4%	0.58 [0.14, 2.35]
Vermeer 1999	5	75	5	75	1.3%	1.00 [0.30, 3.31]
Widimsky 2000	7	101	14	99	3.8%	0.49 [0.21, 1.16]
Widimsky 2003	29	429	42	421	11.3%	0.68 [0.43, 1.07]
Zijlstra 1993	0	70	4	72	1.2%	0.11 [0.01, 2.08]
Zijlstra 1997	1	45	0	50	0.1%	3.33 [0.14, 79.64]
Total (95% CI)		**5216**		**5099**	**100.0%**	**0.82 [0.71, 0.94]**
Total events	310		372			

Heterogeneity: Chi² = 25.63, df = 27 (P = 0.54); I² = 0%
Test for overall effect: Z = 2.75 (P = 0.006)



I.2 Facilitated PPCI

I.2.1 GPIs: fPPCI versus PPCI – all GPIs

Figure 3: All-cause mortality (in-hospital)

Study or Subgroup	fPPCI (GPIs) Events	fPPCI (GPIs) Total	PPCI (placebo / no drug) Events	PPCI (placebo / no drug) Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Zorman 2002	0	56	5	51	100.0%	0.08 [0.00, 1.46]
Total (95% CI)		**56**		**51**	**100.0%**	**0.08 [0.00, 1.46]**
Total events	0		5			

Heterogeneity: Not applicable
Test for overall effect: Z = 1.70 (P = 0.09)

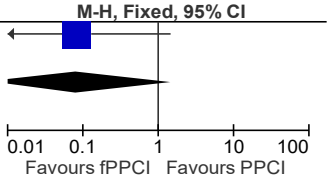


Figure 4: All-cause mortality (short-term)

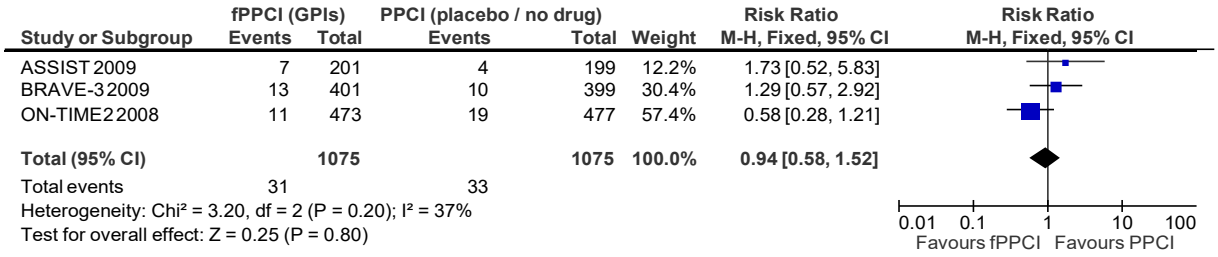


Figure 5: All-cause mortality (longer-term)

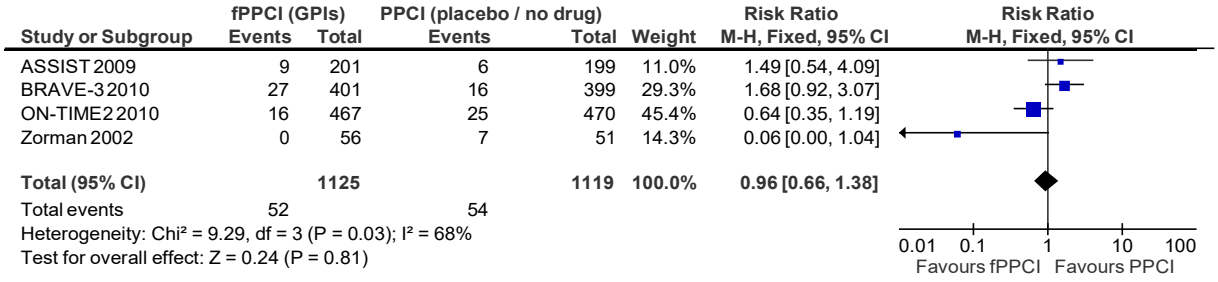


Figure 6: All-cause stroke (short-term)

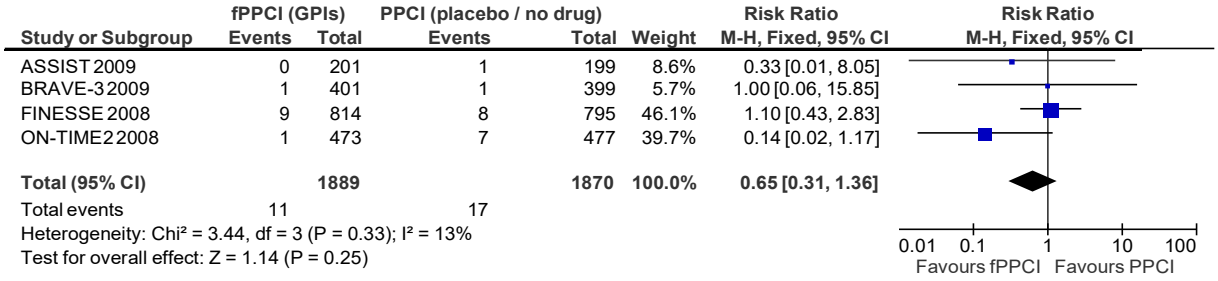


Figure 7: All-cause stroke (longer-term)

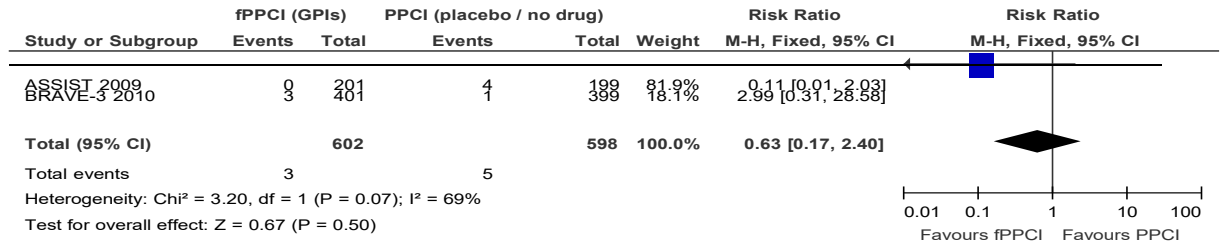


Figure 8: Fatal stroke (short-term)

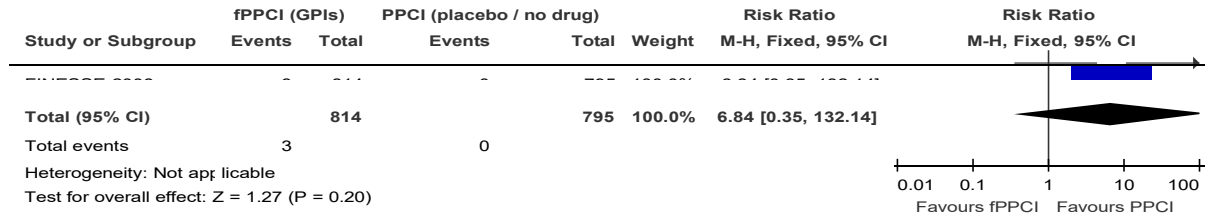


Figure 9: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

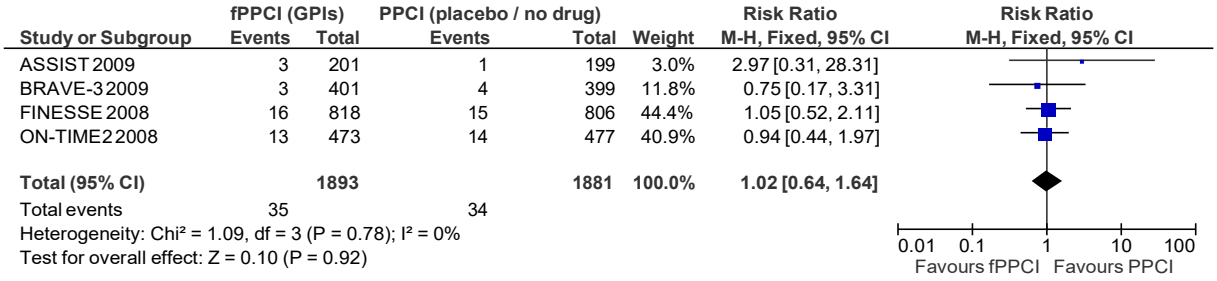


Figure 10: Reinfarction or non-fatal reinfarction or recurrent MI (longer-term)

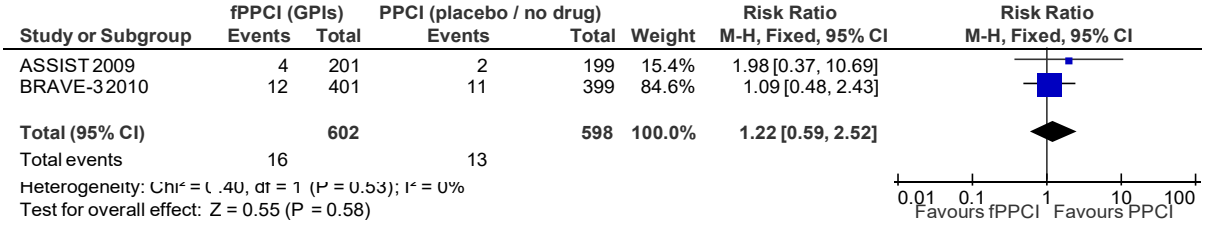


Figure 11: Major bleeding (in-hospital)

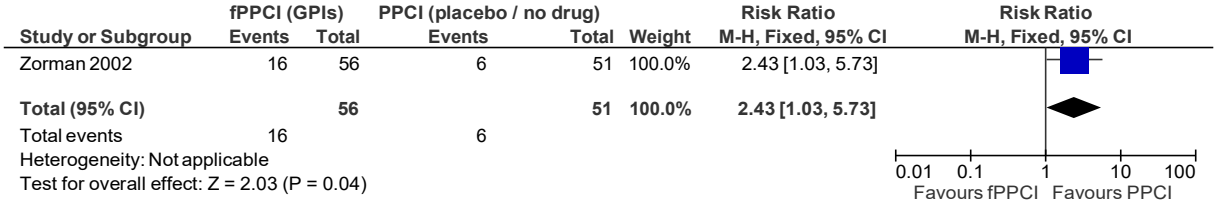


Figure 12: Major bleeding (short-term)

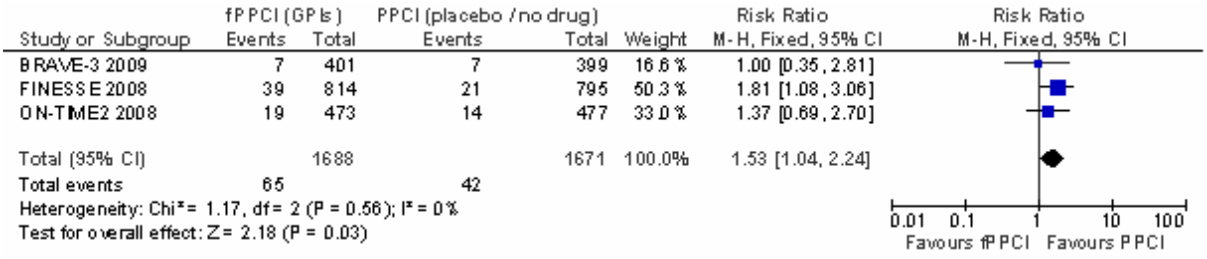


Figure 13: Heart failure (in-hospital)

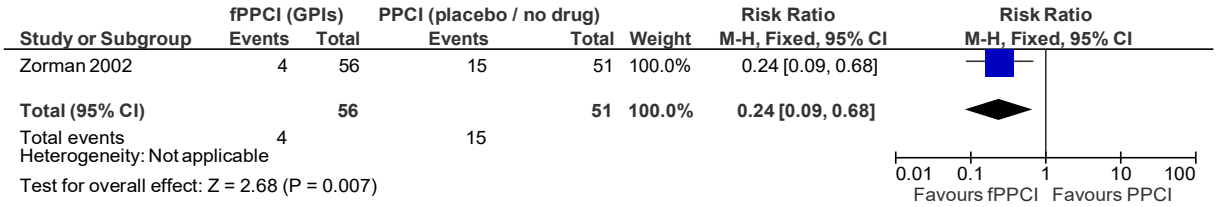


Figure 14: Heart failure (short-term)

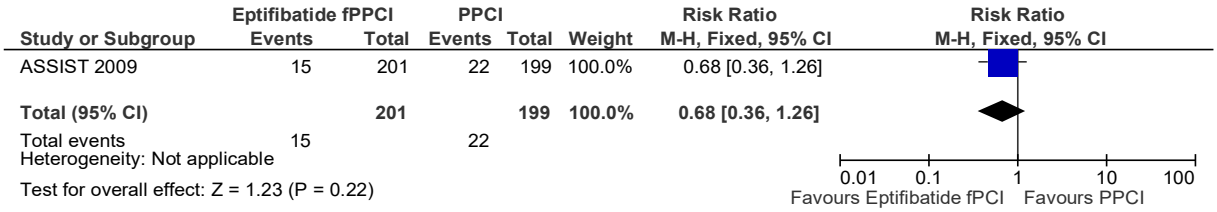


Figure 15: Heart failure (longer-term)

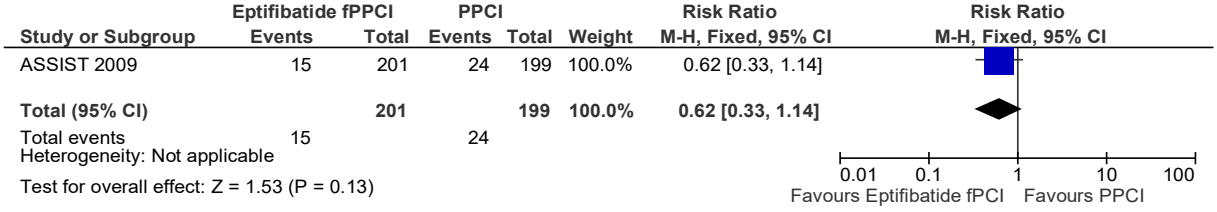


Figure 16: Repeat revascularisation – repeat or urgent (short-term)

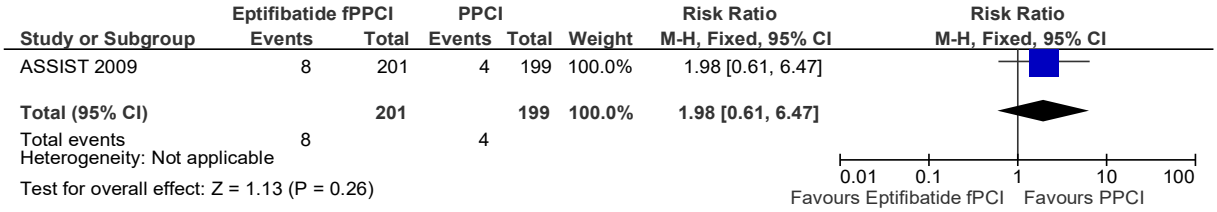
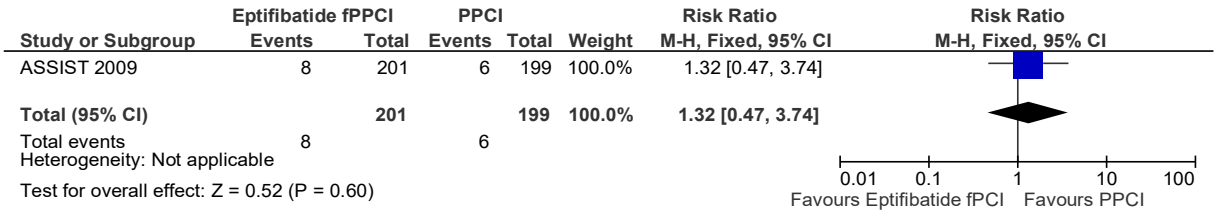


Figure 17: Repeat revascularisation – repeat or urgent (longer-term)



I.2.2 GPIs: fPPCI versus PPCI – all GPIs: subgroup analysis of trials using background of clopidogrel + aspirin or aspirin

Figure 18: All-cause mortality (in-hospital)

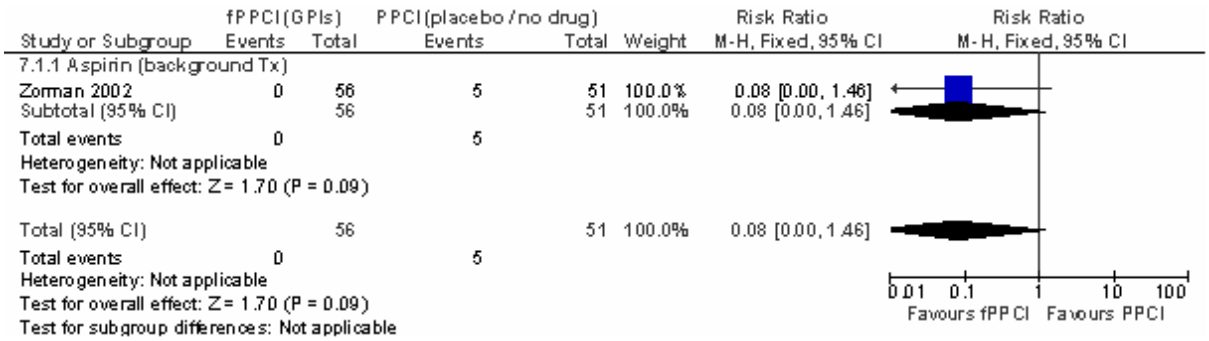


Figure 19: All-cause mortality (short-term)

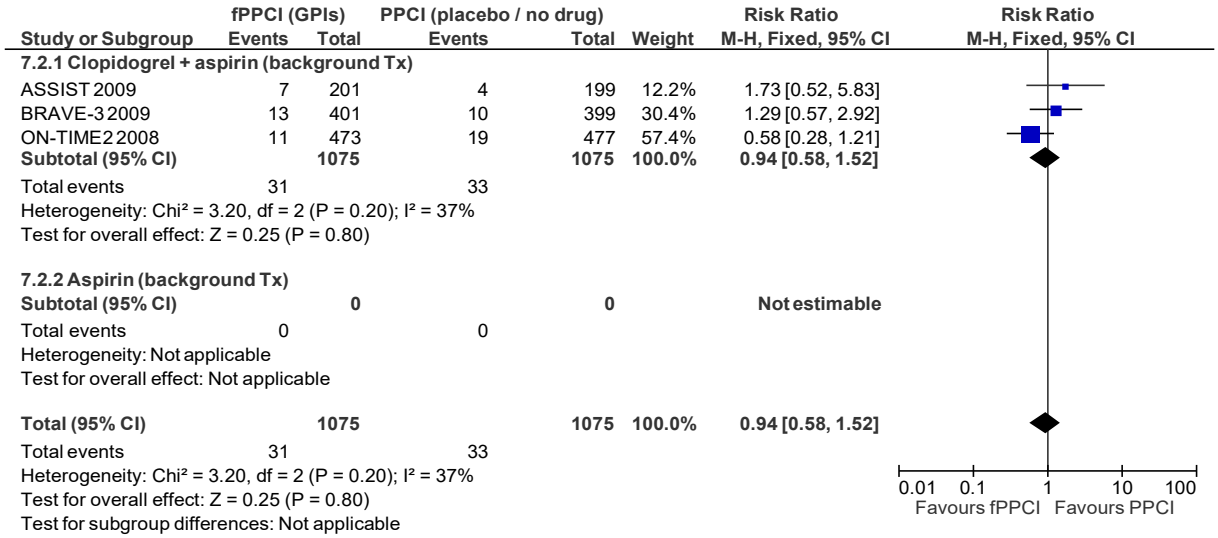


Figure 20: All-cause mortality (longer-term)

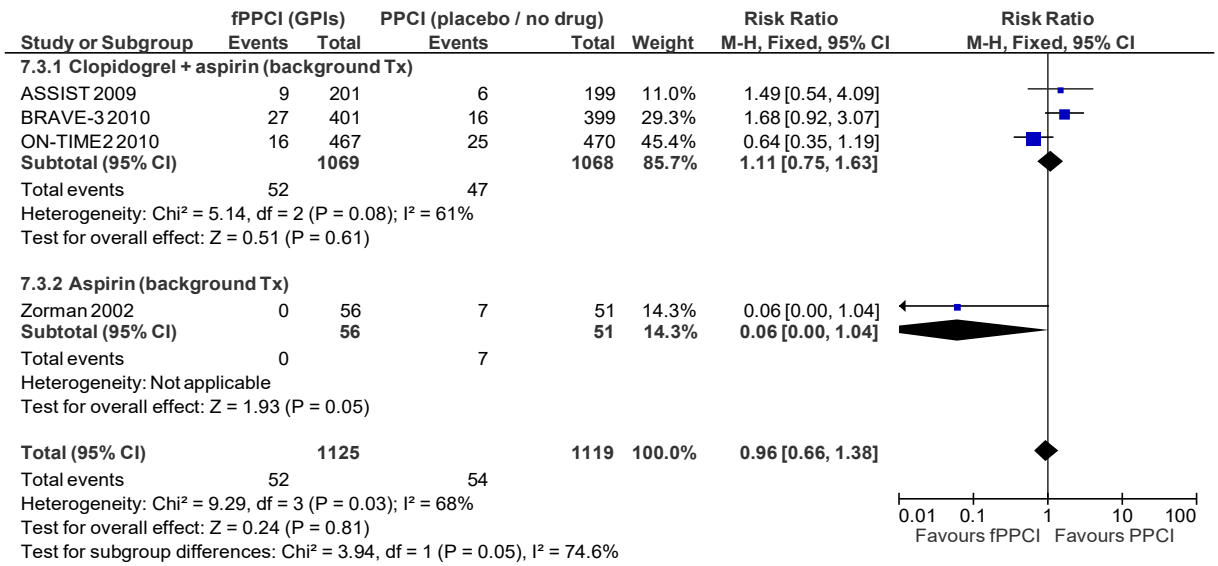


Figure 21: All-cause stroke (short-term)

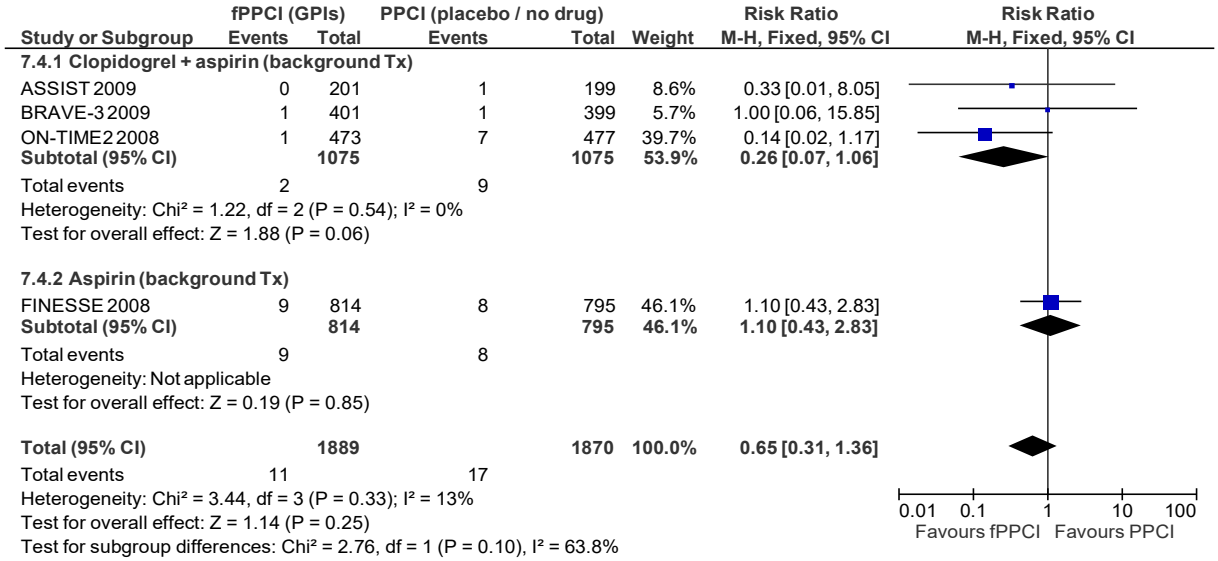


Figure 22: All-cause stroke (longer-term)

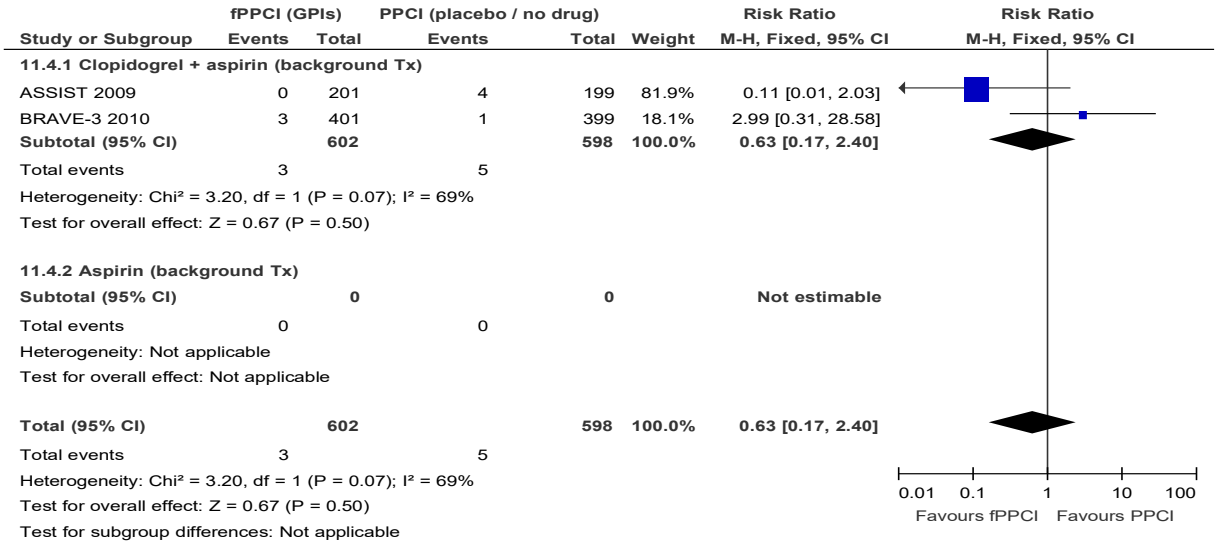


Figure 23: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

Study or Subgroup	fPPCI (GPIs) Events	Total	PPCI (placebo / no drug) Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
7.7.1 Clopidogrel + aspirin (background Tx)						
ASSIST 2009	3	201	1	199	3.0%	2.97 [0.31, 28.31]
BRAVE-3 2009	3	401	4	399	11.8%	0.75 [0.17, 3.31]
ON-TIME 2 2008	13	473	14	477	40.9%	0.94 [0.44, 1.97]
Subtotal (95% CI)		**1075**		**1075**	**55.6%**	**1.00 [0.54, 1.88]**
Total events	19		19			
Heterogeneity: Chi² = 1.07, df = 2 (P = 0.58); I² = 0%						
Test for overall effect: Z = 0.01 (P = 0.99)						
7.7.2 Aspirin (background Tx)						
FINESSE 2008	16	818	15	806	44.4%	1.05 [0.52, 2.11]
Subtotal (95% CI)		**818**		**806**	**44.4%**	**1.05 [0.52, 2.11]**
Total events	16		15			
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.14 (P = 0.89)						
Total (95% CI)		**1893**		**1881**	**100.0%**	**1.02 [0.64, 1.64]**
Total events	35		34			
Heterogeneity: Chi² = 1.09, df = 3 (P = 0.78); I² = 0%						
Test for overall effect: Z = 0.10 (P = 0.92)						
Test for subgroup differences: Chi² = 0.01, df = 1 (P = 0.92), I² = 0%						

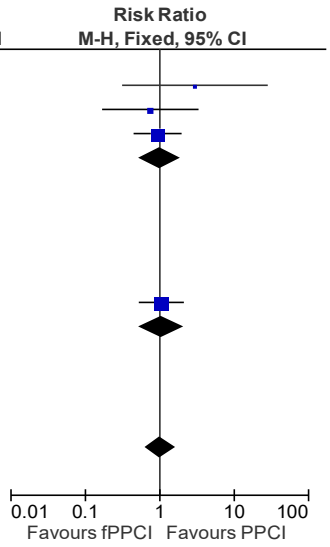


Figure 24: Reinfarction or non-fatal reinfarction or recurrent MI (longer-term)

Study or Subgroup	fPPCI (GPIs) Events	Total	PPCI (placebo / no drug) Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
7.8.1 Clopidogrel + aspirin (background Tx)						
ASSIST 2009	4	201	2	199	15.4%	1.98 [0.37, 10.69]
BRAVE-3 2010	12	401	11	399	84.6%	1.09 [0.48, 2.43]
Subtotal (95% CI)		**602**		**598**	**100.0%**	**1.22 [0.59, 2.52]**
Total events	16		13			
Heterogeneity: Chi² = 0.40, df = 1 (P = 0.53); I² = 0%						
Test for overall effect: Z = 0.55 (P = 0.58)						
7.8.2 Aspirin (background Tx)						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**602**		**598**	**100.0%**	**1.22 [0.59, 2.52]**
Total events	16		13			
Heterogeneity: Chi² = 0.40, df = 1 (P = 0.53); I² = 0%						
Test for overall effect: Z = 0.55 (P = 0.58)						
Test for subgroup differences: Not applicable						

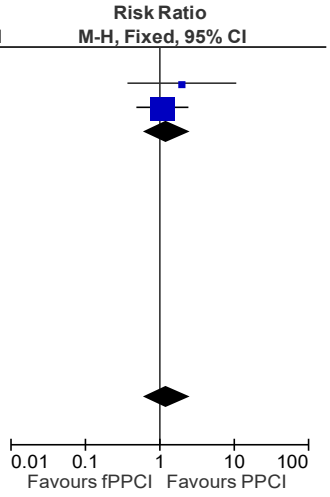


Figure 25: Major bleeding (in-hospital)

Study or Subgroup	fPPCI (GPIs) Events	Total	PPCI (placebo / no drug) Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
7.9.1 Aspirin + clopidogrel						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
7.9.2 Aspirin						
Zorman 2002	16	56	6	51	100.0%	2.43 [1.03, 5.73]
Subtotal (95% CI)		**56**		**51**	**100.0%**	**2.43 [1.03, 5.73]**
Total events	16		6			
Heterogeneity: Not applicable						
Test for overall effect: Z = 2.03 (P = 0.04)						
Total (95% CI)		**56**		**51**	**100.0%**	**2.43 [1.03, 5.73]**
Total events	16		6			
Heterogeneity: Not applicable						
Test for overall effect: Z = 2.03 (P = 0.04)						
Test for subgroup differences: Not applicable						

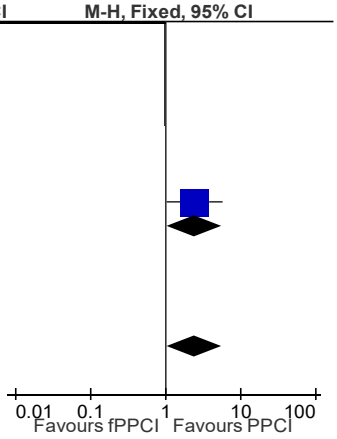


Figure 26: Major bleeding (short-term)

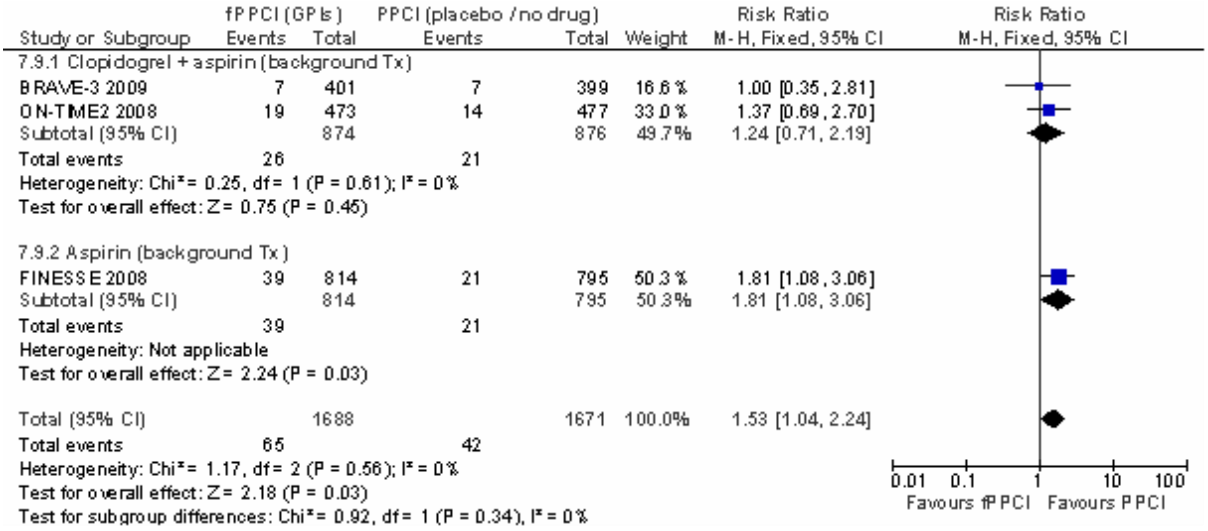
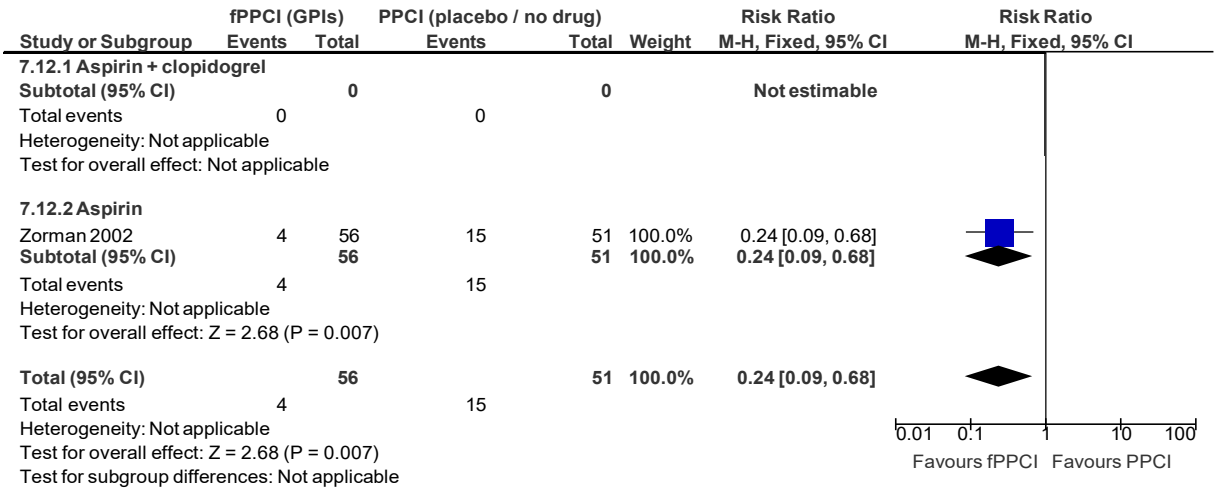


Figure 27: Heart failure (in-hospital)



I.2.3 GPIs: fPPCI versus PPCI – abciximab

Figure 28: All-cause mortality (in-hospital)

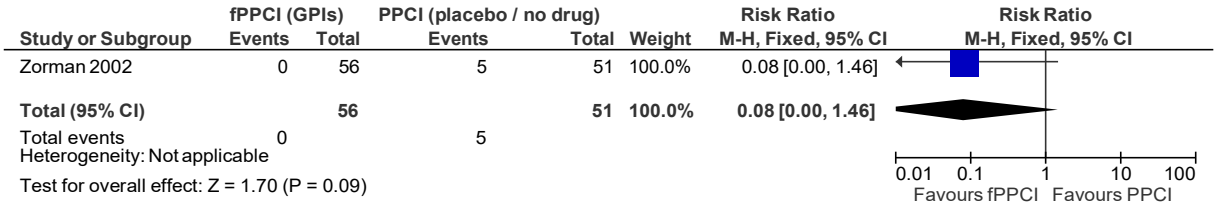


Figure 29: All-cause mortality (short-term)

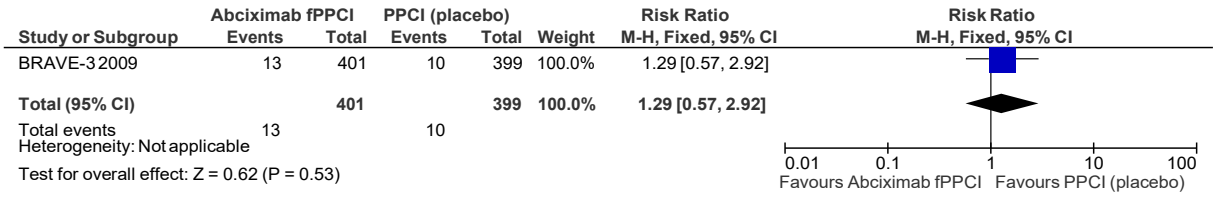


Figure 30: All-cause mortality (longer-term)

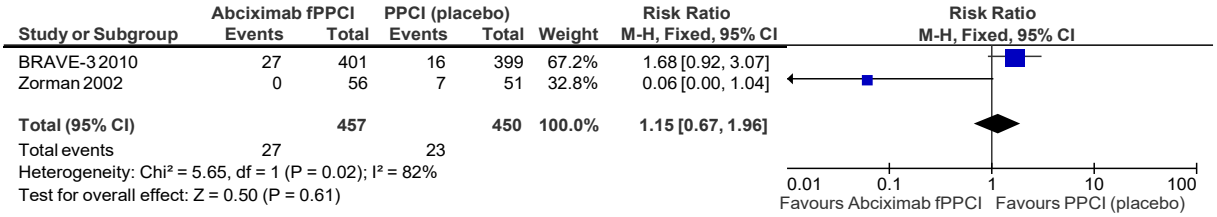


Figure 31: All-cause stroke (short-term)

Figure 32: All-cause stroke (longer-term)

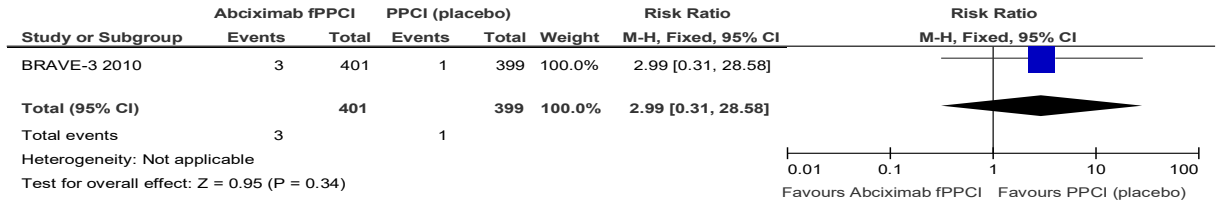


Figure 33: Fatal stroke (short-term)

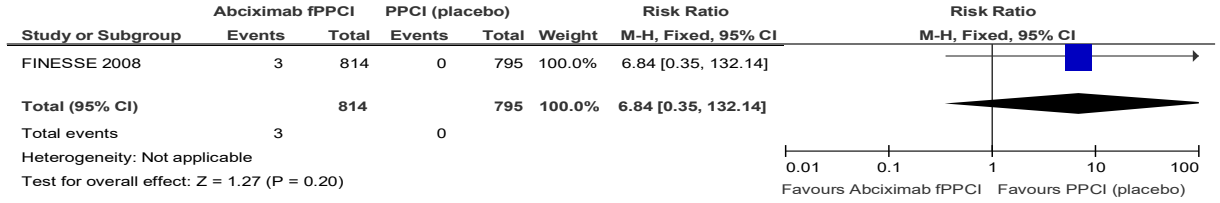


Figure 34: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

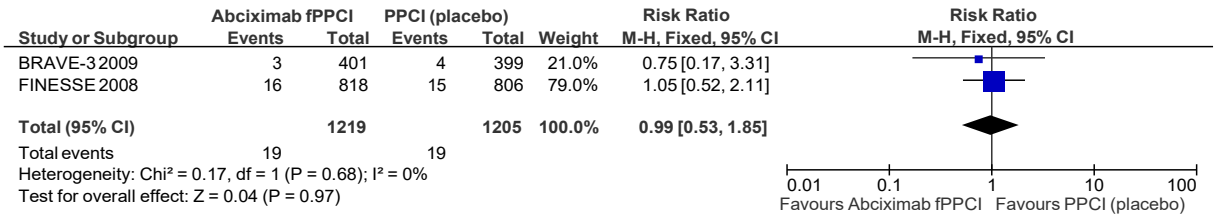


Figure 35: Reinfarction or non-fatal reinfarction or recurrent MI (longer-term)

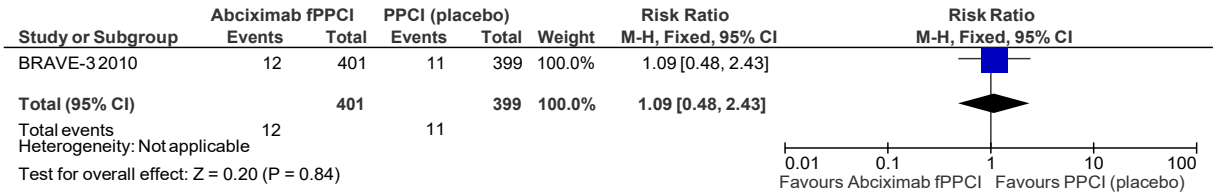


Figure 36: Intracranial bleeding or intracranial haemorrhage (short-term)

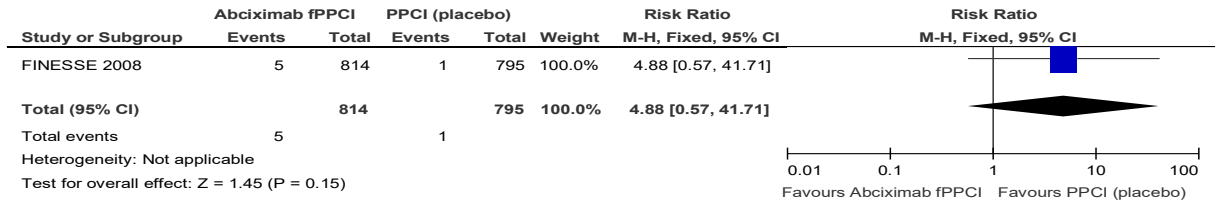


Figure 37: Major bleeding (short-term)

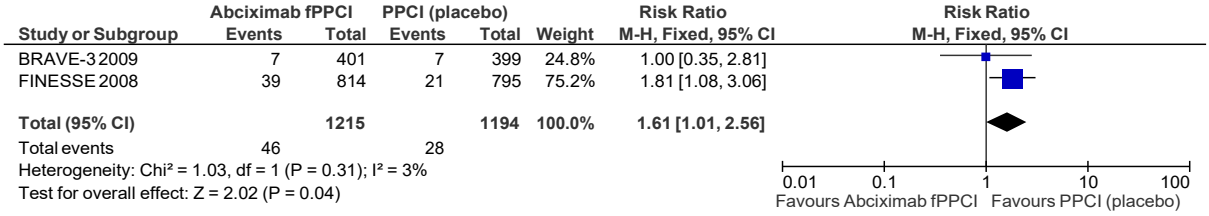


Figure 38: Major bleeding (in-hospital)

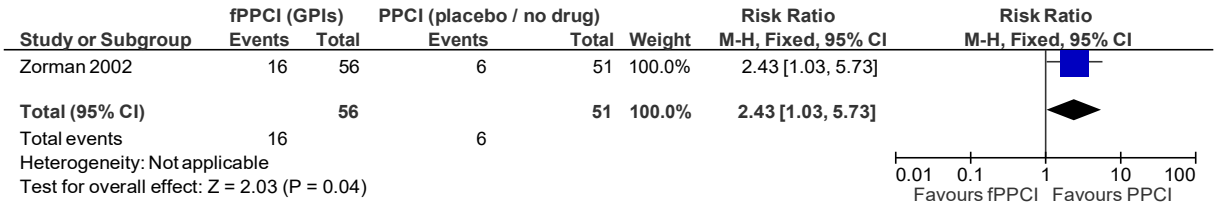


Figure 39: Minor bleeding (short-term)

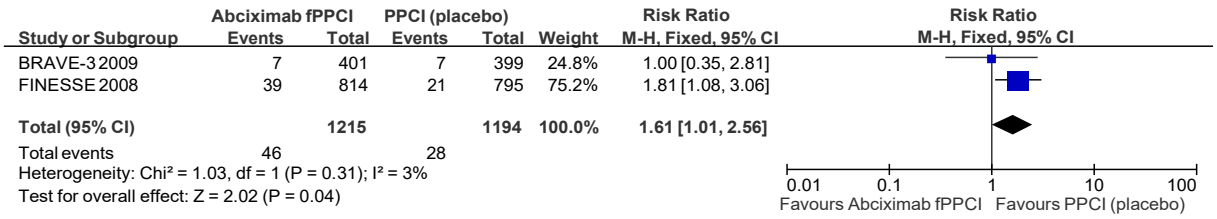


Figure 40: Heart failure or fatal heart failure (short-term)

Figure 41: Repeat revascularisation or reintervention (short-term)

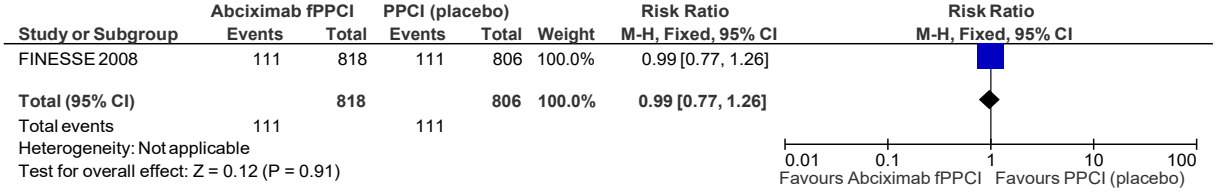


Figure 42: Repeat revascularisation or reintervention (longer-term)

I.2.4 GPIs: fPPCI versus PPCI – tirofiban

Figure 43: All-cause mortality (short-term)

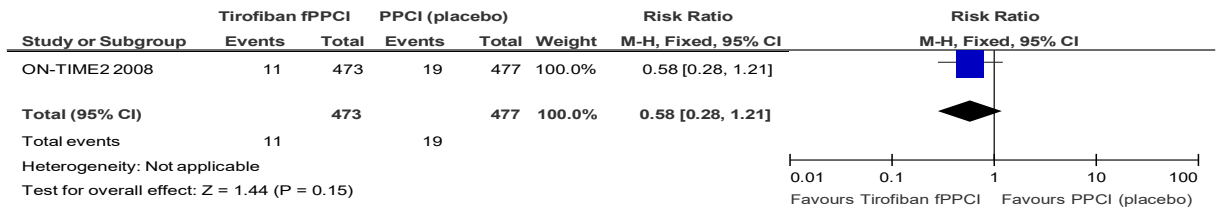


Figure 44: All-cause mortality (longer-term)

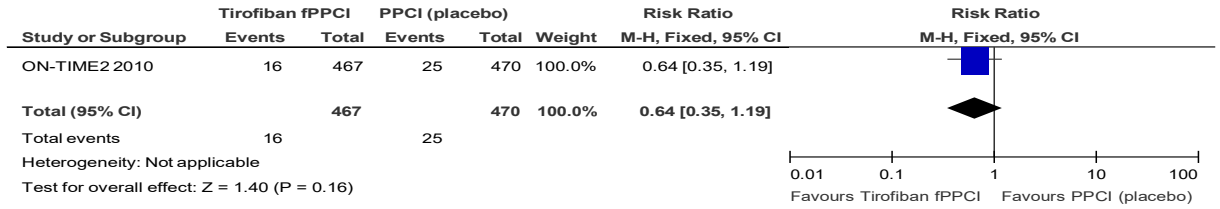


Figure 45: All-cause stroke (short-term)

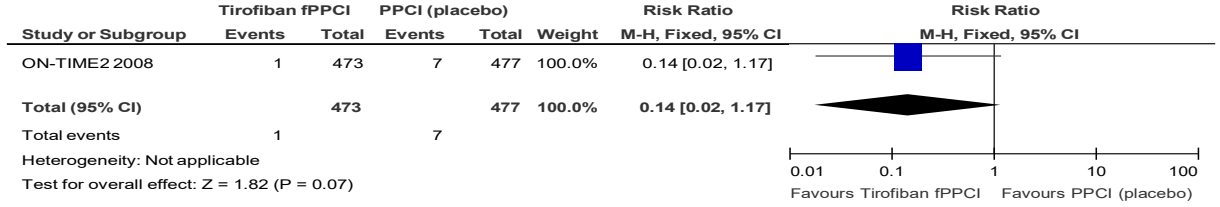


Figure 46: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

Figure 47: Major bleeding (short-term)

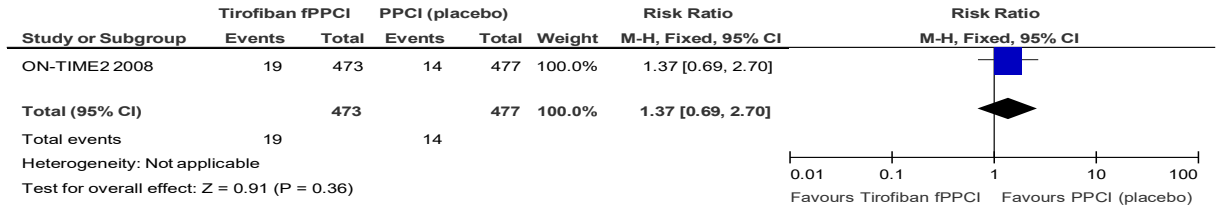


Figure 48: Minor bleeding (short-term)

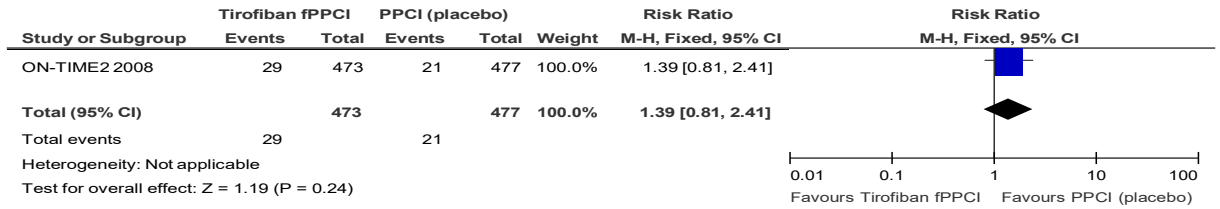
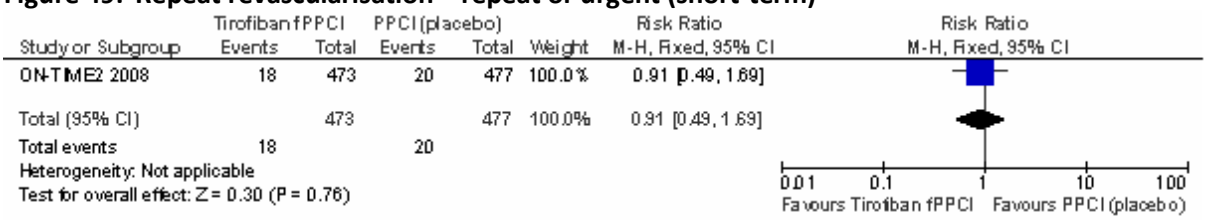


Figure 49: Repeat revascularisation – repeat or urgent (short-term)



I.2.5 GPIs: fPPCI versus PPCI – eptifibatide

Figure 50: All-cause mortality (short-term)

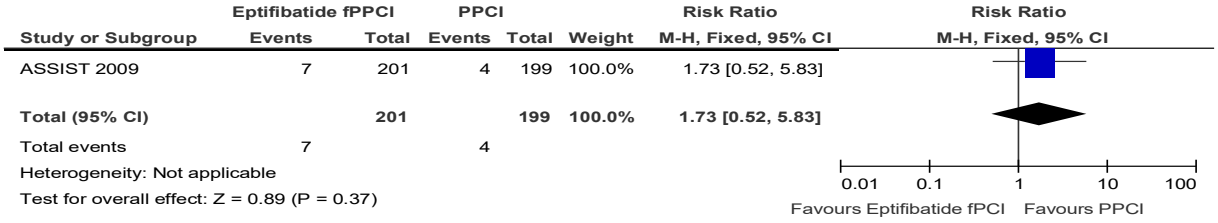


Figure 51: All-cause mortality (longer-term)

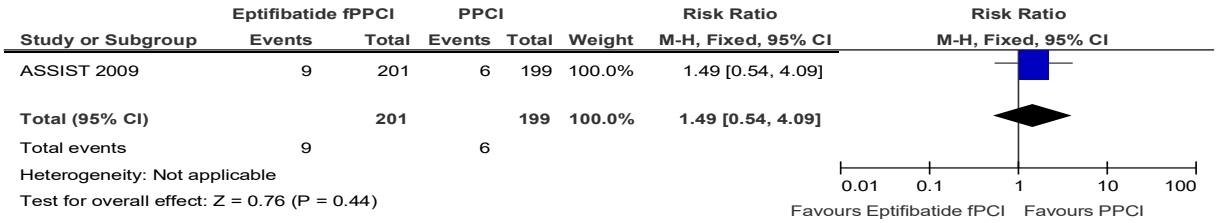


Figure 52: All-cause stroke (short-term)

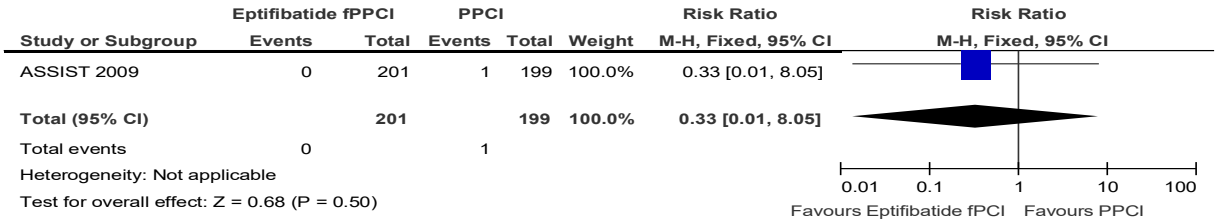


Figure 53: All-cause stroke (longer-term)

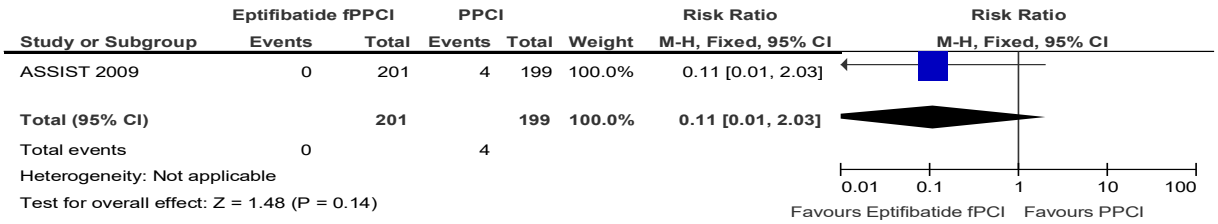


Figure 54: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

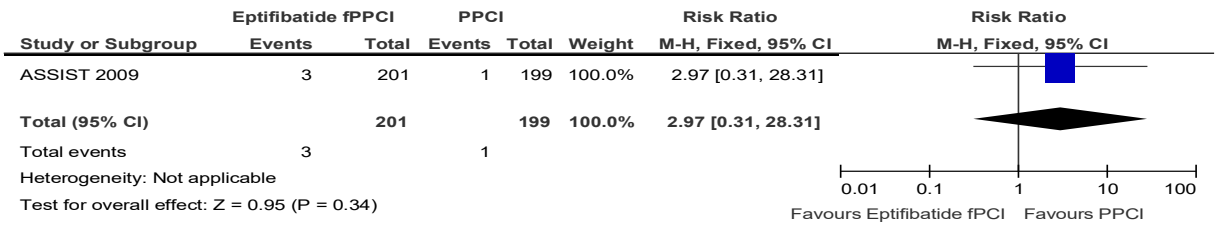


Figure 55: Reinfarction or non-fatal reinfarction or recurrent MI (longer-term)

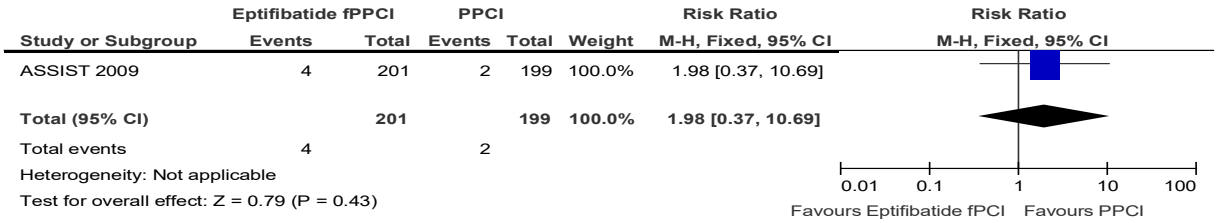


Figure 56: Heart failure or fatal heart failure (short-term)

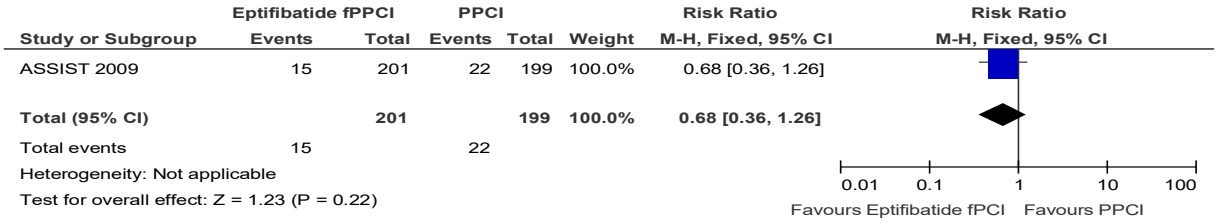


Figure 57: Heart failure or fatal heart failure (longer-term)

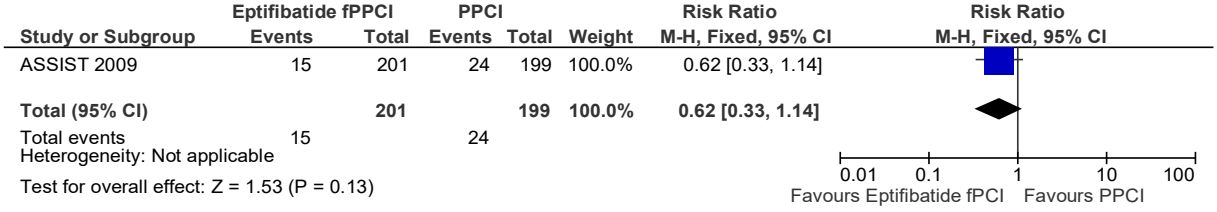


Figure 58: Repeat revascularisation or urgent revascularisation (short-term)

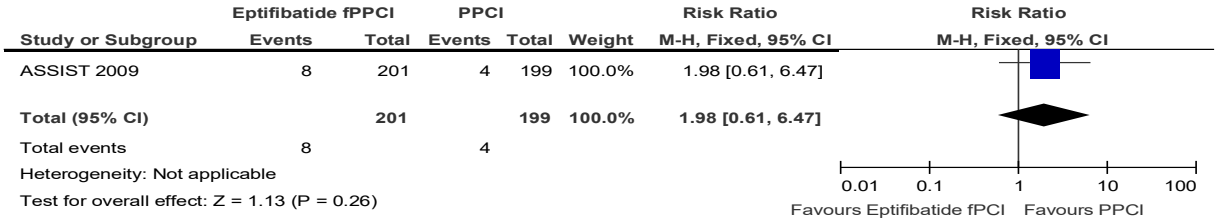
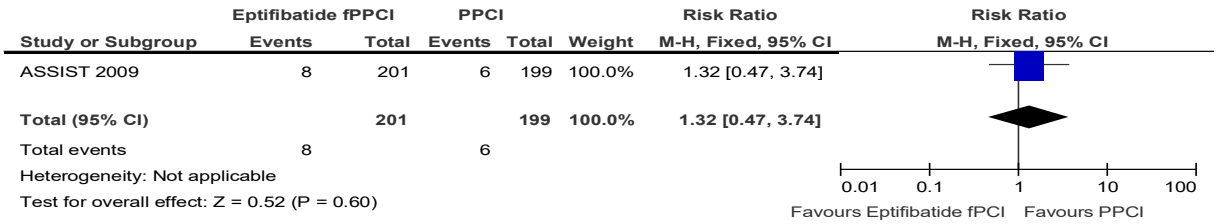


Figure 59: Repeat revascularisation or urgent revascularisation (longer-term)



I.2.6 GPIs: Pre-catheter laboratory versus in-catheter laboratory administration – all GPIs

Figure 60: All-cause mortality (in-hospital)

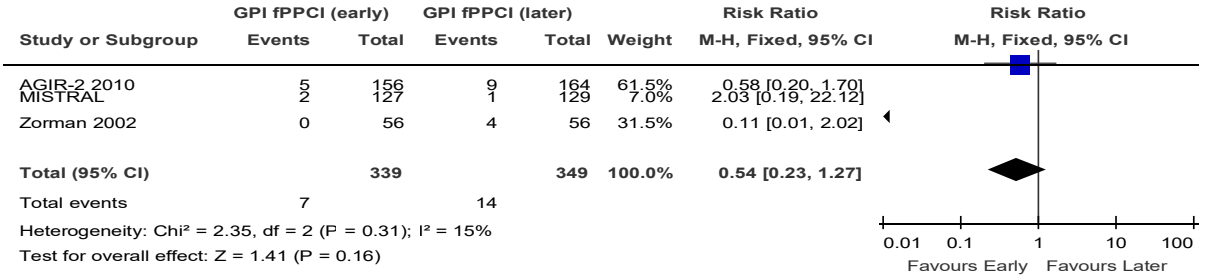


Figure 61: All-cause mortality (short-term)

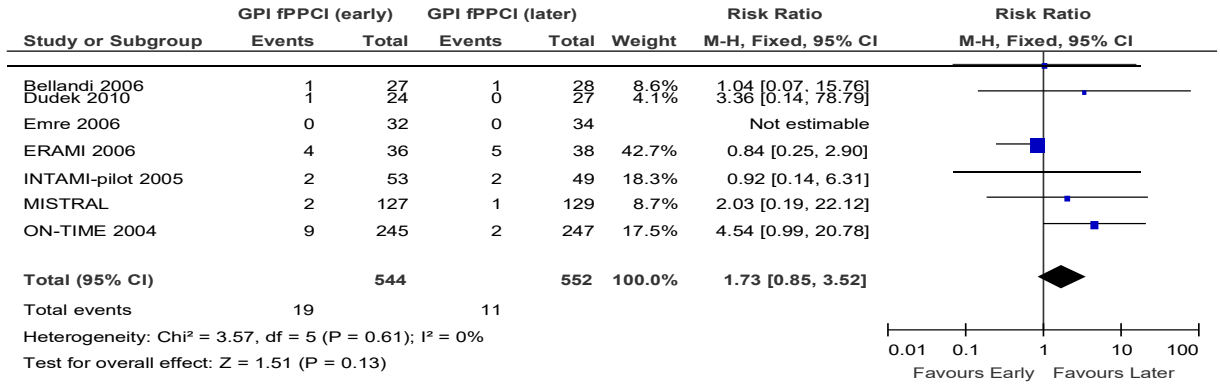


Figure 62: All-cause mortality (longer-term)

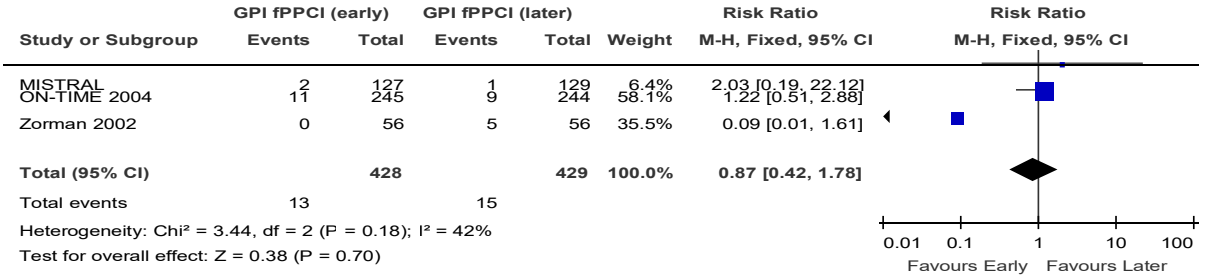


Figure 63: All-cause stroke (in-hospital)

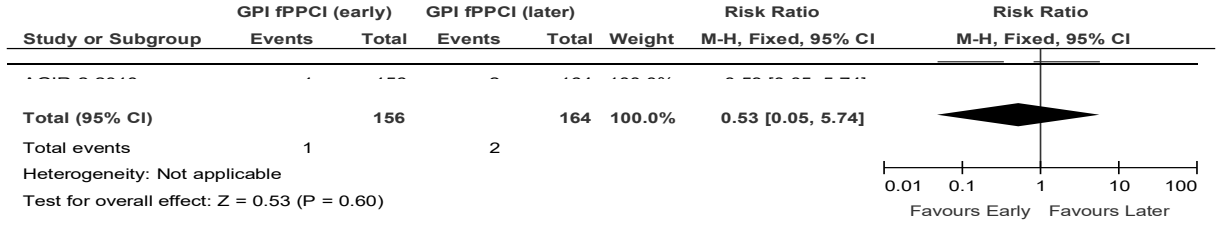


Figure 64: All-cause stroke (short-term)

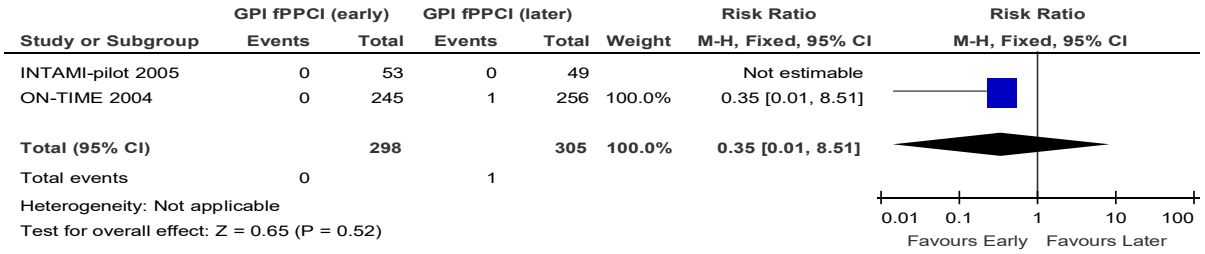


Figure 65: Reinfarction or non-fatal reinfarction or recurrent MI (in-hospital)

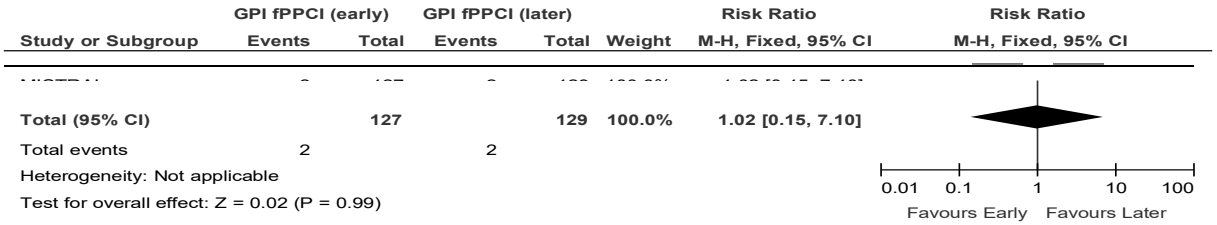


Figure 66: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

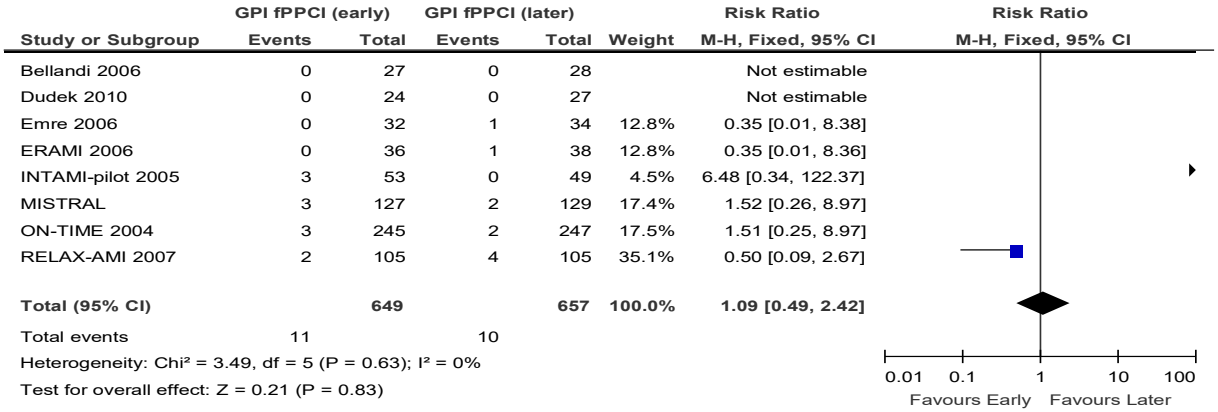


Figure 67: Reinfarction or non-fatal reinfarction or recurrent MI (longer-term)

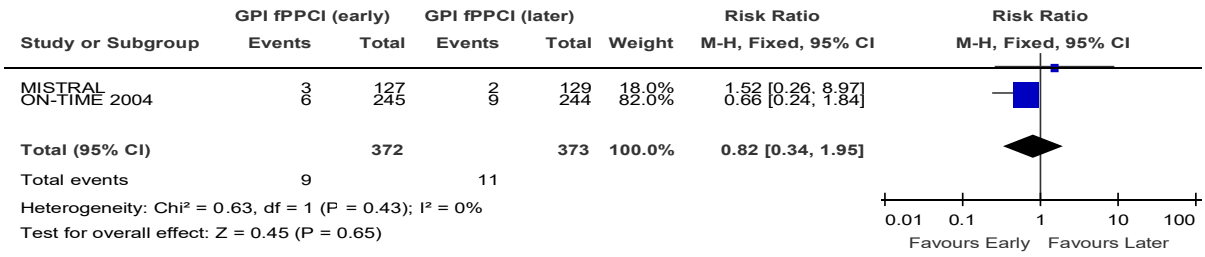


Figure 68: Bleeding (in-hospital)

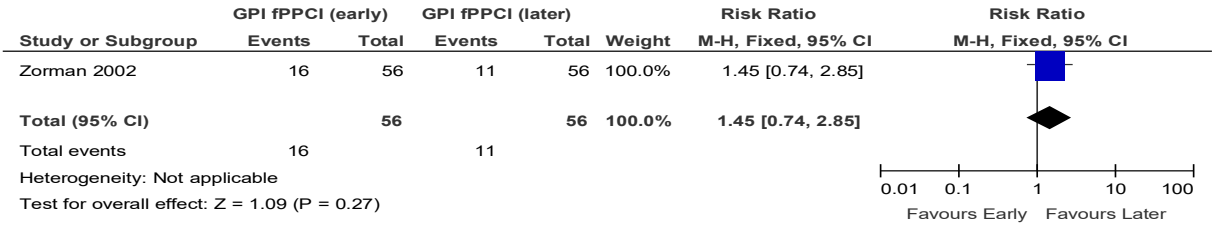


Figure 69: Major bleeding (in-hospital)

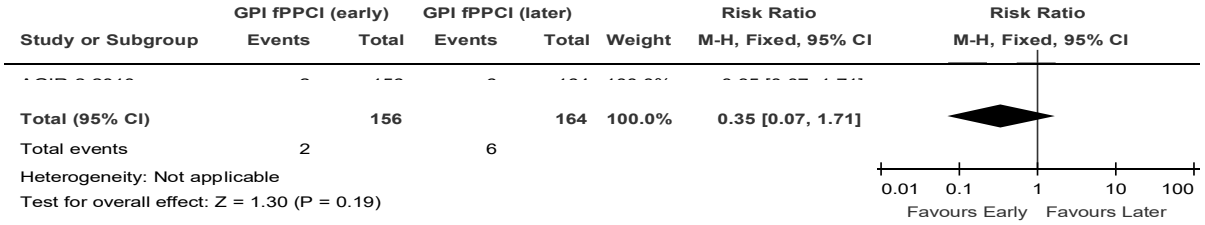


Figure 70: Major bleeding (short-term)

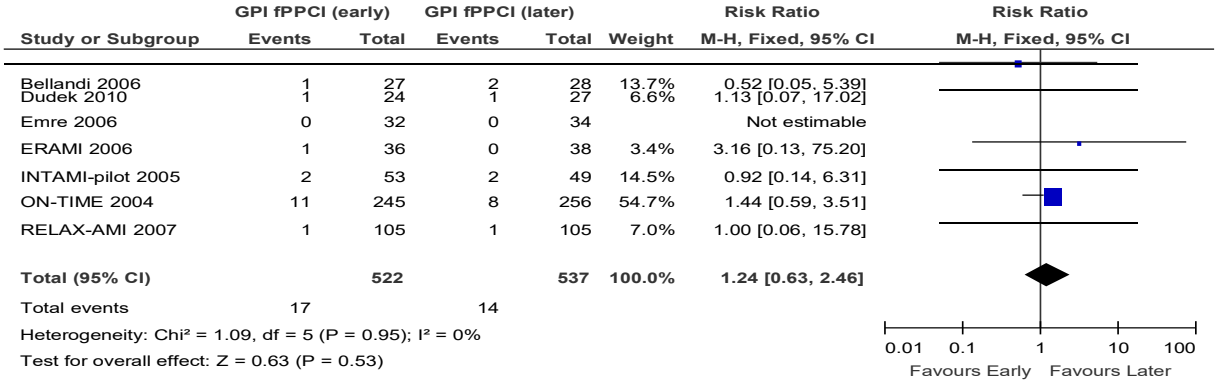
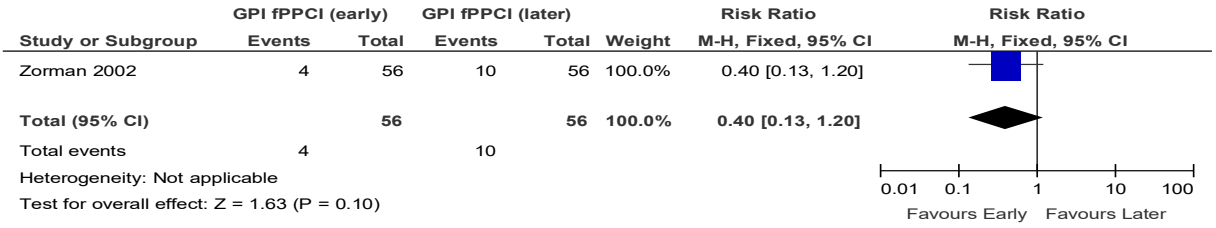


Figure 71: Heart failure (in-hospital)



I.2.7 GPIs: Pre-catheter laboratory versus in-catheter laboratory administration – abciximab

Figure 72: All-cause mortality (in-hospital)

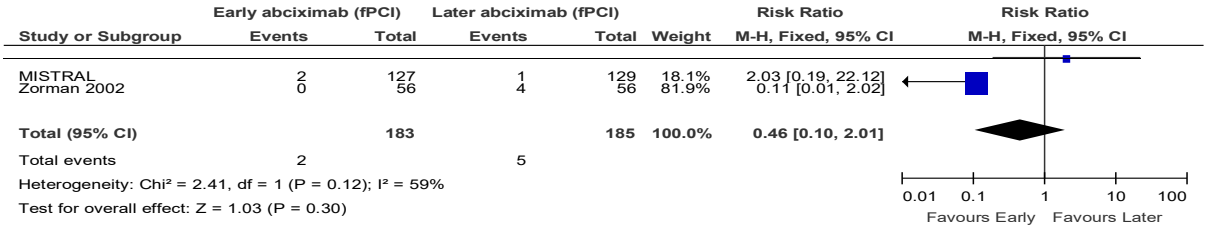


Figure 73: All-cause mortality (short-term)

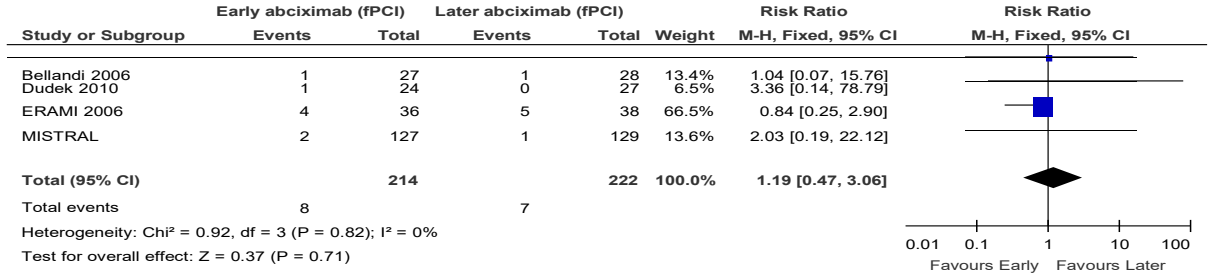


Figure 74: All-cause mortality (longer-term)

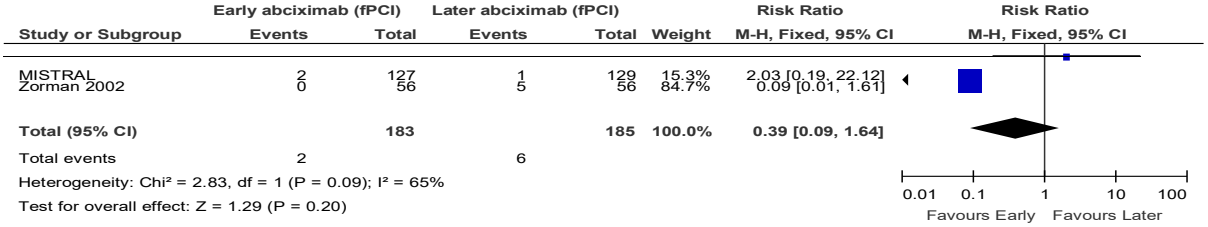


Figure 75: Intracranial bleeding or intracranial haemorrhage (in-hospital)

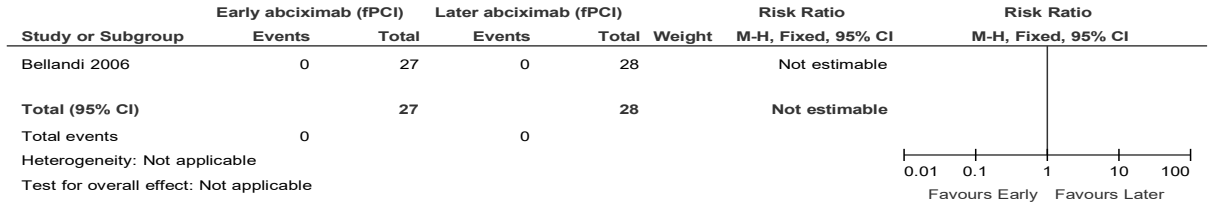


Figure 76: Intracranial bleeding or intracranial haemorrhage (short-term)

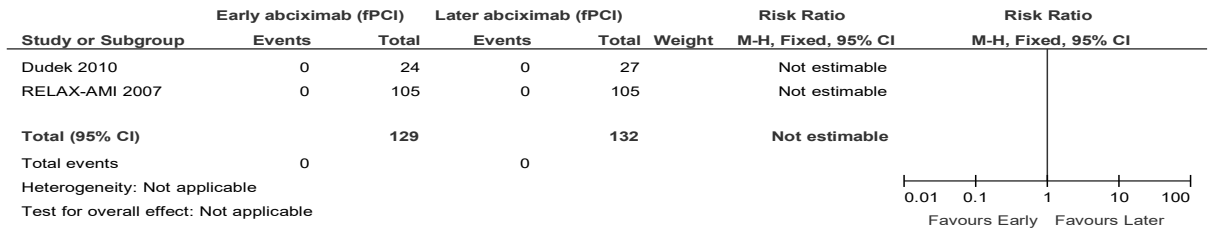


Figure 77: Reinfarction or non-fatal reinfarction or recurrent MI (in-hospital):

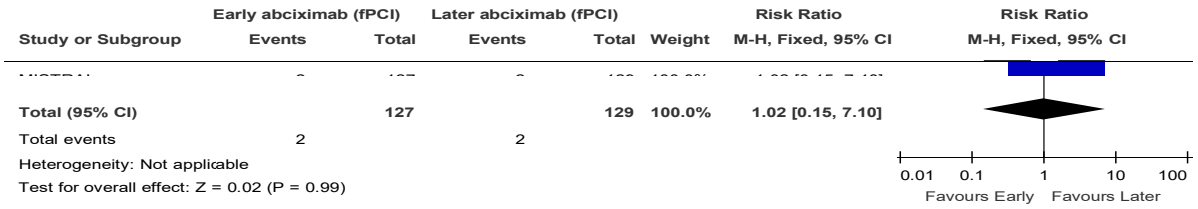


Figure 78: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

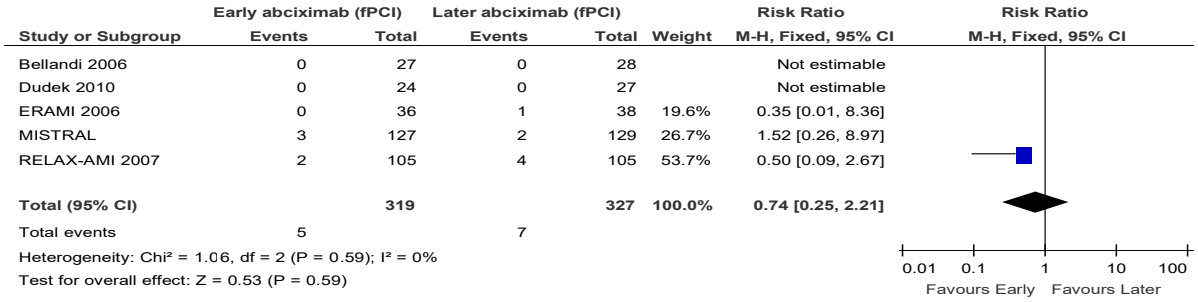


Figure 79: Reinfarction or non-fatal reinfarction or recurrent MI (longer-term)

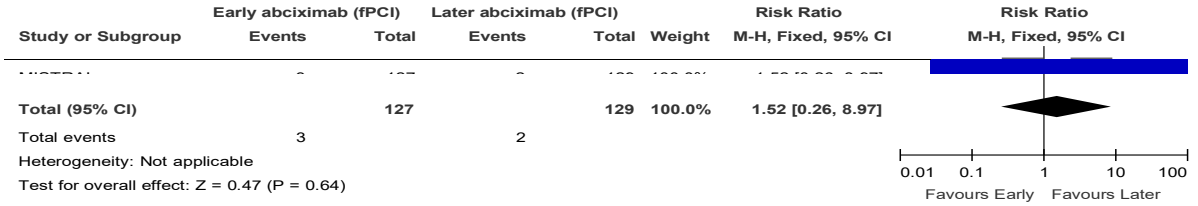


Figure 80: Bleeding (in-hospital)

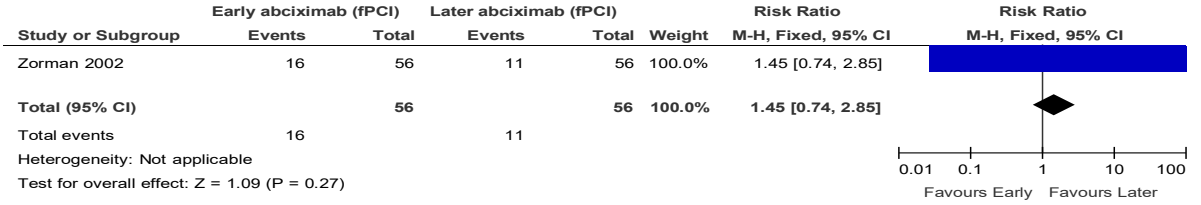


Figure 81: Major bleeding (short-term)

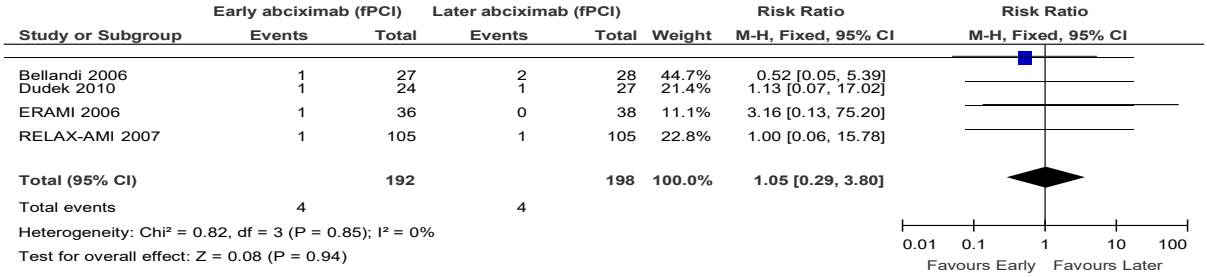


Figure 82: Minor bleeding (short-term)

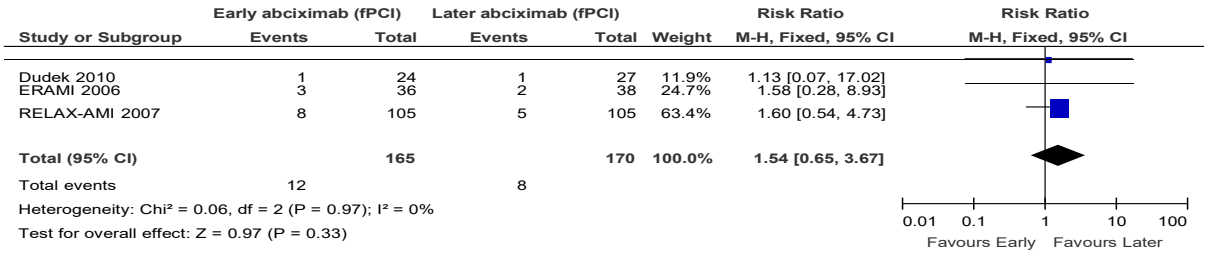


Figure 83: Repeat revascularisation – repeat or urgent (short-term)

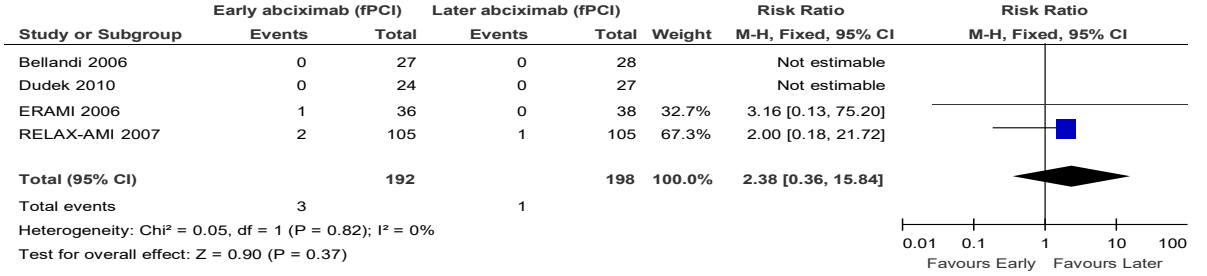
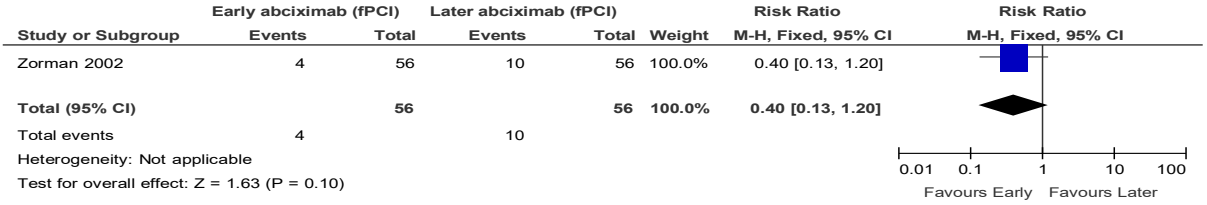


Figure 84: Heart failure (in-hospital)



I.2.8 GPIs: Pre-catheter laboratory versus in-catheter laboratory administration – tirofiban

Figure 85: All-cause mortality (in-hospital)

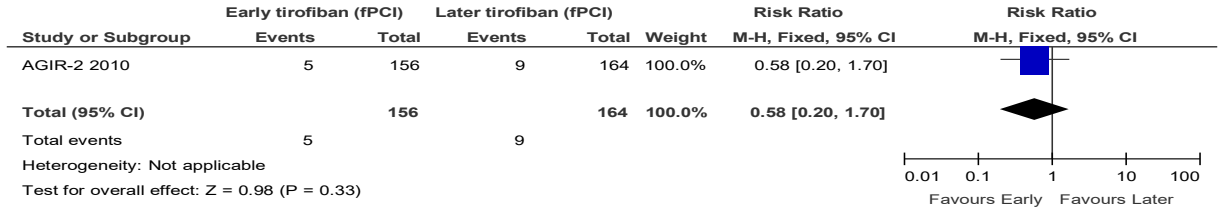


Figure 86: All-cause mortality (short-term)

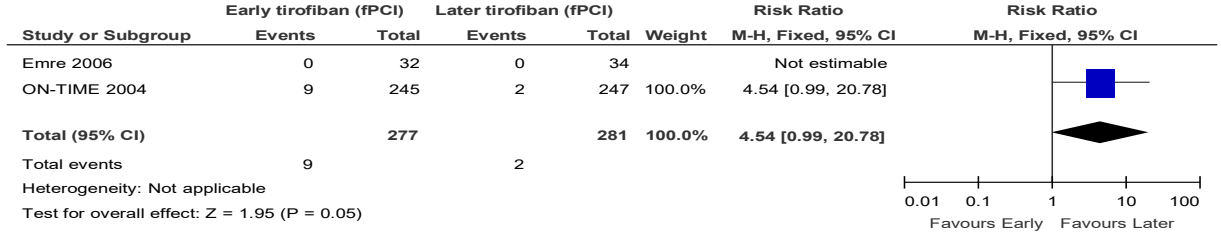


Figure 87: All-cause mortality (longer-term)

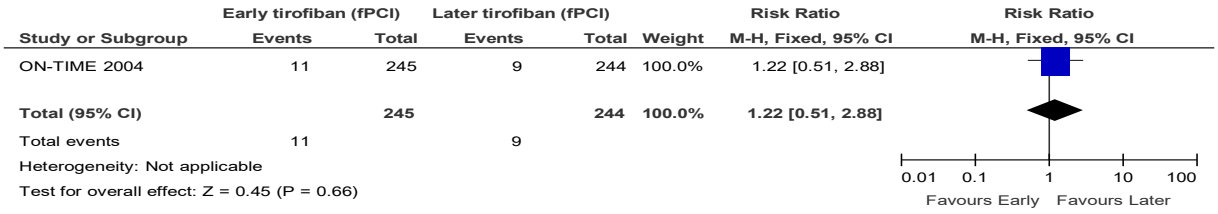


Figure 88: All-cause stroke (in-hospital)

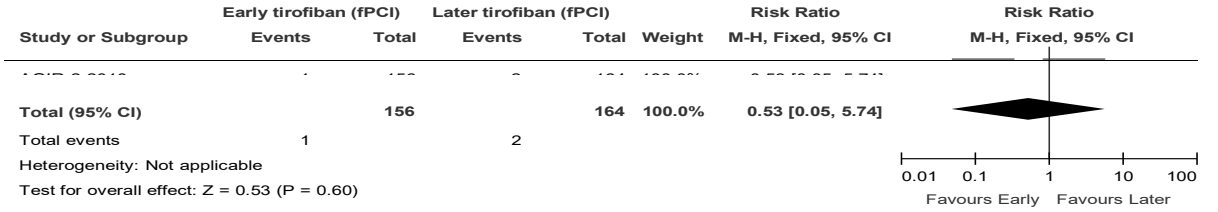


Figure 89: All-cause stroke (short-term)

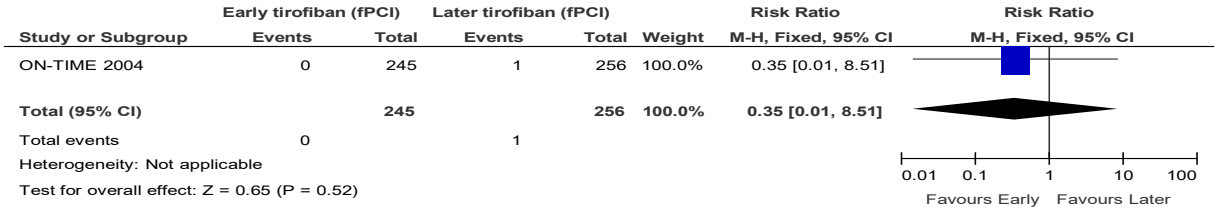


Figure 90: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

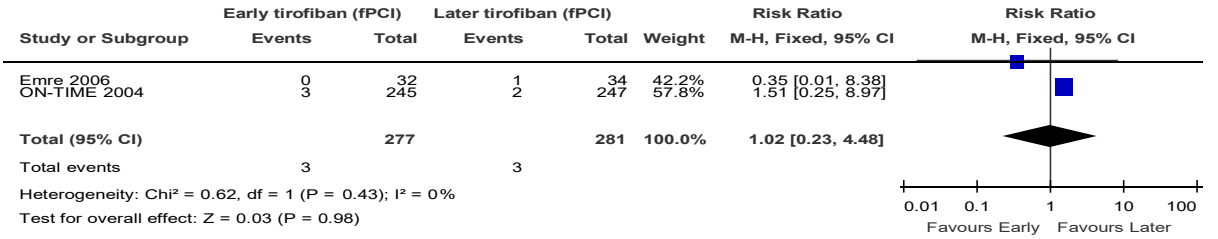


Figure 91: Reinfarction or non-fatal reinfarction or recurrent MI (longer-term)

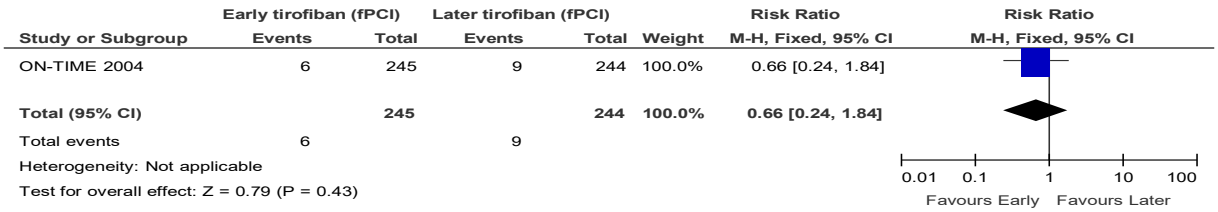


Figure 92: Major bleeding (in-hospital)

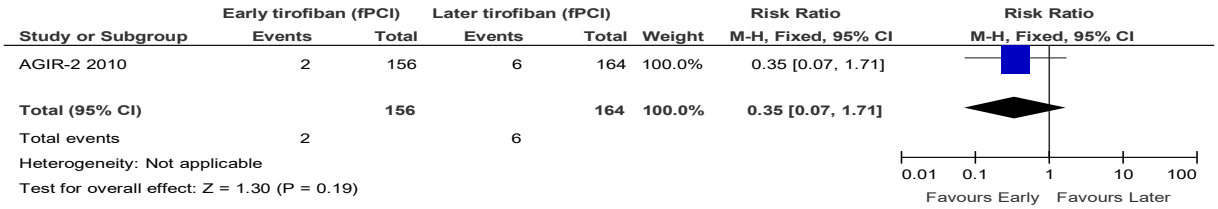


Figure 93: Major bleeding (short-term)

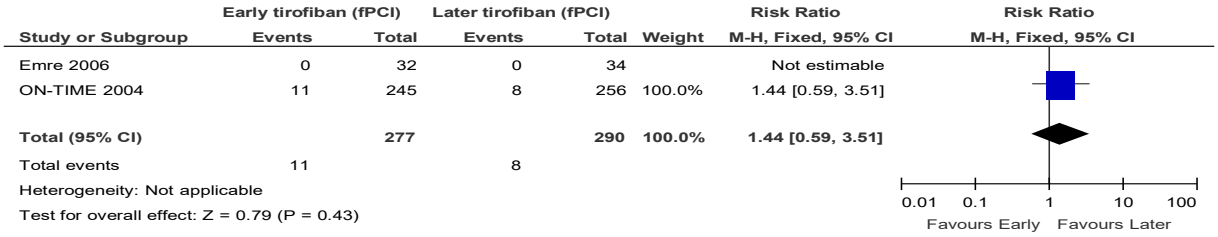


Figure 94: Minor bleeding (short-term)

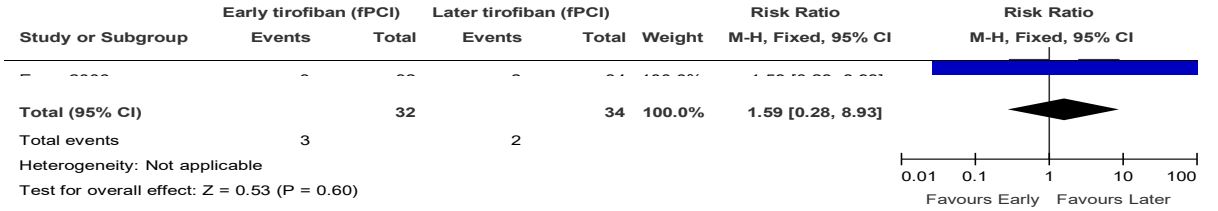
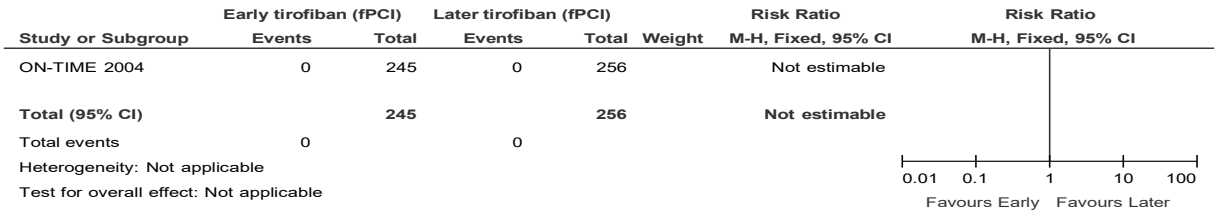


Figure 95: Intracranial bleeding or intracranial haemorrhage (short-term)



I.2.9 GPIs: Pre-catheter laboratory versus in-catheter laboratory administration – eptifibatide

Figure 96: All-cause mortality (short-term)

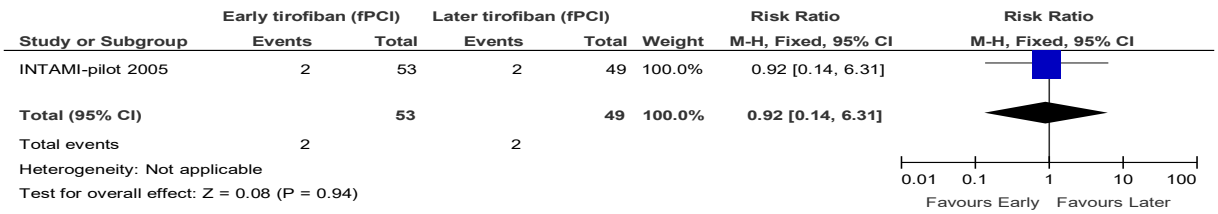


Figure 97: All-cause stroke (short-term)

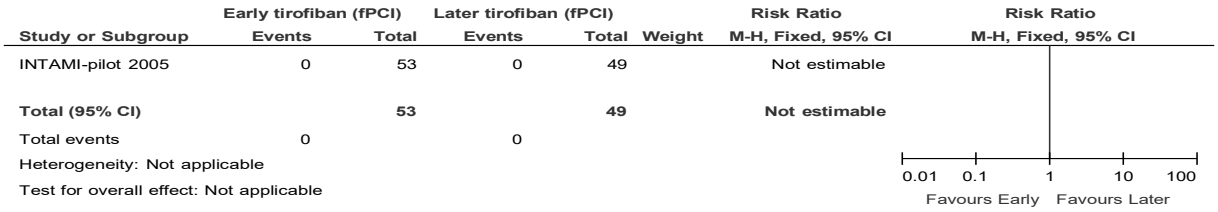


Figure 98: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

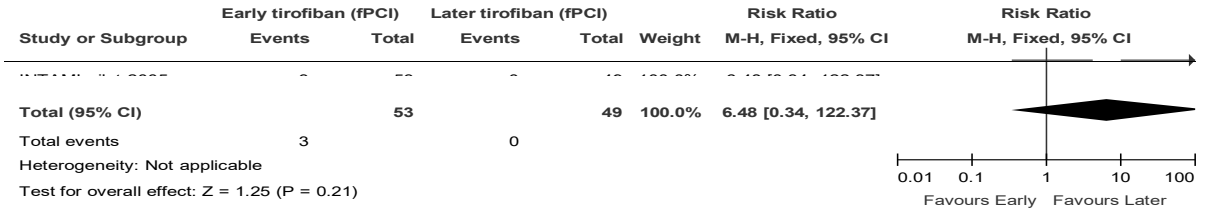


Figure 99: Major bleeding (short-term)

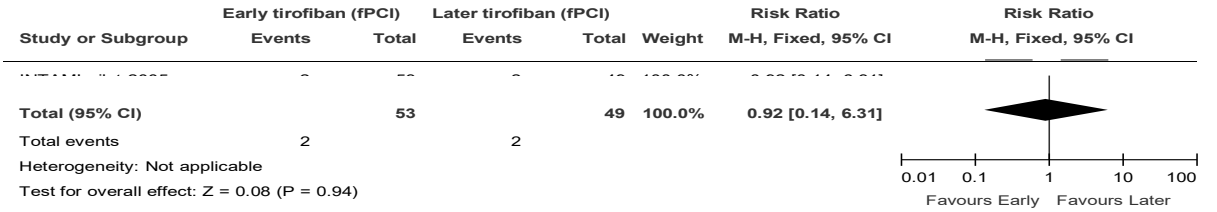
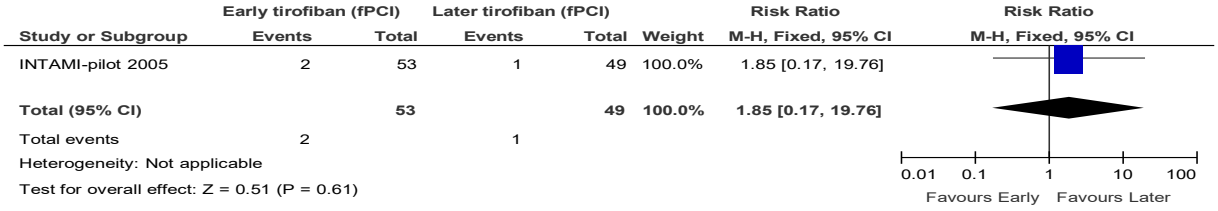


Figure 100: Repeat revascularisation (short-term)



I.2.10 Fibrinolytics: fPPCI versus PPCI – all fibrinolytics

Figure 101: All-cause mortality (in-hospital)

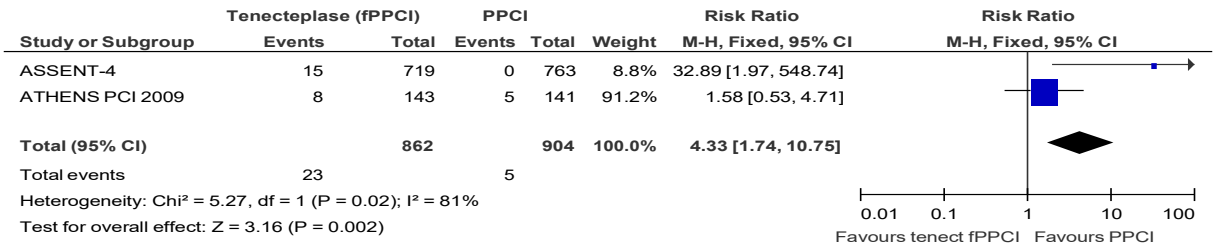


Figure 102: All-cause mortality (short-term)

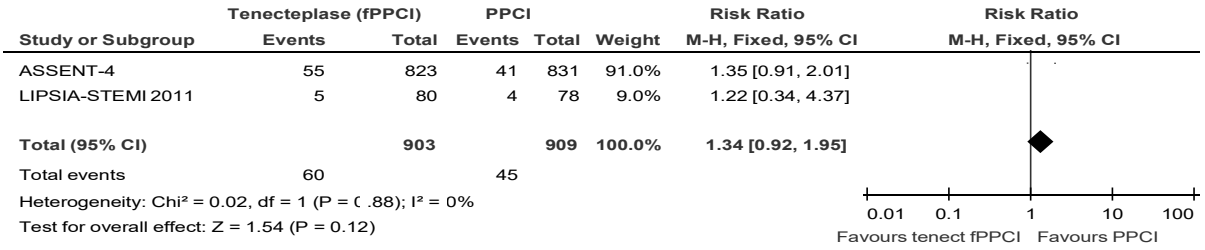


Figure 103: All-cause mortality (longer-term)

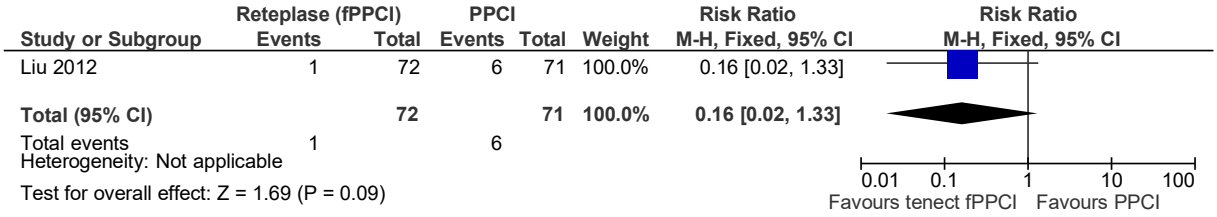


Figure 104: All-cause stroke (in-hospital)

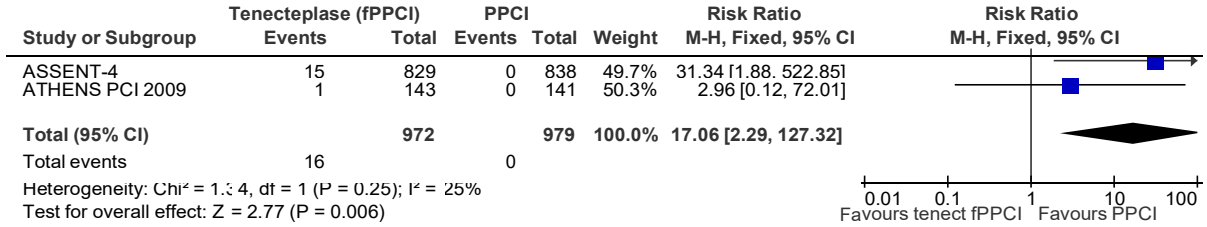


Figure 105: All-cause stroke (short-term)

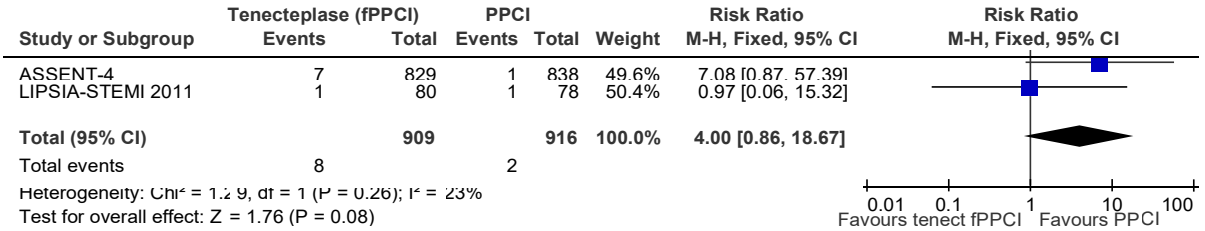


Figure 106: Non-fatal stroke (in-hospital)

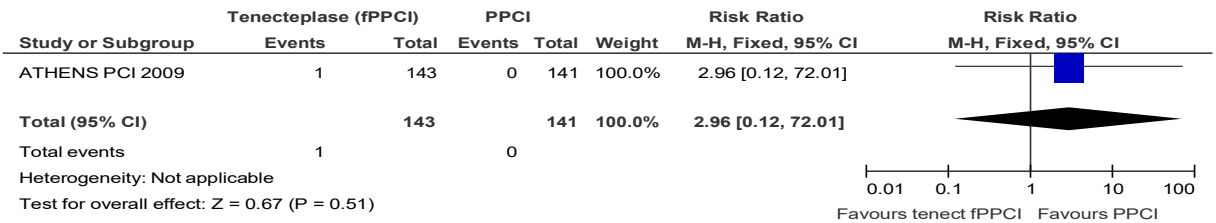


Figure 107: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

Study or Subgroup	Tenecteplase (fPPCI) Events	Total	PPCI Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
ASSENT-4	49	805	30	820	80.8%	1.66 [1.07, 2.59]
LIPSIA-STEMI 2011	5	80	4	78	11.0%	1.22 [0.34, 4.37]
Liu 2012	1	72	3	71	8.2%	0.33 [0.04, 3.09]
Total (95% CI)		**957**		**969**	**100.0%**	**1.51 [1.00, 2.26]**
Total events	55		37			

Heterogeneity: Chi² = 2.07, df = 2 (P = 0.35); I² = 4%
Test for overall effect: Z = 1.97 (P = 0.05)

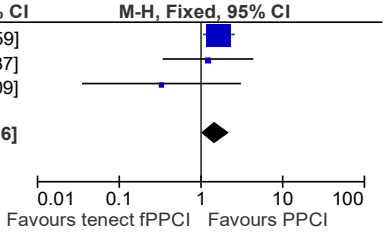


Figure 108: Intracranial bleeding or intracranial haemorrhage (in-hospital)

Study or Subgroup	Tenecteplase (fPPCI) Events	Total	PPCI Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
ASSENT-4	8	719	0	763	100.0%	18.04 [1.04, 311.96]
ATHENS PCI 2009	0	143	0	141		Not estimable
Total (95% CI)		**862**		**904**	**100.0%**	**18.04 [1.04, 311.96]**
Total events	8		0			

Heterogeneity: Not applicable
Test for overall effect: Z = 1.99 (P = 0.05)

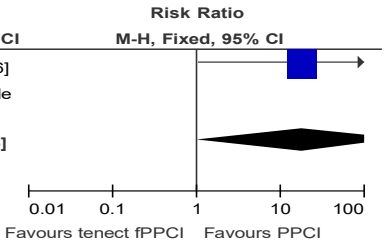


Figure 109: Intracranial bleeding or intracranial haemorrhage (short-term)

Study or Subgroup	Tenecteplase (fPPCI) Events	Total	PPCI Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Total (95% CI)		**829**		**838**	**100.0%**	**1.01 [0.06, 16.13]**
Total events	1		1			

Heterogeneity: Not applicable
Test for overall effect: Z = 0.01 (P = 0.99)

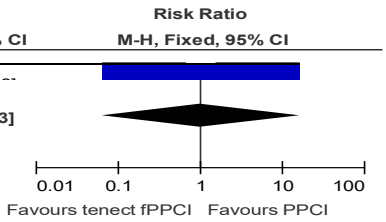


Figure 110: Intracranial bleeding or intracranial haemorhage (longer-term)

Study or Subgroup	Reteplase (fPPCI) Events	Total	PPCI Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Liu 2012	0	72	0	71		Not estimable
Total (95% CI)		**72**		**71**		**Not estimable**
Total events	0		0			

Heterogeneity: Not applicable
Test for overall effect: Not applicable

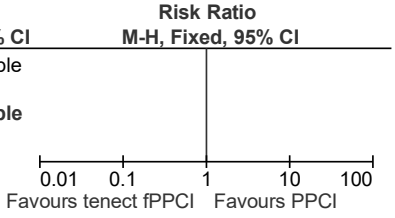


Figure 111: Major bleeding (in-hospital)

Study or Subgroup	Tenecteplase (fPPCI) Events	Total	PPCI Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
ASSENT-4	46	719	37	763	87.7%	1.32 [0.87, 2.01]
ATHENS PCI 2009	8	143	5	141	12.3%	1.58 [0.53, 4.71]
Total (95% CI)		**862**		**904**	**100.0%**	**1.35 [0.91, 2.00]**
Total events	54		42			

Heterogeneity: Chi² = 0.09, df = 1 (P = 0.76); I² = 0%
Test for overall effect: Z = 1.50 (P = 0.13)

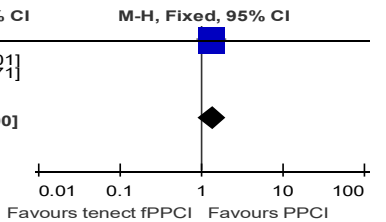


Figure 112: Major bleeding (longer-term)

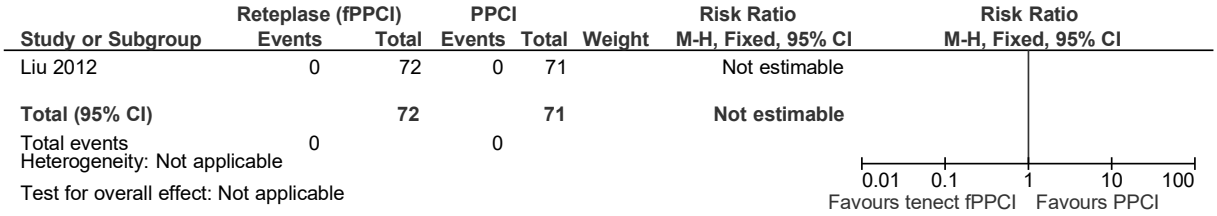


Figure 113: Minor bleeding (in-hospital)

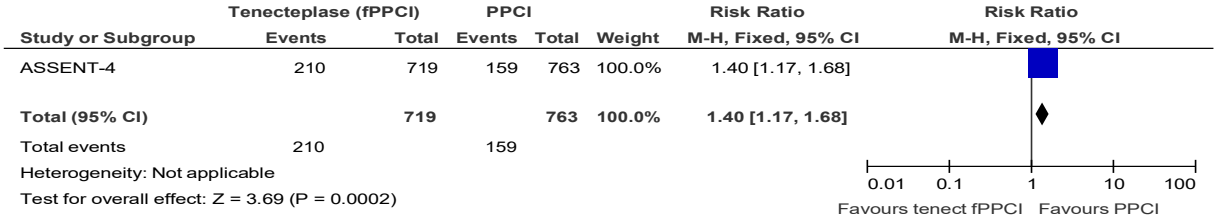


Figure 114: Minor bleeding (longer-term)

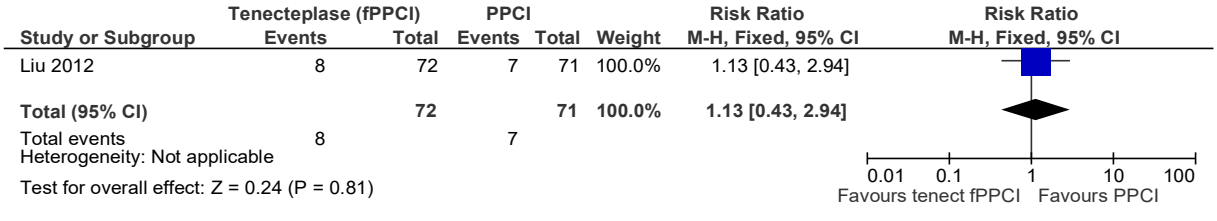


Figure 115: Heart failure (in-hospital)

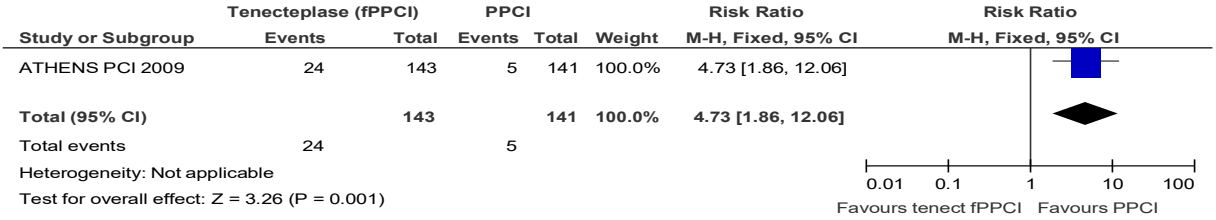


Figure 116: Heart failure (short-term)

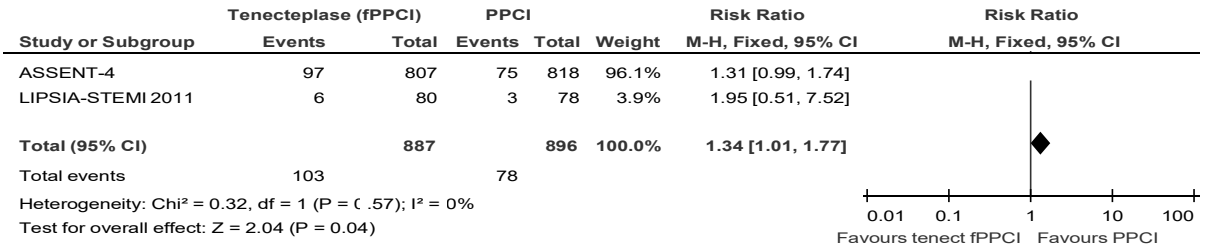


Figure 117: Heart failure (longer-term)

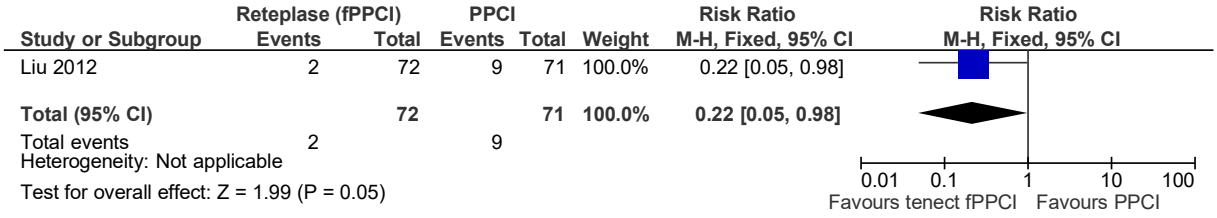
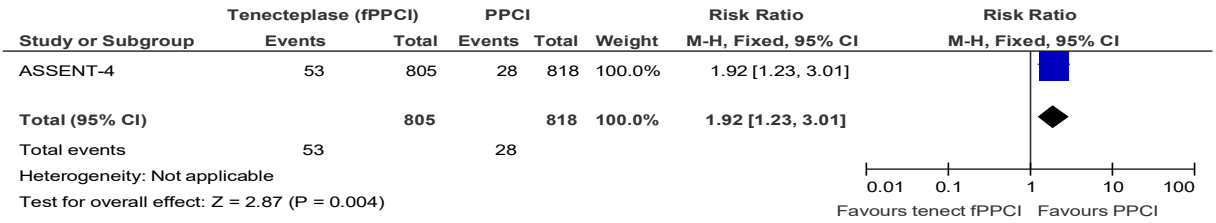


Figure 118: Repeat revascularisation – repeat or urgent (short-term)



I.2.11 Fibrinolytics: fPPCI versus PPCI - tenecteplase

Figure 119: All-cause mortality (in-hospital)

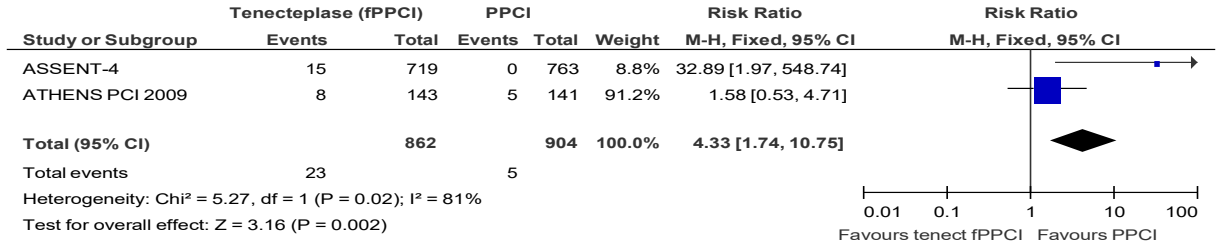


Figure 120: All-cause mortality (short-term)

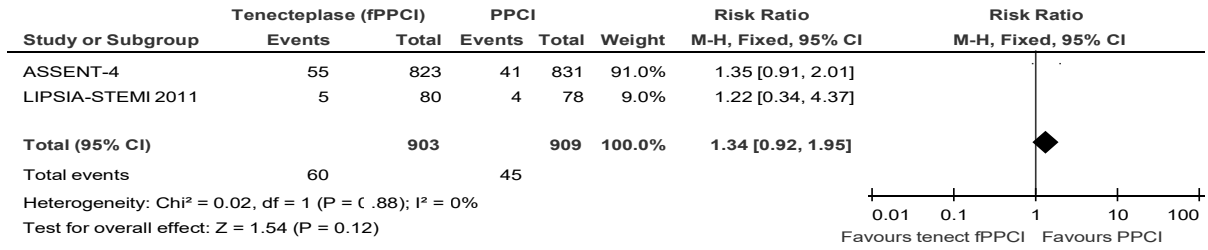


Figure 121: All-cause stroke (in-hospital)

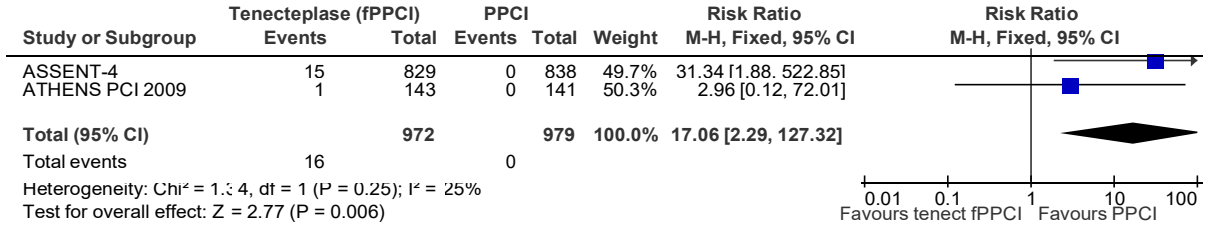


Figure 122: All-cause stroke (short-term)

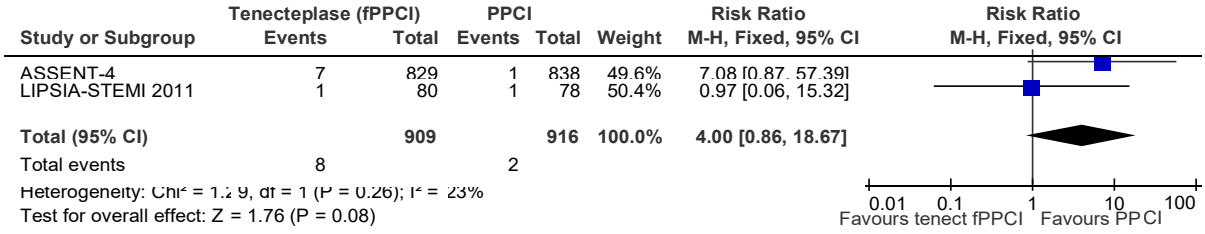


Figure 123: Non-fatal stroke (in-hospital)

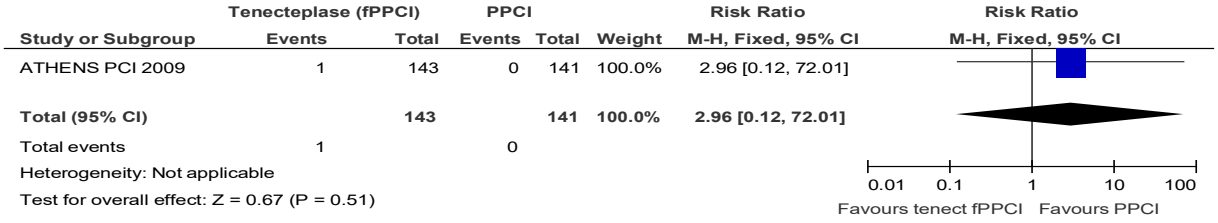


Figure 124: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

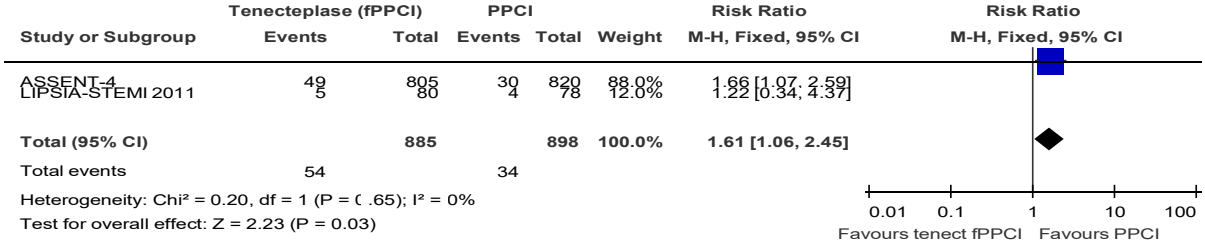


Figure 125: Intracranial bleeding or intracranial haemorrhage (in-hospital)

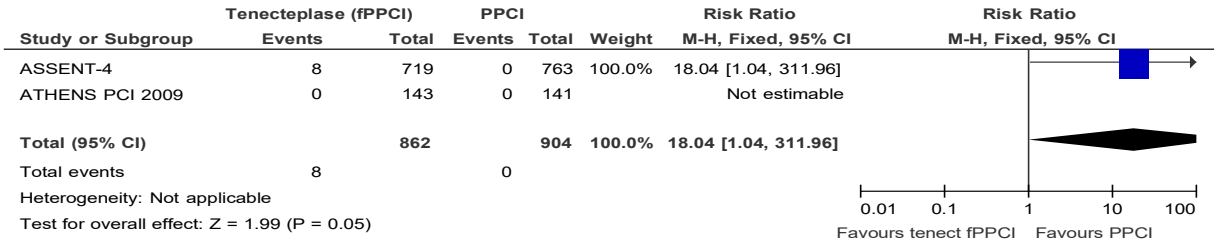


Figure 126: Intracranial bleeding or intracranial haemorrhage (short-term)

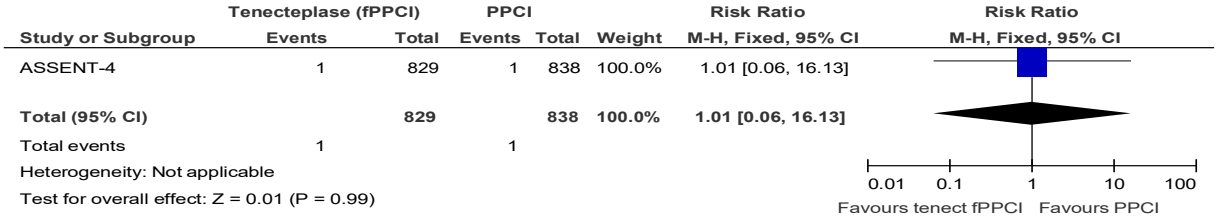


Figure 127: Major bleeding (in-hospital)

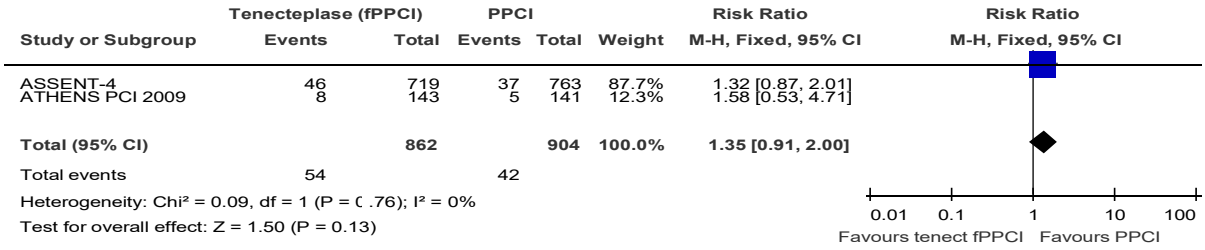


Figure 128: Minor bleeding (in-hospital)

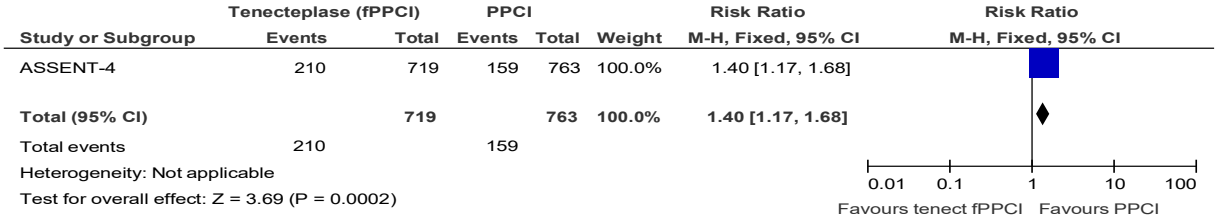


Figure 129: Heart failure (in-hospital)

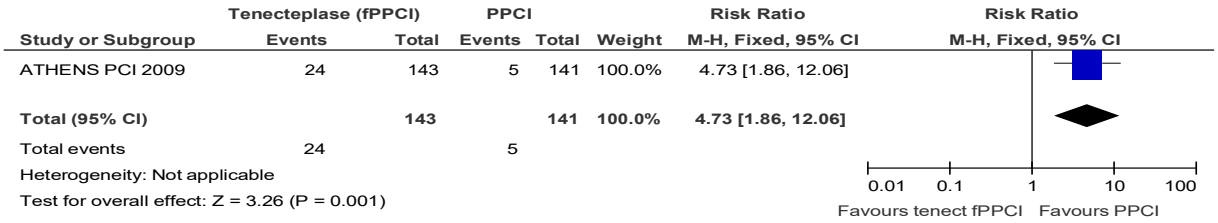


Figure 130: Heart failure (short-term)

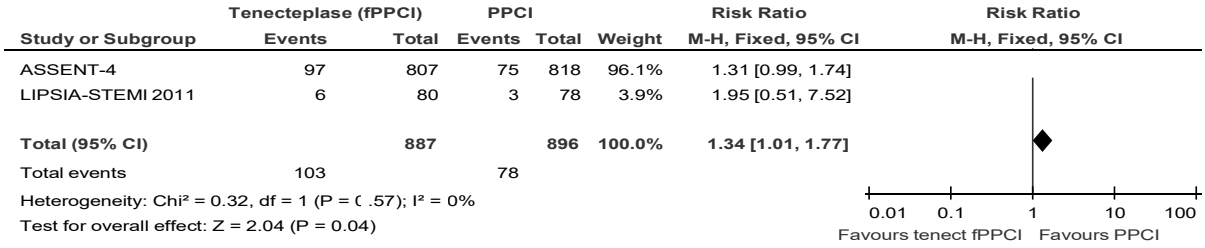
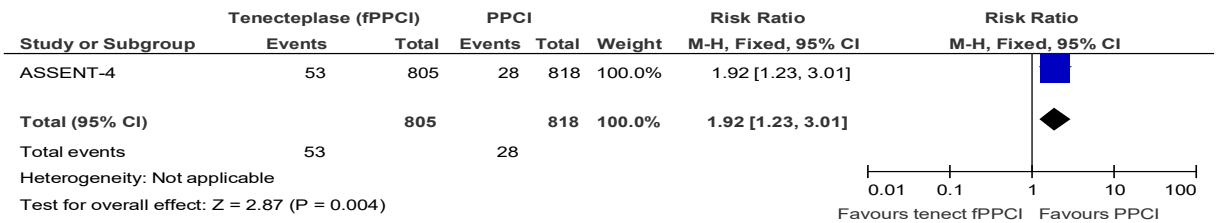


Figure 131: Repeat revascularisation – repeat or urgent (short-term)



I.2.12 Fibrinolytics: fPPCI versus PPCI - reteplase

Figure 132: All-cause mortality (longer-term)

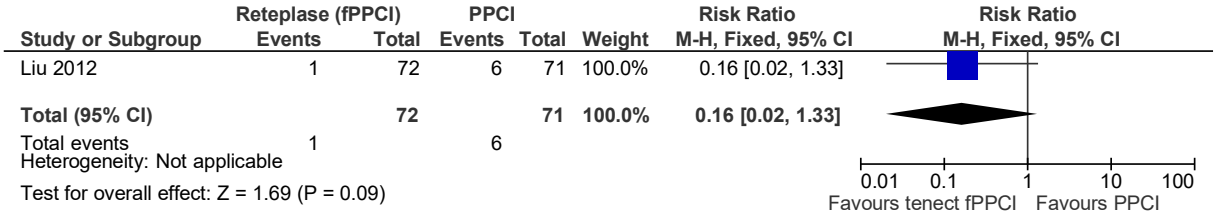


Figure 133: Reinfarction or non-fatal reinfarction or recurrent MI (short-term)

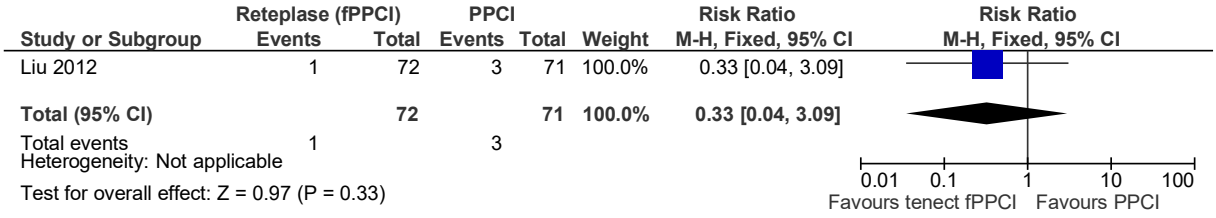


Figure 134: Intracranial bleeding or intracranial haemorhage (longer-term)

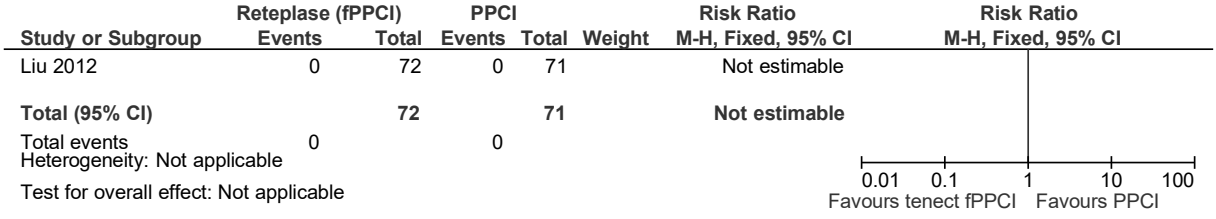


Figure 135: Major bleeding (longer-term)

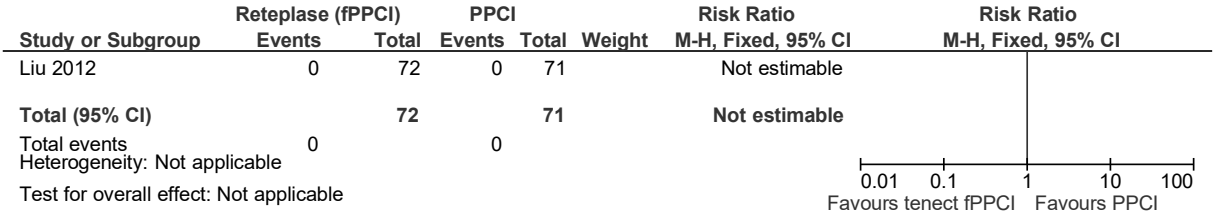


Figure 136: Minor bleeding (longer-term)

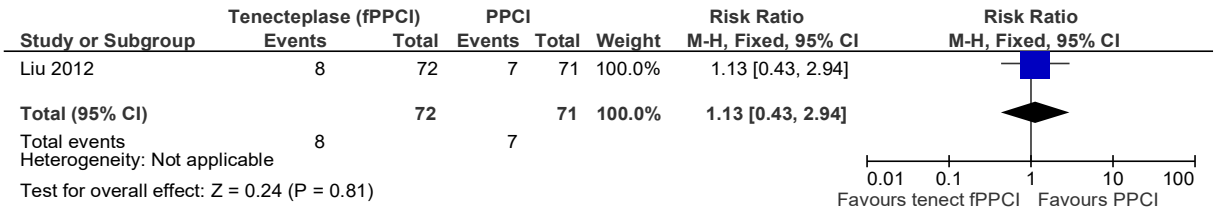
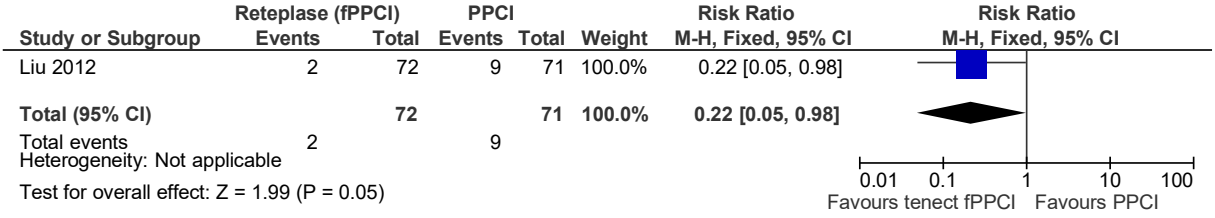


Figure 137: Heart failure (longer-term)



I.2.13 Combination: fPPCI (GPI + fibrinolytic) versus PPCI

Figure 138: All-cause stroke (short-term)

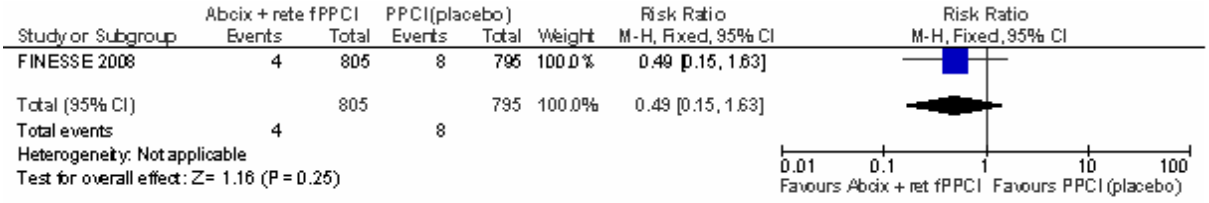


Figure 139: Fatal stroke (short-term)

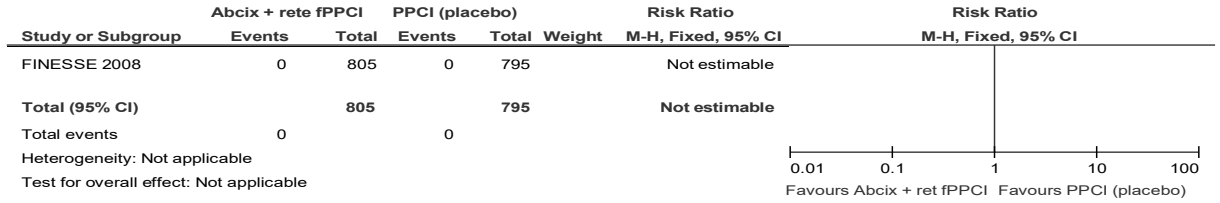


Figure 140: Recurrent MI (short-term)

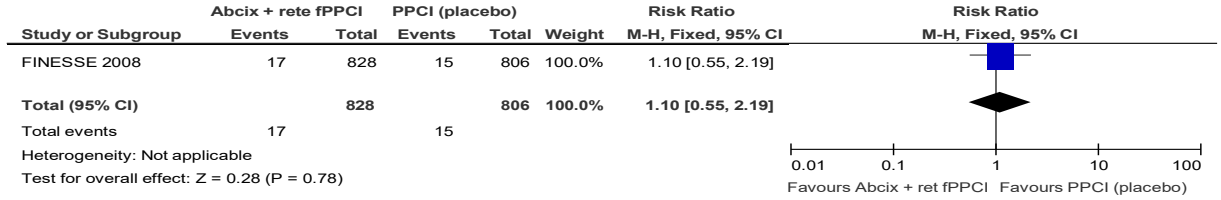


Figure 141: Intracranial bleeding or intracranial haemorrhage (short-term)

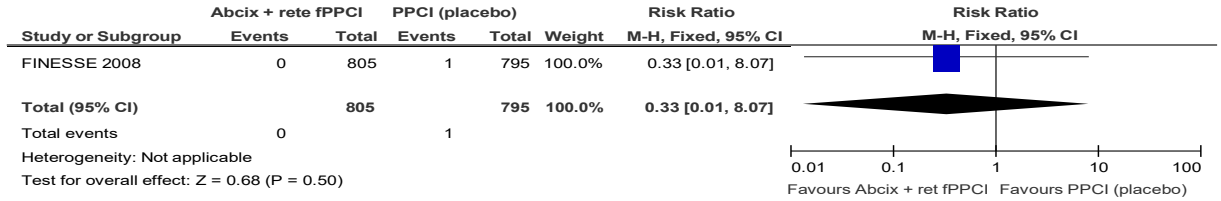


Figure 142: Major bleeding (short-term)

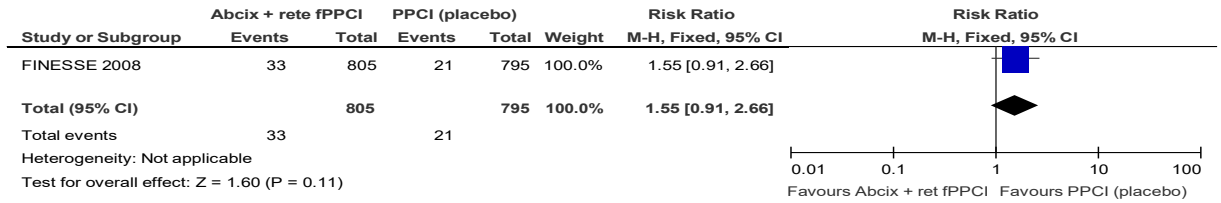


Figure 143: Minor bleeding (short-term)

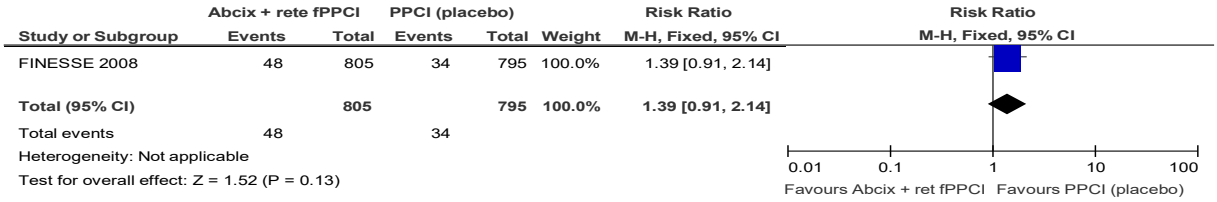


Figure 144: Heart failure (short-term)

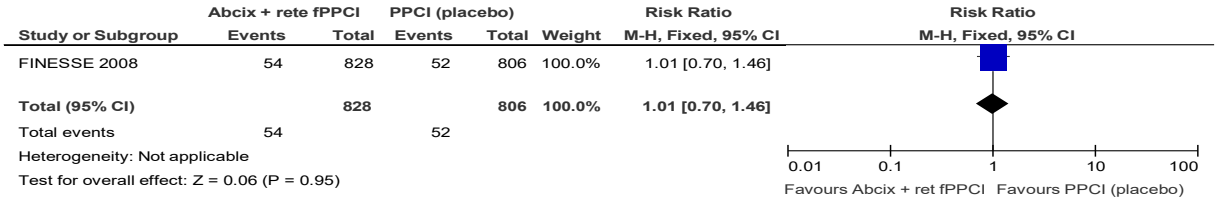
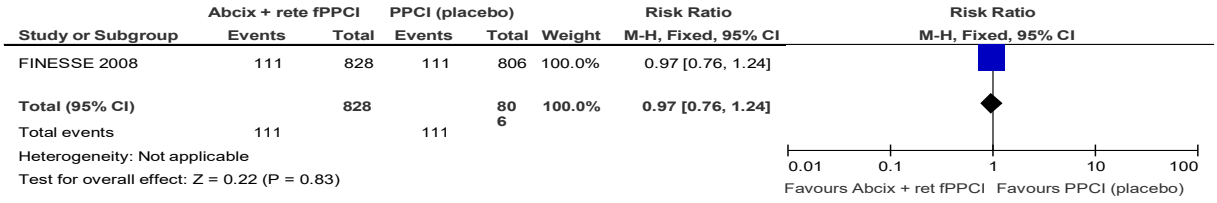


Figure 145: Repeat revascularisation (short-term)



I.3 Radial versus femoral arterial access for PPCI

Figure 146: All-cause mortality (≤ 30 days)

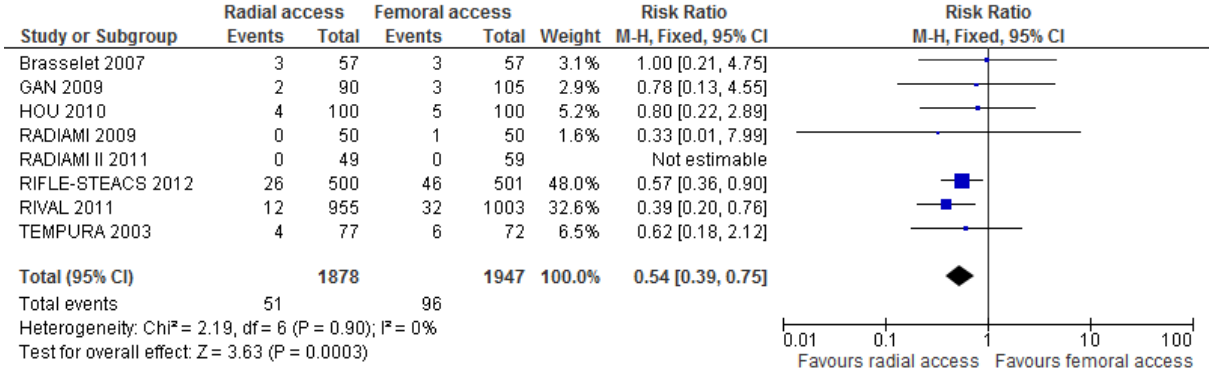
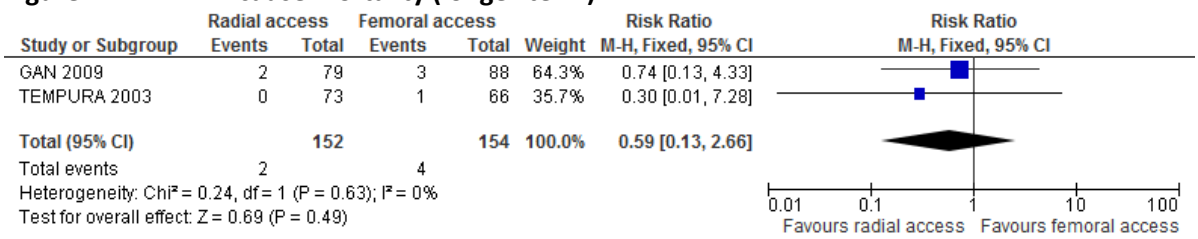


Figure 147: All-cause mortality (longer-term)



6 months TEMPURA 2003, 9 months; GAN 2009

Figure 148: Reinfarction (≤ 30 days)

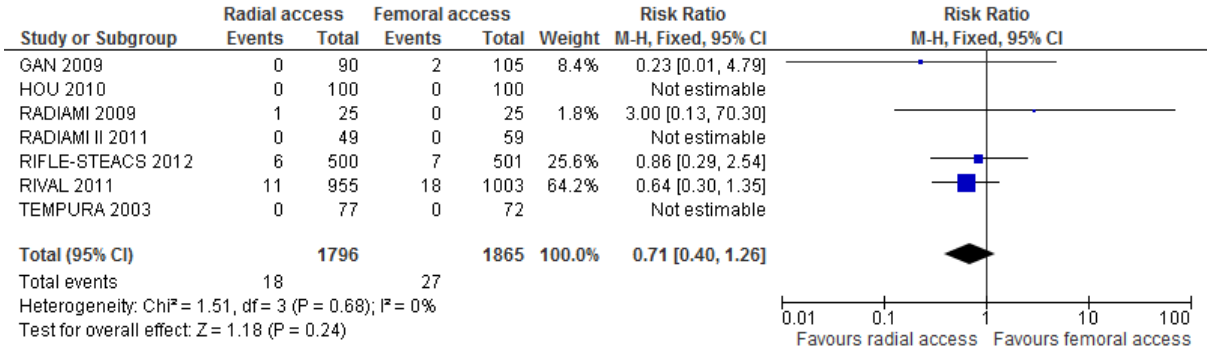
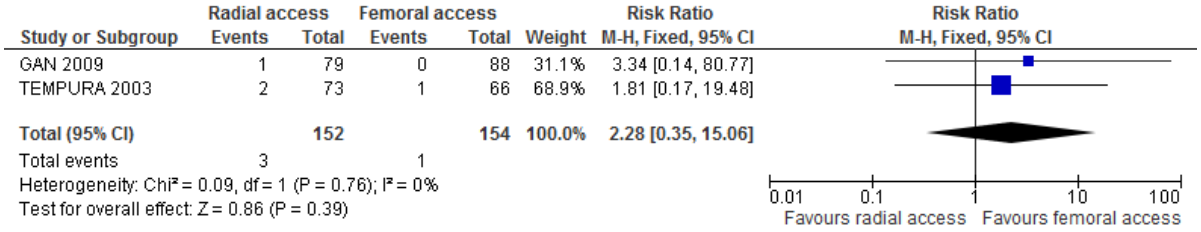


Figure 149: Reinfarction (longer-term)



6 months TEMPURA 2003, 9 months; GAN 2009

Figure 150: Major bleeding (≤ 30 days)

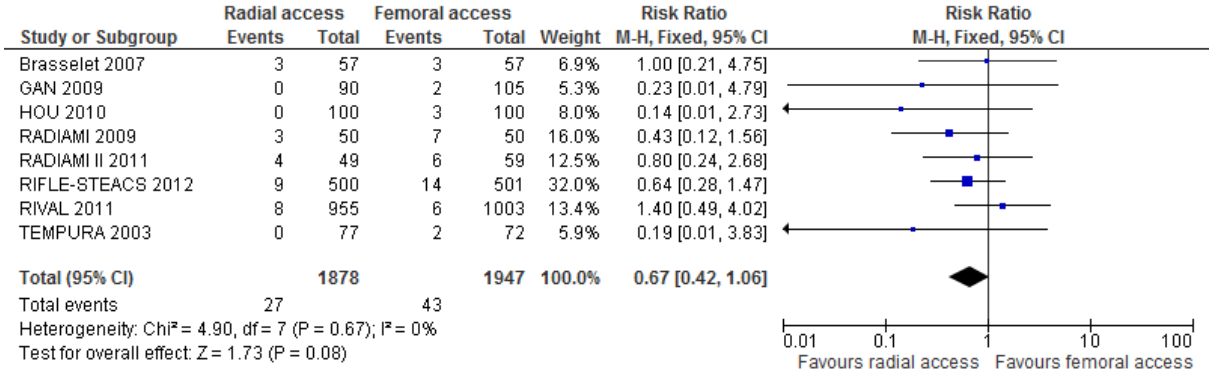


Figure 151: Minor bleeding (≤ 30 days)

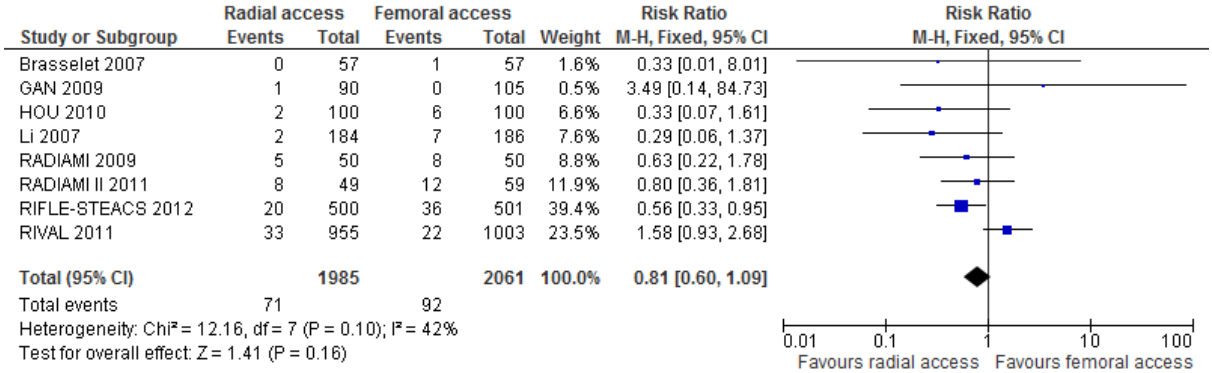


Figure 152: Repeat revascularisation (≤ 30 days)

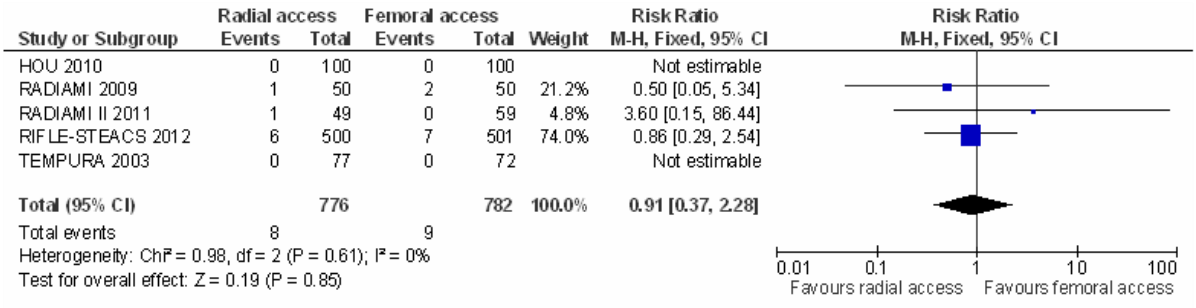
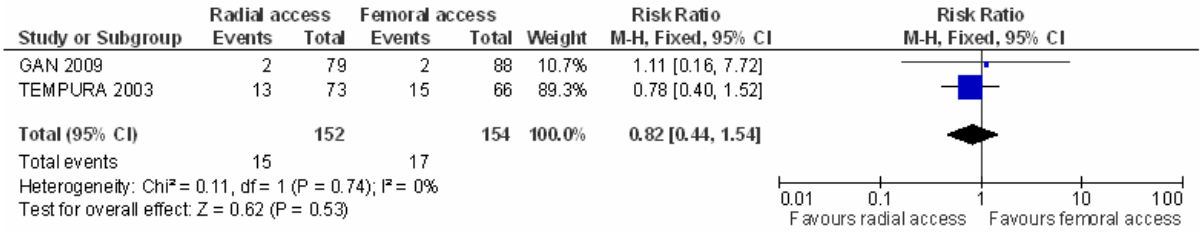


Figure 153: Repeat revascularisation (longer-term)



6 months TEMPURA 2003, 9 months; GAN 2009

Figure 154: CABG (≤ 30 days)

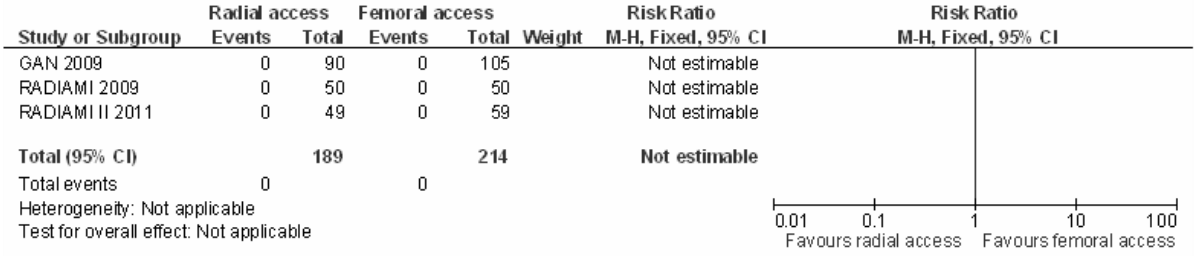
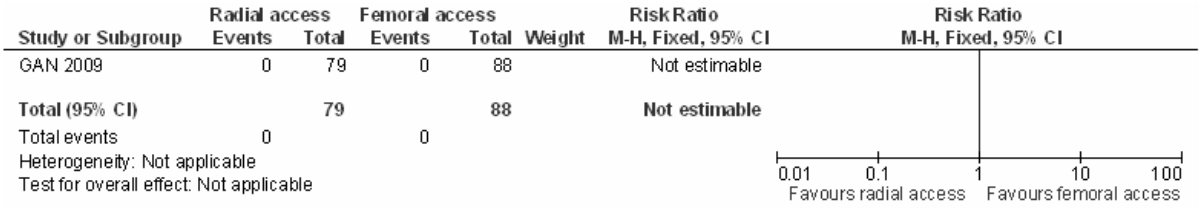


Figure 155: CABG (longer-term)



9 months GAN 2009

Figure 156: Stroke (short-term)

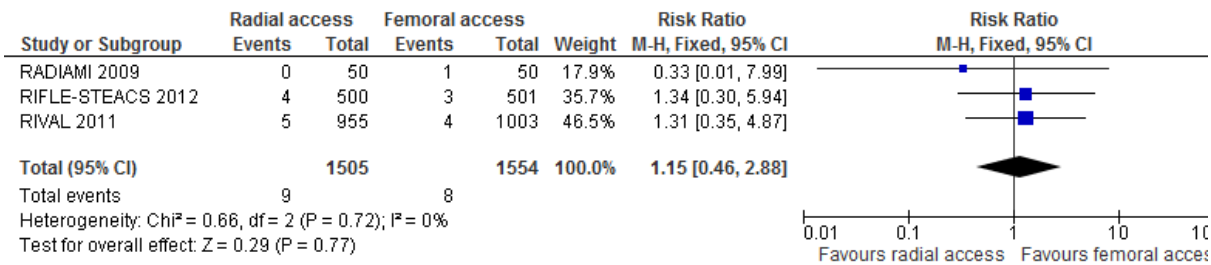


Figure 157: Access site crossover

Study or Subgroup	Radial access Events	Total	Femoral access Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Brasselet 2007	7	57	1	57	2.8%	7.00 [0.89, 55.08]
GAN 2009	1	90	0	105	1.3%	3.49 [0.14, 84.73]
HOU 2010	4	100	0	100	1.4%	9.00 [0.49, 165.00]
Li 2007	3	184	2	186	5.5%	1.52 [0.26, 8.97]
RADIAMI 2009	4	50	1	50	2.8%	4.00 [0.46, 34.54]
RADIAMI II 2011	2	49	1	59	2.5%	2.41 [0.23, 25.77]
RIFLE-STEACS 2012	47	500	14	501	38.9%	3.36 [1.88, 6.03]
RIVAL 2011	51	955	16	1003	43.4%	3.35 [1.92, 5.83]
TEMPURA 2003	1	77	0	72	1.4%	2.81 [0.12, 67.83]
Total (95% CI)		**2062**		**2133**	**100.0%**	**3.42 [2.38, 4.93]**
Total events	120		35			

Heterogeneity: Chi² = 1.82, df = 8 (P = 0.99); I² = 0%
Test for overall effect: Z = 6.62 (P < 0.00001)

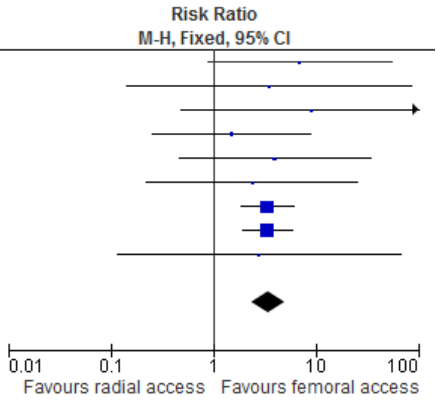


Figure 158: Angiographic procedural success

Study or Subgroup	Radial access Events	Total	Femoral access Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Brasselet 2007	52	57	55	57	3.0%	0.95 [0.86, 1.04]
GAN 2009	87	90	101	105	5.1%	1.00 [0.95, 1.06]
HOU 2010	96	100	95	100	5.2%	1.01 [0.95, 1.07]
Li 2007	174	184	175	185	9.6%	1.00 [0.95, 1.05]
RADIAMI 2009	44	50	46	50	2.5%	0.96 [0.84, 1.09]
RADIAMI II 2011	49	49	58	59	2.9%	1.02 [0.97, 1.07]
RIFLE-STEACS 2012	435	500	436	501	23.9%	1.00 [0.95, 1.05]
RIVAL 2011	789	825	806	842	43.8%	1.00 [0.98, 1.02]
TEMPURA 2003	74	77	70	72	4.0%	0.99 [0.93, 1.05]
Total (95% CI)		**1932**		**1971**	**100.0%**	**1.00 [0.98, 1.01]**
Total events	1800		1842			

Heterogeneity: Chi² = 2.51, df = 8 (P = 0.96); I² = 0%
Test for overall effect: Z = 0.29 (P = 0.77)

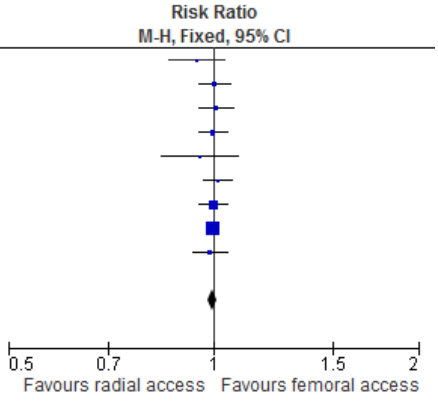


Figure 159: Fluoroscopy time

Study or Subgroup	Radial access Mean [min]	SD [min]	Total	Femoral access Mean [min]	SD [min]	Total	Weight	Mean Difference IV, Fixed, 95% CI [min]
Brasselet 2007	28	14	57	26	18	57	0.6%	2.00 [-3.92, 7.92]
HOU 2010	11.2	2	100	11.4	1.8	100	76.2%	-0.20 [-0.73, 0.33]
RADIAMI 2009	10.9	5.6	50	11.2	7	50	3.4%	-0.30 [-2.78, 2.18]
RADIAMI II 2011	7	3	49	7.5	3	59	16.4%	-0.50 [-1.64, 0.64]
TEMPURA 2003	15.1	7.6	77	16.1	7.9	72	3.4%	-1.00 [-3.49, 1.49]
Total (95% CI)			**333**			**338**	**100.0%**	**-0.27 [-0.73, 0.19]**

Heterogeneity: Chi² = 1.12, df = 4 (P = 0.89); I² = 0%
Test for overall effect: Z = 1.14 (P = 0.26)

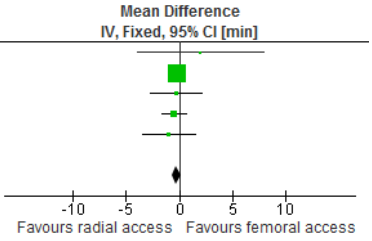


Figure 160: Total radiographic contrast media used in PPCI procedure

Study or Subgroup	Radial access Mean [ml]	SD [ml]	Total	Femoral access Mean [ml]	SD [ml]	Total	Weight	Mean Difference IV, Fixed, 95% CI [ml]
Brasselet 2007	97	57	57	91	47	57	25.4%	6.00 [-13.18, 25.18]
RADIAMI 2009	198.7	45.7	50	197.7	50	59	28.9%	1.00 [-16.98, 18.98]
RADIAMI II 2011	165	41.4	49	162	59	50	23.3%	3.00 [-17.05, 23.05]
TEMPURA 2003	180	61	77	186	66	72	22.4%	-6.00 [-26.45, 14.45]
Total (95% CI)			**233**			**238**	**100.0%**	**1.17 [-8.50, 10.84]**

Heterogeneity: Chi² = 0.75, df = 3 (P = 0.86); I² = 0%
Test for overall effect: Z = 0.24 (P = 0.81)

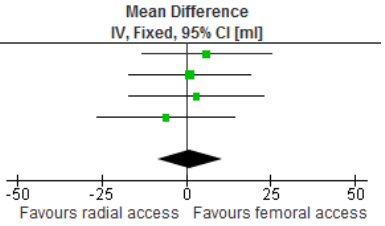


Figure 161: Vascular access site complications

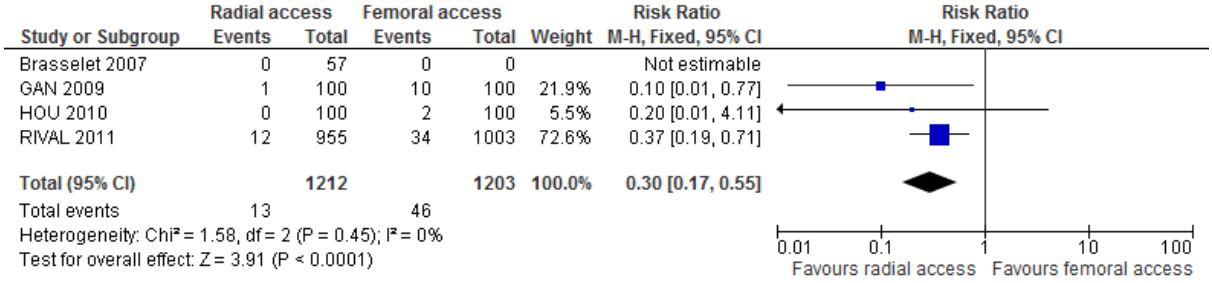
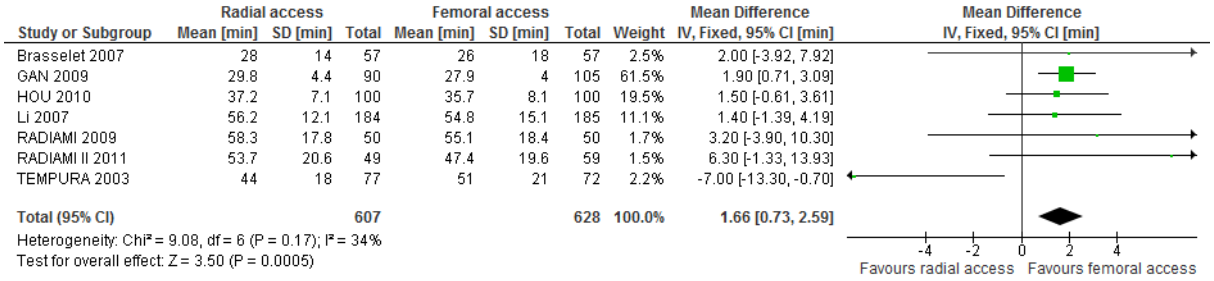


Figure 162: Length of hospital stay

Figure 163: Procedure length



I.3.1 Economic analysis forest plots

Figure 164: Bleeding requiring transfusion

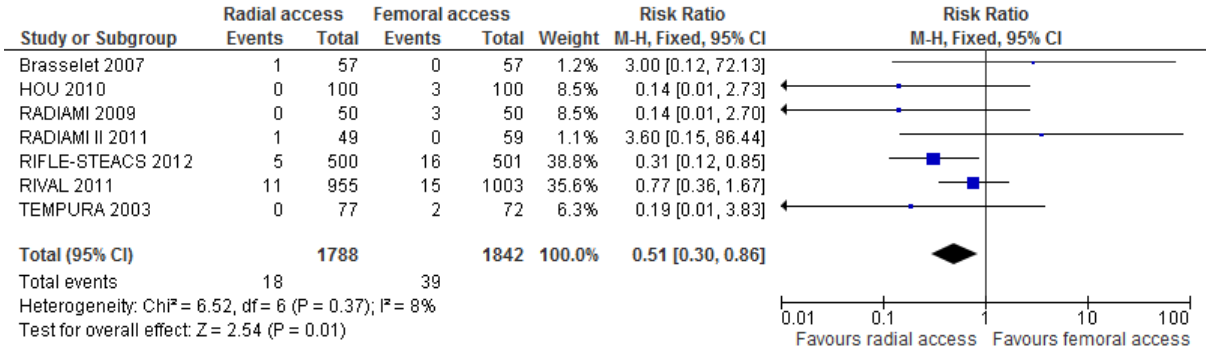
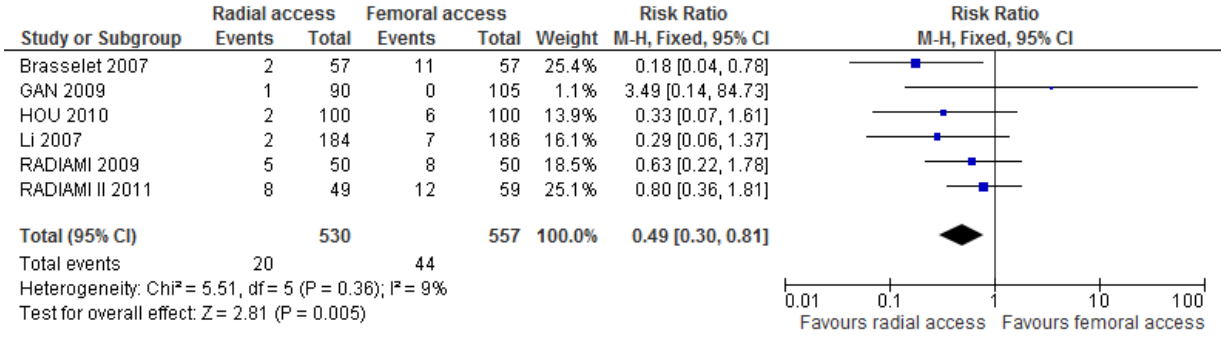


Figure 165: Haematomas



I.4 Thrombus extraction during PPCI

Figure 166: All-cause mortality (≤ 30 days)

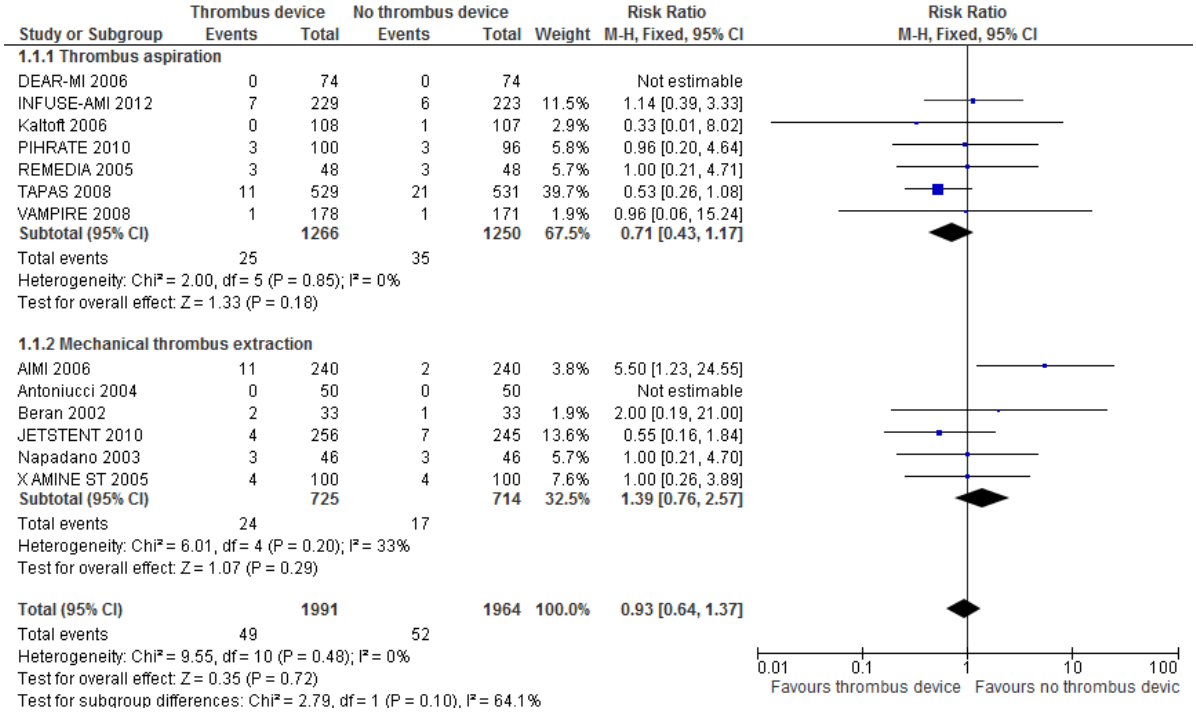
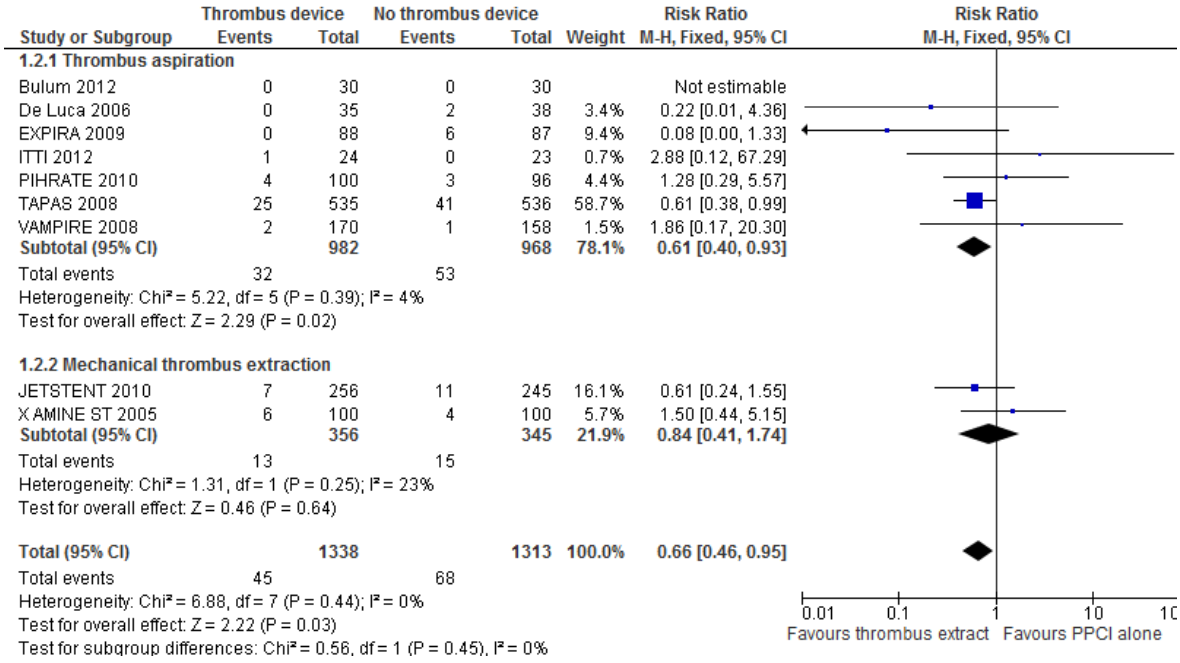


Figure 167: All-cause mortality (longer-term)



Follow-up: Bulum 2012; 6 months, De Luca 2006; 6 months, EXPIRA 2009; 2 years, ITTI 2012; 6 months, PIHRATE 2010; 6 months, TAPAS 2008; 1 year, VAMPIRE 2008; 8 months, JETSTENT 2010; 6 months, X AMINE ST 2005; 6 months

Figure 168: Myocardial reinfarction (≤ 30 days)

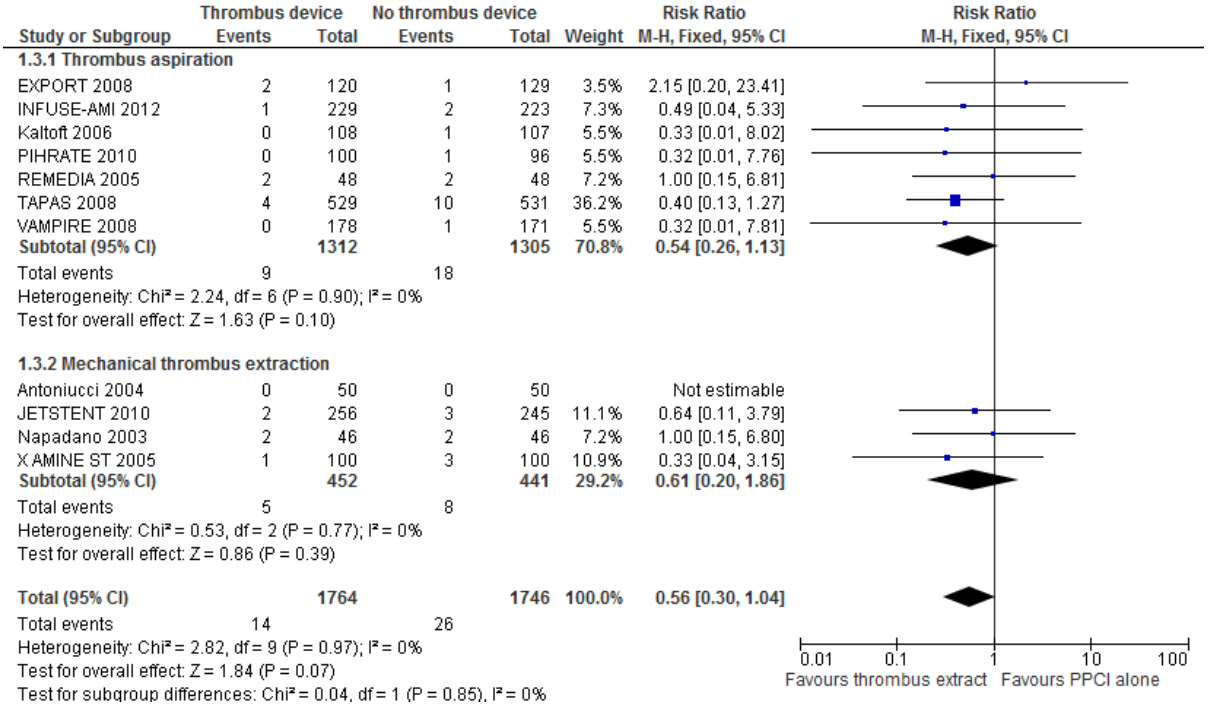
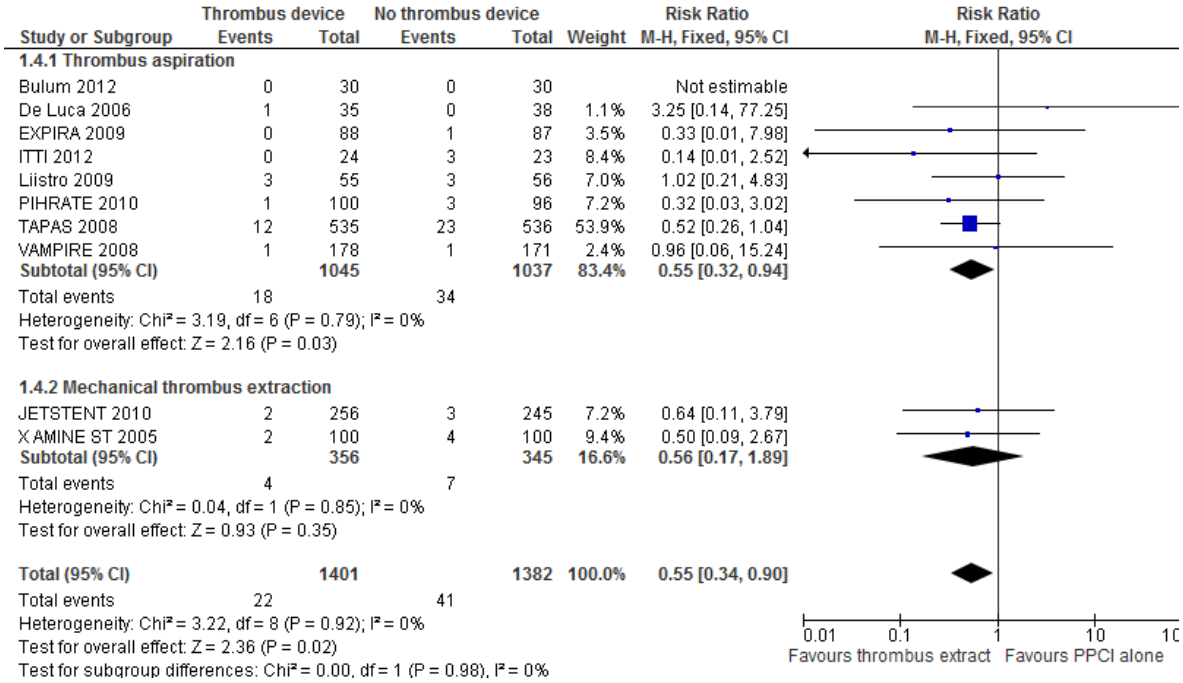


Figure 169: Myocardial reinfarction (longer-term)



Follow-up: Bulum 2012; 6 months, De Luca 2006; 6 months, EXPIRA 2009; 2 years, ITTI 2012; 6 months, Liistro 2012; 6 month, PIHRATE 2010; 6 months, TAPAS 2008; 1 year, VAMPIRE 2008; 8 months, JETSTENT 2010; 6 months, X AMINE ST 2005; 6 months

Figure 170: Stroke (≤ 30 days)

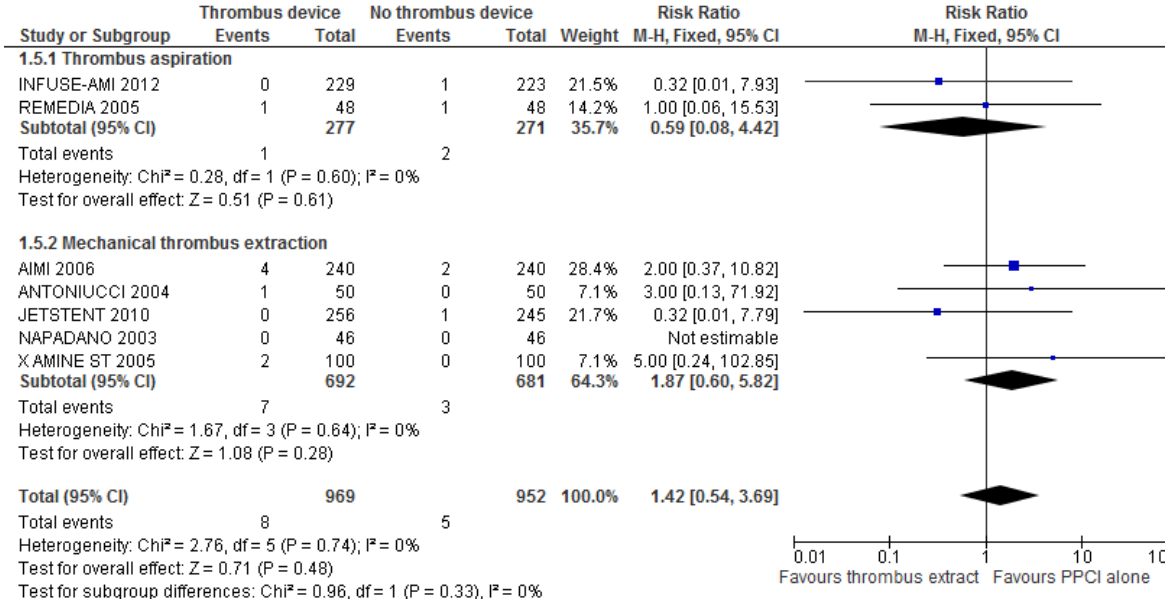
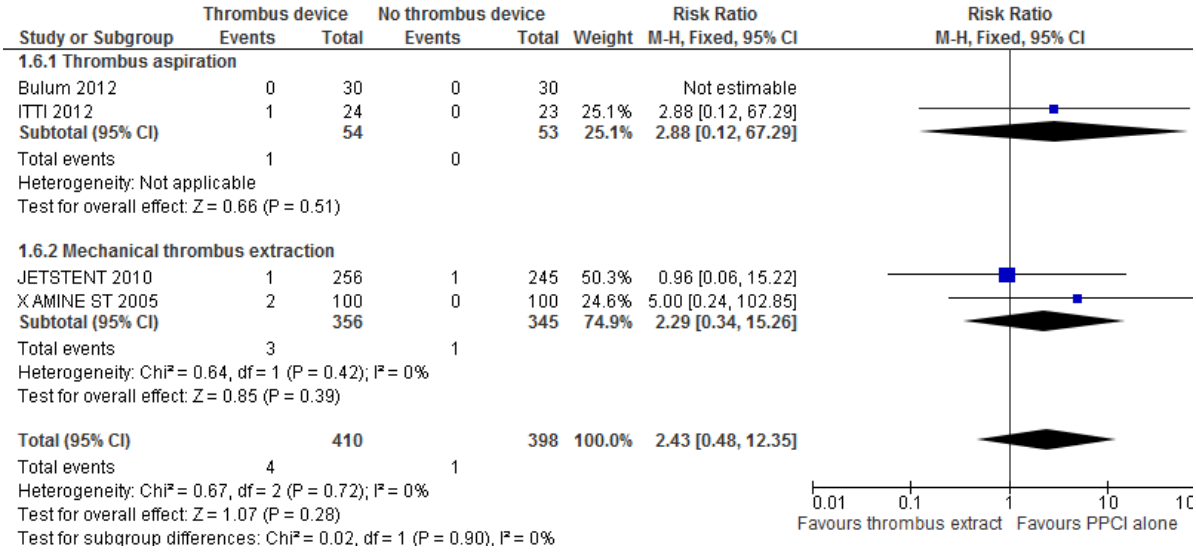


Figure 171: Stroke (longer-term)



Follow-up: Bulum 2012; 6 months, ITTI 2012; 6 months, JETSTENT 2010; 6 months, X AMINE ST 2005; 6 months

Figure 172: Heart failure (≤ 30 days)

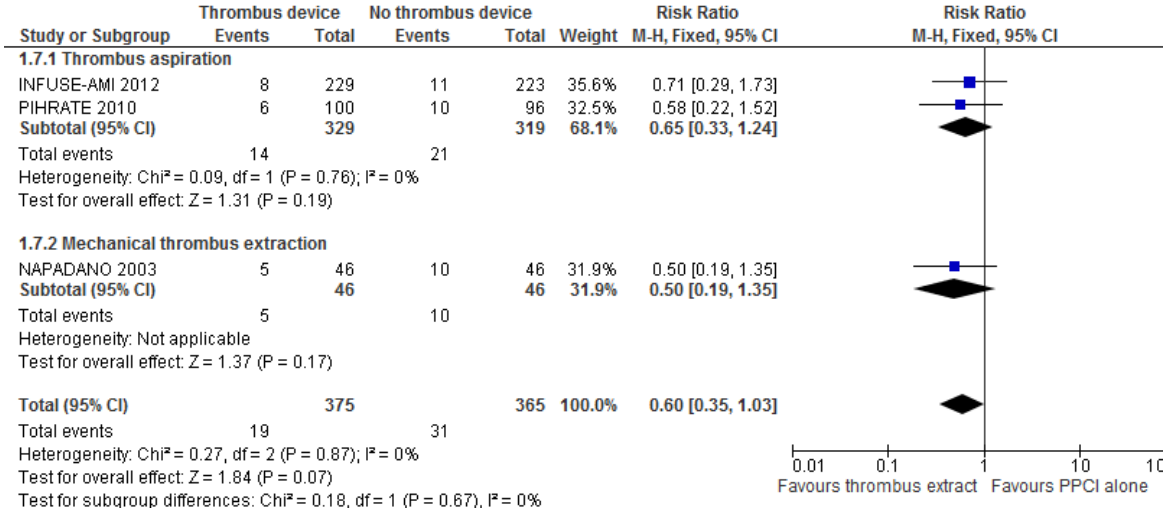
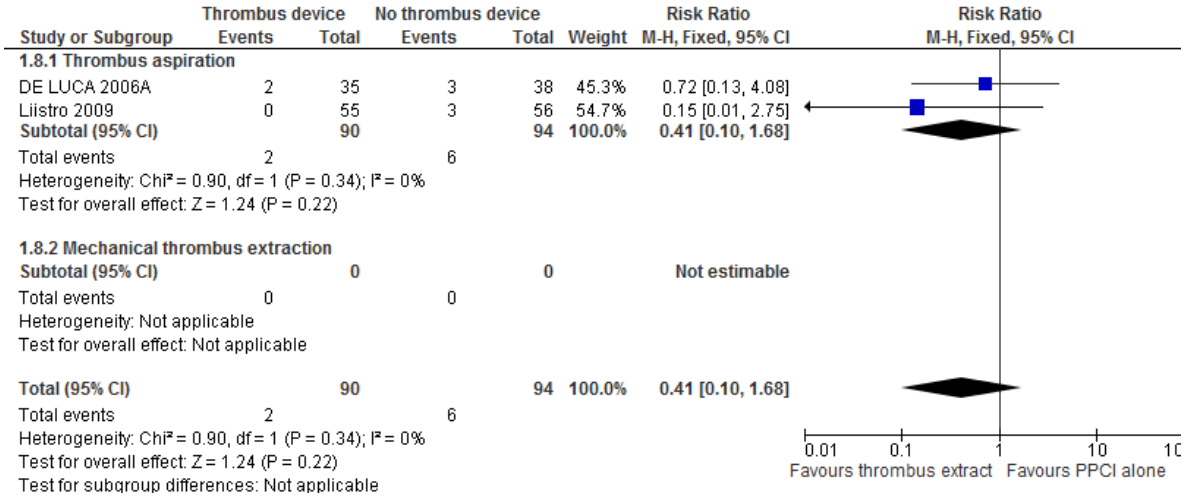


Figure 173: Heart failure (longer-term)



Follow-up: De Luca 2006; 6 months, Liistro 2012; 6 month

Figure 174: Target vessel revascularisation (≤ 30 days)

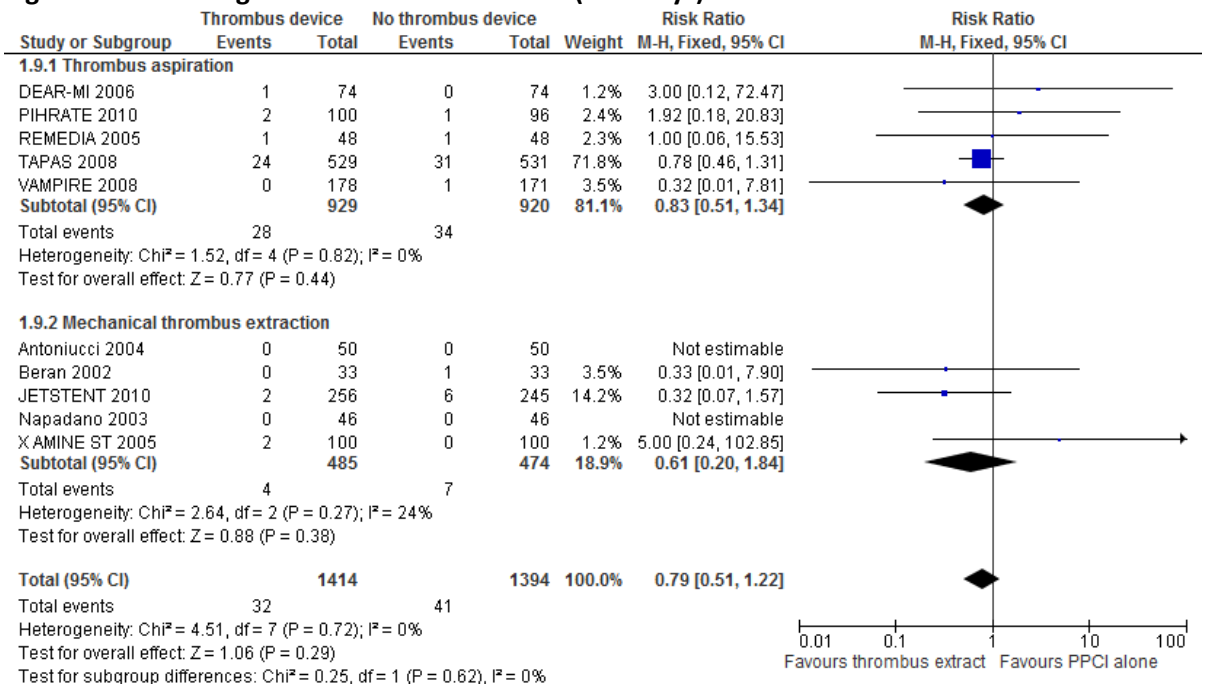
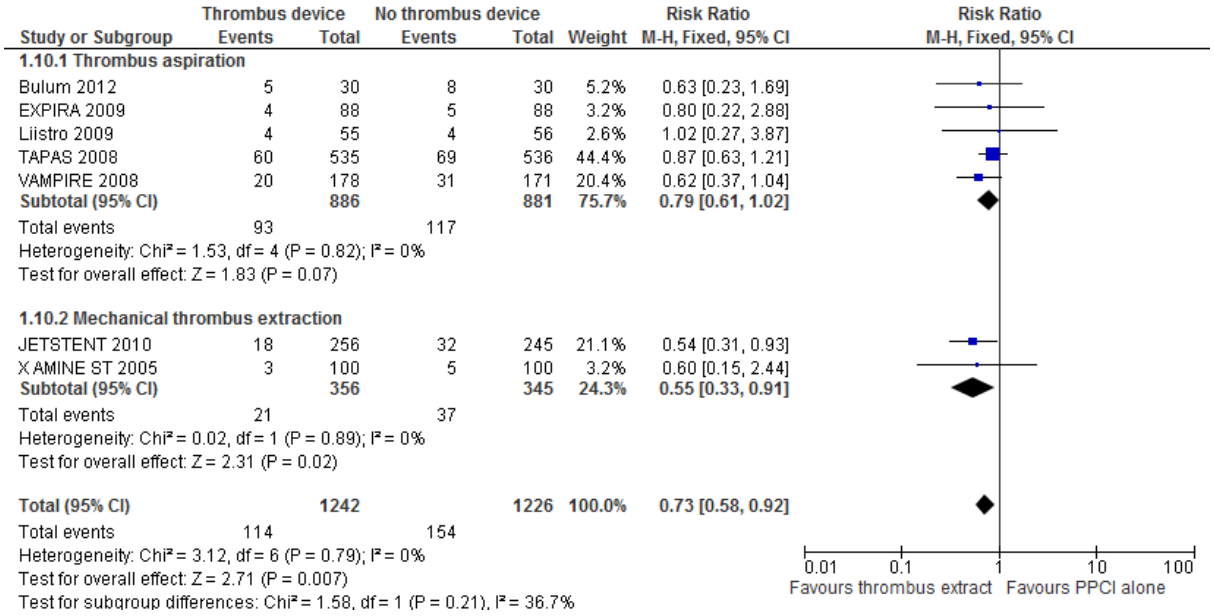
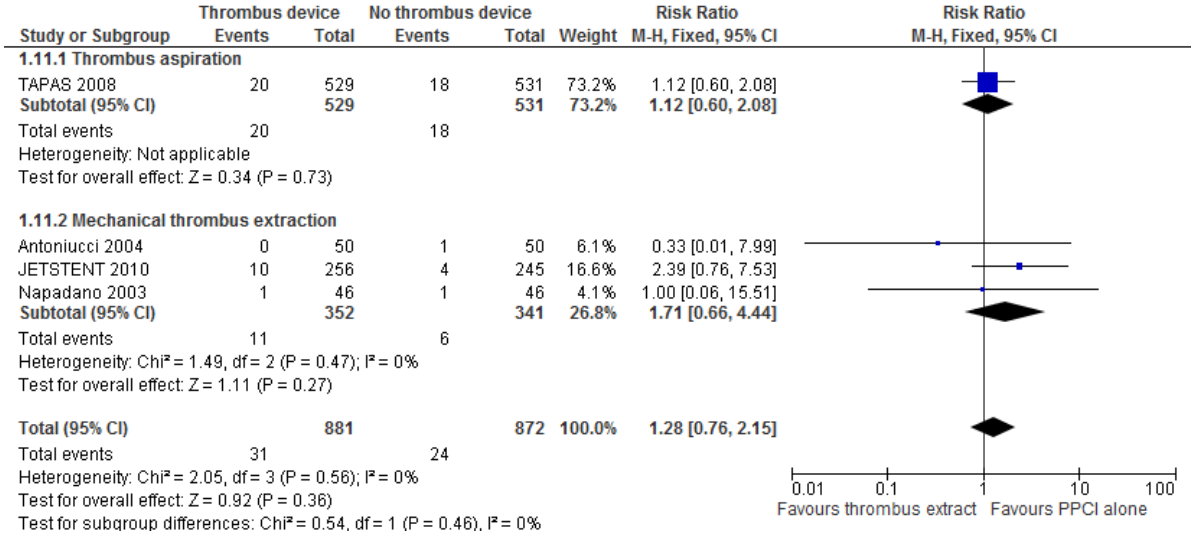


Figure 175: Target vessel revascularisation (longer-term)



Follow-up: Bulum 2012; 6 months, EXPIRA 2009; 2 years, Liistro 2012; 6 months, TAPAS 2008; 1 year, VAMPIRE 2008; 8 months, JETSTENT 2010; 6 months, X AMINE ST 2005

Figure 176: Major bleeding (≤ 30 days)



I.4.1 Economic analysis forest plots

Figure 177: Stent usage

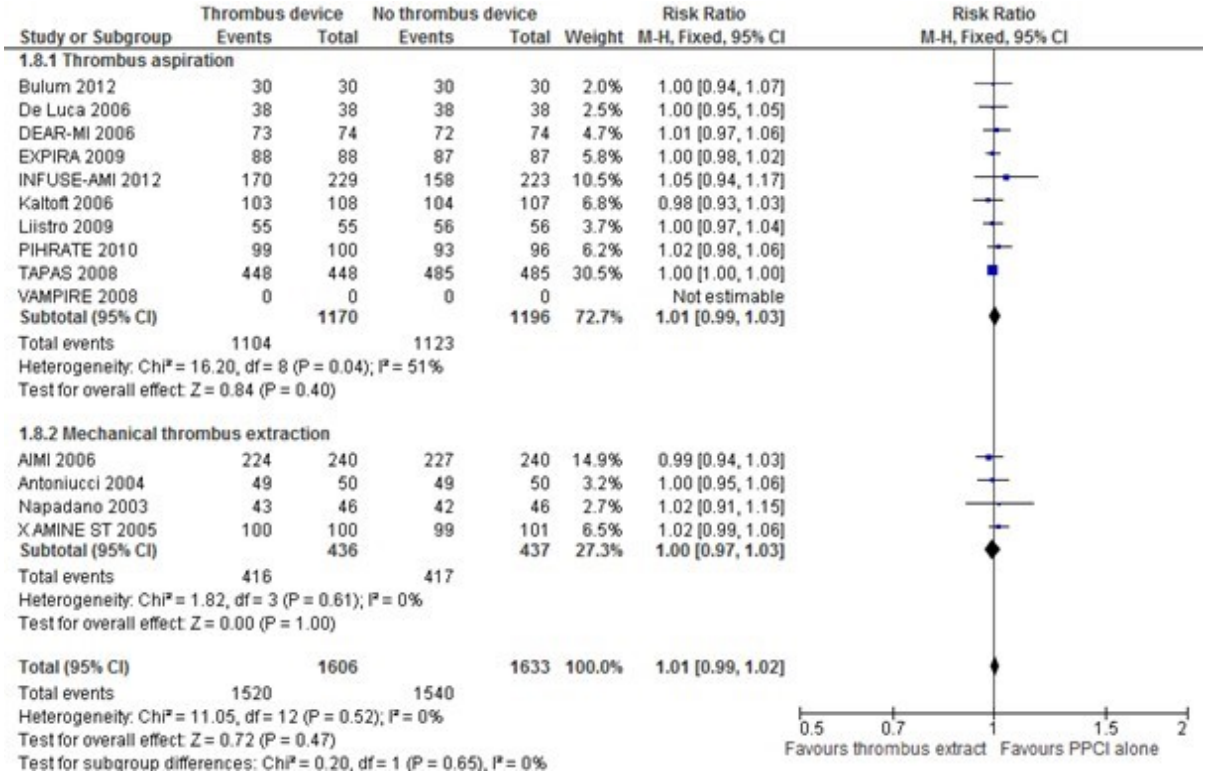


Figure 178: Balloon catheter usage

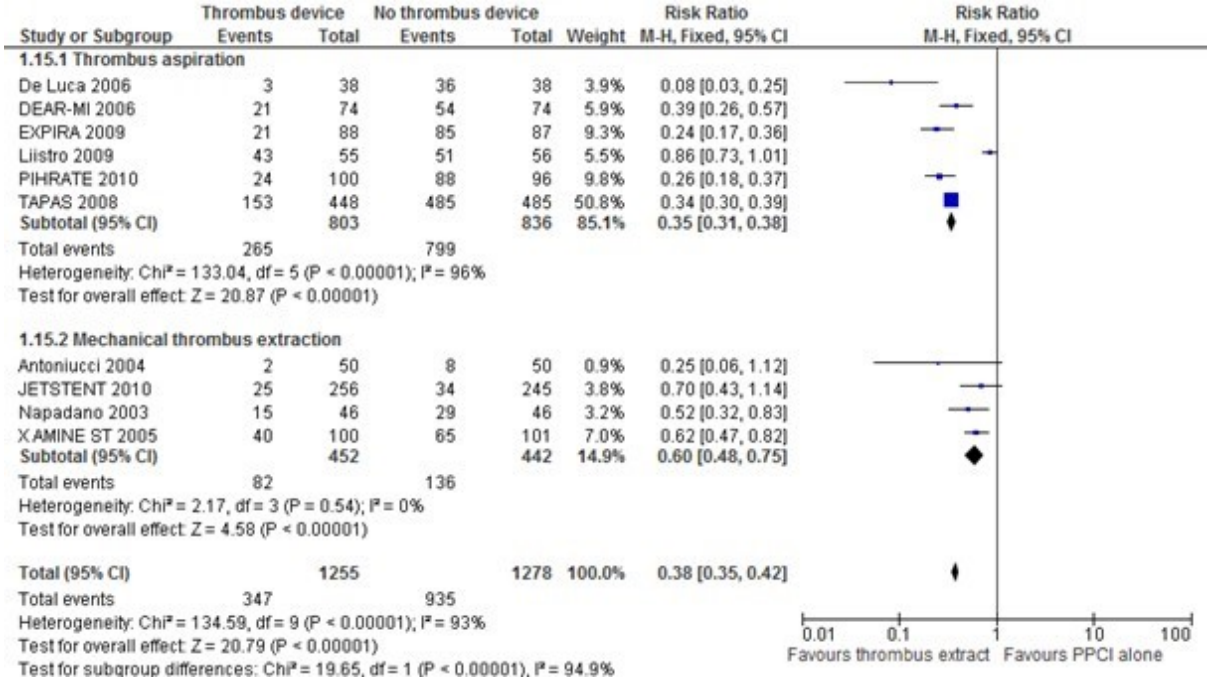
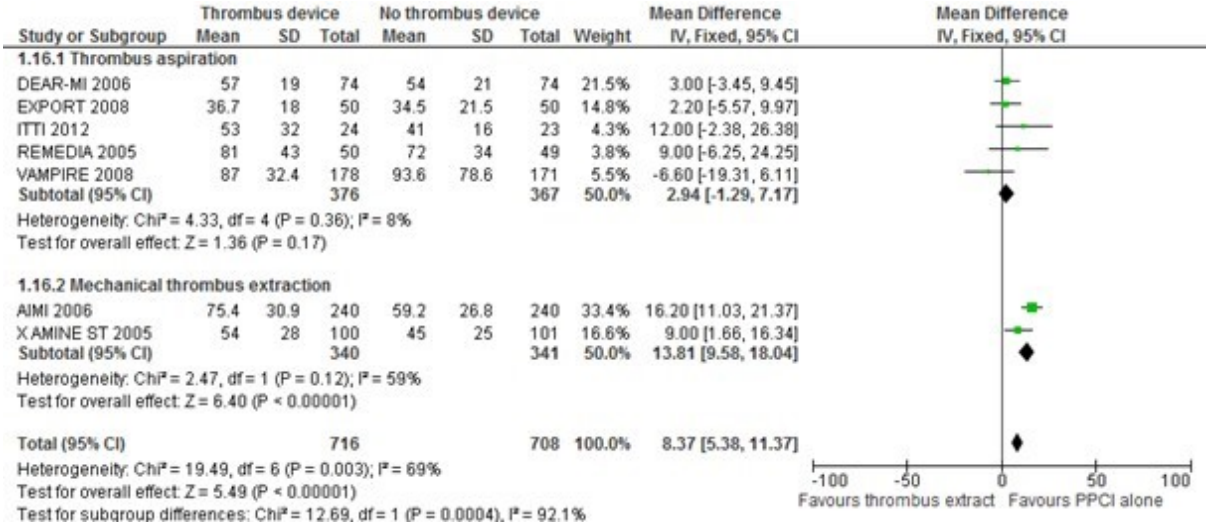


Figure 179: Procedure length



I.5 Culprit versus complete revascularisation

****Updated, see the 2020 evidence review****

I.5.1 Culprit-only PPCI versus immediate multivessel PCI

Figure 180: RCTs: all-cause mortality (≤ 30 days)

Figure 181: Cohort studies: all-cause mortality (≤ 30 days)

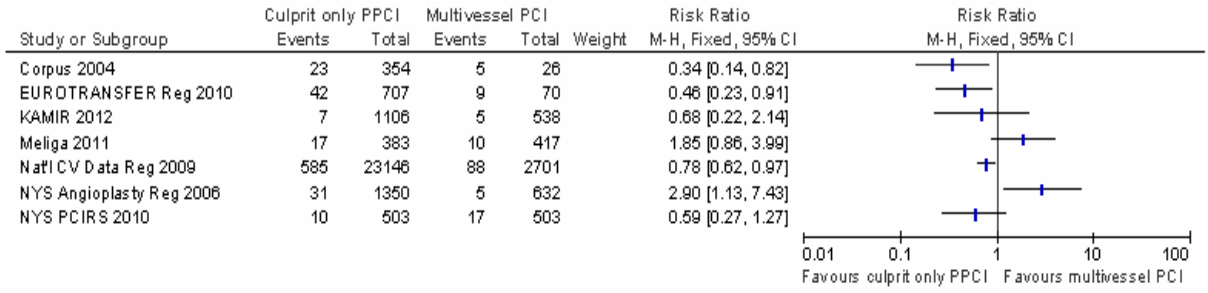
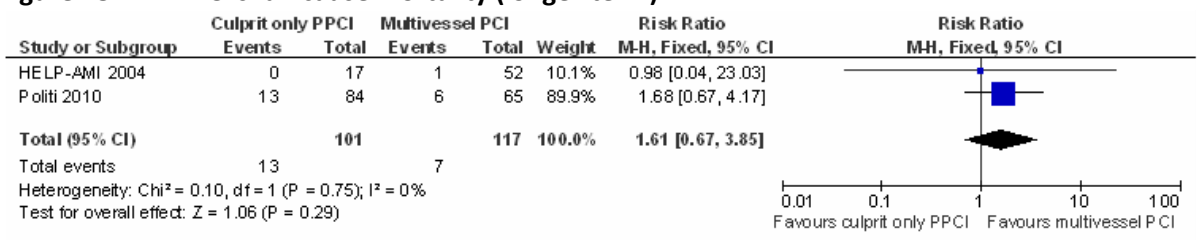
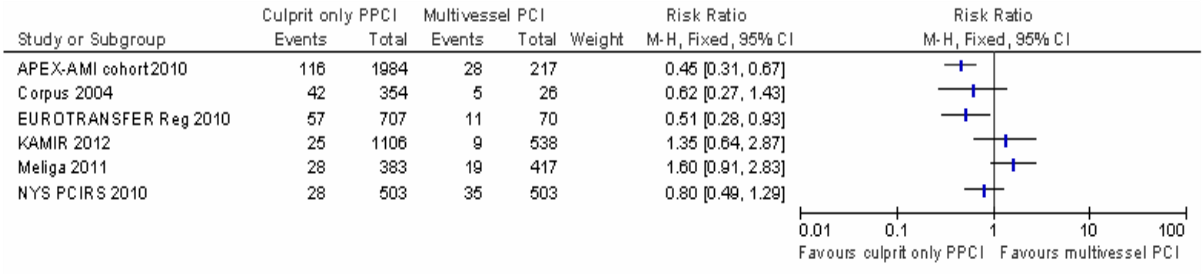


Figure 182: RCTs: all-cause mortality (longer-term)



Follow-up: HELP-AMI 2004; 12 months, Politi 2010; 2.5 years

Figure 183: Cohort studies: all-cause mortality (longer-term)



Follow-up: Corpus 2004, EUROTRANSFER Reg 2012, KAMIR 2012, NYS PCIRS 2010; 12months, Meliga 2011; mean (SD) = 642 (545) days

Figure 184: RCTs: reinfarction (≤ 30 days)

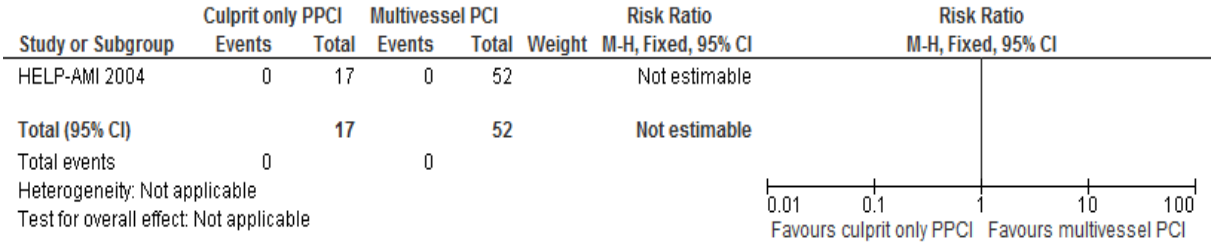


Figure 185: Cohort studies: reinfarction (≤ 30 days)

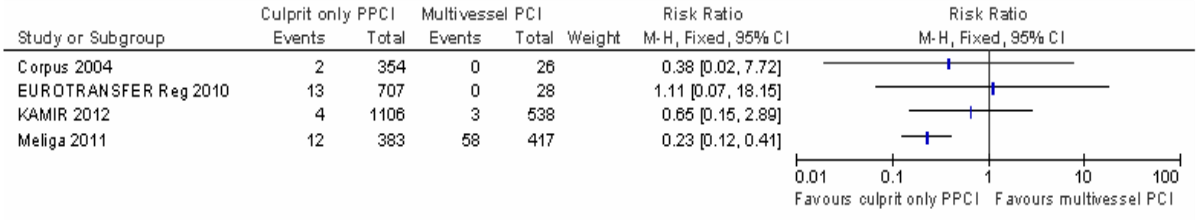
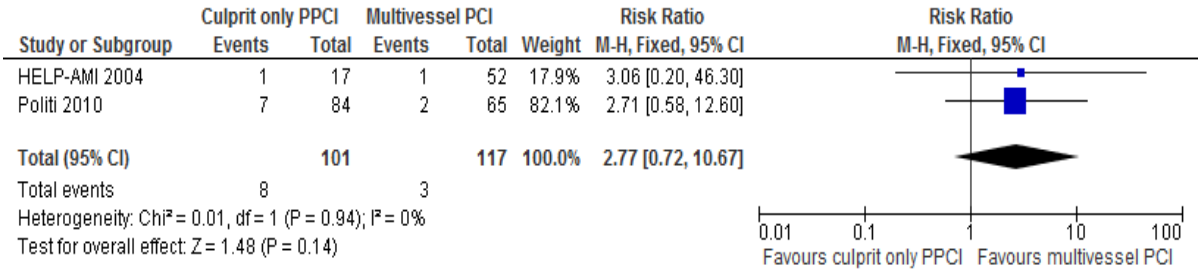
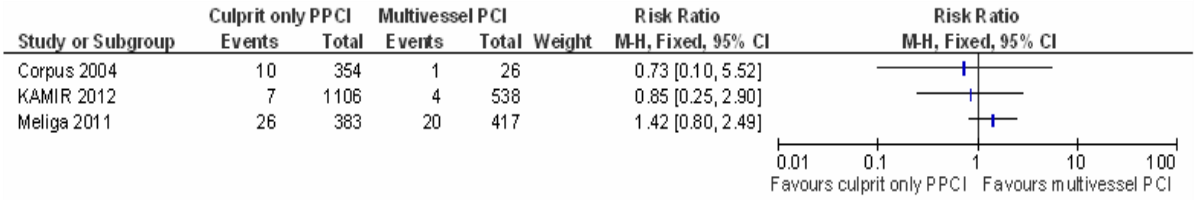


Figure 186: RCTs: reinfarction (longer-term)



Follow-up: HELP-AMI 2004; 12 months, Politi 2010; 2.5 years

Figure 187: Cohort studies: reinfarction (longer-term)



Follow-up: Corpus 2004, KAMIR 2012; 12months, Meliga 2011; mean (SD) = 642 (545) days

Figure 188: RCTs: repeat revascularisation (≤ 30 days)

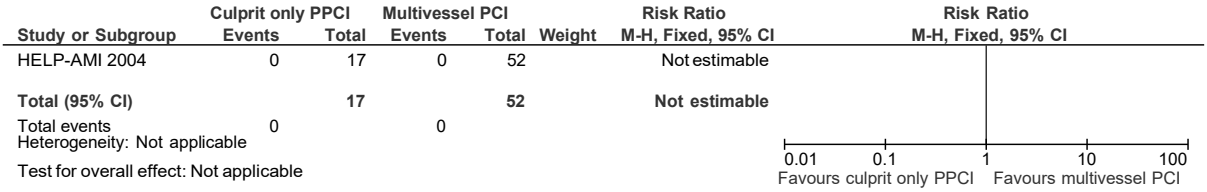


Figure 189: Cohort studies: repeat revascularisation (≤ 30 days)

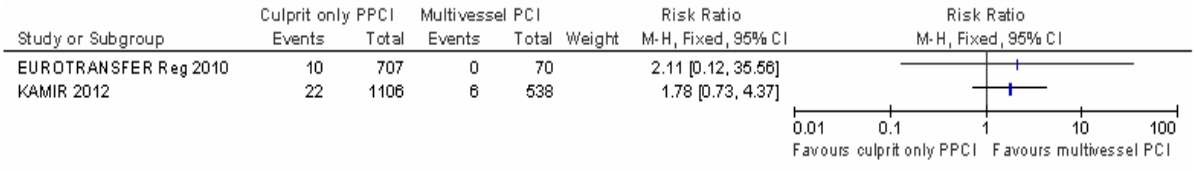
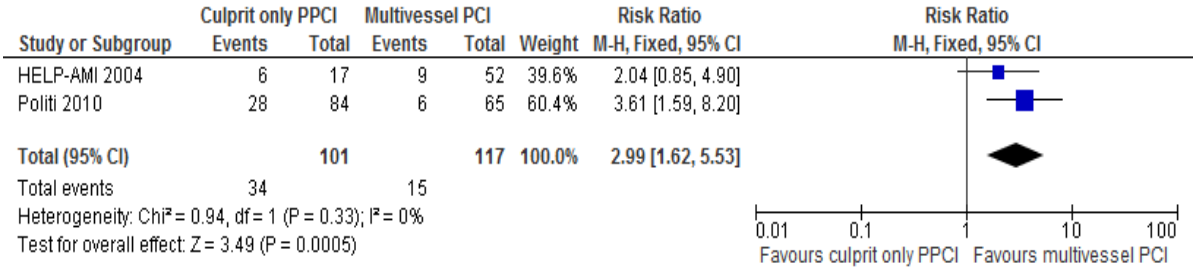
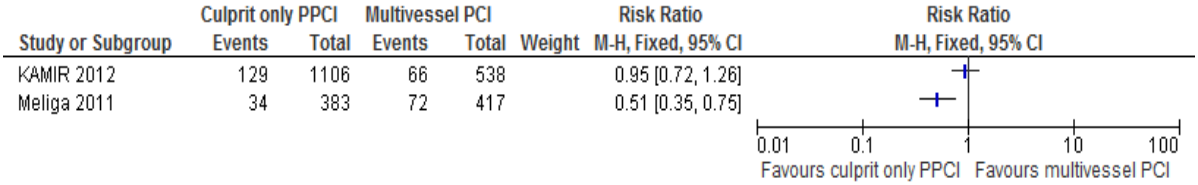


Figure 190: RCTs: repeat revascularisation (longer-term)



Follow-up: HELP-AMI 2004; 12 months, Politi 2010; 2.5 years

Figure 191: Cohort studies: repeat revascularisation (longer-term)



Follow-up: KAMIR 2012; 12months, Meliga 2011; mean (SD) = 642 (545) days

Figure 192: Cohort studies: CABG (≤ 30 days)

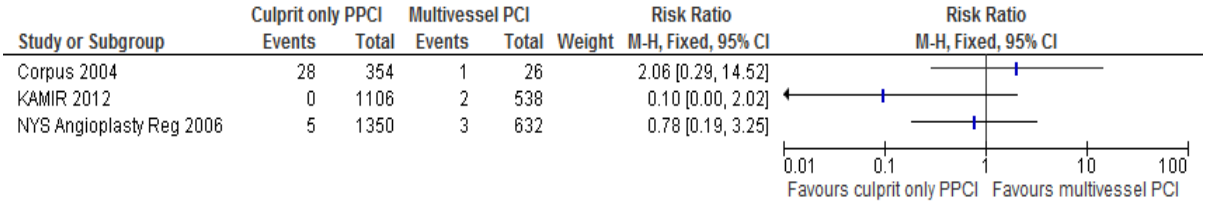
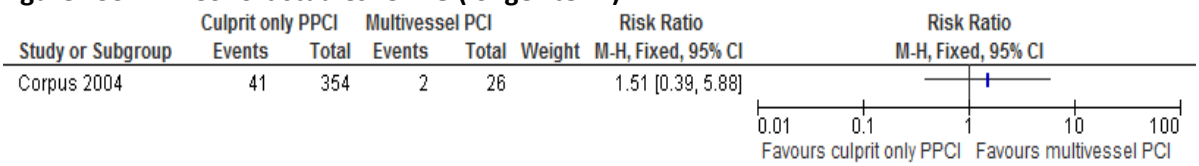


Figure 193: Cohort studies: CABG (longer-term)



Follow-up: Corpus 2004; 12 months

Figure 194: Cohort studies: target vessel revascularisation (≤ 30 days)

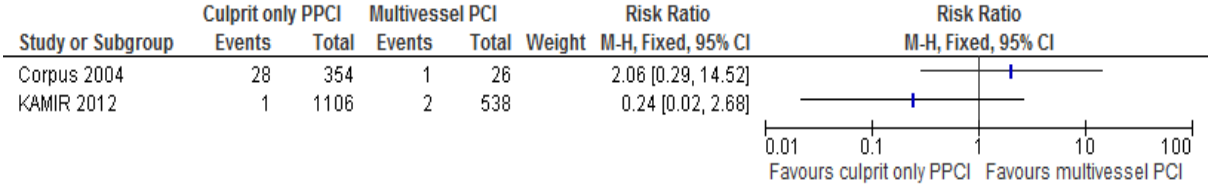
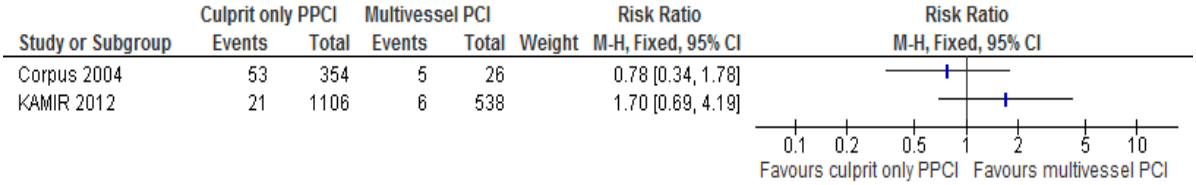


Figure 195: Cohort studies: target vessel revascularisation (longer-term)



Follow-up: Corpus 2004, KAMIR 2012; 12months

Figure 196: Cohort studies: stroke (≤ 30 days)

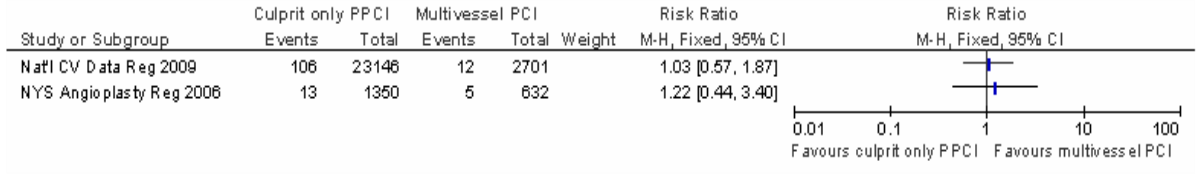


Figure 197: Cohort studies: renal failure(≤ 30 days)

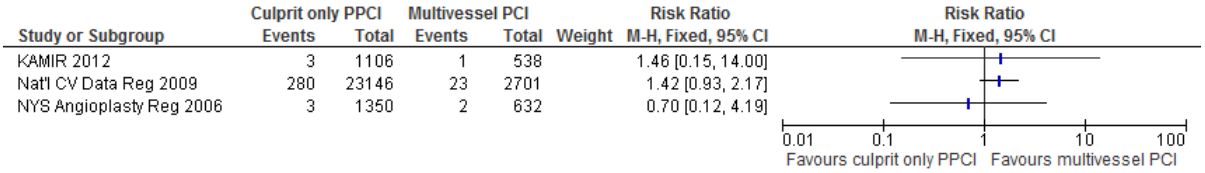


Figure 198: Cohort studies: major bleeding (≤ 30 days)

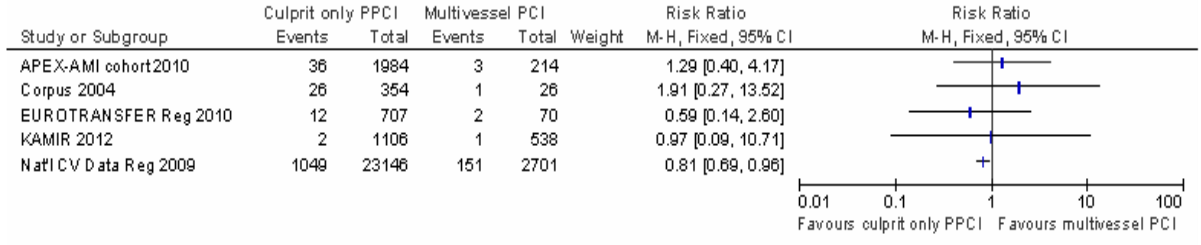


Figure 199: RCTs: procedure time

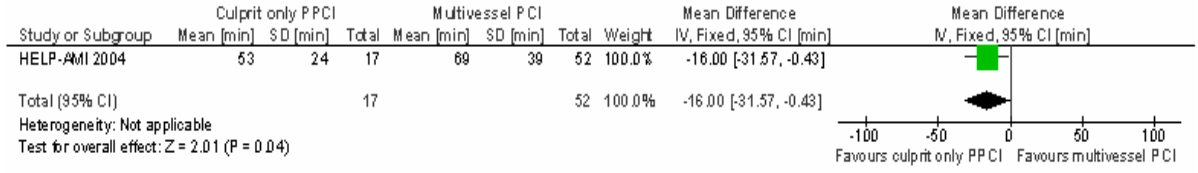


Figure 200: RCTs: length of hospital stay

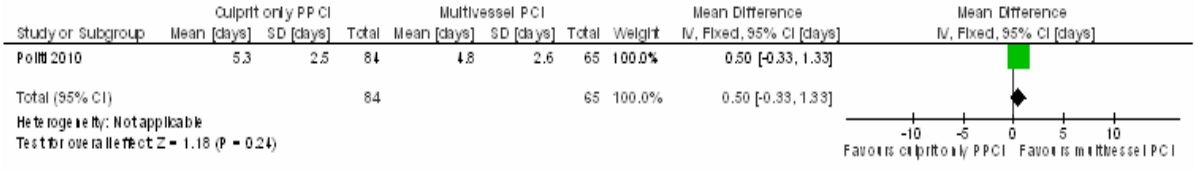
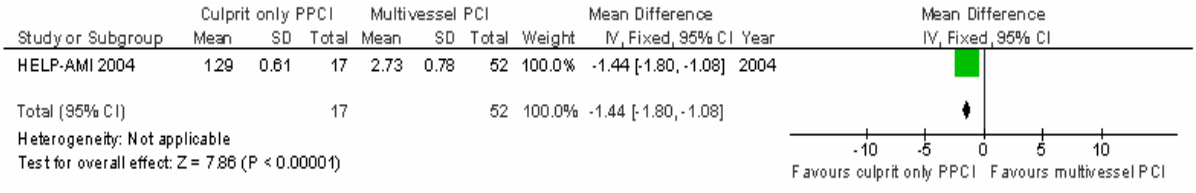


Figure 201: RCTs: stents per person



I.5.2 Culprit-only PPCI versus staged PCI

Figure 202: RCTs: all-cause mortality (≤ 30 days)

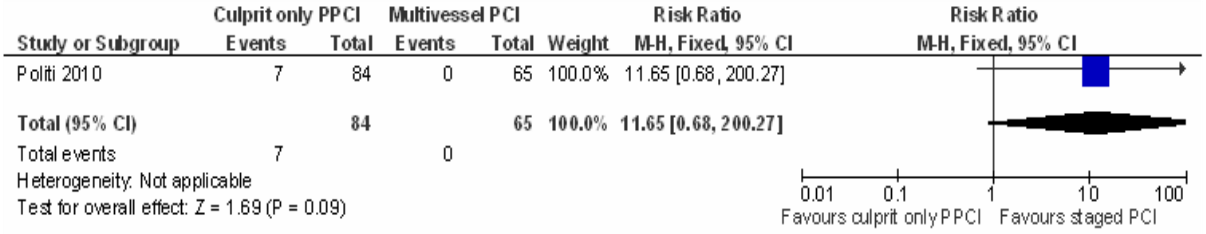


Figure 203: Cohort studies: all-cause mortality (≤ 30 days)

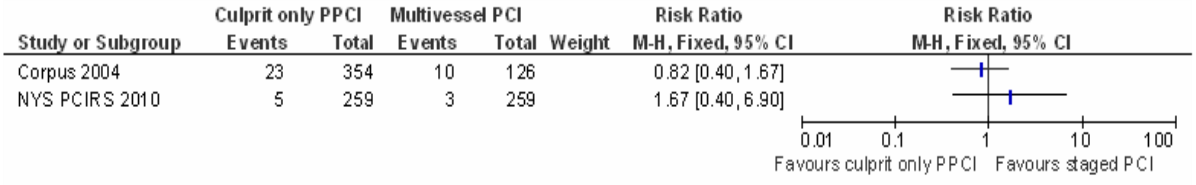
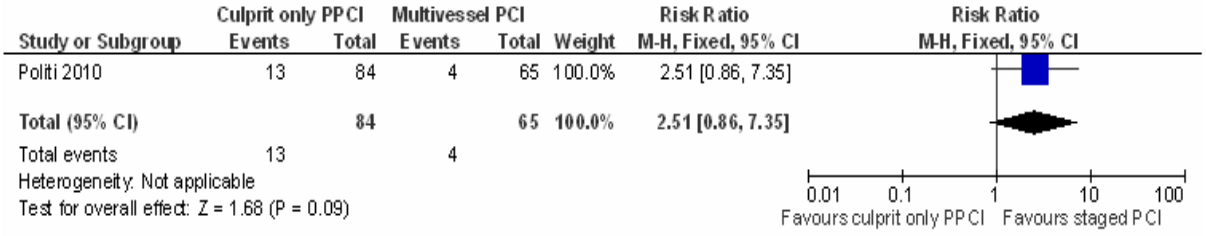
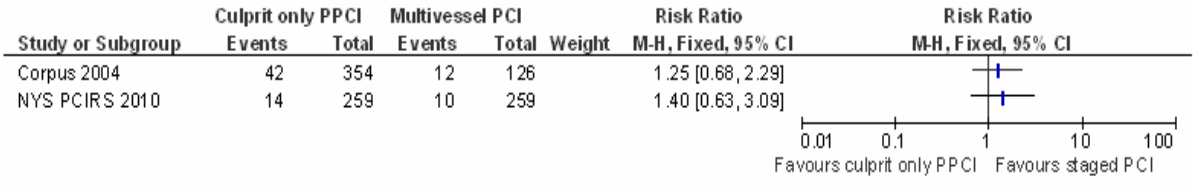


Figure 204: RCTs: all-cause mortality (longer-term)



Follow-up: Politi 2010; 2.5 years

Figure 205: Cohort studies: all-cause mortality (longer-term)



Follow-up: Corpus 2004, NYS PCIRS; 12 months

Figure 206: Cohort studies: reinfarction (≤ 30 days)

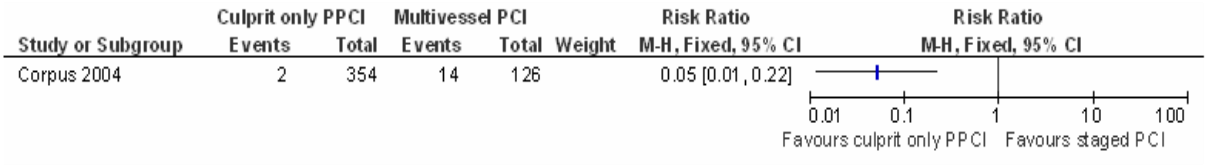
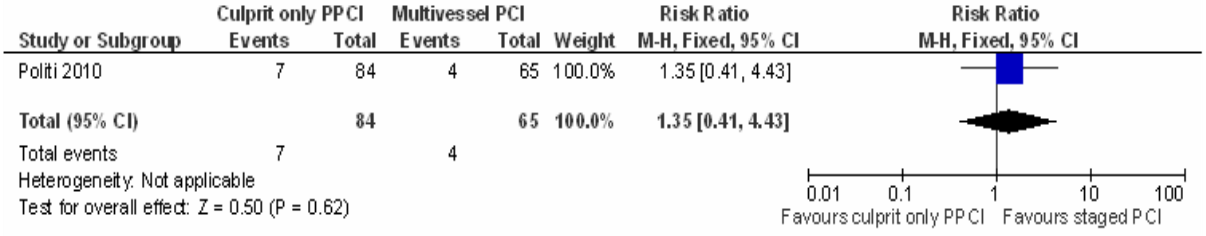
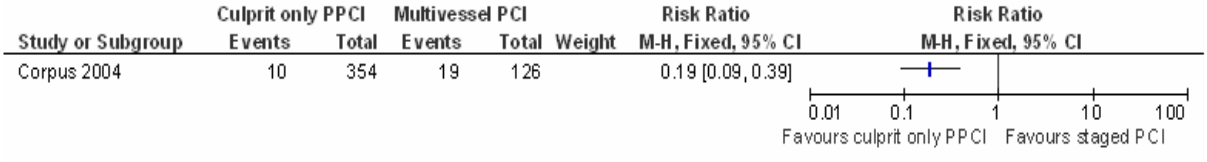


Figure 207: RCTs: reinfarction (longer-term)



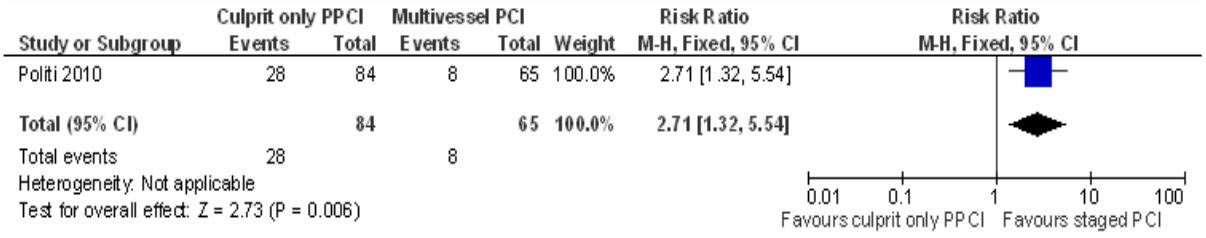
Follow-up: Politi 2010; 2.5 years

Figure 208: Cohort studies: reinfarction (longer-term)



Follow-up: Corpus 2004; 12 months

Figure 209: RCTs: repeat revascularisation (longer-term)



Follow-up: Politi 2010; 2.5 years

Figure 210: Cohort studies: CABG (≤ 30 days)

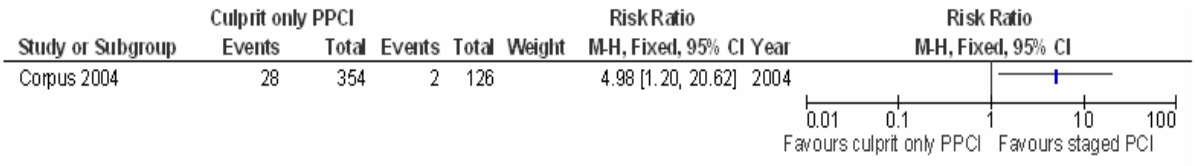
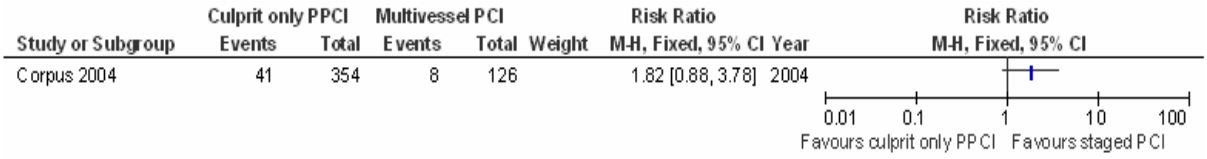


Figure 211: Cohort studies: CABG (longer-term)



Follow-up: Corpus 2004, NYS PCIRS; 12 months

Figure 212: Cohort studies: target vessel revascularisation (≤ 30 days)

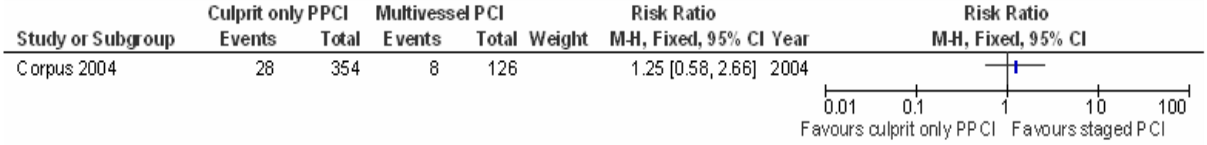
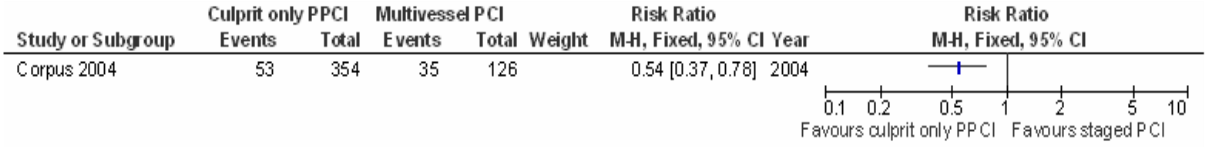
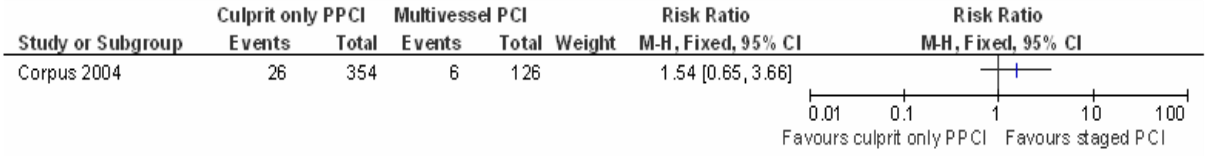


Figure 213: Cohort studies: target vessel revascularisation (longer-term)



Corpus 2004, NYS PCIRS; 12 months

Figure 214: Cohort studies: major bleeding (≤ 30 days)



Follow-up: Corpus 2004, NYS PCIRS; 12 months

I.6 Cardiogenic shock

Figure 215: All-cause mortality – hazard ratio (time to event: 6 years)

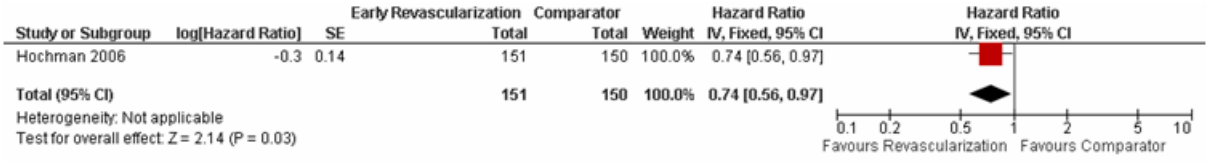


Figure 216: All-cause mortality (short-term: 30 days)

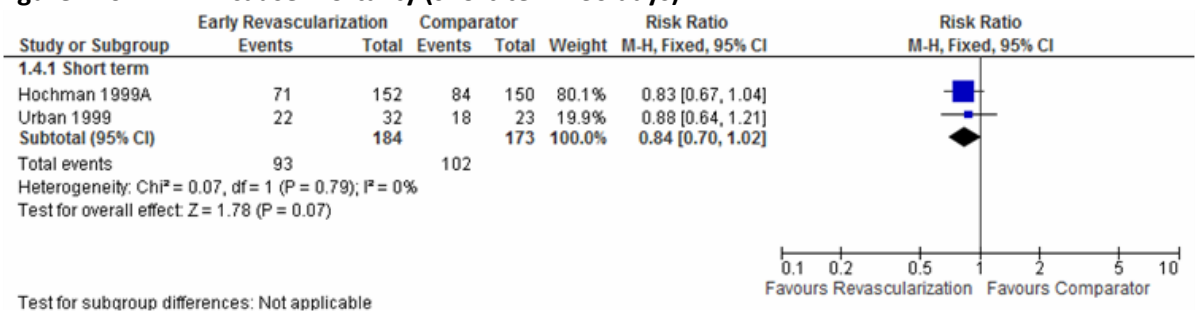


Figure 217: All-cause mortality (short-term: 30 days) – >75 years and <75 years

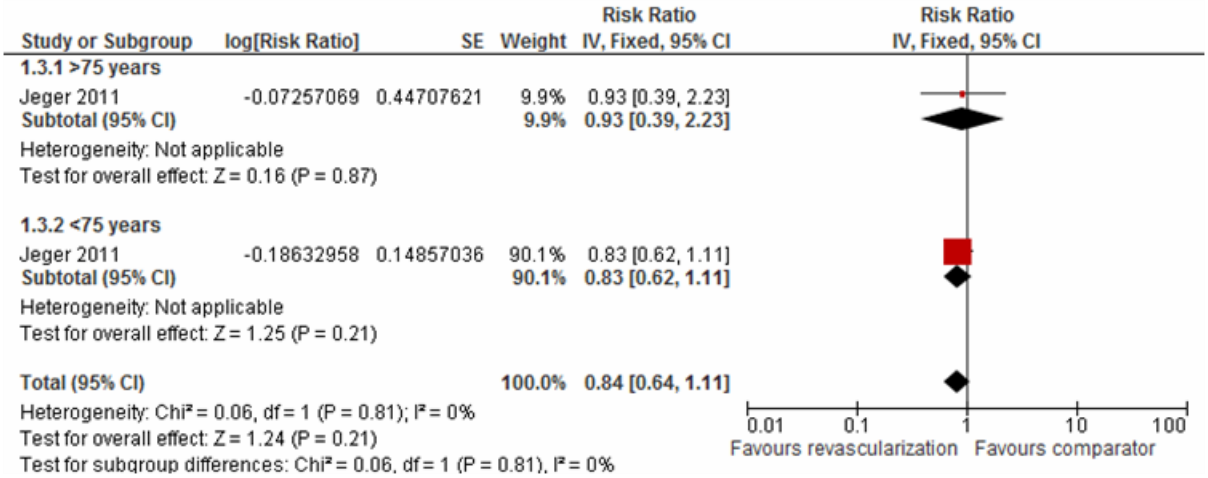


Figure 218: All-cause mortality (longer-term: 1 year) – >75 years and < 75 years

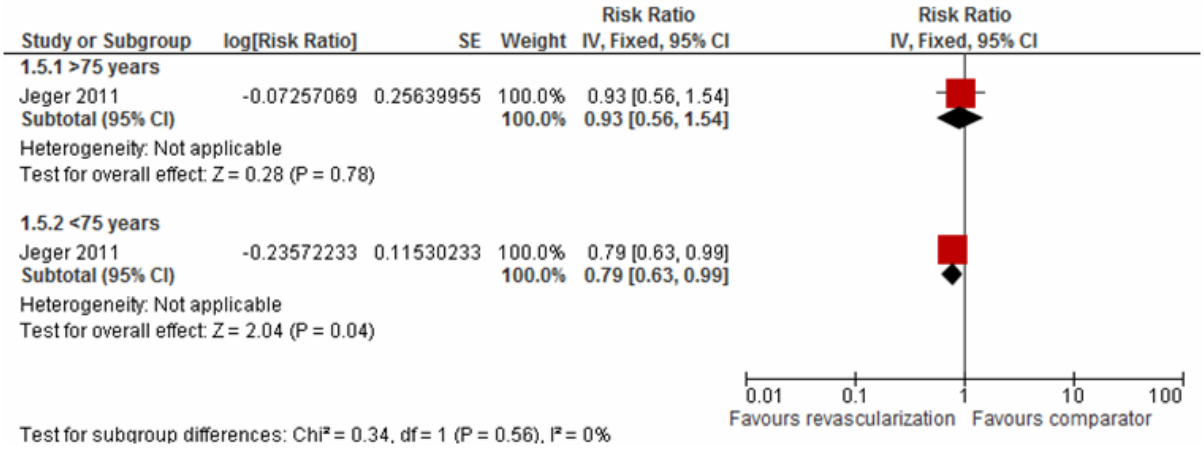


Figure 219: Survival (longer-term: 1 year)

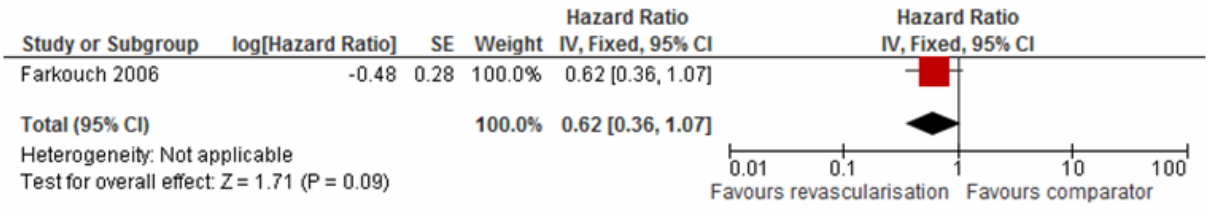


Figure 220: Survival for people without diabetes

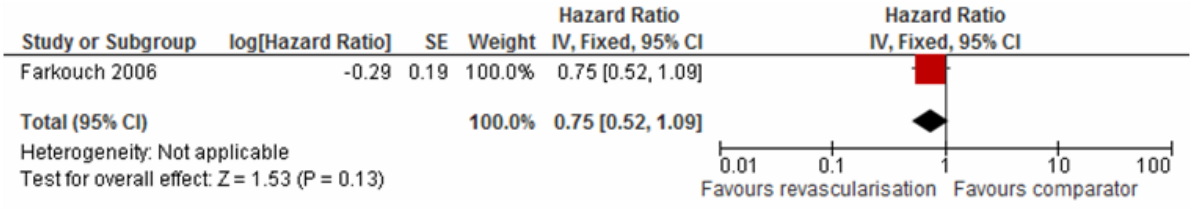


Figure 221: Quality of life (short-term: 14 days and longer-term: 6 months)

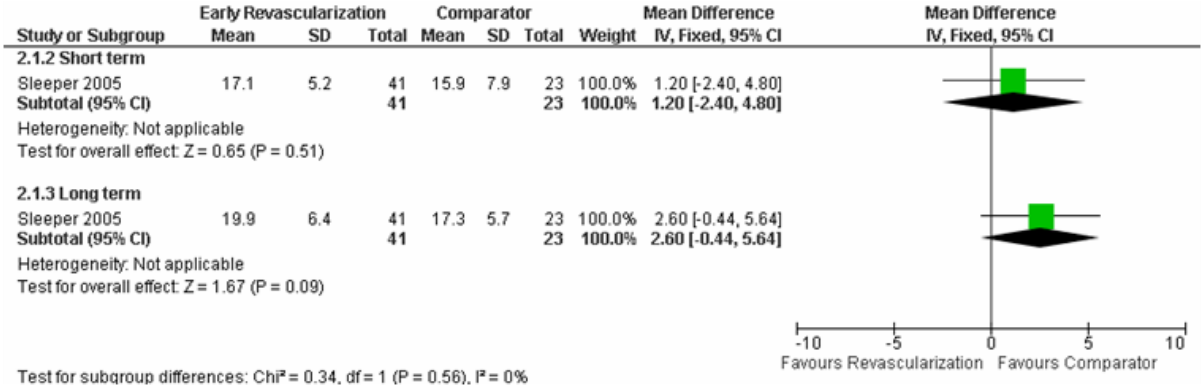


Figure 222: Stroke (short-term: 30 days)

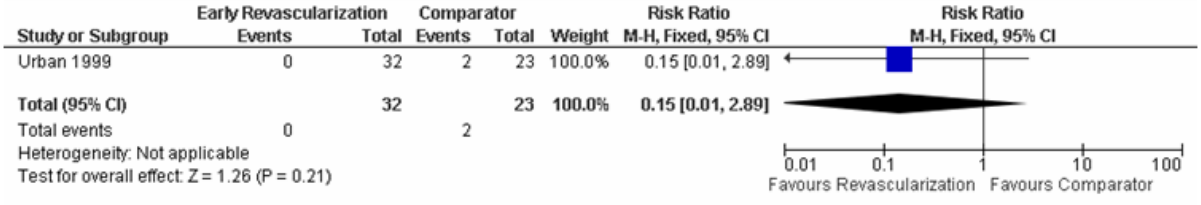


Figure 223: Renal failure (short-term: 30 days)

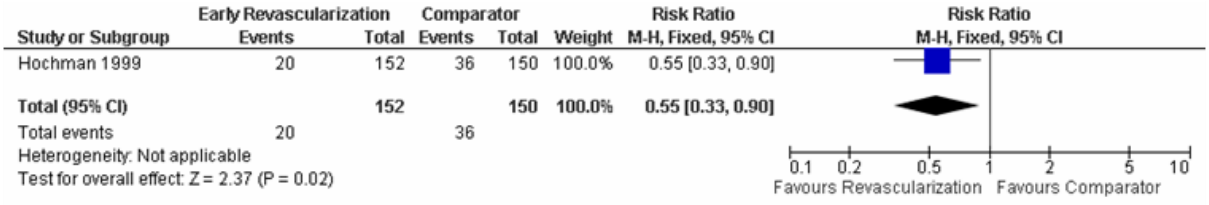


Figure 224: Reinfarction (short-term: 30 days and longer-term: 30 days to 1 year)

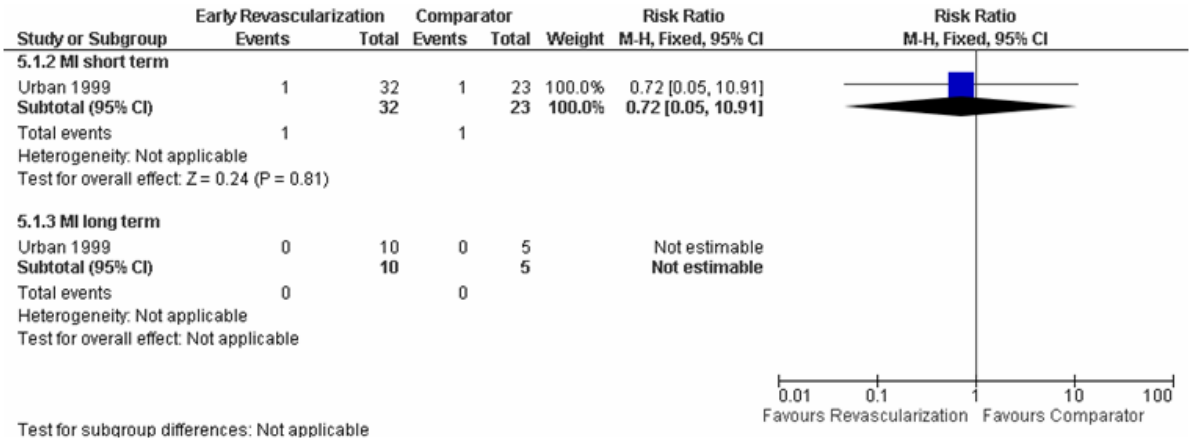


Figure 225: Unplanned revascularisation (short-term: 30 days and longer-term: 30 days to 1 year)

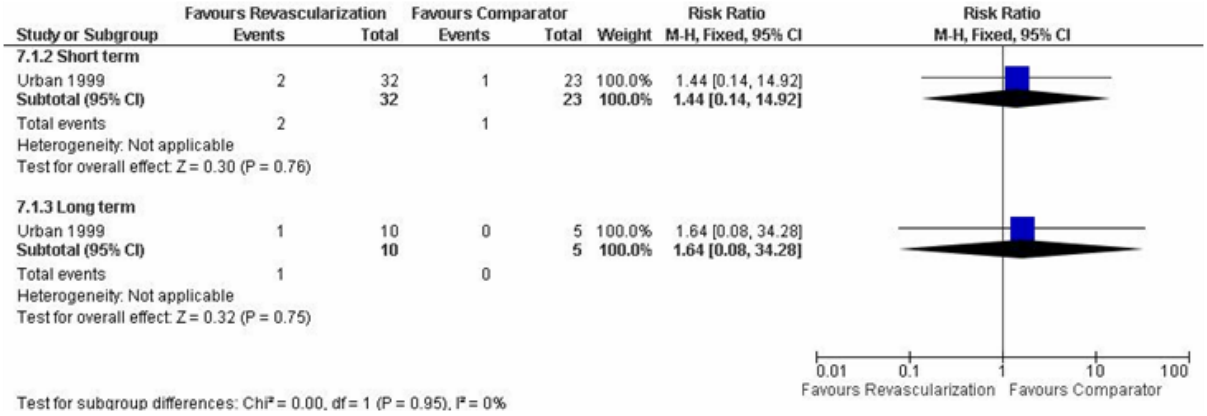


Figure 226: Intracranial bleeding (longer-term: 6 months)

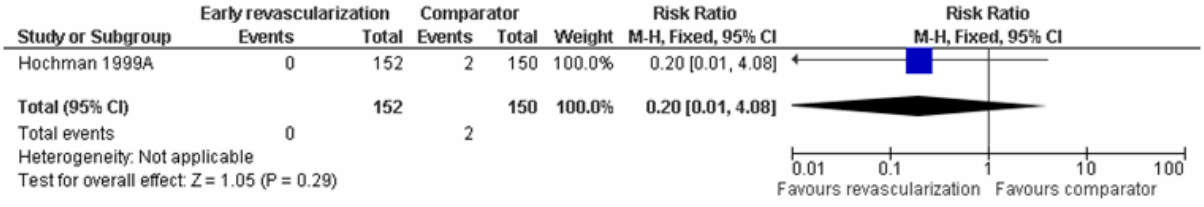


Figure 227: Heart failure Class I (short-term: 2 weeks and longer-term: 6 months)

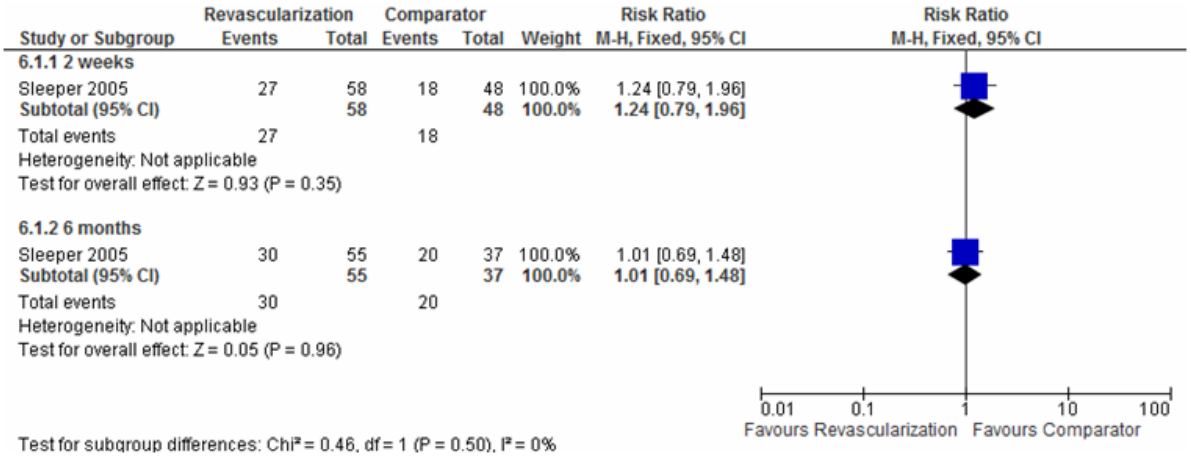


Figure 228: Heart failure Class II (short-term: 2 weeks and longer-term: 6 months)

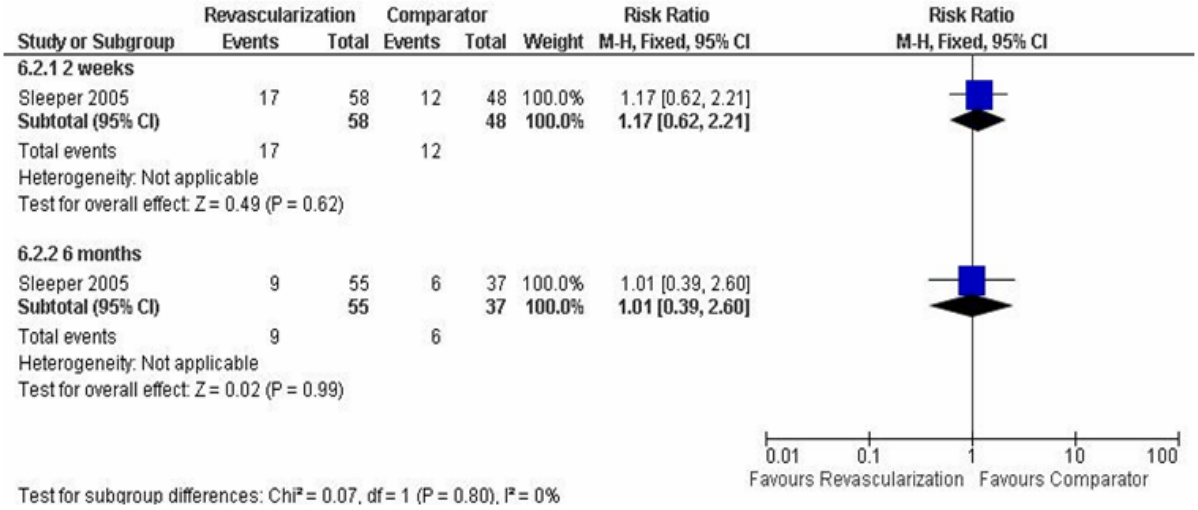


Figure 229: Heart failure Class III (short-term: 2 weeks and longer-term: 6 months)

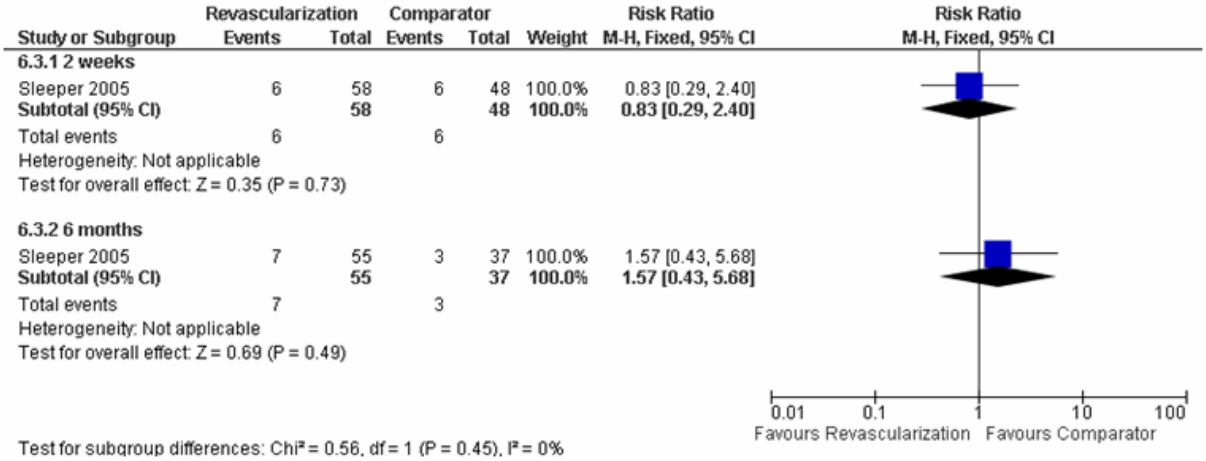
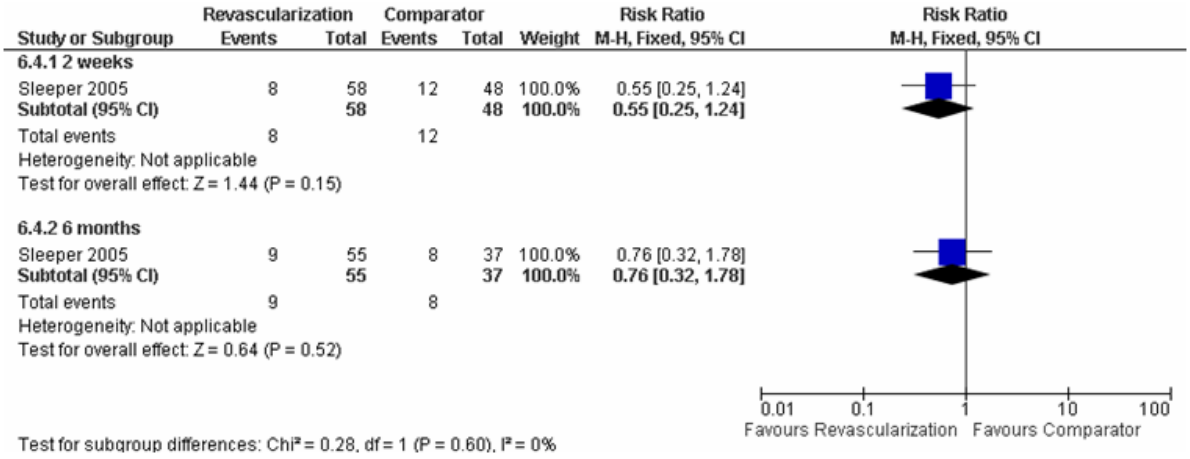


Figure 230: Heart failure Class IV (short-term: 2 weeks and longer-term: 6 months)



I.7 People who remain unconscious after a cardiac arrest

Figure 231: All-cause mortality (≤ 30 days)

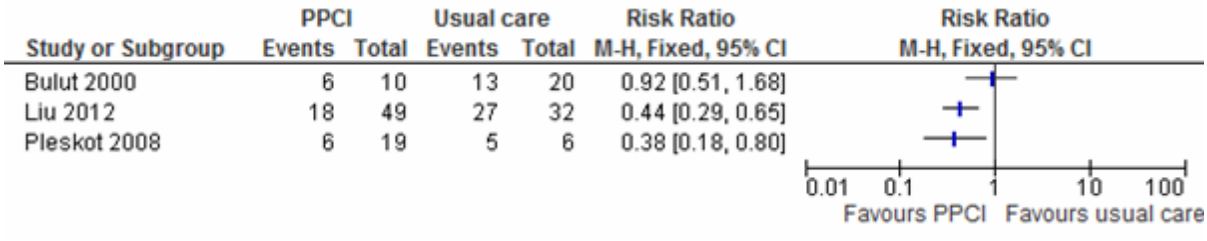


Figure 232: All-cause mortality (longer-term)

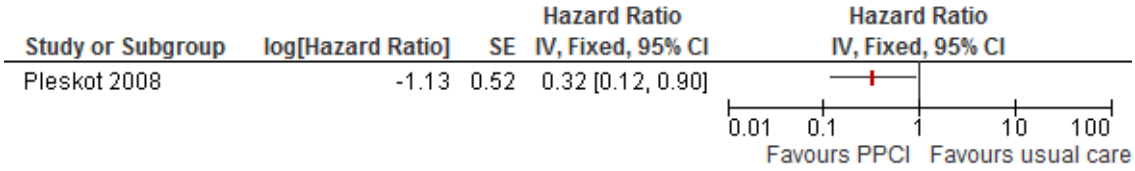


Figure 233: Good performance on CPC ≤ 30 days

Figure 234: Good performance on CPC longer-term

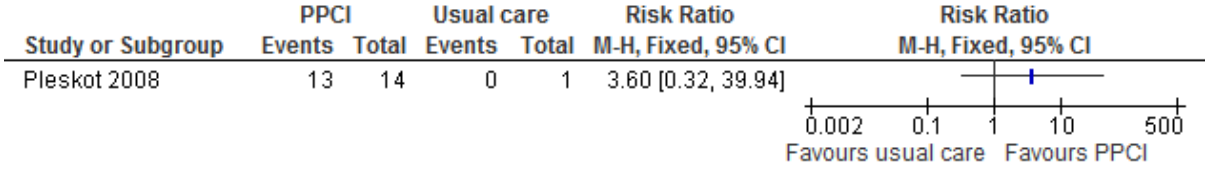


Figure 235: Stroke ≤ 30 days

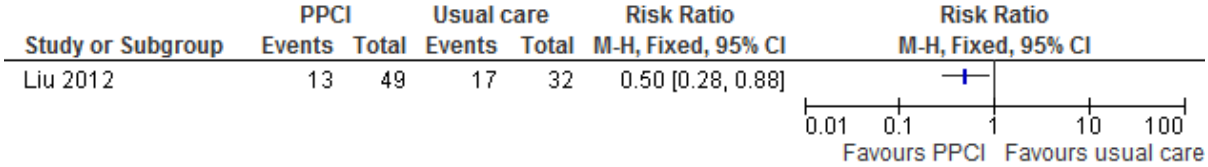
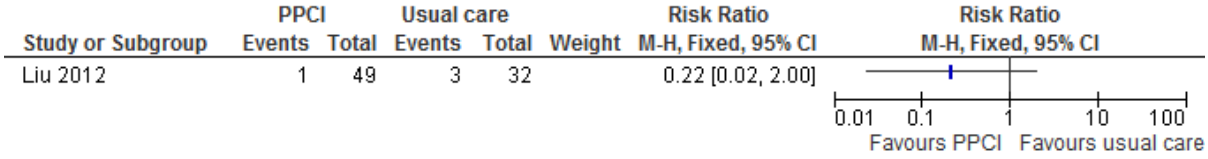
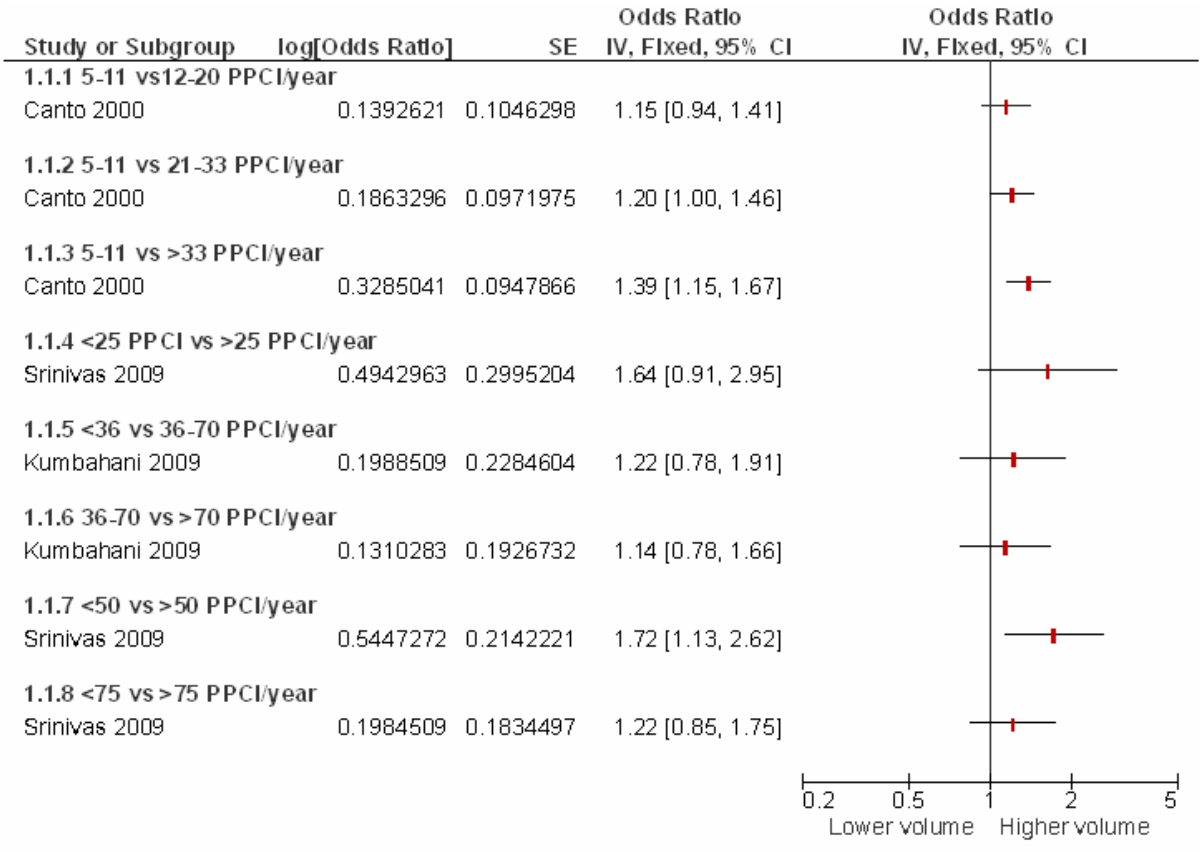


Figure 236: Renal failure stroke ≤ 30 days



I.8 Hospital volumes of PPCI

Figure 237: Odds ratios of in-hospital mortality as a function of hospital PPCI volume



Srinvas 2009 and Canto 2000 results are presented as inverse log odds ratios.

Adjustment factors – Canto 2000 adjusted for demographic characteristics, medical history, clinical presentation, medications within 24 hours, year, and volume of patients with MI; Srinivas 2009 adjusted for New York State PCI risk score (age, sex, haemodynamic status, ejection fraction, pre-procedural myocardial infarction status, peripheral arterial disease, congestive heart failure, renal failure, and left main coronary disease; Kumbhani 2009 adjusted for demographics, hospital characteristics, past medical history, acute use of aspirin and beta-blockers.

I.9 Pre-hospital versus in-hospital fibrinolysis

Figure 238: All-cause mortality (pre-hospital)

Study or Subgroup	Pre-hospital Events	Pre-hospital Total	In-hospital Events	In-hospital Total	Weight	Risk Ratio M-H, Fixed, 95% CI	Year
Castaigne 1989	1	57	1	36	4.8%	0.63 [0.04, 9.78]	1989
Schofer 1990	0	40	0	38		Not estimable	1990
Kuhn 1993/Boissel 1995	36	2750	24	2719	95.2%	1.48 [0.89, 2.48]	1995
Total (95% CI)		**2847**		**2793**	**100.0%**	**1.44 [0.87, 2.39]**	
Total events	37		25				

Heterogeneity: Chi² = 0.36, df = 1 (P = 0.55); I² = 0%
Test for overall effect: Z = 1.42 (P = 0.15)

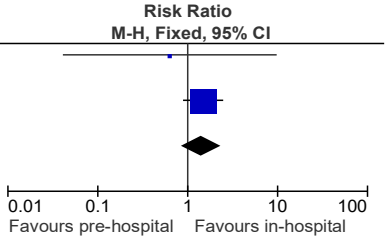
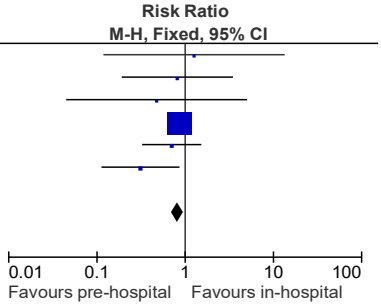


Figure 239: All-cause mortality (short-term: ≤ 30 days)

Study or Subgroup	Pre-hospital Events	Pre-hospital Total	In-hospital Events	In-hospital Total	Weight	Risk Ratio M-H, Fixed, 95% CI	Year
Castaigne 1989	2	57	1	36	0.4%	1.26 [0.12, 13.43]	1989
Barbash 1990 / Roth 1990	4	72	3	44	1.1%	0.81 [0.19, 3.47]	1990
Schofer 1990	1	40	2	38	0.6%	0.47 [0.04, 5.03]	1990
Kuhn 1993/Boissel 1995	266	2750	303	2719	88.7%	0.87 [0.74, 1.01]	1995
Weaver 1993/Brouer1996	10	175	15	185	4.2%	0.70 [0.33, 1.53]	1996
McAleer 2006	4	82	26	166	5.0%	0.31 [0.11, 0.86]	2006
Total (95% CI)		**3176**		**3188**	**100.0%**	**0.83 [0.72, 0.97]**	
Total events	287		350				

Heterogeneity: Chi² = 4.37, df = 5 (P = 0.50); I² = 0%
Test for overall effect: Z = 2.42 (P = 0.02)



McAleer 2006 % converted to patient numbers

Figure 240: All-cause mortality (longer-term: ≥30 days)

Study or Subgroup	Pre-hospital Events	Pre-hospital Total	In-hospital Events	In-hospital Total	Weight	Risk Ratio M-H, Fixed, 95% CI	Year
Weaver 1993/Brouer1996	10	175	15	185	36.1%	0.70 [0.33, 1.53]	1996
McAleer 2006	8	82	39	166	63.9%	0.42 [0.20, 0.85]	2006
Total (95% CI)		**257**		**351**	**100.0%**	**0.52 [0.31, 0.88]**	
Total events	18		54				

Heterogeneity: Chi² = 0.98, df = 1 (P = 0.32); I² = 0%
Test for overall effect: Z = 2.46 (P = 0.01)

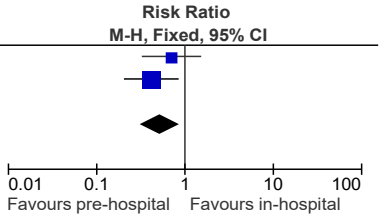


Figure 241: Cardiac mortality (short-term: ≤30 days)

Study or Subgroup	Experimental Events	Experimental Total	Control Events	Control Total	Weight	Risk Ratio M-H, Fixed, 95% CI	Year
Kuhn 1993/Boissel 1995	228	2750	267	2719	100.0%	0.84 [0.71, 1.00]	1995
Total (95% CI)		**2750**		**2719**	**100.0%**	**0.84 [0.71, 1.00]**	
Total events	228		267				

Heterogeneity: Not applicable
Test for overall effect: Z = 1.97 (P = 0.05)

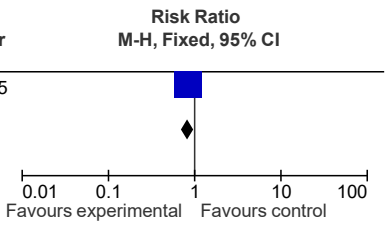


Figure 242: Myocardial reinfarction (short-term: ≤30 days)

Study or Subgroup	Pre-hospital Events	Pre-hospital Total	In-hospital Events	In-hospital Total	Weight	Risk Ratio M-H, Fixed, 95% CI	Year
Barbash 1990 / Roth 1990	10	72	6	44	59.2%	1.02 [0.40, 2.61]	1990
Schofer 1990	4	40	5	38	40.8%	0.76 [0.22, 2.62]	1990
Total (95% CI)		**112**		**82**	**100.0%**	**0.91 [0.43, 1.93]**	
Total events	14		11				

Heterogeneity: Chi² = 0.14, df = 1 (P = 0.71); I² = 0 ,
Test for overall effect: Z = 0.24 (P = 0.81)

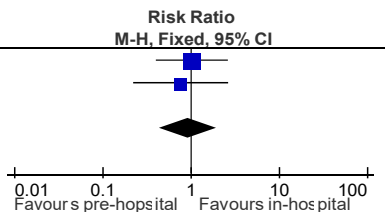


Figure 243: Heart failure (short-term: ≤30 days)

Figure 244: Stroke (short-term: ≤30 days)

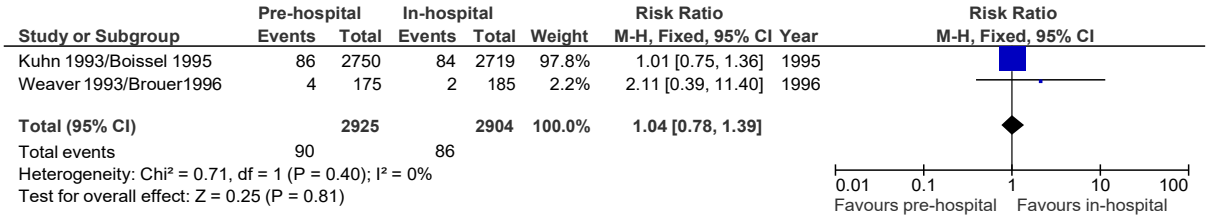
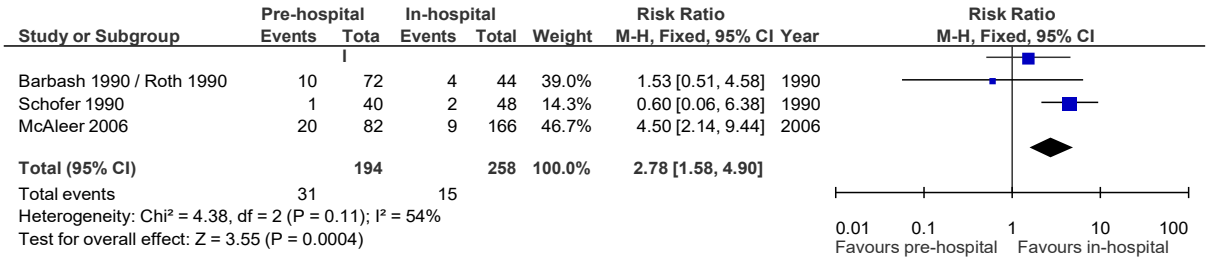


Figure 245: Major and minor bleeding (short-term: ≤30 days)



Definitions:

Barbash/Roth: not specified

Schofer: bleeding at puncture site, haematuria, gastrointestinal bleeding, cerebral bleeding

McAleer: minor – bleeding at venepuncture and haematuria

Weaver/Brouer: 'serious' bleeding

I.10 Use of antithrombin as an adjunct to fibrinolysis

None.

I.11 Rescue PCI

I.11.1 Rescue PCI versus conservative therapy

Figure 246: All-cause mortality (short-term: 30 days unless specified)

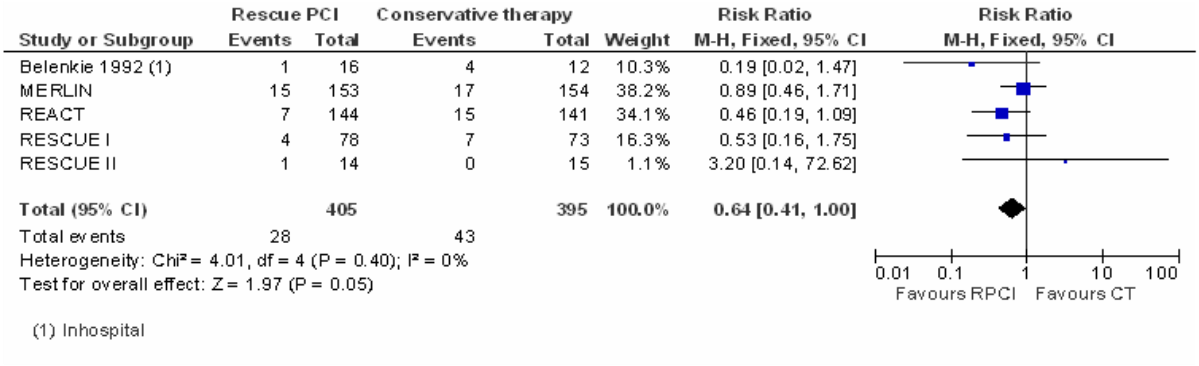


Figure 247: All-cause mortality (longer-term)

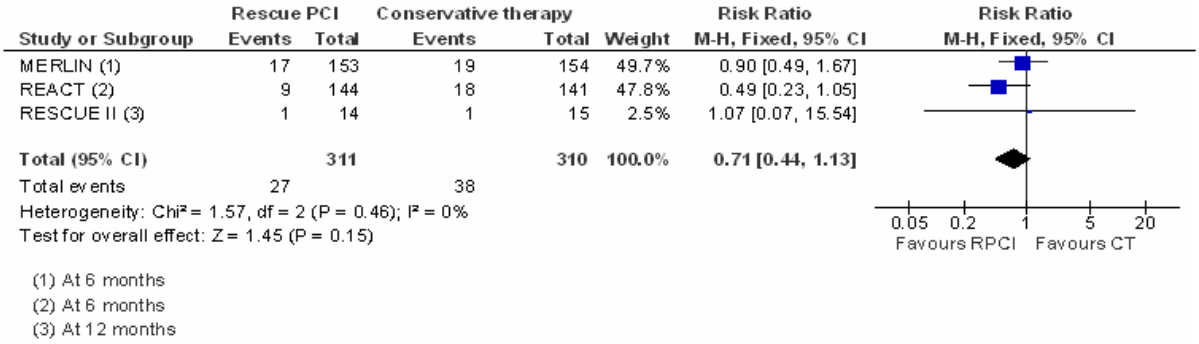


Figure 248: All-cause mortality – time to event

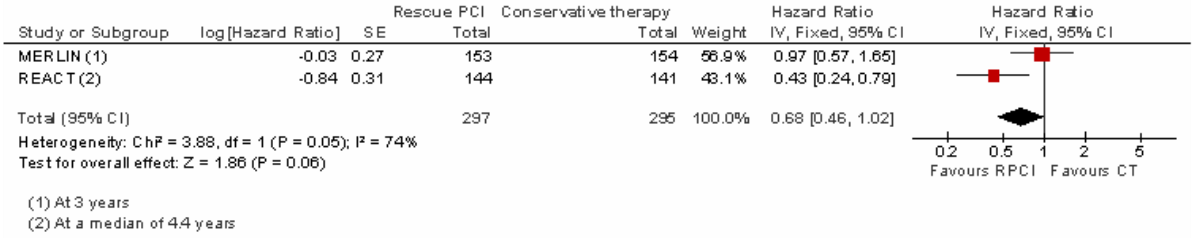


Figure 249: Cardiovascular mortality (short-term: 30 days unless specified)

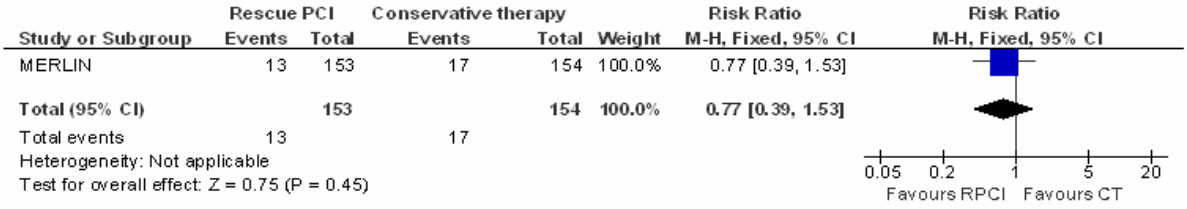


Figure 250: Cardiovascular mortality – time to event

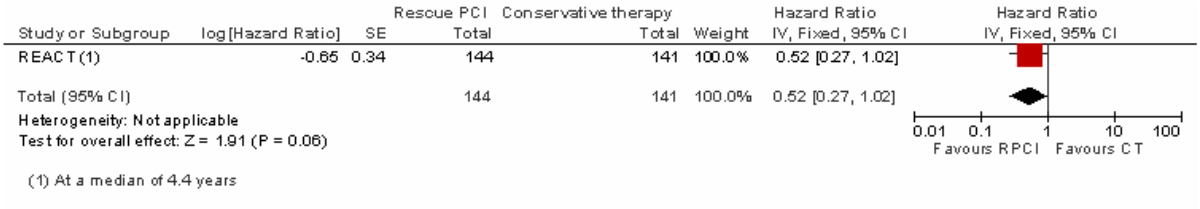


Figure 251: Reinfarction (short-term: 30 days unless specified)

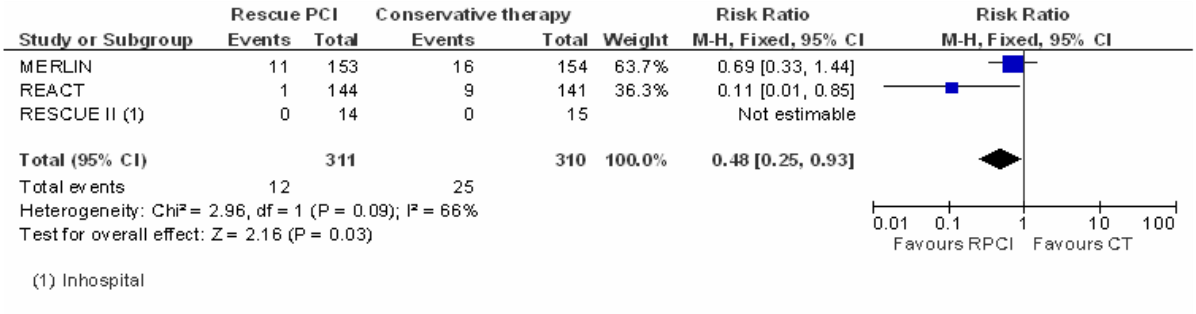


Figure 252: Reinfarction (longer-term)

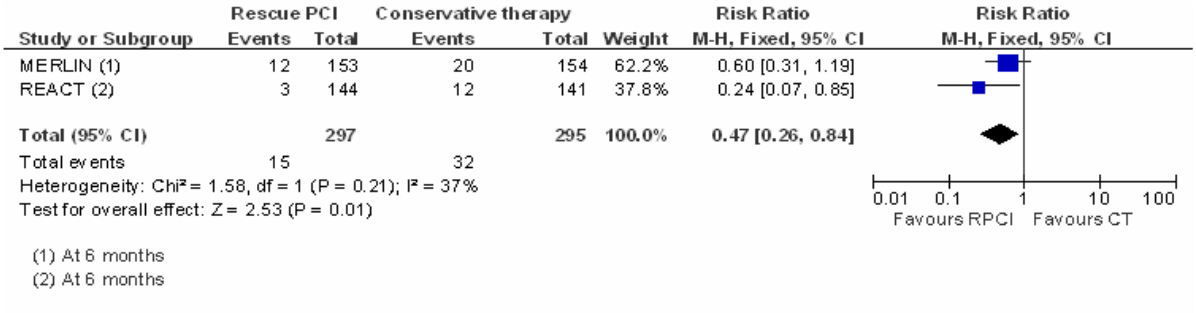


Figure 253: Reinfarction – time to event

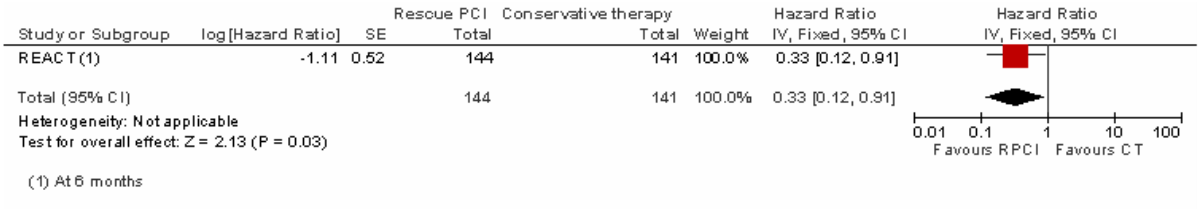


Figure 254: Heart failure (short-term: 30 days unless specified)

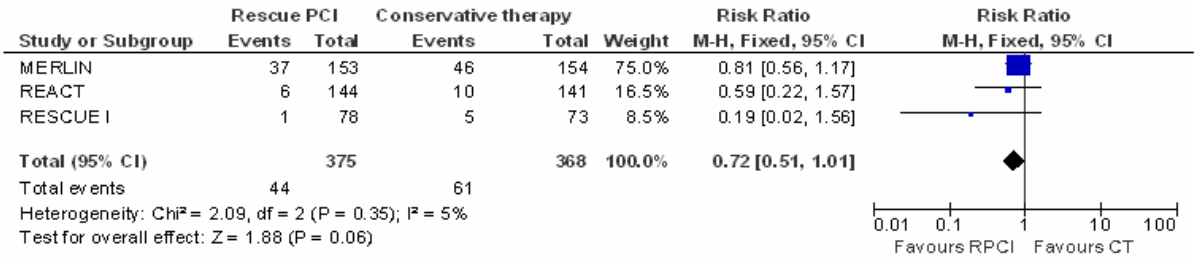


Figure 255: Heart failure – Longer-term

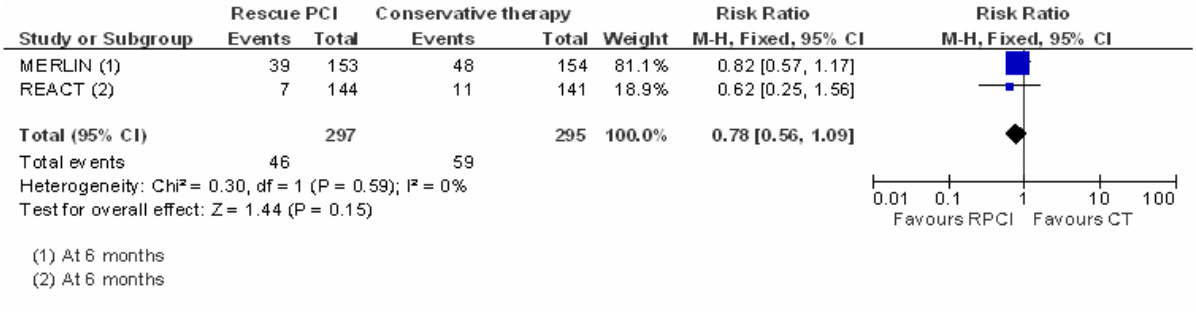


Figure 256: Stroke – Short-term (30 day data unless specified)

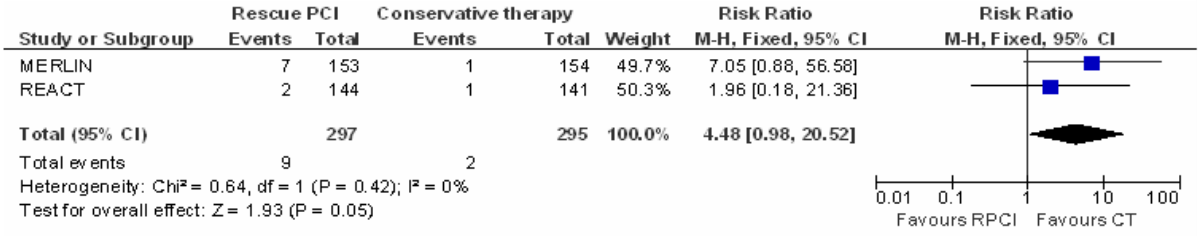


Figure 257: Stroke (longer-term)

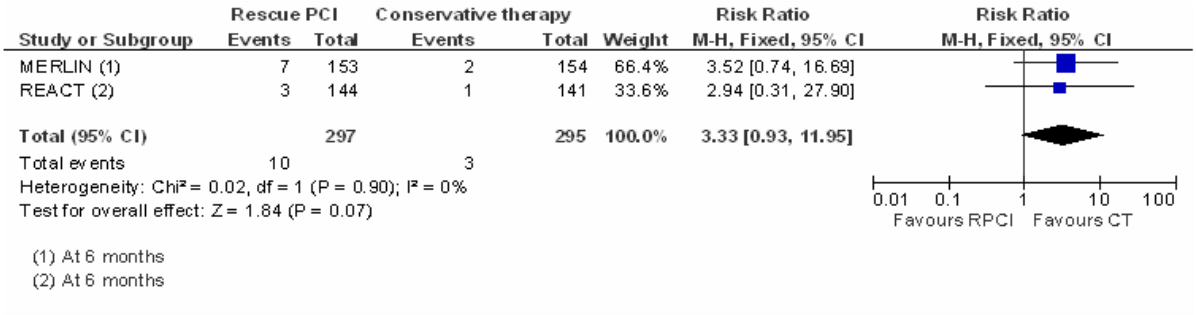


Figure 258: Unplanned revascularisation (short-term: 30 days unless specified)

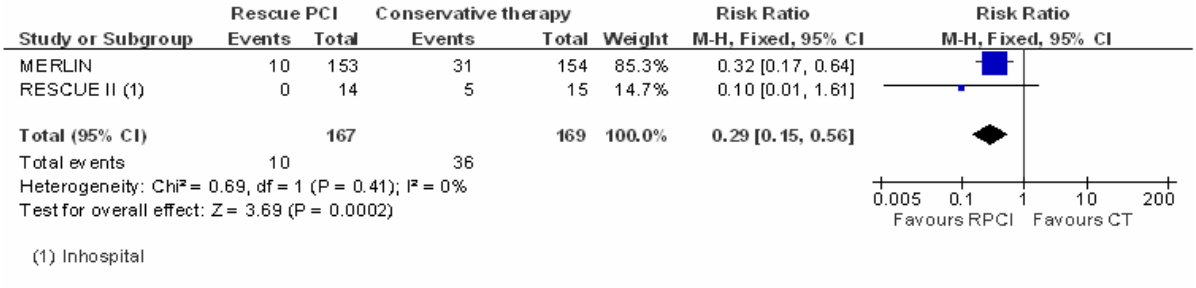


Figure 259: Unplanned revascularisation (longer-term)

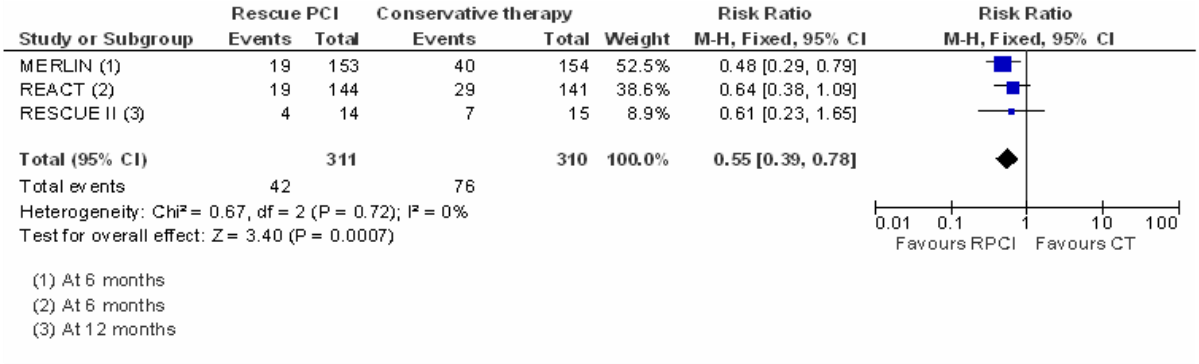


Figure 260: Unplanned revascularisation – time to event

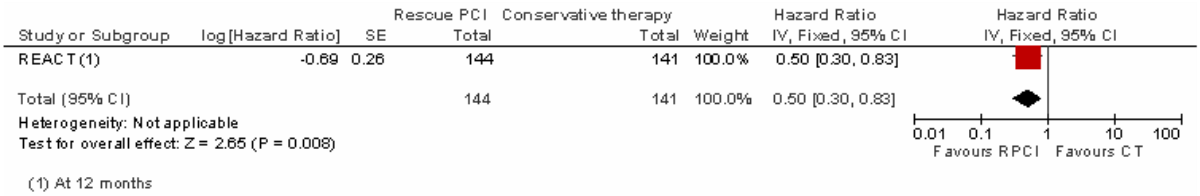


Figure 261: Major bleeding (short-term: 30 days unless specified)

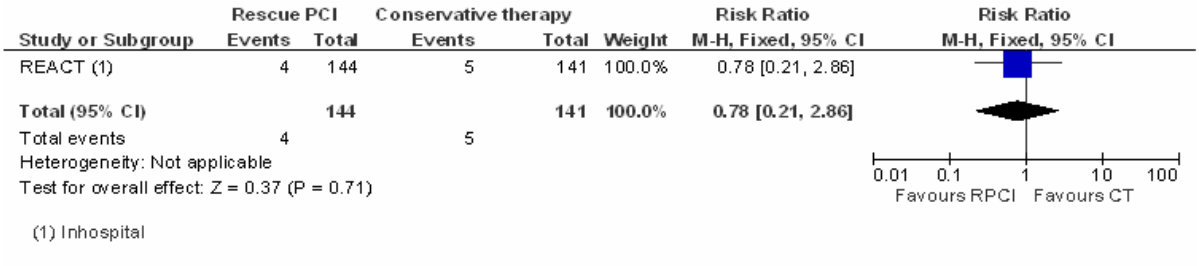


Figure 262: Minor bleeding (short-term: 30 days unless specified)

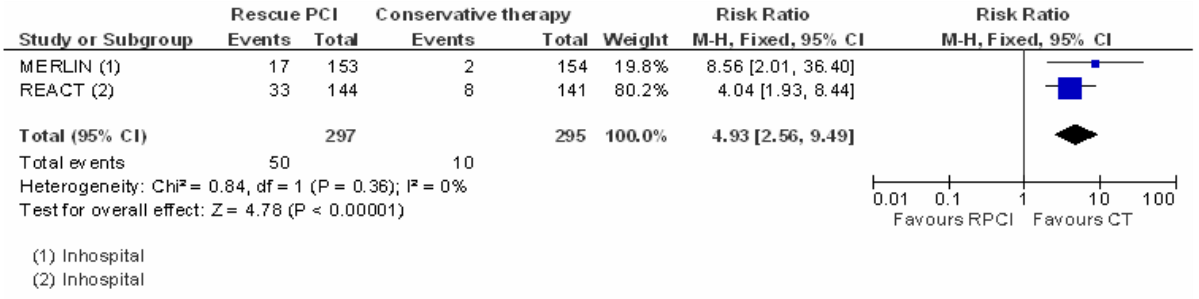
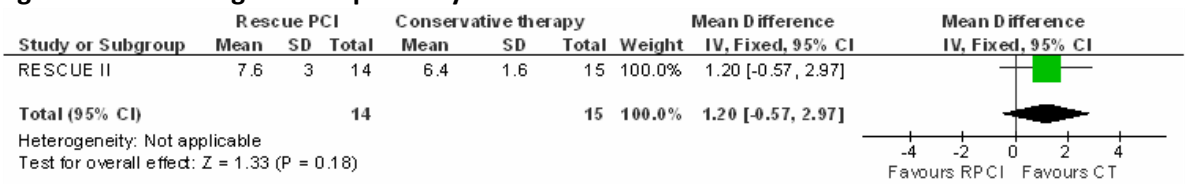


Figure 263: Length of hospital stay – index admission



I.11.2 Repeated fibrinolysis versus conservative therapy

Figure 264: All-cause mortality (short-term)

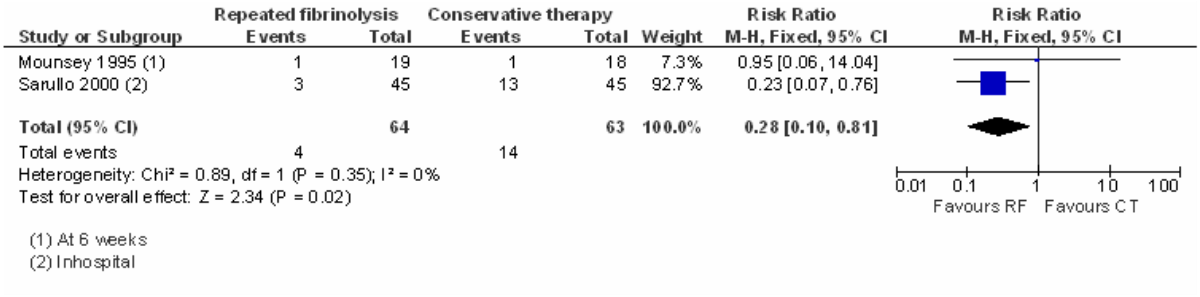


Figure 265: All-cause mortality – time to event

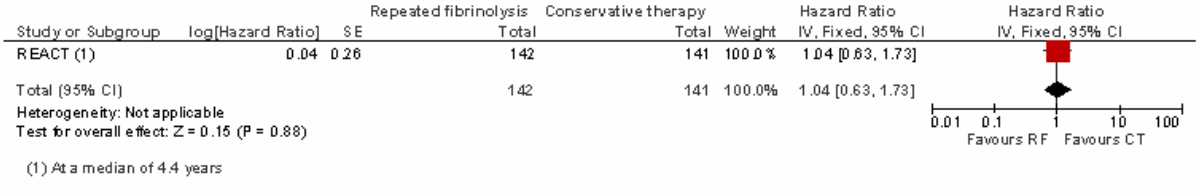


Figure 266: Cardiovascular mortality – time to event

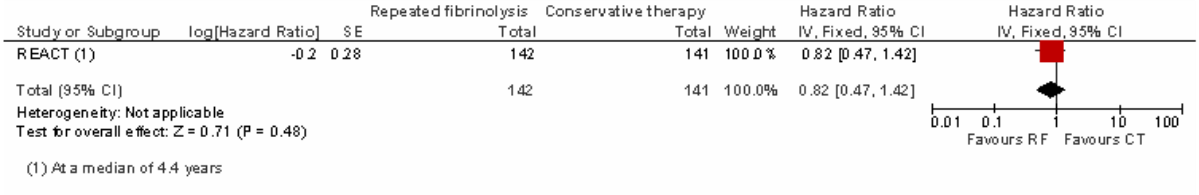


Figure 267: Reinfarction (short-term)

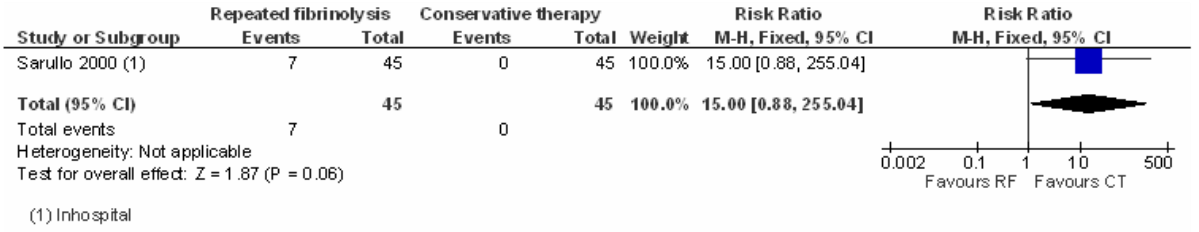


Figure 268: Reinfarction (longer-term)

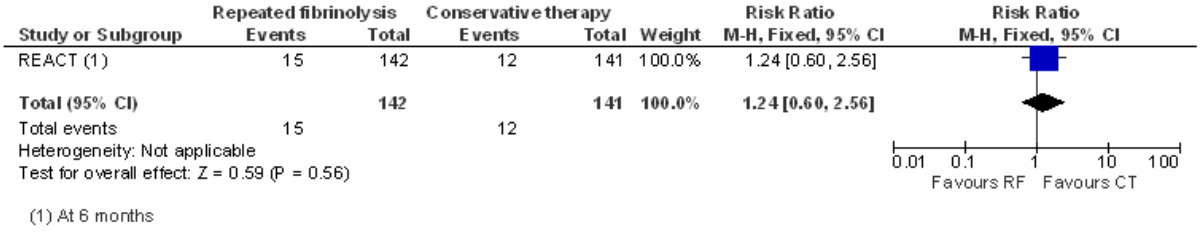


Figure 269: Heart failure (longer-term)

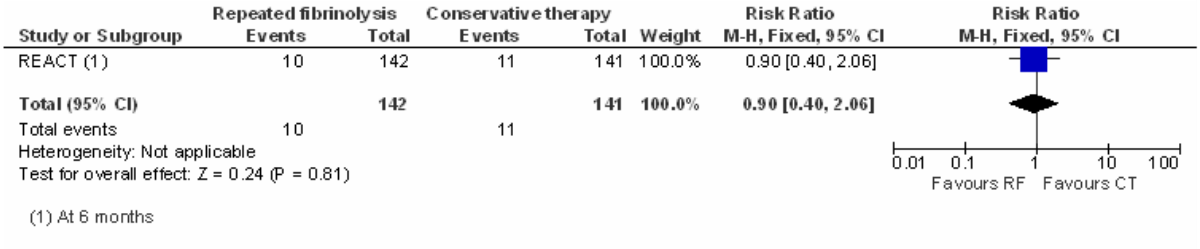


Figure 270: Stroke (longer-term)

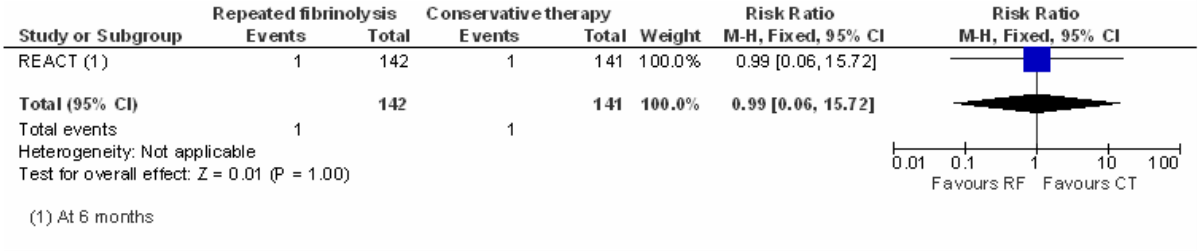


Figure 271: Unplanned revascularisation (short-term)

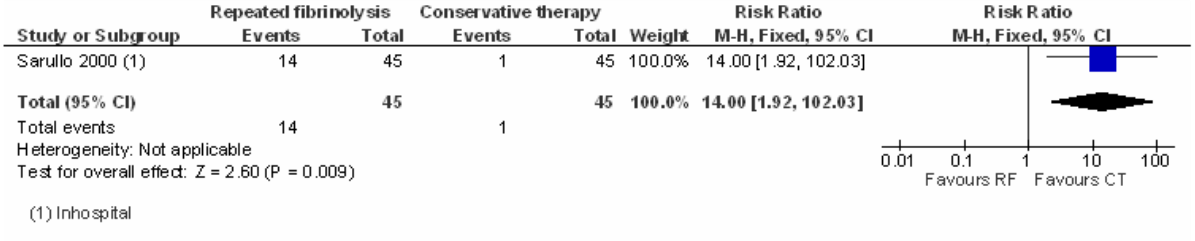


Figure 272: Unplanned revascularisation – time to event

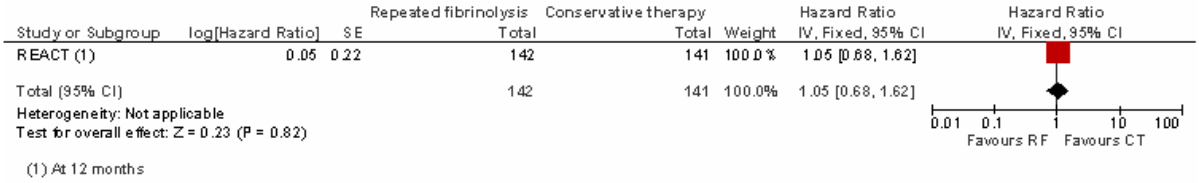


Figure 273: Major bleeding (short-term)

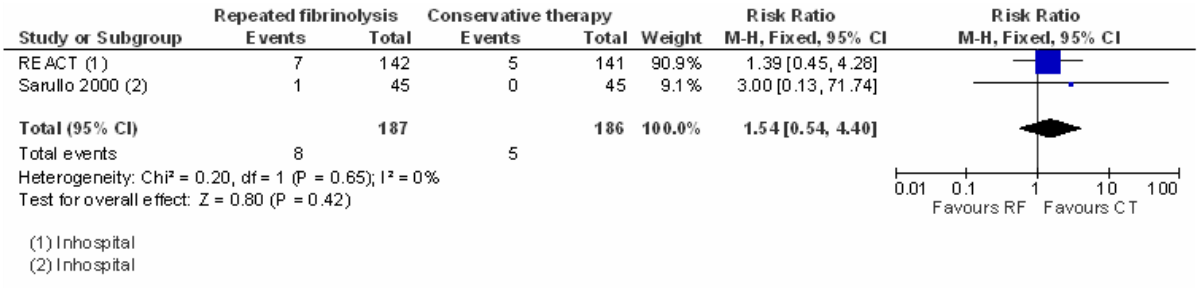
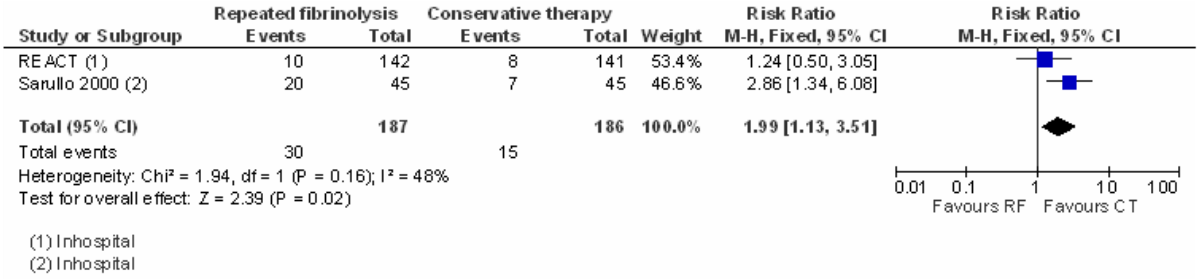


Figure 274: Minor bleeding (short-term)



I.11.3 Rescue PCI versus repeated fibrinolysis

Figure 275: All-cause mortality – time to event

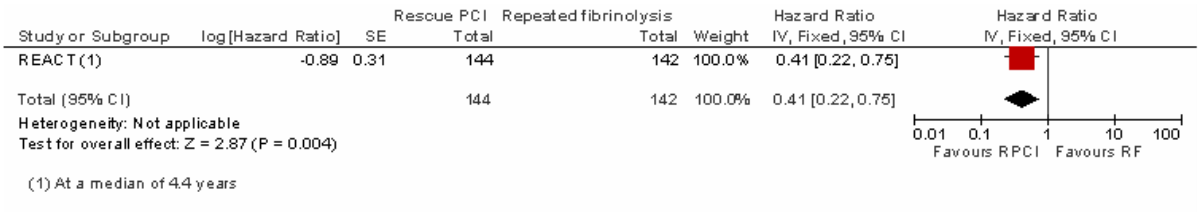


Figure 276: Cardiovascular mortality – time to event

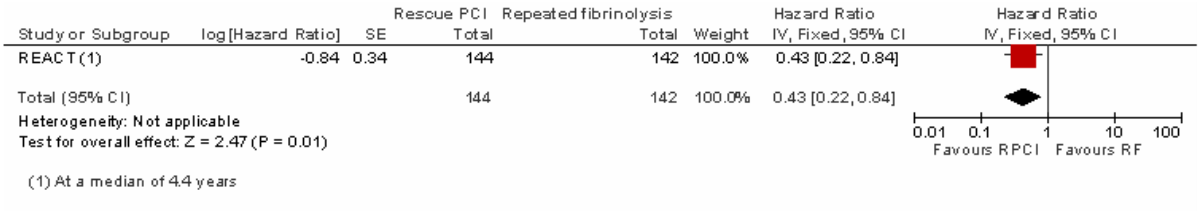


Figure 277: Reinfarction – time to event

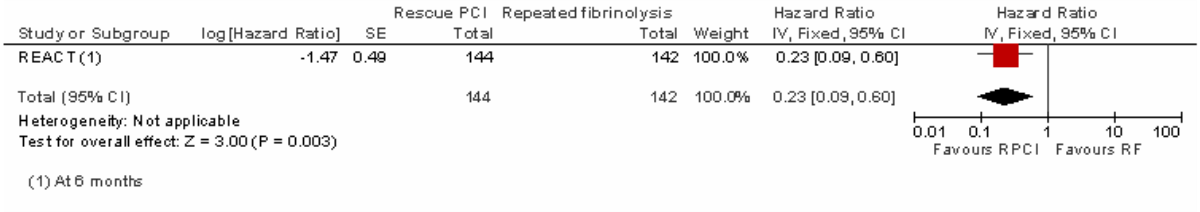


Figure 278: Heart failure (longer-term)

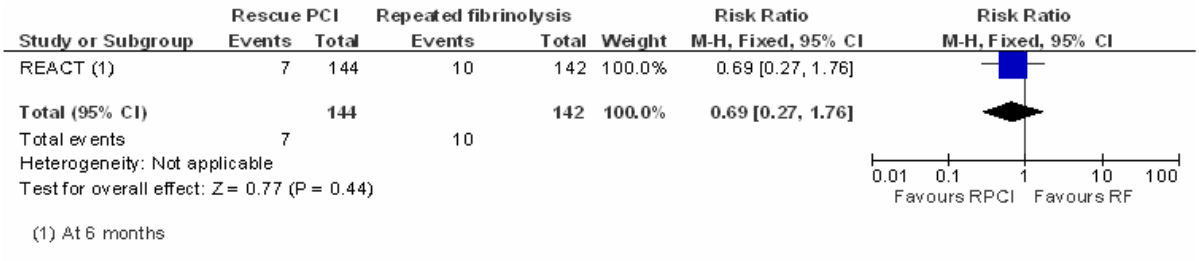


Figure 279: Stroke (longer-term)

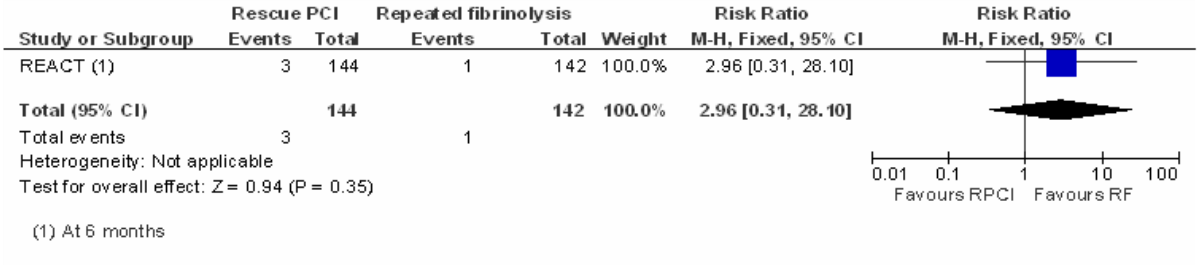


Figure 280: Unplanned revascularisation – time to event

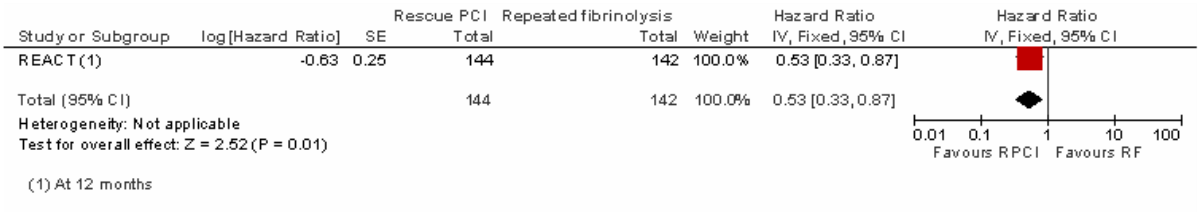


Figure 281: Major bleeding (short-term)

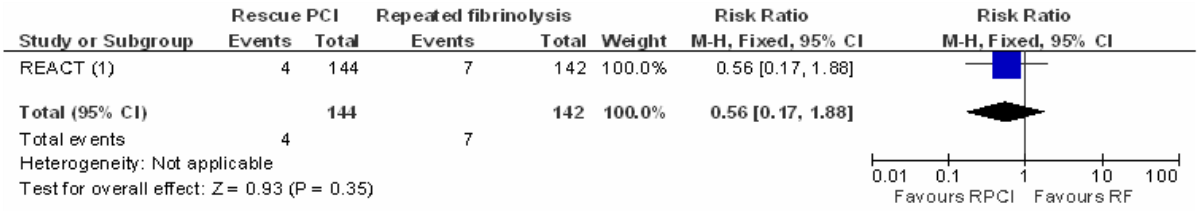
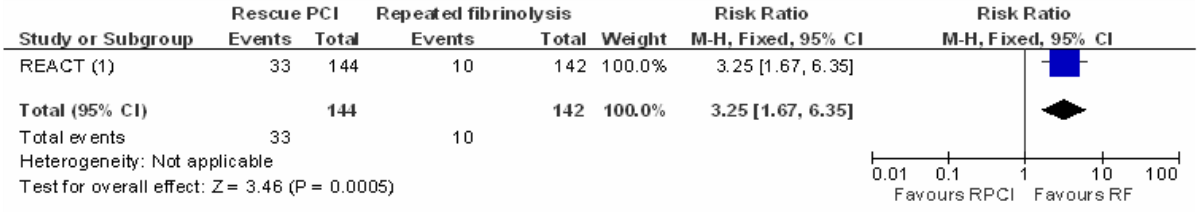


Figure 282: Minor bleeding (short-term)



I.11.4 Rescue PCI versus conservative therapy (sensitivity analysis – incidence of bleeding)

Figure 283: Major bleeding (short-term)

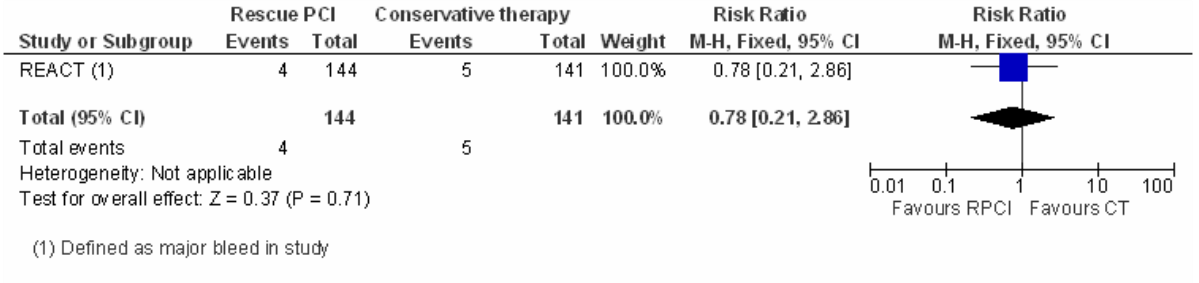
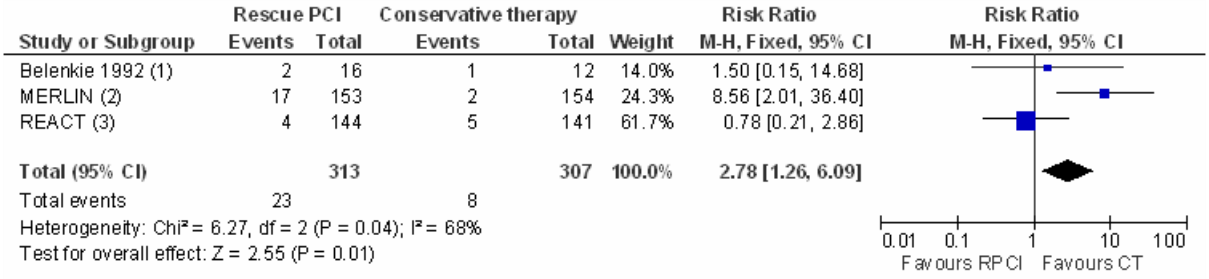
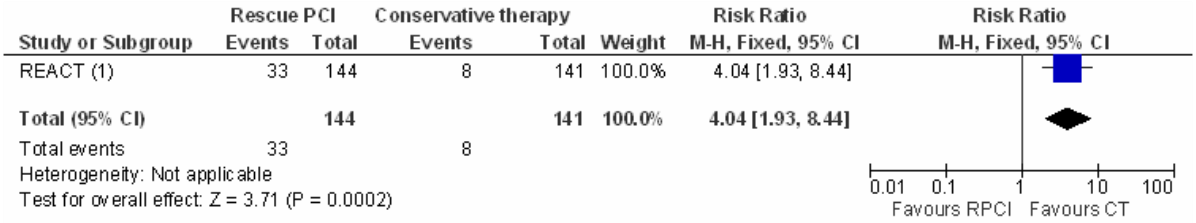


Figure 284: Major bleeding plus undefined bleeding (short-term)



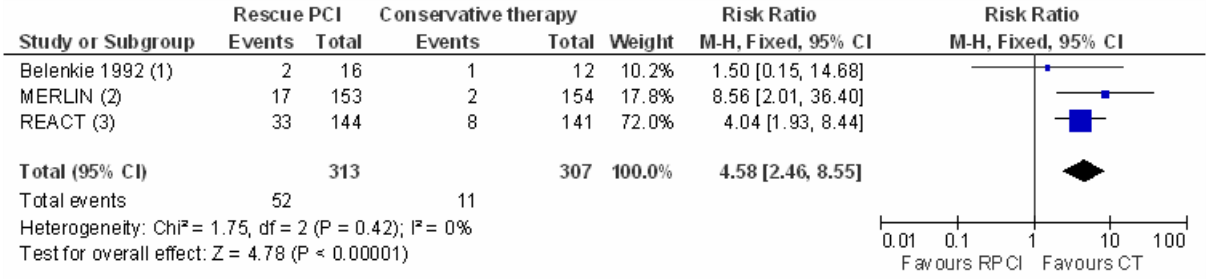
(1) No study definition. RPCI: 1 gastrointestinal bleeding,1 groin haematoma requiring transfusion. CT: 1 severe groin haematoma
(2) Transfusion required.Transfusion reserved for fall in haemoglobin of ≥2 g/dl, and only if this took total haemoglobin to <10 g/dl
(3) Defined as major bleed in study

Figure 285: Minor bleeding (short-term)



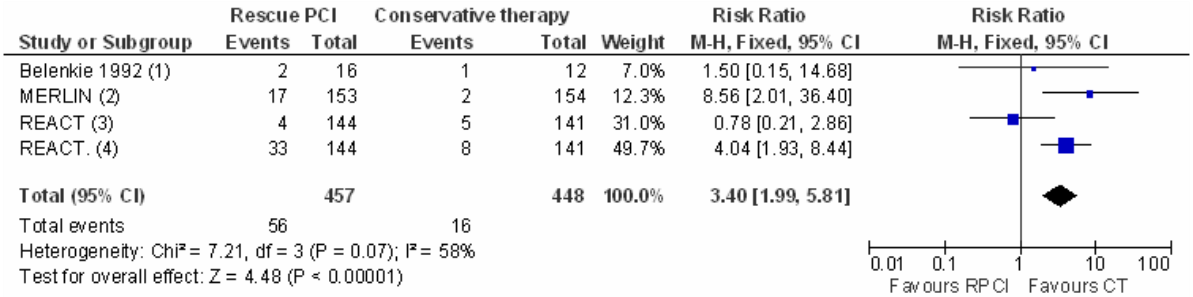
(1) Defined as minor bleed in study

Figure 286: Minor bleeding plus undefined bleeding (short-term)



(1) No study definition. RPCI: 1 gastrointestinal bleeding,1 groin haematoma requiring transfusion. CT: 1 severe groin haematoma
(2) Transfusion required.Transfusion reserved for fall in haemoglobin of ≥2 g/dl, and only if this took total haemoglobin to <10 g/dl
(3) Defined as minor bleed in study

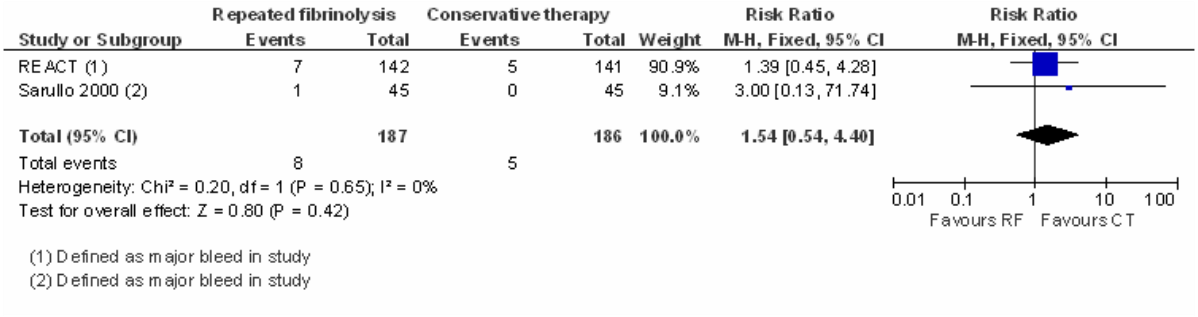
Figure 287: All bleeding (short-term)



(1) No study definition. RPCI: 1 gastrointestinal bleeding,1 groin haematoma requiring transfusion. CT: 1 severe groin haematoma
(2) Transfusion required.Transfusion reserved for fall in haemoglobin of ≥2 g/dl, and only if this took total haemoglobin to <10 g/dl
(3) Defined as major bleed in study
(4) Defined as minor bleed in study

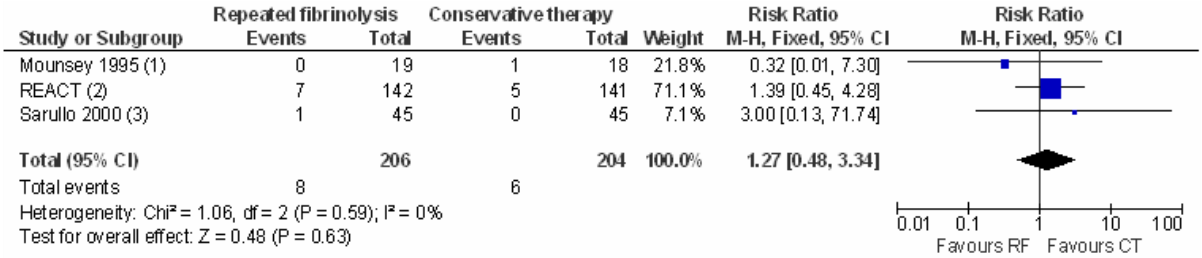
I.11.5 Repeated fibrinolysis versus conservative therapy (sensitivity analysis – incidence of bleeding)

Figure 288: Major bleeding (short-term)



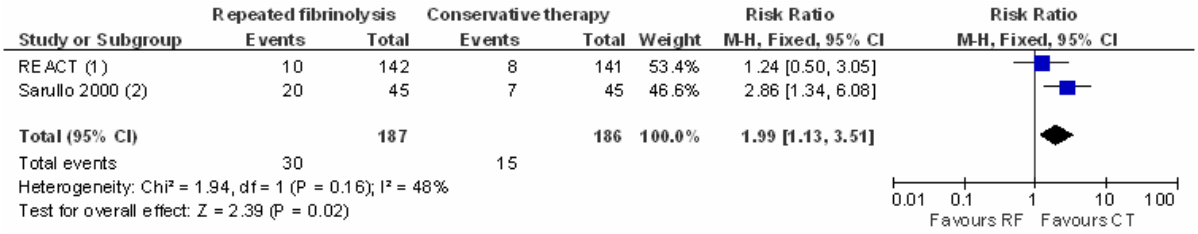
(1) Defined as major bleed in study
(2) Defined as major bleed in study

Figure 289: Major bleeding plus undefined bleeding (short-term)



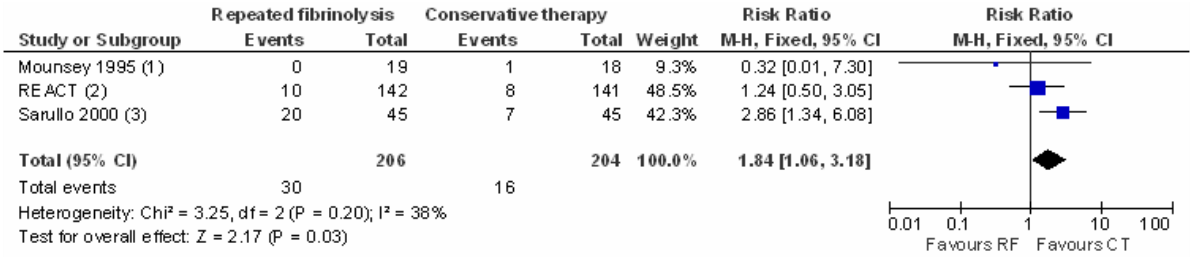
(1) No study definition. CT: 1 gastrointestinal haemorrhage requiring transfusion
(2) Defined as major bleed in study
(3) Defined as major bleed in study

Figure 290: Minor bleeding (short-term)



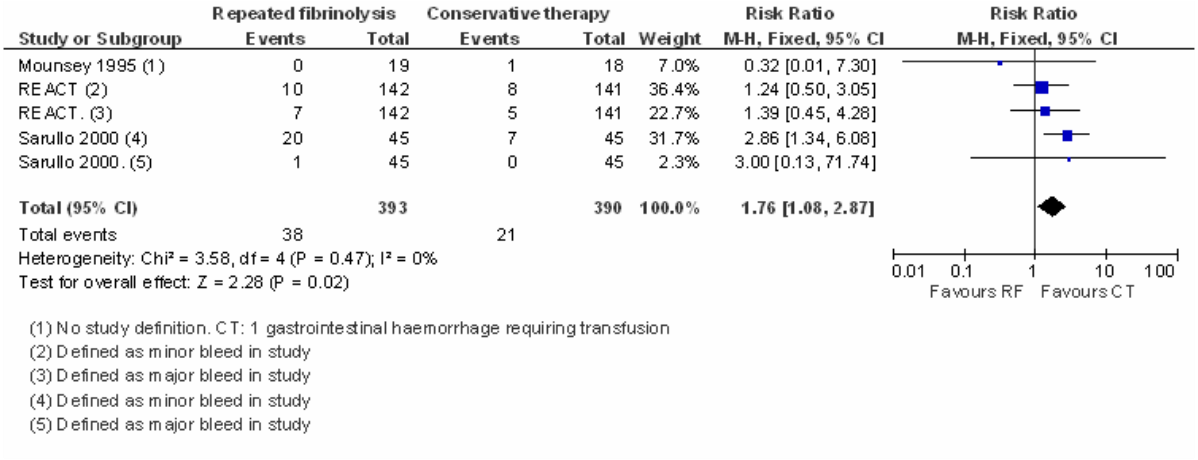
(1) Defined as minor bleed in study
(2) Defined as minor bleed in study

Figure 291: Minor bleeding plus undefined bleeding (short-term)



(1) No study definition. CT: 1 gastrointestinal haemorrhage requiring transfusion
(2) Defined as minor bleed in study
(3) Defined as minor bleed in study

Figure 292: All bleeding (short-term)



I.12 Routine early angiography following fibrinolysis

I.12.1 Routine early angiography versus selective or routine deferred angiography

Figure 293: All-cause mortality (short-term: 30 days unless specified)

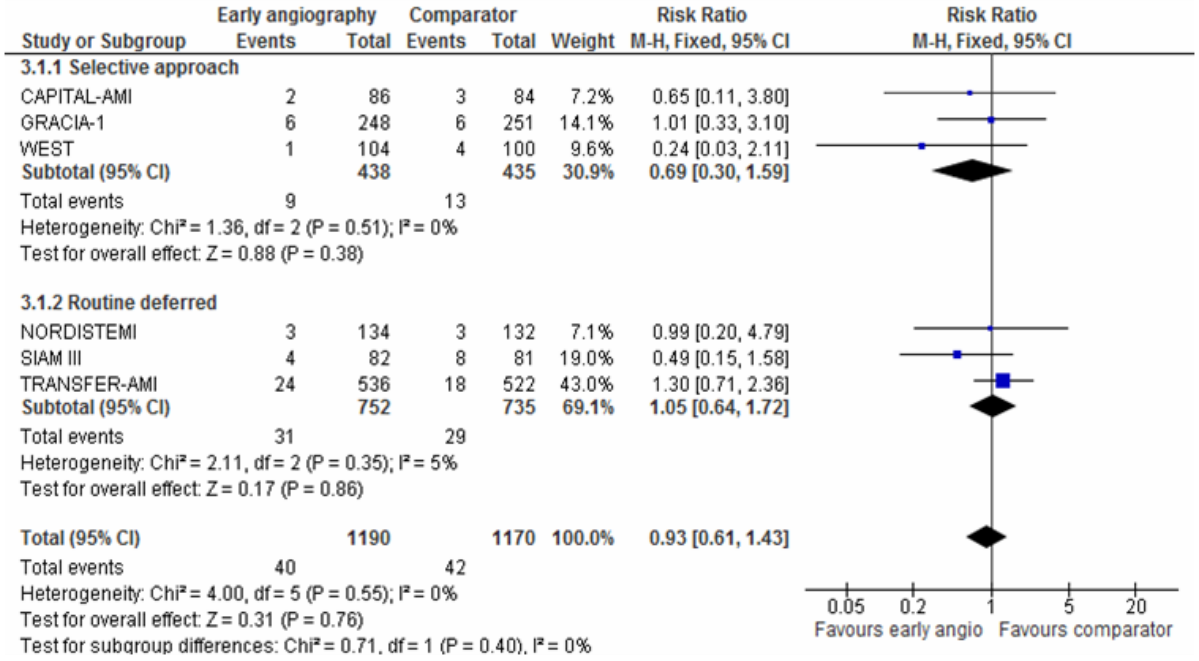


Figure 294: All-cause mortality (longer-term: 6 months unless specified)

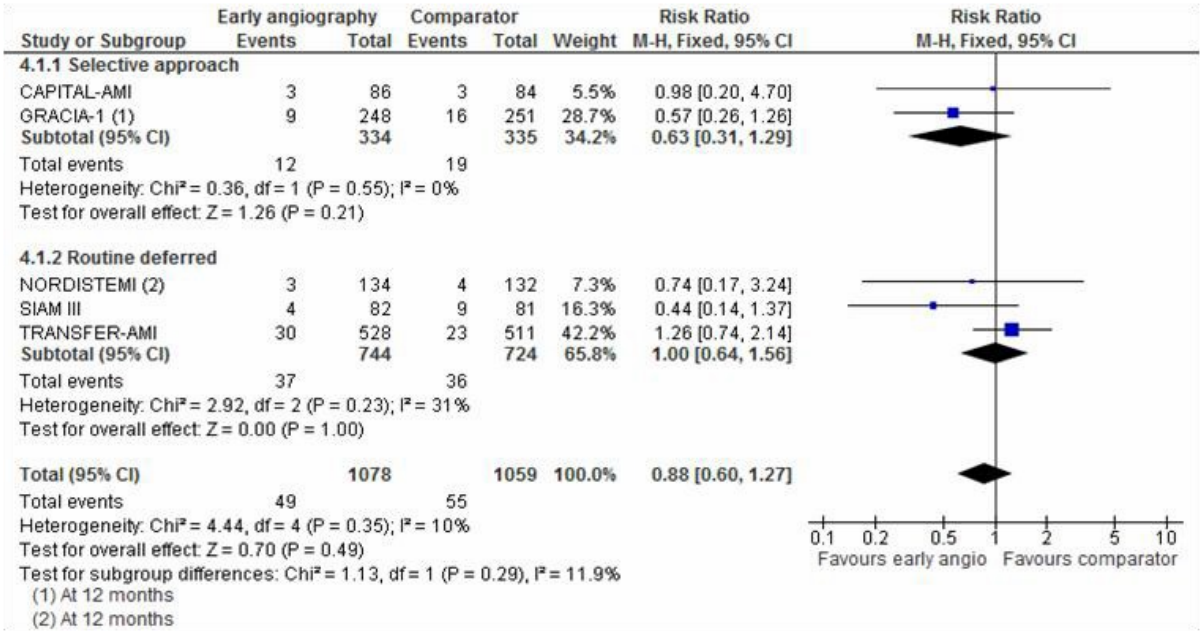


Figure 295: Reinfarction (short-term: 30 days unless specified)

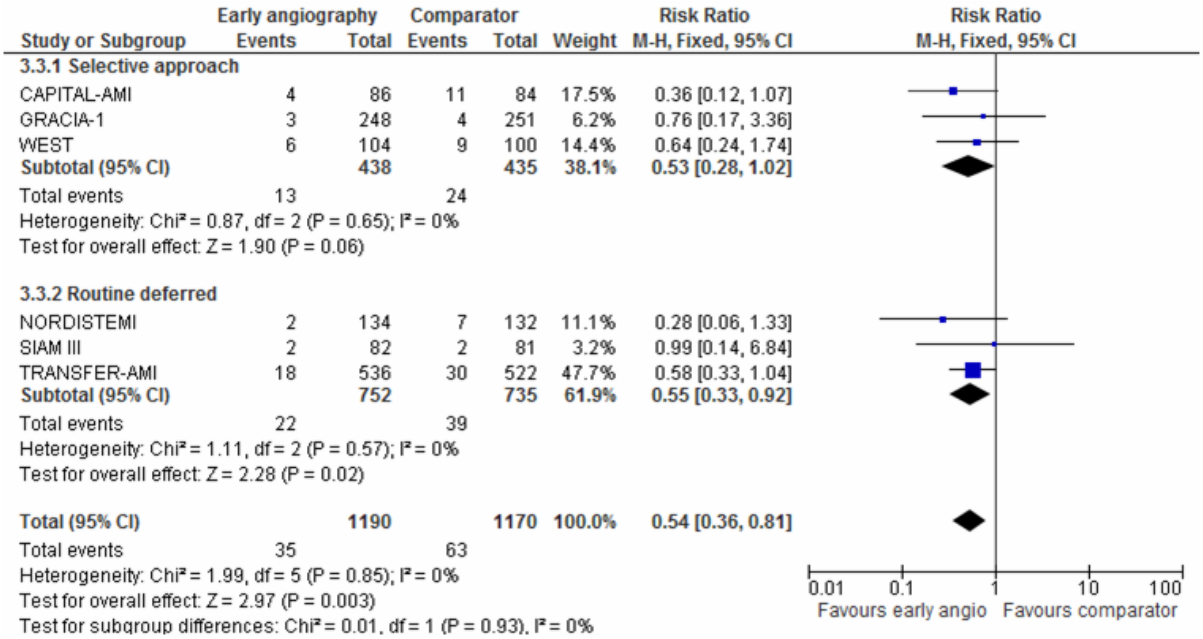


Figure 296: Reinfarction (longer-term: 6 months unless specified)

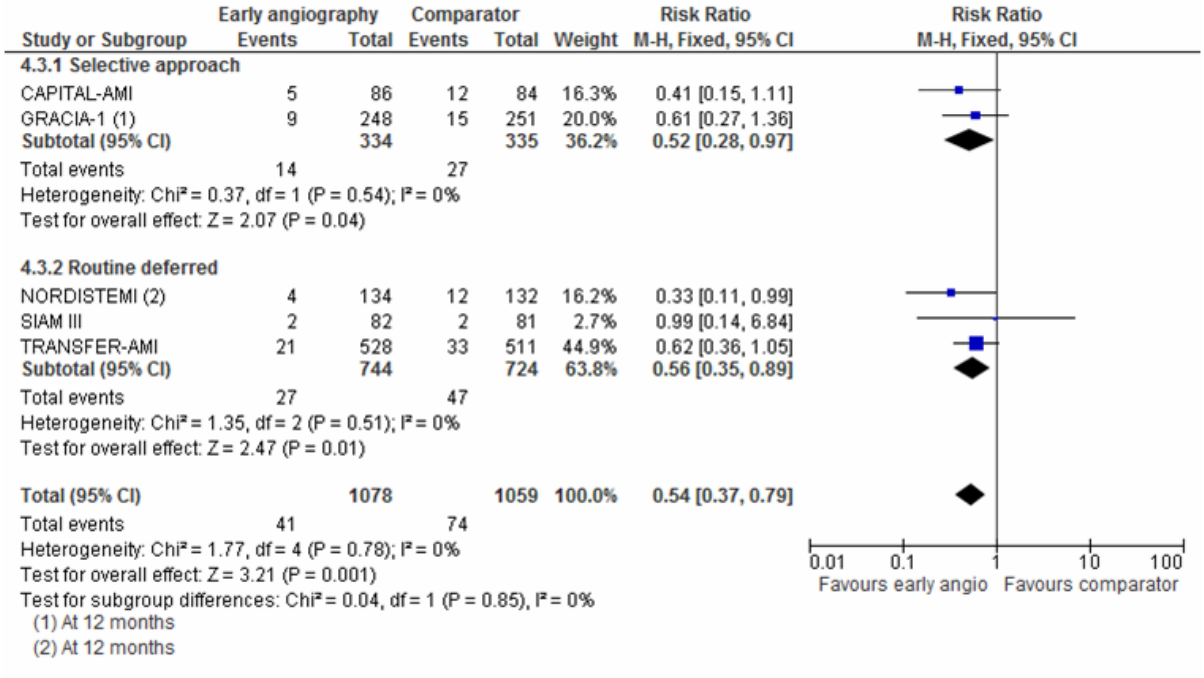


Figure 297: Heart failure (short-term: 30 days unless specified)

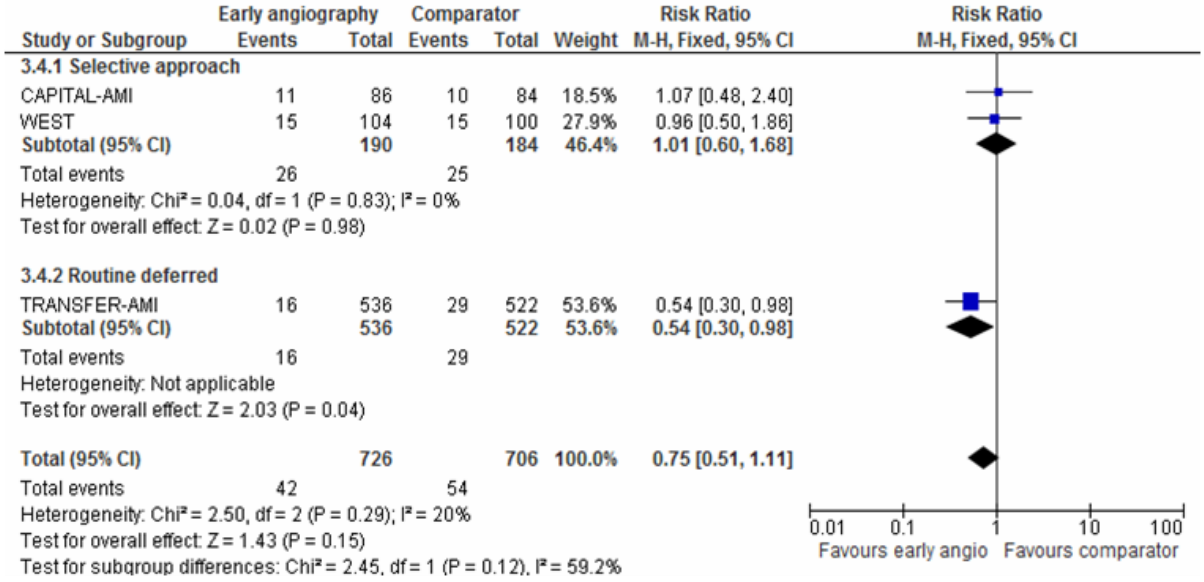


Figure 298: Heart failure (longer-term: 6 months unless specified)

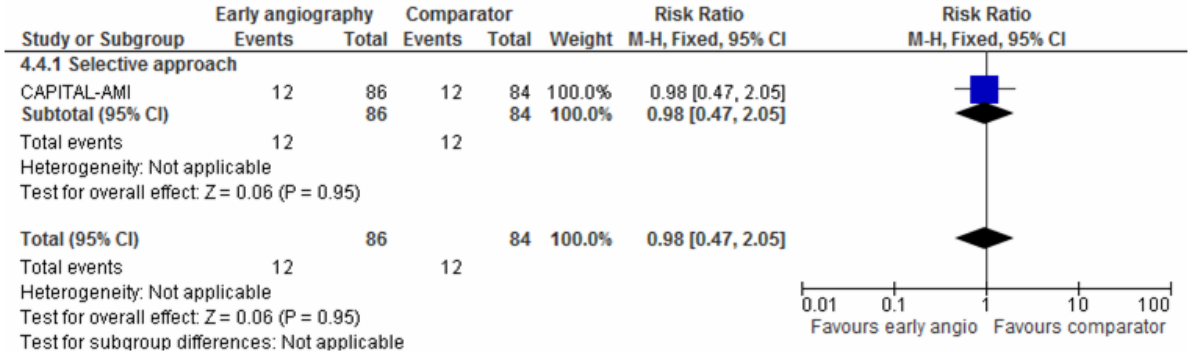
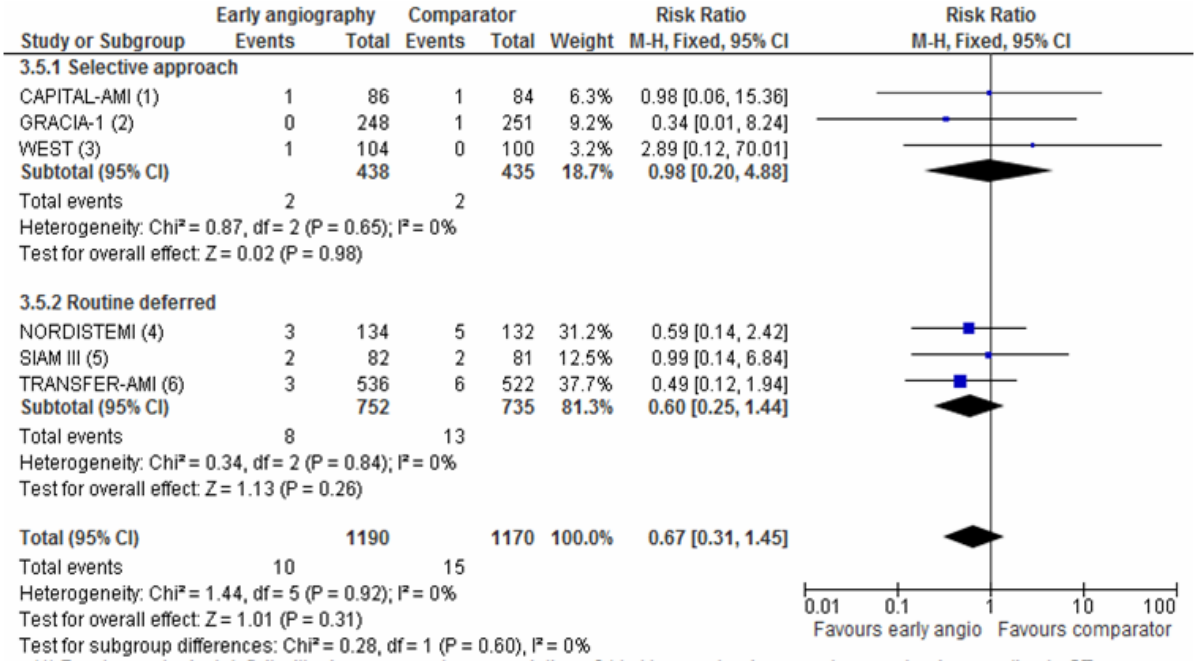
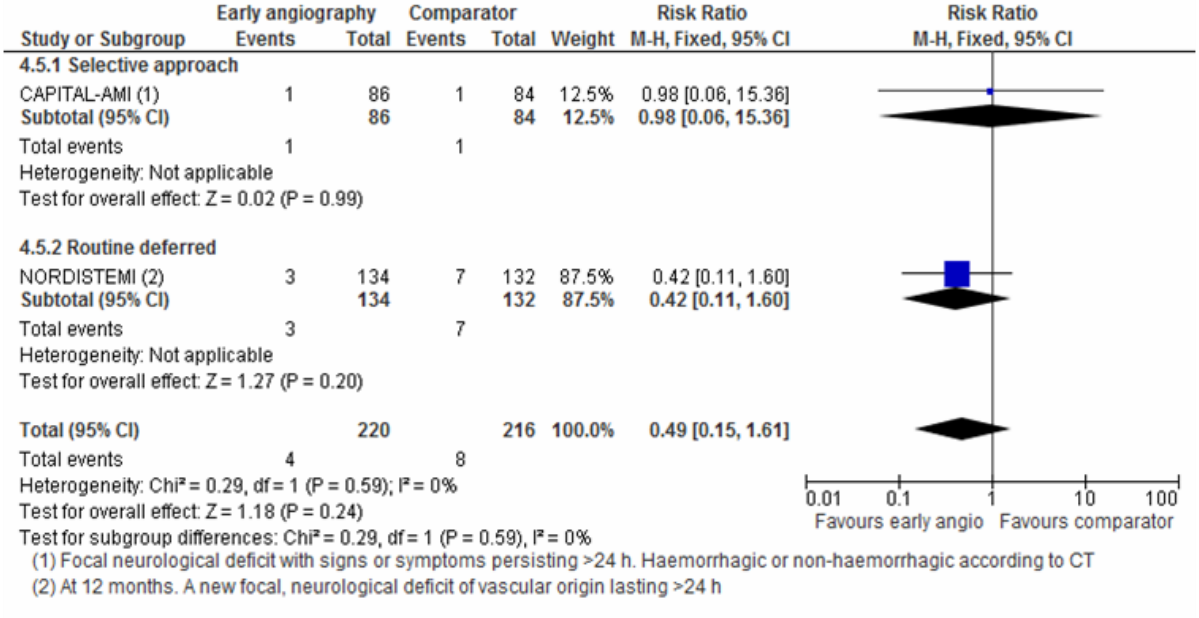


Figure 299: Stroke (short-term: 30 days unless specified)



(1) Focal neurological deficit with signs or symptoms persisting >24 h. Haemorrhagic or non-haemorrhagic according to CT
(2) Inhospital. Not defined; cases of intracranial bleeding
(3) Inhospital. Haemorrhagic or non-haemorrhagic stroke
(4) A new focal, neurological deficit of vascular origin lasting >24 h
(5) Inhospital. Due to ischaemia or intracranial bleeding
(6) Inhospital. Not defined; cases of intracranial bleeding

Figure 300: Stroke (longer-term: 6 months unless specified)



(1) Focal neurological deficit with signs or symptoms persisting >24 h. Haemorrhagic or non-haemorrhagic according to CT
(2) At 12 months. A new focal, neurological deficit of vascular origin lasting >24 h

Figure 301: Intracranial bleeding (short-term: 30 days unless specified)

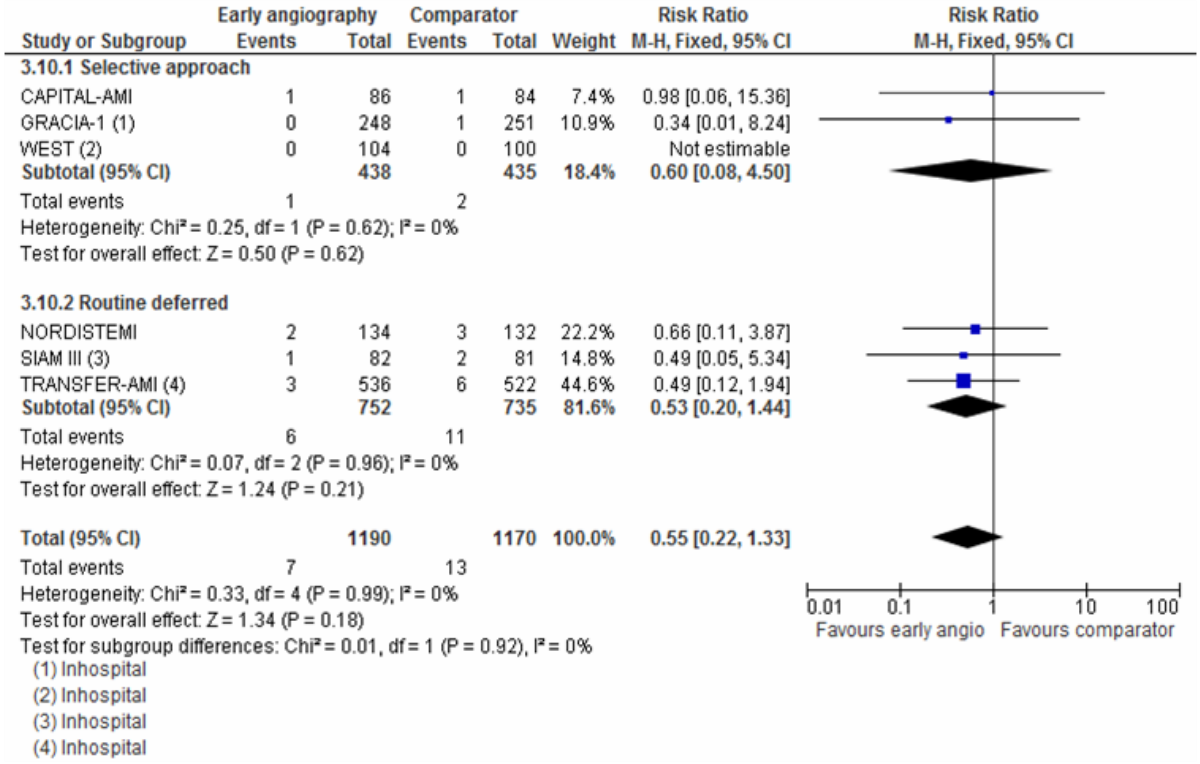


Figure 302: Intracranial bleeding (longer-term: 6 months unless specified)

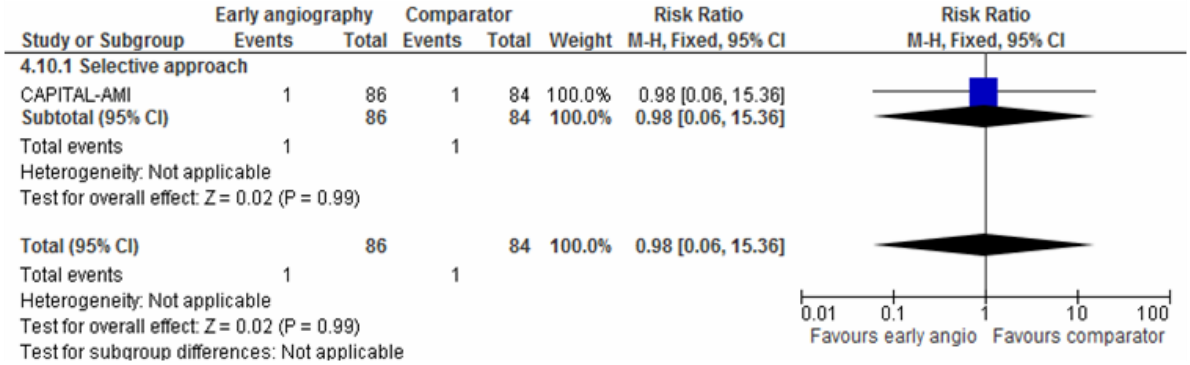


Figure 303: Major bleeding (short-term: 30 days unless specified)

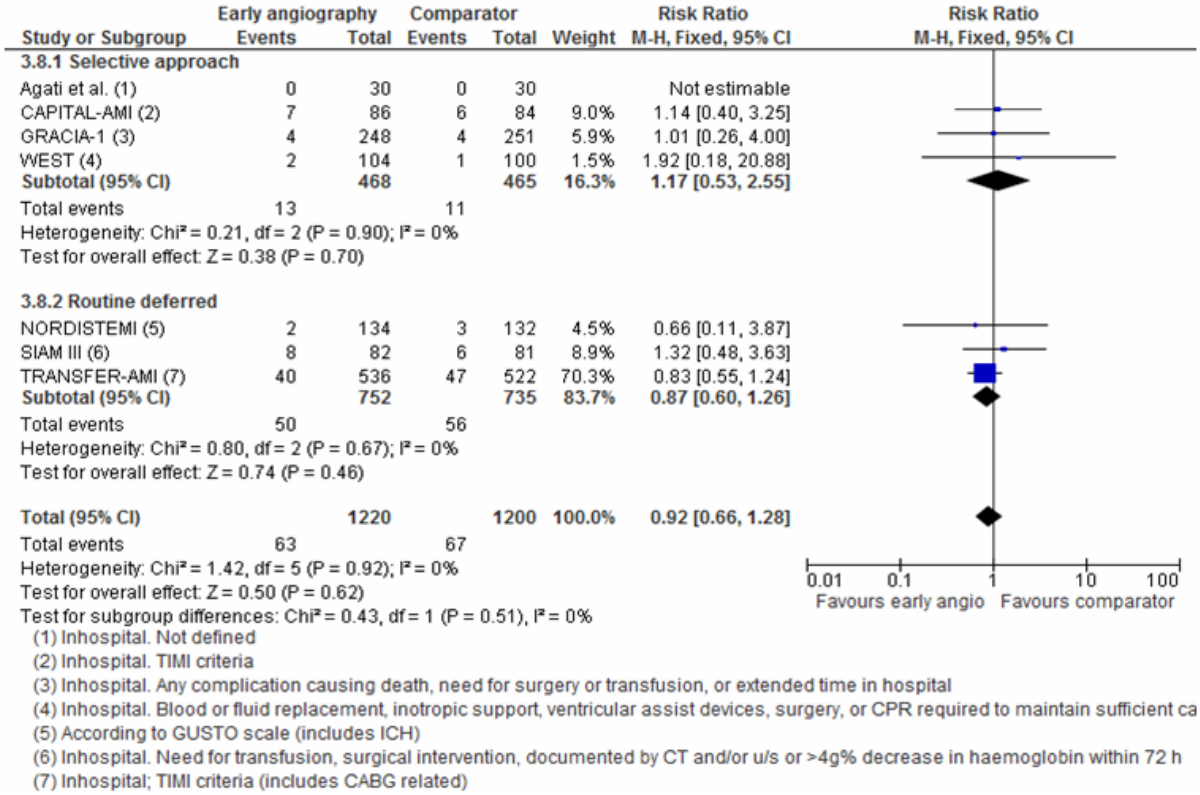


Figure 304: Minor bleeding (short-term: 30 days unless specified)

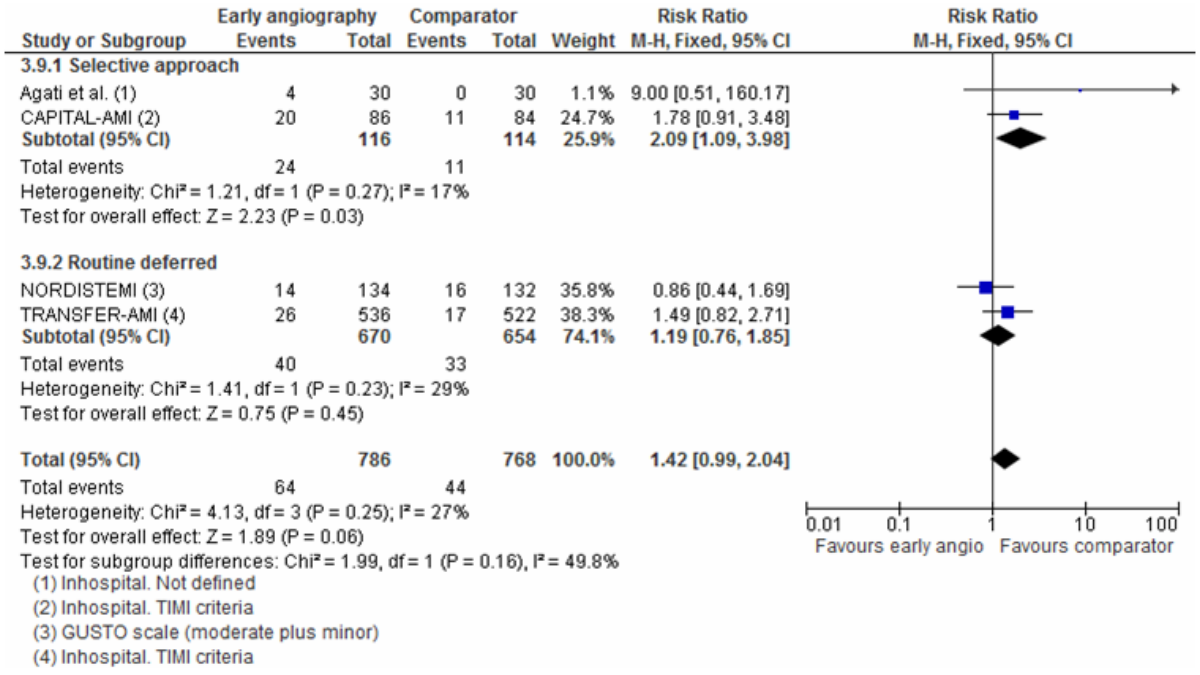


Figure 305: Recurrent ischaemia (short-term: 30 days unless specified)

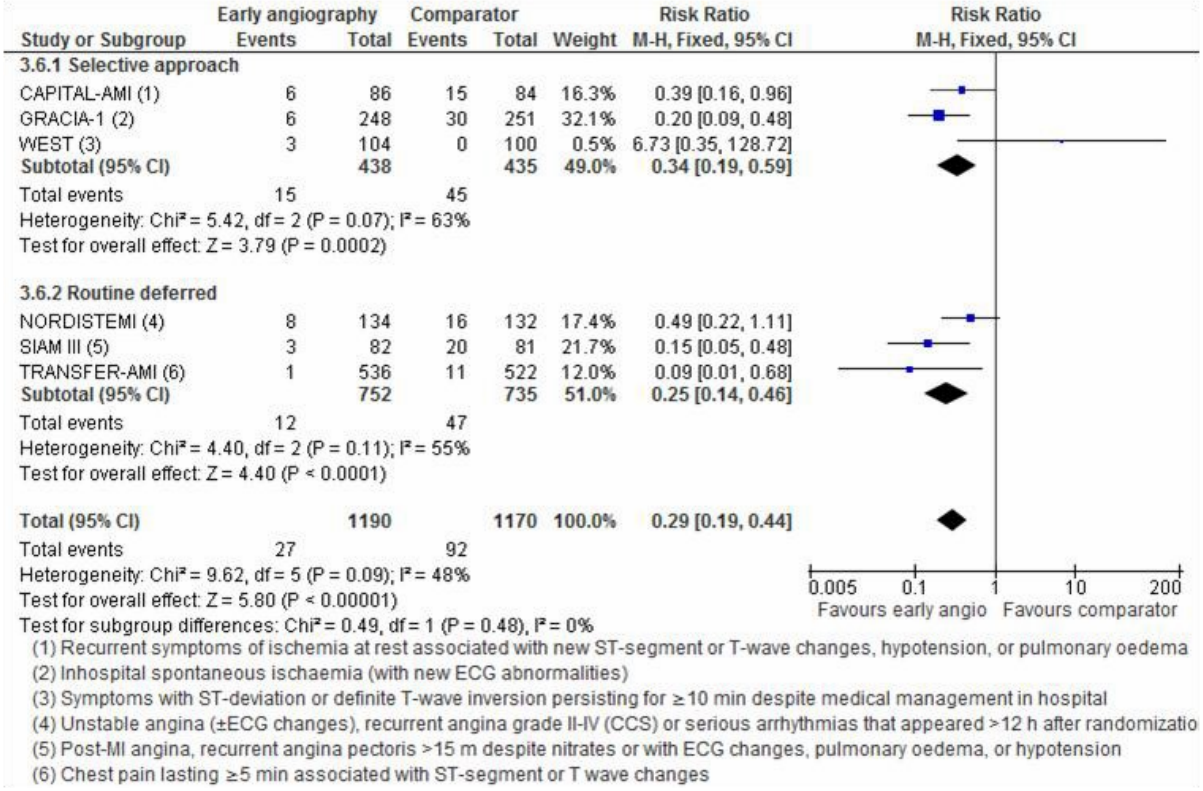


Figure 306: Recurrent ischaemia (longer-term: 6 months unless specified)

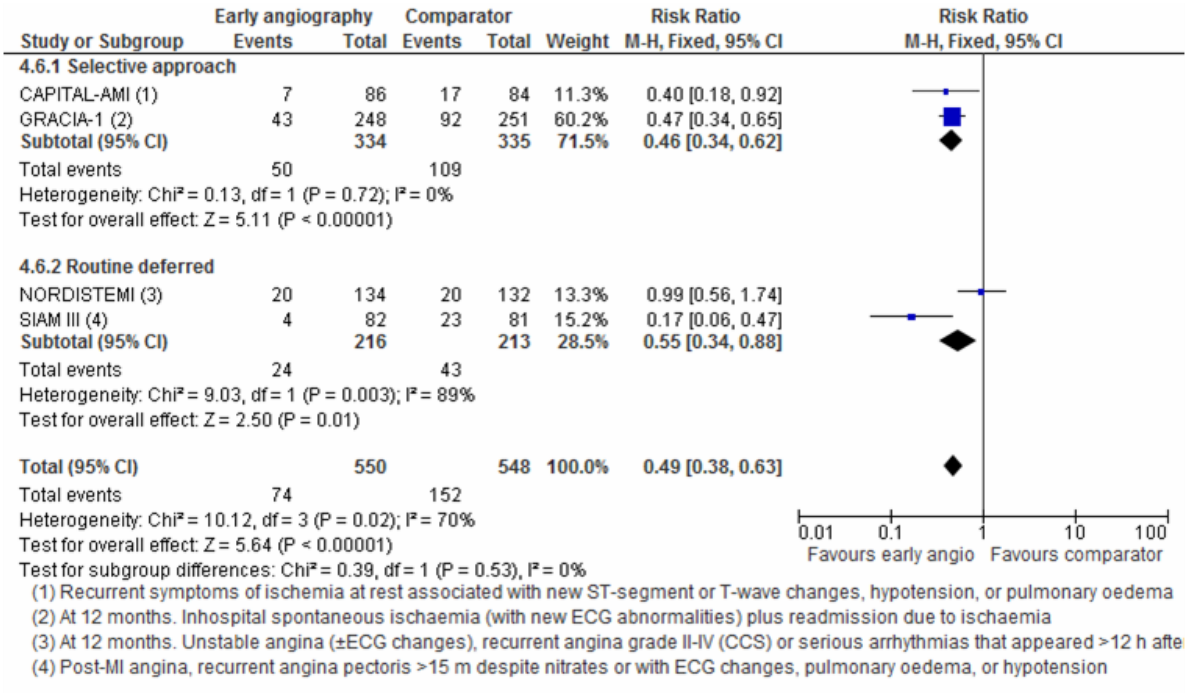


Figure 307: Unplanned revascularisation (short-term: 30 days unless specified)

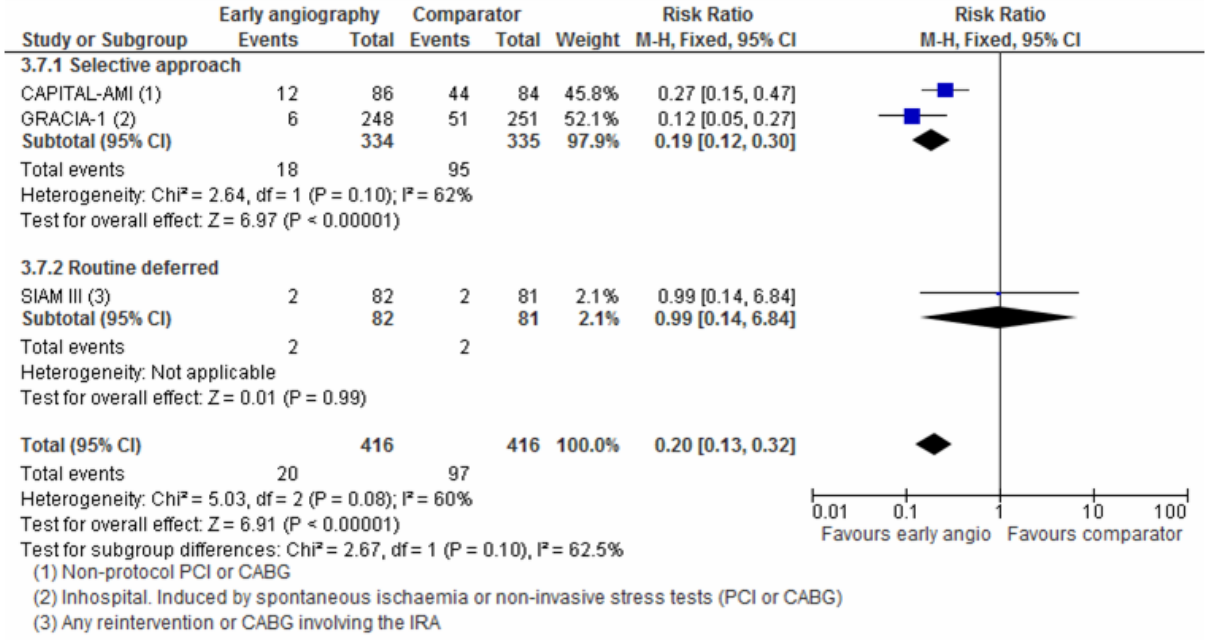


Figure 308: Unplanned revascularisation (longer-term: 6 months unless specified)

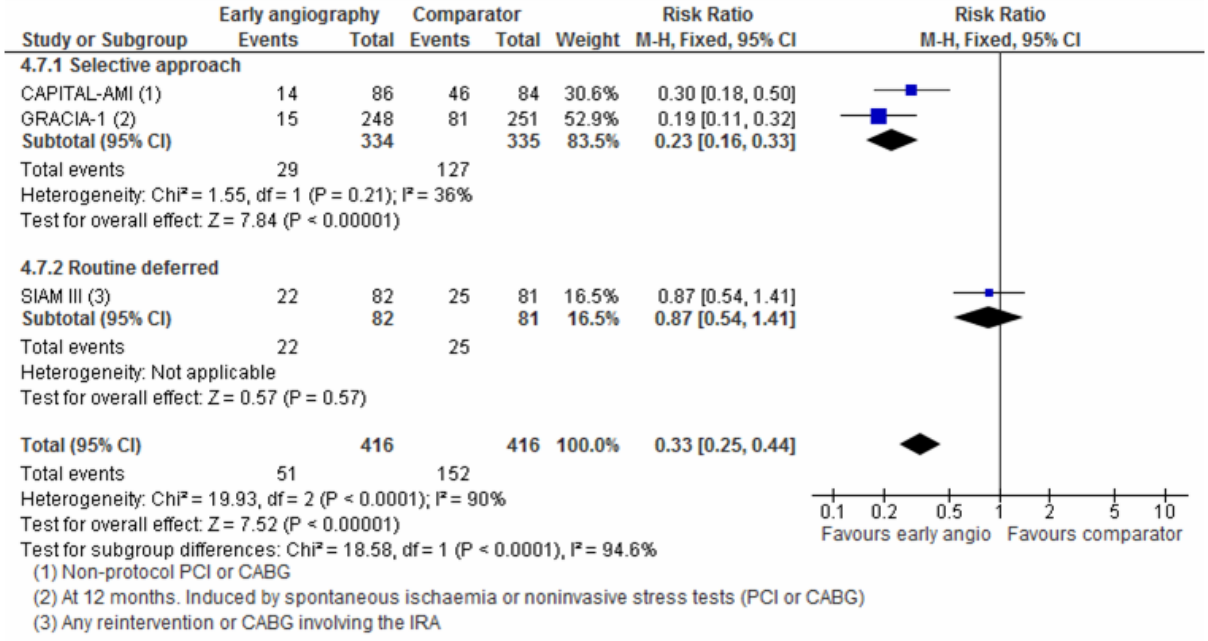


Figure 309: Quality of life (short-term: 30 days unless specified)

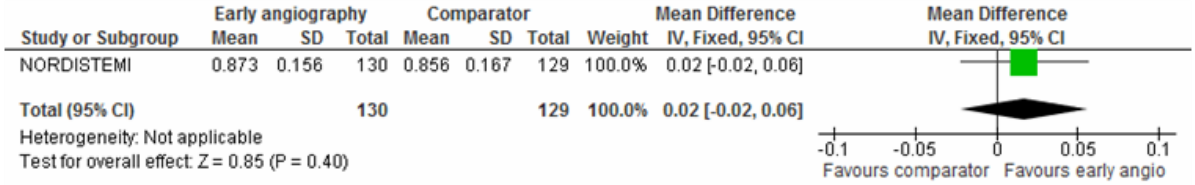


Figure 310: Quality of life (longer-term: 6 months unless specified)

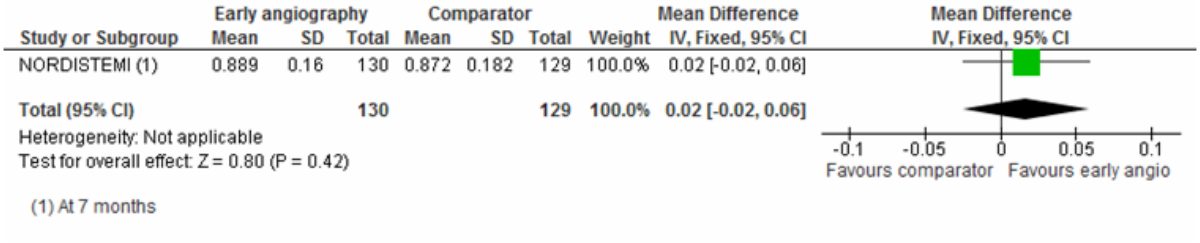
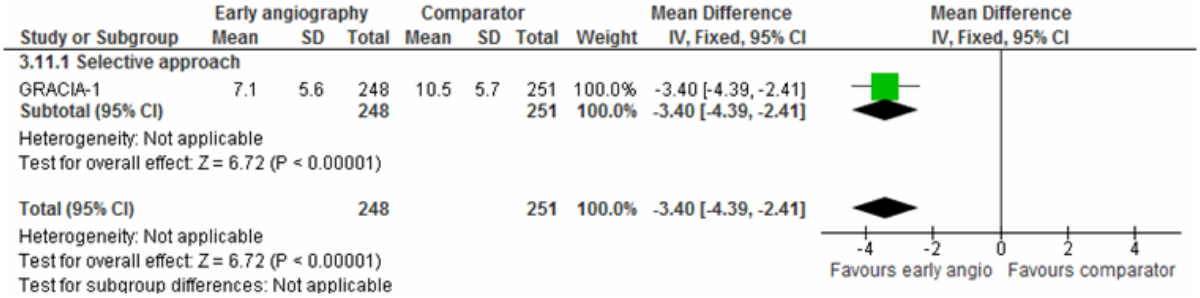


Figure 311: Length of hospital stay – index admission



Appendix J: Excluded clinical studies

J.1 Time to reperfusion

Exclusion List	Reason for exclusion
Aasa M, Dellborg M, Herlitz J, Svensson L, Grip L. Risk reduction for cardiac events after primary coronary intervention compared with thrombolysis for acute ST-elevation myocardial infarction (five-year results of the Swedish early decision reperfusion strategy [SWEDES] trial). American Journal of Cardiology. 2010; 106(12):1685-1691.	Follow-up of RCT that does not stratify study participants according to time to intervention
Aasa M, Dellborg M, Herlitz J, Svensson L, Grip L. Superior long-term outcome after primary PCI compared to early thrombolysis in acute ST-segment elevation myocardial infarction. European Heart Journal. 2009; 30:474.	Follow-up of RCT that does not stratify study participants according to time to intervention
Agati L, Voci P, Hickle P, et al. Tissue-type plasminogen activator therapy versus primary coronary angioplasty: impact on myocardial tissue perfusion and regional function 1 month after uncomplicated myocardial infarction. J Am Coll Cardiol 1998; 31:338-43.	No outcomes of interest
Agati L, Voci P, Hickle P, Vizza DC, Autore C, Fedele F et al. Tissue-type plasminogen activator therapy versus primary coronary angioplasty: impact on myocardial tissue perfusion and regional function 1 month after uncomplicated myocardial infarction. Journal of the American College of Cardiology. 1998; 31(2):338-343.	No outcomes of interest, RCT does not stratify study participants according to time to intervention
Akdemir R, Karakurt O, Kilic H, Yesilay AB, Dogan M, Cagirci G et al. Effect of reperfusion therapy on index of myocardial performance in acute myocardial infarction: thrombolytics versus primary angioplasty. Heart and Vessels. 2010; 25(2):87-91.	RCT does not stratify study participants according to time to intervention
Akhras F, Abu Ousa A, Swann.G., Duncan H, Chamsi-Pasha H, Jabbad H. Primary coronary angioplasty or intraveneous thrombolysis for pateines with acute myocardial infarction? Acute and late follow up results in a new cardiac unit. Journal of the American College of Cardiology. 2011; 29(Suppl 1):A235.	RCT does not stratify study participants according to time to intervention
Andersen,Henning R.; Nielsen,Torsten T.; Rasmussen,Klaus; Thuesen,Leif; Kelbaek,Henning; Thayssen,Per; Abildgaard,Ulrik; Pedersen,Flemming; Madsen,Jan K.; Grande,Peer; Villadsen,Anton B.; Krusell,Lars R.; Haghfelt,Torben; Lomholt,Preben; Husted,Steen E. Vigholt,Else; Kjaergard,Henrik K.; Mortensen,Leif Spange; DANAMI-2 Investigators. A comparison of coronary angioplasty with fibrinolytic therapy in acute myocardial infarction. New England Journal of Medicine.2003; 349(8)733-742.	RCT does not stratify study participants according to time to intervention
Andersen,Henning R.; Nielsen,Torsten T.; Rasmussen,Klaus; Thuesen,Leif; Kelbaek,Henning; Thayssen,Per; Abildgaard,Ulrik; Pedersen,Flemming; Madsen,Jan K.; Grande,Peer; Villadsen,Anton B.; Krusell,Lars R.; Haghfelt,Torben; Lomholt,Preben; Husted,Steen E. Vigholt,Else; Kjaergard,Henrik K.; Mortensen,Leif Spange; DANAMI-2 Investigators. A comparison of coronary angioplasty with fibrinolytic therapy in acute myocardial infarction. New England Journal of Medicine.2003; 349(8)733-742.	RCT does not stratify study participants according to time to intervention
Angeja BG, Gibson CM, Chin R, Frederick PD, Every NR, Ross AM et al. Predictors of door-to-balloon delay in primary angioplasty. American Journal of Cardiology. 2002; 89(10):1156-1161.	Not RCT, cohort (n = 40,077)
Antoniucci D, Valenti R, Migliorini A, Moschi G, Trapani M, Buonamici P et al. Relation of time to treatment and mortality in patients with acute myocardial infarction undergoing primary coronary angioplasty. American Journal of Cardiology. 2002; 89(11):1248-1252.	Not question of interest
Aoki H, Suzuki T, Shibata M, Takino T, Sato N, Mukaida H et al. A prospective	RCT does not stratify study

Exclusion List	Reason for exclusion
randomized trial of intracoronary t-PA vs. coronary angioplasty in acute myocardial infarction: Japanese Intervention trial in Myocardial Infarction (JIMI). Circulation. 1997; 96(Suppl.):3003.	participants according to time to intervention
Armstrong PW, WEST Steering Committee. A comparison of pharmacologic therapy with/without timely coronary intervention vs. primary percutaneous intervention early after ST-elevation myocardial infarction: the WEST (Which Early ST-elevation myocardial infarction Therapy) study. European Heart Journal. 2006; 27(13):1530-1538.	RCT does not stratify study participants according to time to intervention
Aversano T, Aversano LT, Passamani E, Knatterud GL, Terrin ML, Williams DO et al. Thrombolytic therapy vs primary percutaneous coronary intervention for myocardial infarction in patients presenting to hospitals without on-site cardiac surgery: a randomized controlled trial. JAMA. 2002; 287(15):1943-1951.	Not RCT, narrative review
Aversano T, Aversano LT, Passamani E, Knatterud GL, Terrin ML, Williams DO et al. Thrombolytic therapy vs primary percutaneous coronary intervention for myocardial infarction in patients presenting to hospitals without on-site cardiac surgery: a randomized controlled trial. JAMA.2002; 287(15):1943-1951.	RCT does not stratify study participants according to time to intervention
Barbagelata A, Perna ER, Clemmensen P, Uretsky BF, Canella JPC, Califf RM et al. Time to reperfusion in acute myocardial infarction. It is time to reduce it! Journal of Electrocardiology. 2007; 40(3):257-264.	Not question of interest, meta-analysis does not examine timing
Bates DW, Miller E, Bernstein SJ, Hauptman PJ, Leape LL. Coronary angiography and angioplasty after acute myocardial infarction. Annals of Internal Medicine. 1997; 126(7):539-550.	Not RCT, narrative review
Bauer T, Hoffmann R, Junger C, Koeth O, Zahn R, Gitt A et al. Efficacy of a 24-h primary percutaneous coronary intervention service on outcome in patients with ST elevation myocardial infarction in clinical practice. Clinical Research in Cardiology. 2009; 98(3):171-178.	Not RCT, cohort study < 100,000 (n = 6350)
Beck CA, Eisenberg MJ, Pilote L. Invasive versus noninvasive management of ST-elevation acute myocardial infarction: a review of clinical trials and observational studies. American Heart Journal. 2005; 149(2):194-199.	Not RCT, narrative review
Bednar F, Widimsky P, Krupicka J, Groch L, Aschermann M, Zelizko M et l. Interhospital transport for primary angioplasty improves the long-term outcome of acute myocardial infarction compared with immediate thrombolysis in the nearest hospital (one-year follow-up of the PRAGUE-1 study). Canadian Journal of Cardiology. 2003; 19(10):1133-1137.	RCT does not stratify study participants according to time to intervention
Berger AK, Radford MJ, Krumholz HM. Factors associated with delay in reperfusion therapy in elderly patients with acute myocardial infarction: Analysis of the cooperative cardiovascular project. American Heart Journal. 2000; 139(6):985-992.	Not RCT, cohort (n = 17,379)
Berger PB, Ellis SG, Holmes J, Granger CB, Criger DA, Betriu A et al. Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: Results from the global use of strategies to open occluded arteries in acute coronary syndromes (GUSTO-IIb) trial. Circulation. 1999; 100(1):14-20.	Not question of interest, substudy examined outcome according to timing of PCI from onset of symptoms without comparison of data from fibrinolysis arm
Berger PB, Bell MR, Holmes J, Gersh BJ, Hopfenspirger M, Gibbons R. Time to reperfusion with direct coronary angioplasty and thrombolytic therapy in acute myocardial infarction. American Journal of Cardiology. 1994; 73(4):231-236.	No outcome of interest
Beri A, Printz M, Hassan A, Babb JD. Fibrinolysis versus primary percutaneous intervention in ST-elevation myocardial infarction with long interhospital transfer distances. Clin Cardiol. 2010 Mar; 33(3):162-7	Not RCT, cohort study
Berrocal DH, Cohen MG, Spinetta AD, Ben MG, Rojas Matas CA, Gabay JM et al.	Not outcome of interest

Exclusion List	Reason for exclusion
Early reperfusion and late clinical outcomes in patients presenting with acute myocardial infarction randomly assigned to primary percutaneous coronary intervention or streptokinase. American Heart Journal. 2003; 146(6):E22.	
Betriu A, Masotti M. Comparison of mortality rates in acute myocardial infarction treated by percutaneous coronary intervention versus fibrinolysis. Am J Cardiol. 2005; 95(1):100-1.	Post hoc meta-regression that only reported absolute risk reductions
Birnbaum Y, Goodman S, Barr A, Gates KB, Barbash GI, Battler A et al. Comparison of primary coronary angioplasty versus thrombolysis in patients with ST-segment elevation acute myocardial infarction and grade II and grade III myocardial ischemia on the enrollment electrocardiogram. American Journal of Cardiology. 2001; 88(8):842-847.	RCT does not stratify study participants according to time to intervention
Boersma E, Steyerberg EW, Van der Vlugt MJ, Simoons ML. Reperfusion therapy for acute myocardial infarction. Which strategy for which patient? Drugs. 1998; 56(1):31-48.	Not RCT, not question of interest
Boersma H, Califf R, Collins R, Deckers JW, Simoons ML. Selection of reperfusion therapy for individual patients with evolving myocardial infarction. European Heart Journal. 1997; 18(9):1371-1381.	Not RCT, not question of interest
Boersma H, Van der Vlugt MJ, Arnold AER, Deckers JW, Simoons ML. Estimated gain in life expectancy. A simple tool to select optimal reperfusion treatment in individual patients with evolving myocardial infarction. European Heart Journal. 1996; 17(1):64-75.	Not RCT, not question of interest
Bonnefoy E, Steg PG, Boutitie F, Dubien PY, Lapostolle F, Roncalli J et al. Comparison of primary angioplasty and pre-hospital fibrinolysis in acute myocardial infarction (CAPTIM) trial: a 5-year follow-up. European Heart Journal. 2009; 30(13):1598-1606.	Follow-up of RCT that does not stratify study participants according to time to intervention
Bonnefoy E, Steg PG, Chabaud S, Dubien PY, Lapostolle F, Boudet F et al. Is primary angioplasty more effective than prehospital fibrinolysis in diabetics with acute myocardial infarction? Data from the CAPTIM randomized clinical trial. European Heart Journal. 2005; 26(17):1712-1718.	RCT does not stratify study participants according to time to intervention
Bonnefoy E, Lapostolle F, Leizorovicz A, Steg G, McFadden EP, Dubien PY et al. Primary angioplasty versus prehospital fibrinolysis in acute myocardial infarction: a randomised study. Lancet. 2002; 360(9336):825-829.	Not question of interest RCT does not stratify study participants according to time to intervention
Bradley EH, Herrin J, Wang Y, McNamara RL, Radford MJ, Magid DJ et al. Door-to-drug and door-to-balloon times: where can we improve? Time to reperfusion therapy in patients with ST-segment elevation myocardial infarction (STEMI). American Heart Journal. 2006; 151(6):1281-1287.	Not RCT, cohort study National Registry of Myocardial Infarction (NRMI-4), population < 100,000 (n = 33,822)
Bradley EH, Herrin J, Wang Y, McNamara RL, Webster TR, Magid DJ et al. Racial and ethnic differences in time to acute reperfusion therapy for patients hospitalized with myocardial infarction. JAMA. 2004; 292(13):1563-1572.	Not RCT, cohort study Second National Registry of Myocardial Infarction (NRMI-3 or NRMI-4), population < 100,000 (n = 73,032), not question of interest
Bravo Vergel Y, Palmer S, Asseburg C, Fenwick E, de Belder M, Abrams K et al. Is primary angioplasty cost effective in the UK? Results of a comprehensive decision analysis. Heart. 2007; 93(10):1238-1243.	Cost-effectiveness analysis
Brieger DB, Mak K-H, White HD, Kleiman NS, Miller DP, Vahanian A et al. Benefit of early sustained reperfusion in patients with prior myocardial infarction (The GUSTO-I Trial). American Journal of Cardiology. 1998; 81(3):282-287.	Not question of interest
Brodie BR, Stuckey TD, Muncy DB, Hansen CJ, Wall TC, Pulsipher M et al.	Not RCT, cohort study (n =

Exclusion List	Reason for exclusion
Importance of time-to-reperfusion in patients with acute myocardial infarction with and without cardiogenic shock treated with primary percutaneous coronary intervention. American Heart Journal. 2003; 145(4):708-715.	1843)
Brodie BR, Stone GW, Morice MC, Cox DA, Garcia E, Mattos LA et al. Importance of time to reperfusion on outcomes with primary coronary angioplasty for acute myocardial infarction (results from the Stent Primary Angioplasty in Myocardial Infarction Trial). American Journal of Cardiology. 2001;88(10):1085-1090.	Not question of interest
Brodie BR, Stuckey TD, Wall TC, Kissling G, Hansen CJ, Muncy DB et al. Importance of time to reperfusion for 30-day and late survival and recovery of left ventricular function after primary angioplasty for acute myocardial infarction. Journal of the American College of Cardiology. 1998; 32(5):1312-1319.	Not RCT (cohort; n = 1352) no comparator for PCI, not question of interest, study examined outcomes for differential timing of PCI from onset of symptoms
Brooks SC, Allan KS, Welsford M, Verbeek PR, Arntz HR, Morrison LJ. Prehospital triage and direct transport of patients with ST-elevation myocardial infarction to primary percutaneous coronary intervention centres: a systematic review and meta-analysis. Canadian Journal of Emergency Medicine. 2009; 11(5):481-492.	Not question of interest, meta-analysis of RCTs with varying comparators to PCI
Brophy JM, Bogaty P. Primary angioplasty and thrombolysis are both reasonable options in acute myocardial infarction. Annals of Internal Medicine. 2004;141(4):292-297.	Not RCT, narrative review
Bueno H, Betriu A, Heras M, Alonso JJ, Cequier A, Garcia EJ et al. Primary angioplasty vs. fibrinolysis in very old patients with acute myocardial infarction: TRIANA (TRatamiento del Infarto Agudo de miocardio eN Ancianos) randomized trial and pooled analysis with previous studies. European Heart Journal. 2011; 32(1):51-60.	RCT does not stratify study participants according to time to intervention
Busk M, Maeng M, Rasmussen K, Kelbaek H, Thayssen P, Abildgaard U et al. The Danish multicentre randomized study of fibrinolytic therapy vs. primary angioplasty in acute myocardial infarction (the DANAMI-2 trial): outcome after 3 years follow-up. European Heart Journal. 2008; 29(10):1259-1266.	Follow-up of RCT that does not stratify study participants according to time to intervention
Cannon CP, Gibson CM, Lambrew CT, Shoultz DA, Levy D, French WJ et al. Relationship of symptom-onset-to-balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction. JAMA. 2000; 283(22):2941-2947.	Not RCT, cohort studyNational Registry of Myocardial Infarction (NRMI-2), population < 100,000 (n = 27,080) study examined outcomes for differential timing of PCI from onset of symptoms, no data on fibrinolysis
Cannon CP, Sayah AJ, Walls RM. Prehospital thrombolysis: an idea whose time has come. Clinical Cardiology. 1999; 22(Suppl 4):IV10-IV19.	Not RCT, not question of interest
Cannon CP. Time to treatment: A crucial factor in thrombolysis and primary angioplasty. Journal of Thrombosis and Thrombolysis. 1996; 3(3):249-255.	Not RCT, narrative review
Cannon CP. Time to treatment of acute myocardial infarction revisited. Current Opinion in Cardiology. 1998; 13(4):254-266.	Not RCT, narrative review
Canto JG, Every NR, Magid DJ, Rogers WJ, Malmgren JA, Frederick PD et al. The volume of primary angioplasty procedures and survival after acute myocardial infarction. National Registry of Myocardial Infarction 2 Investigators. New England Journal of Medicine. 2000; 342(21):1573-1580.	Not RCT, cohort study National Registry of Myocardial Infarction (NRMI), not question of interest, examined volume of PCI procedures
Caspi A, Gottlieb S, Behar S. Delayed percutaneous transluminal coronary	Not RCT, cohort (n = 1940)

Exclusion List	Reason for exclusion
angioplasty after acute myocardial infarction. International Journal of Cardiology. 1998; 63(3):199-204.	
Chen K-Y, Rha SW, Li Y-J, Choi B-G, Choi C-U, Park C-G et al. Impact of presentation time on the management and clinical outcomes of acute myocardial infarction in Korea. European Heart Journal. 2011; 32(Suppl 1):726.	Not RCT, cohort study population < 100,000 (n = 7883)
Chen B, Wang W, Zhao H, Hu D, Xu C, Zhao M et al. Efficacy of recombinant tissue-type plasminogen activator thrombolysis and primary coronary stenting after acute myocardial infarction. Chinese Medical Journal. 2003; 116(1):142-144.	Not question of interest
Chong JJH, Ganesan AN, Eipper V, Kovoor P. Comparison of left ventricular ejection fraction and inducible ventricular tachycardia in ST-elevation myocardial infarction treated by primary angioplasty versus thrombolysis. American Journal of Cardiology. 2008; 101(2):153-157.	Not RCT, cohort (n = 420)
Cox JL, Lee E, Langer A, Armstrong PW, Naylor CD. Time to treatment with thrombolytic therapy: determinants and effect on short-term nonfatal outcomes of acute myocardial infarction. Canadian GUSTO Investigators. Global Utilization of Streptokinase and + PA for Occluded Coronary Arteries. CMAJ : Canadian Medical Association Journal = Journal De L'Association Medicale Canadienne. 1997; 156(4):497-505.	RCT does not stratify study participants according to time to intervention
Dalby M, Bouzamondo A, Lechat P, Montalescot G. Transfer for primary angioplasty versus immediate thrombolysis in acute myocardial infarction: a meta-analysis. Circulation. 2003; 108(15):1809-1814.	Meta-analysis PCI versus fibrinolysis, not question of interest, no analysis on time to intervention
De Boer SPM, Barnes EH, Westerhout CM, Simes RJ, Granger CB, Kastrati A et al. High-risk patients with ST-elevation myocardial infarction derive greatest absolute benefit from primary percutaneous coronary intervention: results from the Primary Coronary Angioplasty Trialist versus thrombolysis (PCAT)-2 collaboration. American Heart Journal. 2011; 161(3):500.	No data on timing
de Boer SPM, Westerhout CM, Simes RJ, Granger CB, Zijlstra F, Boersma E et al. Mortality and morbidity reduction by primary percutaneous coronary intervention is independent of the patient's age. JACC Cardiovascular Interventions. 2010; 3(3):324-331.	Not question of interest
De Boer MJ, Ottervanger JP, van 't Hof AW, Hoorntje JC, Suryapranata H, Zijlstra F. Reperfusion therapy in elderly patients with acute myocardial infarction: a randomized comparison of primary angioplasty and thrombolytic therapy. Journal of the American College of Cardiology. 2002; 39(11):1723-1728.	RCT does not stratify study participants according to time to intervention
De Boer MJ, Hoorntje JC, Ottervanger JP, Reiffers S, Suryapranata H, Zijlstra F. Immediate coronary angioplasty versus intravenous streptokinase in acute myocardial infarction: left ventricular ejection fraction, hospital mortality and reinfarction. Journal of the American College of Cardiology. 1994; 23(5):1004-1008.	RCT does not stratify study participants according to time to time
Dhingra R, Conley S, Niles NW. Time delay to percutaneous coronary intervention and 30-day mortality in patients with ST-elevation myocardial infarction: Single center registry. Journal of the American College of Cardiology. 2012; 59(13 SUPPL. 1):E467.	Not study type of interest; cohort analysis
De Jaegere PP, Serruys PW, Simoons ML. Should all patients with an acute myocardial infarction be referred for direct PTCA? Heart. 2004; 90(11):1352-1357.	Not RCT, narrative review
de Labriolle A, Pacouret G, Giraudeau B, Fremont B, Desveaux B, Quilliet L et al. Effect of time to treatment and age on one year mortality in acute STEMI: difference between thrombolysis and primary percutaneous coronary intervention. Archives of Cardiovascular Diseases. 2008; 101(1):48-54.	Not RCT, cohort (n = 794)

Exclusion List	Reason for exclusion
DeLuca G, et al. Percutaneous coronary intervention-related time delay, patient's risk profile, and survival benefits of primary angioplasty vs lytic therapy in ST-segment elevation myocardial infarction. Am J Emerg Med. 2009; 27(6):712-9.	Post hoc meta-regression included 2 RCTs not matching our inclusion criteria (fPPCI versus fibrinolysis)
De Luca G, Biondi-Zoccai G, Marino P. Transferring patients with ST-segment elevation myocardial infarction for mechanical reperfusion: a meta-regression analysis of randomized trials. Annals of Emergency Medicine. 2008; 52(6):665-676.	Not question of interest
De Luca L, Bolognese L, Casella G, Savonitto S, Gonzini L, Di Chiara A et al. Modalities of treatment and 30-day outcomes of unselected patients older than 75 years with acute ST-elevation myocardial infarction: data from the BLITZ study. Journal of Cardiovascular Medicine. 2008; 9(10):1045-1051.	Not RCT, cohort (n = 1959)
De Luca G, Suryapranata H, Marino P. Reperfusion strategies in acute ST-elevation myocardial infarction: an overview of current status. Progress in Cardiovascular Diseases. 2008; 50(5):352-382.	Not RCT, narrative review
De Luca G, Suryapranata H, Marino P. Primary angioplasty vs. thrombolysis. Indian Heart Journal. 2007; 59(4):302-310.	Not RCT, narrative review
De Luca G. Overview of contemporary reperfusion strategies in acute ST-elevation myocardial infarction. Cardiology International. 2007; 8(3):92-98.	Not RCT, narrative review
De Luca G, Suryapranata H, Ottervanger JP, Antman EM. Time delay to treatment and mortality in primary angioplasty for acute myocardial infarction: every minute of delay counts. Circulation. 2004; 109(10):1223-1225.	Not question of interest, no comparator for PCI
De Luca G, Suryapranata H, Zijlstra F, van 't Hof AWJ, Hoorntje JCA, Gosselink ATM et al. Symptom-onset-to-balloon time and mortality in patients with acute myocardial infarction treated by primary angioplasty. Journal of the American College of Cardiology. 2003; 42(6):991-997.	Not question of interest, no comparator for PCI, data from 4 RCTs
DeWood MA. Surgical reperfusion vs. rt-PA vs. PTCA as therapy for single vessel LAD anterior myocardial infarction. Circulation 1992; 86:772.	RCT does not stratify study participants according to time to intervention
DeWood MA, Fisher MJ. Direct PTCA versus intravenous r-tPA in acute myocardial infarction: preliminary results from a prospective randomized trial. Circulation. 1989; 80(2):418.	RCT does not stratify study participants according to time to intervention
Deng HQ, Zhou XS, Dong XF, Hu GY, Liao YQ, Liu GD et al. Comparisons of immediate and delayed PTCA/stenting with intravenous thrombolytic therapy for patients with acute myocardial infarction. Chinese Journal of Coal Industry Medine. 2002; 5(7):647-649.	Not RCT, narrative review
Dudek D, Rakowski T, Dziewierz A, Mielecki W. Time delay in primary angioplasty: How relevant is it? Heart. 2007; 93(10):1164-1166.	Not RCT, narrative review
Dussoix P, Reuille O, Verin V, Gaspoz JM, Unger PF. Time savings with prehospital thrombolysis in an urban area. European Journal of Emergency Medicine. 2003; 10(1):2-5.	Not question of interest, RCT did not examine PCI versus fibrinolysis
Eisenhauer AC. Prolonged door-to-balloon time: is treatment delayed always treatment denied? Progress in Cardiovascular Diseases. 2010; 53(3):195-201.	Retrospective cohort study
Every NR, Parsons LS, Fihn SD, Larson EB, Maynard C, Hallstrom AP et al. Long-term outcome in acute myocardial infarction patients admitted to hospitals with and without on-site cardiac catheterization facilities. Circulation. 1997; 96(6):1770-1775.	Not question of interest
Fernandez-Aviles F. Primary versus facilitated percutaneous coronary intervention (tenecteplase plus stenting) in patients with ST-elevated myocardial infarction: the final results of the GRACIA-2 randomized trial. European Heart Journal. 2004; 25(Suppl):33.	RCT does not stratify study participants according to time to intervention

Exclusion List	Reason for exclusion
Fernandez-Aviles F, Alonso JJ, Castro-Beiras A, Vazquez N, Blanco J, Alonso-Briales J et al. Routine invasive strategy within 24 hours of thrombolysis versus ischaemia-guided conservative approach for acute myocardial infarction with ST-segment elevation (GRACIA-1): a randomised controlled trial. Lancet. 2004; 364(9439):1045-1053.	Not question of interest
Fernandez-Aviles F, Alonso JJ, Pena G, Blanco J, Alonso-Briales J, Lopez-Mesa J et al. Primary angioplasty vs. early routine post-fibrinolysis angioplasty for acute myocardial infarction with ST-segment elevation: the GRACIA-2 non-inferiority, randomized, controlled trial. European Heart Journal. 2007; 28(8):949-960.	RCT does not stratify study participants according to time to intervention
Fosbol EL, Thune JJ, Kelbaek H, Andersen HR, Saunamaki K, Nielsen TT et al. Long-term outcome of primary angioplasty compared with fibrinolysis across age groups: a Danish Multicenter Randomized Study on Fibrinolytic Therapy Versus Acute Coronary Angioplasty in Acute Myocardial Infarction (DANAMI-2) substudy. American Heart Journal. 2008; 156(2):391-396.	Follow-up of RCT that does not stratify study participants according to time to intervention
Fu Y, Goodman S, Chang W-C, De Werf FV, Granger CB, Armstrong PW. Time to treatment influences the impact of ST-segment resolution on one-year prognosis: Insights from the Assessment of the Safety and Efficacy of a New Thrombolytic (ASSENT-2) Trial. Circulation. 2001; 104(22):2653-2659.	Not question of interest, original RCT examined alteplase versus tenecteplase
Gao Rl, Han Yl, Yang Xc, Mao Jm, Fang Wy, Wang L et al. Thrombolytic therapy with rescue percutaneous coronary intervention versus primary percutaneous coronary intervention in patients with acute myocardial infarction: a multicenter randomized clinical trial. Chinese Medical Journal. 2010; 123(11):1365-1372.	RCT does not stratify study participants according to time to intervention
Gao R, Han Y, Yang X, Mao J, Fang W, Wang L et al. Thrombolytic therapy with rescue percutaneous coronary intervention versus primary percutaneous coronary intervention in patients with acute myocardial infarction: A multicenter randomized clinical trial. Circulation. 2010; 122(2):e249.	RCT does not stratify study participants according to time to intervention
Garcia E, Elizaga J, Soriano J, Abeytua M, Botas J, Fernandez A et al. Primary angioplasty versus thrombolysis with t-PA in the anterior myocardial infarction: results from a single center trial. Journal of the American College of Cardiology. 1997; 29(Suppl):389A.	RCT does not stratify study participants according to time to intervention
Garcia E, Elizaga J, Perez-Castellano N, Serrano JA, Soriano J, Abeytua M et al. Primary angioplasty versus systemic thrombolysis in anterior myocardial infarction. Journal of the American College of Cardiology. 1999; 33(3):605-611.	RCT does not stratify study participants according to time to intervention
Gibbons RJ, Holmes DR, Reeder GS, Bailey KR, Hopfenspirger MR, Gersh BJ. Immediate angioplasty compared with the administration of a thrombolytic agent followed by conservative treatment for myocardial infarction. The Mayo Coronary Care Unit and Catheterization Laboratory Groups. N Engl J Med. 1993 Mar 11; 328(10):685-91.	No outcomes of interest
Gibson CM, Pride YB, Frederick PD, Pollack CVJ, Canto JG, Tiefenbrunn AJ et al. Trends in reperfusion strategies, door-to-needle and door-to-balloon times, and in-hospital mortality among patients with ST-segment elevation myocardial infarction enrolled in the National Registry of Myocardial Infarction from 1990 to 2006. American Heart Journal. 2008; 156(6):1035-1044.	Not question of interest
Gibson CM, Murphy SA, Kirtane AJ, Giugliano RP, Cannon CP, Antman EM et al. Association of duration of symptoms at presentation with angiographic and clinical outcomes after fibrinolytic therapy in patients with ST-segment elevation myocardial infarction. Journal of the American College of Cardiology. 2004; 44(5):980-987.	Not RCT, not question of interest, no comparator for fibrinolysis
Giugliano RP, Sabatine MS, Gibson CM, Roe MT, Harrington RA, Murphy SA et al. Combined assessment of thrombolysis in myocardial infarction flow grade, myocardial perfusion grade, and ST-segment resolution to evaluate epicardial	Not question of interest

Exclusion List	Reason for exclusion
and myocardial reperfusion. American Journal of Cardiology. 2004; 93(11):1362-1366.	
Giugliano RP, Braunwald E. Selecting the Best Reperfusion Strategy in ST-Elevation Myocardial Infarction: It's All a Matter of Time. Circulation. 2003; 108(23):2828-2830.	Not RCT, not question of interest
Goldberg RJ, Mooradd M, Gurwitz JH, Rogers WJ, French WJ, Barron HV et al. Impact of time to treatment with tissue plasminogen activator on morbidity and mortality following acute myocardial infarction (The second National Registry of Myocardial Infarction). American Journal of Cardiology. 1998; 82(3):259-264.	Not question of interest
Goldenberg I, Matetzky S, Halkin A, Roth A, Di SE, Freimark D et al. Primary angioplasty with routine stenting compared with thrombolytic therapy in elderly patients with acute myocardial infarction. American Heart Journal. 2003; 145(5):862-867.	Not RCT, cohort (n = 160)
Grines CL, Block PC. Senior PAMI - Final results. ACC Cardiosource Review Journal. 2007; 16(3):35-38.	RCT does not stratify study participants according to time to intervention
Grines C, Patel A, Zijlstra F, Weaver WD, Granger C, Simes RJ et al. Primary coronary angioplasty compared with intravenous thrombolytic therapy for acute myocardial infarction: six-month follow up and analysis of individual patient data from randomized trials. American Heart Journal. 2003; 145(1):47-57.	Meta-analysis PCI versus fibrinolysis, not question of interest, no analysis on time to intervention
Grines CL, Westerhausen DRJ, Grines LL, Hanlon JT, Logemann TL, Niemela M et al. A randomized trial of transfer for primary angioplasty versus on-site thrombolysis in patients with high-risk myocardial infarction: the Air Primary Angioplasty in Myocardial Infarction study. Journal of the American College of Cardiology. 2002; 39(11):1713-1719.	RCT does not stratify study participants according to time to interventions, thrombolytic arm either streptokinase or rt-PA
Grines CL, Browne KF, Marco J, Rothbaum D, Stone GW, O'Keefe J et al. A comparison of immediate angioplasty with thrombolytic therapy for acute myocardial infarction. The Primary Angioplasty in Myocardial Infarction Study Group. New England Journal of Medicine. 1993; 328(10):673-679.	RCT does not stratify study participants according to time to intervention
Guerra DR, Gibson CM. Door-to-balloon delays with PCI in acute myocardial infarction. Current Treatment Options in Cardiovascular Medicine. 2004; 6(1):69-77.	Not RCT, narrative review
Guo L, Mai X, Deng J, Liu A, Bu L, Wang H. Early percutaneous intervention improves survival in elderly patients with acute myocardial infarction complicated by cardiogenic shock. Kardiologia Polska. 2008; 66(7):722-728.	Not RCT, cohort study (n = 94)
Syndromes (GUSTO IIb) Angioplasty Substudy Investigators. A clinical trial comparing primary coronary angioplasty with tissue plasminogen activator for acute myocardial infarction. New England Journal of Medicine. 1997; 336(23):1621-1628.	RCT does not stratify study participants according to time to intervention
Hartwell D, Colquitt J, Loveman E, Clegg AJ, Brodin H, Waugh N et al. Clinical effectiveness and cost-effectiveness of immediate angioplasty for acute myocardial infarction: systematic review and economic evaluation. Health Technology Assessment. 2005; 9(17):1-114.	Not question of interest, meta-analysis does not examine timing
Herlitz J, Dellborg M, Hartford M, Karlsson T, Risenfors M, Karlson BW et al. Mortality and morbidity 1 year after early thrombolysis in suspected AMI: results from the TEAHAT Study. Journal of Internal Medicine Supplement. 1991; 734:43-51.	Not question of interest
Hochman JS, Sleeper LA, Webb JG, Sanborn TA, White HD, Talley JD et al. Early revascularization in acute myocardial infarction complicated by cardiogenic shock. New England Journal of Medicine. 1999; 341(9):625-634.	Not question of interest

Exclusion List	Reason for exclusion
Hudson MP, Armstrong PW, O'Neil WW, Stebbins AL, Weaver WD, Widimsky P et al. Mortality implications of primary percutaneous coronary intervention treatment delays: insights from the Assessment of Pexelizumab in Acute Myocardial Infarction trial. Circulation Cardiovascular Quality and Outcomes. 2011; 4(2):183-192.	Not question of interest, study on PPCI only
Hugenholtz PG. Expanding indications for thrombolytic therapy in acute myocardial infarction. How late is too late, and how early is early: the clinician's view of the first 100 minutes. American Journal of Cardiology. 1993; 72(19):22G-29G.	Not RCT, narrative review
Huynh T, Perron S, O'Loughlin J, Joseph L, Labrecque M, Tu JV et al. Comparison of primary percutaneous coronary intervention and fibrinolytic therapy in ST-segment-elevation myocardial infarction: bayesian hierarchical meta-analyses of randomized controlled trials and observational studies. Circulation. 2009; 119(24):3101-3109.	Not question of interest, meta-analysis of RCTs that did not stratify study participants according to time to intervention
Jezewski T, Konopa B, Tarchalski J, Kasprzak JD. Comparison of clinical results and life quality after myocardial infarction therapy with primary percutaneous coronary intervention and fibrinolytic angents. Polskie Achiwum Medycyny Wewnetrznej. 2009; 119(1-2):26-31.	Not RCT, cohort study (n = 200)
Karha J, Topol EJ. Primary percutaneous coronary intervention vs. fibrinolytic therapy for acute ST-elevation myocardial infarction in the elderly. American Journal of Geriatric Cardiology. 2006; 15(1):19-21.	Not RCT, narrative review
Kastrati A, Mehilli J, Dirschinger J, Schricke U, Neverve J, Pache J et al. Myocardial salvage after coronary stenting plus abciximab vs. FL plus abciximab in patients with acute myocardial infarction: a randomised trial. Lancet. 2002; 359(9310):920-925.	RCT does not stratify study participants according to time to intervention
Kedev S, Petrovksi B, Kotevski V, Antov S, Sokolov I, Jovanova S. Primary coronary angioplasty vs. intravenous streptokinase in acute myocardial infarction. Journal of the American College of Cardiology. 1997; 29(Suppl):91A.	RCT does not stratify study participants according to time to intervention
Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. Lancet. 2003; 361(9351):13-20.	Not question of interest, meta-analysis of RCTs that did not stratify study participants according to time to intervention
Kent DM, Lau J, Selker HP. Balancing the benefits of primary angioplasty against the benefits of thrombolytic therapy for acute myocardial infarction: the importance of timing. Effective Clinical Practice. 2001; 4(5):214-220.	Not RCT, narrative review
Kent DM, Ruthazer R, Griffith JL, Beshansky JR, Concannon TW, Aversano T et al. A percutaneous coronary intervention-thrombolytic predictive instrument to assist choosing between immediate thrombolytic therapy versus delayed primary percutaneous coronary intervention for acute myocardial infarction. American Journal of Cardiology. 2008; 101(6):790-795.	Not question of interest
Kent DM, Ruthazer R, Griffith JL, Beshansky JR, Grines CL, Aversano T et al. Comparison of mortality benefit of immediate thrombolytic therapy versus delayed primary angioplasty for acute myocardial infarction. American Journal of Cardiology. 2007; 99(10):1384-1388.	Not question of interest
Kent DM, Schmid CH, Lau J, Selker HP. Is primary angioplasty for some as good as primary angioplasty for all? Journal of General Internal Medicine. 2002; 17(12):887-894.	Not question of interest, meta-analysis of RCTs that did not stratify study participants according to time to intervention
Lamas GA, Escolar E, Faxon DP. Review article: Examining treatment of st-elevation myocardial infarction: The importance of early intervention. Journal of Cardiovascular Pharmacology and Therapeutics. 2010; 15(1):6-16.	Not RCT, narrative review

Exclusion List	Reason for exclusion
Leizorovicz A, Boissel JP, Robert F. Coronary reperfusion rates in acute myocardial infarction patients after thrombolytic treatment with anistreplase: correlation with the delay from onset of symptoms to treatment: a review of 424 case records of patients admitted to coronary reperfusion studies with anistreplase. Journal of Cardiovascular Pharmacology. 1992; 19(1):34-39.	Not question of interest
Le May MR, Labinaz M, Davies RF, Marquis JF, Laramee LA, O'Brien ER et al. Stenting versus thrombolysis in acute myocardial infarction trial (STAT). Journal of the American College of Cardiology. 2001; 37(4):985-991.	RCT does not stratify study participants according to time to intervention
Leonard S. Reperfusion therapy for acute st-elevation myocardial infarction (STEMI). Cardiovascular Journal of Africa. 2011; 22(3 SUPPL. 1):S26.	Not RCT, narrative review
Lundergan CF, Reiner JS, Ross AM. How long is too long? Association of time delay to successful reperfusion and ventricular function outcome in acute myocardial infarction: The case for thrombolytic therapy before planned angioplasty for acute myocardial infarction. American Heart Journal. 2002; 144(3):456-462.	Not outcome of interest
Madan M, Tan M, Halvorsen S, Westernout CM, Cantor W, Le May MR et al. Timing of angiography and clinical outcomes after fibrinolysis: A patient-level analysis of randomized early invasive clinical trials. Journal of the American College of Cardiology. 2012; 59(13 SUPPL. 1):E353.	Not question of interest
Madsen MM, Busk M, Sondergaard HM, Bottcher M, Mortensen LS, Andersen HR et al. Does diabetes mellitus abolish the beneficial effect of primary coronary angioplasty on long-term risk of reinfarction after acute ST-segment elevation myocardial infarction compared with fibrinolysis? (A DANAMI-2 substudy). American Journal of Cardiology. 2005; 96(11):1469-1475.	Not question of interest
Maeng M, Nielsen PH, Busk M, Mortensen LS, Kristensen SD, Nielsen TT et al. Time to treatment and three-year mortality after primary percutaneous coronary intervention for ST-segment elevation myocardial infarction-a DANish Trial in Acute Myocardial Infarction-2 (DANAMI-2) substudy. American Journal of Cardiology. 2010; 105(11):1528-1534.	Subgroup analysis of RCT that does not stratify study participants according to time to intervention
Magid DJ, Wang Y, Herrin J, McNamara RL, Bradley EH, Curtis JP et al. Relationship between time of day, day of week, timeliness of reperfusion, and in-hospital mortality for patients with acute ST-segment elevation myocardial infarction. JAMA. 2005; 294(7):803-812.	Not RCT, cohort study National Registry of Myocardial Infarction (NRMI-3 or NRMI-4), population < 100,000 (n = 68,439)
Martinez-Rios MA, Rosas M, Gonzalez H, Pena-Duque MA, Martinez-Sanchez C, Gaspar J et al. Comparison of reperfusion regimens with or without tirofiban in ST-elevation acute myocardial infarction. American Journal of Cardiology. 2004; 93(3):280-287.	Not question of interest
Morais J, Faria H, Goncalves F, Brandao V, Calisto J, Goncalves L et al. Primary angioplasty in better than front loaded t-PA to preserve left ventricular function after acute anterior myocardial infarction. European Heart Journal. 1997; 18(Suppl):59.	RCT does not stratify study participants according to time to intervention
Moreno R, Lopez-Sendon J, Garcia E, Perez de Isla L, Lopez de Sa E, Ortega A et al. Primary angioplasty reduces the risk of left ventricular free wall rupture compared with thrombolysis in patients with acute myocardial infarction. Journal of the American College of Cardiology. 2002; 39(4):598-603.	No outcome of interest
Nallamothu BK, Bradley EH, Krumholz HM. Time to treatment in primary percutaneous coronary intervention. New England Journal of Medicine. 2007; 357(16):1631-1638.	Not RCT, narrative review
Nallamothu BK, Wang Y, Magid DJ, McNamara RL, Herrin J, Bradley EH et al. Relation between hospital specialization with primary percutaneous coronary intervention and clinical outcomes in ST-segment elevation myocardial	Not RCT, cohort study National Registry of Myocardial Infarction

Exclusion List	Reason for exclusion
infarction: National Registry of Myocardial Infarction-4 analysis. Circulation. 2006; 113(2):222-229.	(NRMI-4), population < 100,000 (n = 37,233), not question of interest
Nallamothu BK, et al. Primary percutaneous coronary intervention versus fibrinolytic therapy in acute myocardial infarction: does the choice of fibrinolytic agent impact on the importance of time-to-treatment? Am J Cardiol. 2004; 94(6):772-4.	Post hoc meta-regression that only reported absolute risk reductions
Nallamothu BK, Bates ER. Percutaneous coronary intervention versus fibrinolytic therapy in acute myocardial infarction: is timing (almost) everything?Am J Cardiol. 2003; 92(7):824-6.	Post hoc meta-regression that only reported absolute risk reductions
Nielsen PH, Terkelsen CJ, Nielsen TT, Thuesen L, Krusell LR, Thayssen P et al. System delay and timing of intervention in acute myocardial infarction (from the Danish Acute Myocardial Infarction-2 [DANAMI-2] Trial). American Journal of Cardiology. 2011; 108(6):776-781.	Subgroup analysis of RCT that does not stratify study participants according to time to intervention
Nielsen PH, Maeng M, Busk M, Mortensen LS, Kristensen SD, Nielsen TT et al. Primary angioplasty versus fibrinolysis in acute myocardial infarction: long-term follow-up in the Danish acute myocardial infarction 2 trial. Circulation. 2010; 121(13):1484-1491.	RCT does not stratify study participants according to time to intervention
Nielsen PH, Maeng M, Busk M, Mortensen LS, Nielsen TT, Andersen HR. Primary angioplasty versus fibrinolysis in acute myocardial infarction: Long-term follow-up in the DANAMI-2 trial. Journal of the American College of Cardiology. 2009; 53(10):A459-A460.	RCT does not stratify study participants according to time to intervention
Noguchi Y, Yamaguchi I, Sugishita Y. [Comparison of thrombolytic therapy and direct percutaneous transluminal coronary angioplasty for acute myocardial infarction: prospective multicenter trial at 16 clinical centers in Ibaraki prefecture TUGMI. Tsukuba University Group for Myocardial Infarction]. Journal of Cardiology. 1996; 27(3):111-120.	RCT does not stratify study participants according to time to time
Nunn CM, O'Neill WW, Rothbaum D, Stone GW, O'Keefe J, Overlie P et al. Long-term outcome after primary angioplasty: report from the primary angioplasty in myocardial infarction (PAMI-I) trial. Journal of the American College of Cardiology. 1999; 33(3):640-646.	RCT does not stratify study participants according to time to intervention
O'Keefe JHJ, Bailey WL, Rutherford BD, Hartzler GO. Primary angioplasty for acute myocardial infarction in 1,000 consecutive patients. Results in an unselected population and high-risk subgroups. American Journal of Cardiology. 1993; 72(19):107G-115G.	Not RCT, cohort
Ornato JP. Timely lessons in heart attack management. Heart attack patients may benefit more from angioplasty than clot-busting drugs, even if it means waiting two hours. Health News. 2003; 9(10):8-9.	Not RCT, narrative review
Pinto DS, Frederick PD, Chakrabarti AK, Kirtane AJ, Ullman E, Dejam A et al. Benefit of Transferring ST-Segment-Elevation Myocardial Infarction Patients for Percutaneous Coronary Intervention Compared With Administration of Onsite Fibrinolytic Declines as Delays Increase. Circulation. 2011; 124(23):2512-2521.	Not RCT, cohort study population < 100,000 (n = 19,012)
Pinto DS, Southard M, Ciaglo L, Gibson CM. Door-to-balloon delays with percutaneous coronary intervention in ST-elevation myocardial infarction. American Heart Journal. 2006; 151(6 Suppl):S24-S29.	Not RCT, narrative review
Shiraishi J, Kohno Y, Sawada T, Arihara M, Hyogo M, Yagi T et al. Effects of hospital volume of primary percutaneous coronary interventions on angiographic results and in-hospital outcomes for acute myocardial infarction. Circulation Journal. 2008; 72(7):1041-1046.	Not RCT, cohort (n = 1785)
Rihal CS, Jaffe AS, Holmes J, Ting HH, Gersh BJ, Bell MR. Percutaneous coronary intervention vs thrombolysis for ST-elevation myocardial infarction. Journal of the American Medical Association. 2007; 297(12):1313.	Not RCT, narrative review

Exclusion List	Reason for exclusion
Rollins G. Time delays negate advantage of primary balloon angioplasty over fibrinolytic therapy in heart attack treatment. Report on Medical Guidelines and Outcomes Research. 2003; 14(21):1-6.	Not RCT, narrative review
Ribeiro EE, Silva LA, Carneiro R, D'Oliveira LG, Gasquez A, Amino JG et al. Randomized trial of direct coronary angioplasty versus intravenous streptokinase in acute myocardial infarction. Journal of the American College of Cardiology. 1993; 22(2):376-380.	RCT does not stratify study participants according to time to intervention
Ribichini F, Steffenino G, Dellavalle A, Ferrero V, Vado A, Feola M et al. Comparison of thrombolytic therapy and primary coronary angioplasty with liberal stenting for inferior myocardial infarction with precordial ST-segment depression: immediate and long-term results of a randomized study. Journal of the American College of Cardiology. 1998; 32(6):1687-1694.	RCT does not stratify study participants according to time to intervention
Ripa R, Sejersten M, Grande P, Wagner GS, Clemmensen P. Time to treatment has little influence on myocardial salvage after AMI: A DANAMI-2 substudy. Journal of Electrocardiology. 2004; 37(SUPPL.):173.	No outcome of interest
Ross AM, Huber K, Zeymer U, Armstrong PW, Granger CB, Goldstein P et al. The impact of place of enrollment and delay to reperfusion on 90-day post-infarction mortality in the ASSENT-4 PCI trial: assessment of the safety and efficacy of a new treatment strategy with percutaneous coronary intervention. JACC Cardiovascular Interventions. 2009; 2(10):925-930.	Not question of interest, RCT of fPPCI versus PCI
Ross AM, Coyne KS, Reiner JS, et al. A randomized trial comparing primary angioplasty with a strategy of short-acting thrombolysis and immediate planned rescue angioplasty in acute myocardial infarction: the PACT trial. PACT investigators. Plasminogen-activator Angioplasty Compatibility Trial. J Am Coll Cardiol 1999 Dec; 34:1954-62.	Not question of interest
Sadeghi HM, Grines CL, Chandra HR, Mehran R, Fahy M, Cox DA et al. Magnitude and impact of treatment delays on weeknights and weekends in patients undergoing primary angioplasty for acute myocardial infarction (the cadillac trial). American Journal of Cardiology. 2004; 94(5):637-640.	Not question of interest
Schömig A, Kastrati A, Dirschinger J, Mehilli J, Schricke U, Pache J, Martinoff S, Neumann FJ, Schwaiger M. Coronary stenting plus platelet glycoprotein IIb/IIIa blockade compared with tissue plasminogen activator in acute myocardial infarction. Stent versus Thrombolysis for Occluded Coronary Arteries in Patients with Acute Myocardial Infarction Study Investigators. N Engl J Med. 2000 Aug 10; 343(6):385-91.	Not question of interest
Schomig A, Ndrepepa G, Mehilli J, Schwaiger M, Schuhlen H, Nekolla S et al. Therapy-dependent influence of time-to-treatment interval on myocardial salvage in patients with acute myocardial infarction treated with coronary artery stenting or thrombolysis. Circulation. 2003; 108(9):1084-1088.	Not question of interest, 2 RCTs examined PCI with stent and abciximab versus fibrinolysis
Sejersten M, Ripa RS, Maynard C, et al. Timing of ischemic onset estimated from the electrocardiogram is better than historical timing for predicting outcome after reperfusion therapy for acute anterior myocardial infarction: a DANish trial in Acute Myocardial Infarction 2 (DANAMI-2) substudy. Am Heart J 2007; 154:61-8.	No outcome of interest
Sejersten M, Birnbaum Y, Ripa RS, Maynard C, Wagner GS, Clemmensen P et al. Influences of electrocardiographic ischaemia grades and symptom duration on outcomes in patients with acute myocardial infarction treated with thrombolysis versus primary percutaneous coronary intervention: results from the DANAMI-2 trial. Heart. 2006; 92(11):1577-1582.	RCT does not stratify study participants according to time to intervention
Sejersten M, Ripa RS, Maynard C, Grande P, Andersen HR, Wagner GS et al. Timing of ischemic onset estimated from the electrocardiogram is better than historical timing for predicting outcome after reperfusion therapy for acute anterior myocardial infarction: a DANish trial in Acute Myocardial Infarction 2	No outcomes of interest

Exclusion List	Reason for exclusion
(DANAMI-2) substudy. American Heart Journal. 2007; 154(1):61-68.	
Simek S, Lubanda JC, Aschermann M, Humhal J, Hork J, Kovarnik T et al. How does delaying treatment affect the long-term prognosis for patients with acute myocardial infarction treated with primary coronary angioplasty? Kardiologia Polska. 2004; 61(8):91-100.	Not RCT, narrative review
Smalling RW, Giesler GM, Julapalli VR, Denktas AE, Sdringola SM, Vooletich MT et al. Pre-hospital reduced-dose fibrinolysis coupled with urgent percutaneous coronary intervention reduces time to reperfusion and improves angiographic perfusion score compared with prehospital fibrinolysis alone or primary percutaneous coronary intervention: results of the PATCAR Pilot Trial. Journal of the American College of Cardiology. 2007; 50(16):1612-1614.	Not question of interest, RCT of fibrinolysis plus PCI versus stenting plus abciximab
Soon CY, Chan WX, Tan HC. The impact of time-to-balloon on outcomes in patients undergoing modern primary angioplasty for acute myocardial infarction. Singapore Medical Journal. 2007; 48(2):131-136.	Not RCT, cohort study (n = 2008
Stanislaw S, Lubanda JC, Aschermann M, et al. How does thetime to treatment affects the long term prognosis with patients with acute myocardial infarction treated with PPCI. 2004, 61, 91.	Not RCT, cohort (n = 339)
Steffenino G, Santoro GM, Maras P, Mauri F, Ardissino D, Violini R et al. In-hospital and one-year outcomes of patients with high-risk acute myocardial infarction treated with thrombolysis or primary coronary angioplasty. Italian Heart Journal. 2004; 5(2):136-145.	Not RCT, cohort (n = 2227)
Steg PG, Bonnefoy E, Chabaud S, Lapostolle F, Dubien PY, Cristofini P et al. Impact of time to treatment on mortality after prehospital fibrinolysis or primary angioplasty: data from the CAPTIM randomized clinical trial. Circulation. 2003; 108(23):2851-2856.	Not question of interest, substudy of RCT that did not stratify study participants according to time to intervention
Stenestrand U, Lindback J, Wallentin L, RIKS-HIA R. Long-term outcome of primary percutaneous coronary intervention vs prehospital and in-hospital thrombolysis for patients with ST-elevation myocardial infarction. JAMA. 2006; 296(14):1749-1756.	Not RCT, cohort study, Register of Information and Knowledge about Swedish Heart Intensive Care Admissions (RIKS-HIA), population < 100,000 (n = 26,205)
Swanson N, Nunn C, Holmes S, Devlin G. Door to balloon times: streamlining admission for primary percutaneous coronary intervention. New Zealand Medical Journal. 2010; 123(1309):18-25.	Not question of interest, RCT on PPCI
Tarantini G, Van de Werf F, Bilato C, Gersh B. Primary percutaneous coronary intervention for acute myocardial infarction: Is it worth the wait? The risk-time relationship and the need to quantify the impact of delay. American Heart Journal. 2011; 161(2):247-253.	Not RCT, narrative review
Tarantini G, Ramondo A, Napodano M, Bilato C, Buja P, Isabella G et al. Time delay-adjusted survival benefit of angioplasty over thrombolysis in acute myocardial infarction: influence of time from symptom onset. Italian Heart Journal. 2004; 5(11):844-850.	Post hoc meta-regression that only reported absolute risk reductions
Terkelsen CJ, Sorensen JT, Nielsen TT. Is there any time left for primary percutaneous coronary intervention according to the 2007 updated American College of Cardiology/American Heart Association ST-segment elevation myocardial infarction guidelines and the D2B alliance? Journal of the American College of Cardiology. 2008; 52(15):1211-1215.	Not RCT, narrative review
Thomas K, Ottervanger JP, De Boer MJ, Suryapranata H, Hoorntje JC, Zijlstra F. Primary angioplasty compared with thrombolysis in acute myocardial infarction in diabetic patients. Diabetes Care. 1999; 22(4):647-649.	Subgroup analysis of RCT that does not stratify study participants according to time to

Exclusion List	Reason for exclusion
	intervention
Valente S, Lazzeri C, Saletti E, Chiostri M, Gensini GF. Primary percutaneous coronary intervention in comatose survivors of cardiac arrest with ST-elevation acute myocardial infarction: a single-center experience in Florence. Journal of Cardiovascular Medicine. 2008; 9(11):1083-1087.	Not RCT, cohort (n = 31)
Vermeer F, Oude Ophuis AJ, vd Berg EJ, Brunninkhuis LG, Werter CJ, Boehmer AG et al. Prospective randomised comparison between thrombolysis, rescue PTCA, and primary PTCA in patients with extensive myocardial infarction admitted to a hospital without PTCA facilities: a safety and feasibility study. Heart. 1999; 82(4):426-431.	No outcomes of interest, RCT does not stratify study participants according to time to intervention
Vrachatis AD, Alpert MA, Georgulas VP, Nikas DJ, Petropoulou EN, Lazaros GI et al. Comparative efficacy of primary angioplasty with stent implantation and thrombolysis in restoring basal coronary artery flow in acute ST segment elevation myocardial infarction: quantitative assessment using the corrected TIMI frame count. Angiology. 2001; 52(3):161-166.	No outcomes of interest
Wang TY, Nallamothu BK, Krumholz HM, Li S, Roe MT, Jollis JG et al. Association of door-in to door-out time with reperfusion delays and outcomes among patients transferred for primary percutaneous coronary intervention. JAMA. 2011; 305(24):2540-2547.	Not RCT, cohort study, National Cardiovascular Data Registry (NCDR) Acute Coronary Treatment and Intervention Outcomes Network Registry-Get with the Guidelines (ATCION Registry-GWTG), population < 100,000 (n = 14,821) study examined outcomes for differential timing of PCI from onset of symptoms, no data on fibrinolysis
Weaver WD, Simes RJ, Betriu A, Grines CL, Zijlstra F, Garcia E, Grinfeld L, Gibbons RJ, Ribeiro EE, DeWood MA, Ribichini F. Comparison of primary coronary angioplasty and intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review. JAMA. 1997 Dec 17; 278(23):2093-8. Erratum in: JAMA 1998 Jun 17; 279(23):1876.	Not question of interest, meta-analysis of RCTs that did not stratify study participants according to time to intervention
Widimsky P, Bilkova D, Penicka M, et al. Long-term outcomes of patients with acute myocardial infarction presenting to hospitals without catheterization laboratory and randomized to immediate thrombolysis or interhospital transport for primary percutaneous coronary intervention. Five years' follow-up of the PRAGUE-2 Trial. Eur Heart J 2007; 28:679-84.	RCT does not stratify study participants according to time to intervention
Widimsky P, Budesinsky T, Vorac D, Groch L, Zelizko M, Aschermann M et al. Long distance transport for primary angioplasty vs immediate thrombolysis in acute myocardial infarction. Final results of the randomized national multicentre trial--PRAGUE-2. European Heart Journal. 2003; 24(1):94-104.	RCT does not stratify study participants according to time to intervention
Widimsky P, Groch L, Zelizko M, Aschermann M, Bednar F, Suryapranata H. Multicentre randomized trial comparing transport to primary angioplasty vs immediate thrombolysis vs combined strategy for patients with acute myocardial infarction presenting to a community hospital without a catheterization laboratory. The PRAGUE study. European Heart Journal. 2000; 21(10):823-831.	RCT does not stratify study participants according to time to intervention
Wong A, Koh T-H, Mak K-H, Sim K-H, Ahmad TRL, Tan KH et al. A randomized multicenter trial comparing primary angioplasty and combined fibrinolytic therapy with or without rescue angioplasty-apamit extended pilot study. American Journal of Cardiology. 2009; 103(9):3B.	RCT does not stratify study participants according to time to intervention

Exclusion List	Reason for exclusion
Woollard M. Early thrombolysis: Time to change? A discussion paper. Journal of Emergency Primary Health Care. 2005; 3(4).	Not RCT, narrative review
Zeymer U, Schroder R, Machnig T, Neuhaus KL. Primary percutaneous transluminal coronary angioplasty accelerates early myocardial reperfusion compared to thrombolytic therapy in patients with acute myocardial infarction. American Heart Journal. 2003; 146(4):686-691.	Not question of interest
Zeymer U, Neuhaus K-L. Thrombolysis and percutaneous transluminal coronary angioplasty in patients with acute myocardial. Zeitschrift Fur Kardiologie. 2000; 89(SUPPL. 4):IV30-IV40.	Not RCT, narrative review
Zijlstra F, Patel A, Jones M, Grines CL, Ellis S, Garcia E et al. Clinical characteristics and outcome of patients with early (<2 h), intermediate (2-4 h) and late (>4 h) presentation treated by primary coronary angioplasty or thrombolytic therapy for acute myocardial infarction. European Heart Journal. 2002; 23(7):550-557.	Superseded by newer regression analyses (found 10 RCTs that are identified in newer studies)
Zijlstra F, Hoorntje JC, de BM, Reiffers S, Medema K, Ottervanger JP et al. Long-term benefit of primary angioplasty as compared with thrombolytic therapy for acute myocardial infarction. New England Journal of Medicine. 1999; 341(19):1413-1419.	Not RCT, narrative review
Zijlstra F, Beukema WP, van't Hof AW, Liem A, Reiffers S, Hoorntje JC et al. Randomized comparison of primary coronary angioplasty with thrombolytic therapy in low risk patients with acute myocardial infarction. Journal of the American College of Cardiology. 1997; 29(5):908-912.	RCT does not stratify study participants according to time to intervention
Zijlstra F, de Boer MJ, Hoorntje JC, Reiffers S, Reiber JH, Suryapranata H. A comparison of immediate coronary angioplasty with intravenous streptokinase in acute myocardial infarction. N Engl J Med. 1993 Mar 11; 328(10):680-4.	RCT does not stratify study participants according to time to intervention
Zijlstra F, De Boer MJ, Ottervanger JP, Liem AL, Hoorntje JC, Suryapranata H. Primary coronary angioplasty versus intravenous streptokinase in acute myocardial infarction: differences in outcome during a mean follow-up of 18 months. Coronary Artery Disease. 1994; 5(8):707-712.	RCT does not stratify study participants according to time to time

J.2 Facilitated PPCI

Reference	Reason for exclusion
Anonymous. Platelet glycoprotein IIb/IIIa receptor blockade and low-dose heparin during percutaneous coronary revascularization. The EPILOG Investigators. N.Engl.J.Med. 336 (24):1689-1696, 1997.	Wrong population: not STEMI (STEMI excluded)
Anonymous. Promising results with argatroban as an adjunctive thrombolytic therapy. Br.J.Cardiol. 4 (5):180, 1997.	Wrong treatment: thrombolysis not fPPCI; trial overview not full study publication
J. Afilalo, A. Michael Roy, and M. J. Eisenberg. Systematic review of fibrinolytic-facilitated percutaneous coronary intervention: potential benefits and future challenges. Can.J.Cardiol. 25 (3):141-148, 2009.	Systematic review with no meta-analysis
L. Agati, S. Funaro, M. Madonna, G. Sardella, B. Garramone, and L. Galiuto. Does coronary angioplasty after timely thrombolysis improve microvascular perfusion and left ventricular function after acute myocardial infarction? Am.Heart J. 154 (1):151-157, 2007.	Not true fPPCI as PCI performed anytime within 24hrs
F. V. Aguirre, R. P. McMahon, H. Mueller, N. S. Kleiman, M. J. Kern, P. Desvigne-Nickens, W. P. Hamilton, and B. R. Chaitman. Impact of age on clinical outcome and postlytic management strategies in patients treated with intravenous thrombolytic therapy: Results from the TIMI II study. Circulation 90 (1):78-86, 1994.	TIMI-II subanalysis – wrong treatment: patients received fibrinolysis and not additional PCI (thus not fPPCI versus PPCI)

Reference	Reason for exclusion
H.-R. Amtz, J. F. Schroeder, K. Pels, P. Schwimmbeck, B. Witzenbichler, and H. P. Schultheiss. Prehospital versus periprocedural administration of abciximab in STEMI: early and late results from the randomised REOMOBILE-study. Eur.Heart J. 24 (Suppl 1):268, 2003.	REOMOBILE study - abstract. This has not been published into a full article yet.
H Andersen, T Nielsen, T Vesterlund, P Grande, U Abildgaard, P Thayssen, F Pedersen, L Mortensen, and DANAMI-2 Investigators. Danish multicenter randomized study on fibrinolytic therapy versus acute coronary angioplasty in acute myocardial infarction: rationale and design of the DANish trial in Acute Myocardial Infarction-2 (DANAMI-2). Am.Heart J. 146 (2):234-241, 2003.	DANAMI-2 trial – wrong intervention: thrombolysis not fPPCI
F. Andreotti, S. B. Ujang, P. Sritara, C. Kluft, G. J. Davies, and A. Maseri. Can we reduce thrombin generation during coronary thrombolysis or coronary angioplasty? Fibrinolysis 9 (SUPPL. 1):74-77, 1995.	Wrong comparison: different doses of t-PA
E. M. Antman, H. W. Louwerenburg, H. F. Baars, J. C. Wesdorp, B. Hamer, J. P. Bassand, F. Bigonzi, G. Pisapia, C. M. Gibson, H. Heidbuchel, E. Braunwald, and F. Van de Werf. Enoxaparin as adjunctive antithrombin therapy for ST-elevation myocardial infarction: results of the ENTIRE-Thrombolysis in Myocardial Infarction (TIMI) 23 Trial. Circulation 105 (14):1642-1649, 2002.	TIMI 23 trial – wrong treatment: PCI was given at physician's discretion thus not true PCI versus fPPCI (only 47% of patients had PCI)
E. M. Antman, C. M. Gibson, J. A. de Lemos, R. P. Giugliano, C. H. McCabe, P. Coussement, I. Menown, C. A. Nienaber, et al. Combination reperfusion therapy with abciximab and reduced dose reteplase: Results from TIMI 14. Eur.Heart J. 21 (23):1944-1953, 2000.	TIMI 14 trial – wrong intervention: groups just fibrinolysis with out PCI
D. Antoniucci, R. Valenti, A. Migliorini, G. Moschi, M. Trapani, P. Buonamici, G. Cerisano, L. Bolognese, and G. M. Santoro. Abciximab therapy improves 1-month survival rate in unselected patients with acute myocardial infarction undergoing routine infarct artery stent implantation. Am.Heart J. 144 (2):315-322, 2002.	Not RCT
D. Antoniucci, R. Valenti, A. Migliorini, G. Moschi, M. Trapani, E. V. Dovellini, L. Bolognese, and G. M. Santoro. Abciximab therapy improves survival in patients with acute myocardial infarction complicated by early cardiogenic shock undergoing coronary artery stent implantation. Am.J.Cardiol. 90 (4):353-357, 2002.	Not RCT
R. J. Applegate, M. A. Grabarczyk, D. C. Sane, M. T. Sacrinty, J. E. Goodin, G. S. Statonk, T. T. Baki, S. K. Gandhi, M. A. Kutcher, and W. C. Little. PCI with and without abciximab after upstream eptifibatide use: outcomes in high-risk patients. J.Invasive Cardiol. 18 (12):604-613, 2006.	Not RCT
P W. Armstrong, A Gershlick, P Goldstein, R Wilcox, T Danays, E Bluhmki, F Van de Werf, and STREAM Steering Committee. The Strategic Reperfusion Early After Myocardial Infarction (STREAM) study. Am.Heart J. 160 (1):30, 2010.	STREAM study: study protocol.
P. W. Armstrong and WEST Steering Committee. A comparison of pharmacologic therapy with/without timely coronary intervention vs. primary percutaneous intervention early after ST-elevation myocardial infarction: the WEST (Which Early ST-elevation myocardial infarction Therapy) study. Eur.Heart J. 27 (13):1530-1538, 2006.	WEST study - wrong percentage had PCI in the fPPCI arm: <85% (78%) and 50% of this was rescue PCI. More pts in the PPCI arm had PCI (91%).
P. W. Armstrong, N. Bett, D. Brieger, D. Chew, R. Dick, A. Farshid, P. Garrahy, B. Gunalingham, R. Hendriks, J. Horowitz, N. Jepson, J. Lefkovits, S. Lo, et al. PexeLizumab for Acute ST-elevation myocardial infarction in patients undergoing primary percutaneous coronary intervention: A randomized controlled trial. JAMA 297 (1):43-51, 2007.	Wrong drug: pexelizumab not licensed in UK
A. E. Arnold, M. L. Simoons, F. Van de Werf, D. P. de Bono, J. Lubsen, J. G. Tijssen, P. W. Serruys, and M. Verstraete. Recombinant tissue-type	Wrong population: suspected MI

Reference	Reason for exclusion
plasminogen activator and immediate angioplasty in acute myocardial infarction. One-year follow-up. The European Cooperative Study Group. Circulation 86 (1):111-120, 1992.	
A. T. Askari and A. M. Lincoff. GUSTO V: Combination drug treatment of acute myocardial infarction. Cleve.Clin.J.Med. 69 (7):554-560, 2002.	GUSTO V trial overview - wrong comparison: abciximab versus reteplase (both fPPCI) using different drugs given at the same time rather than early versus later thus not fPPCI versus PPCI.
R Bagur, OF. Bertrand, J Rodes-Cabau, E Larose, S Rinfret, CM. Nguyen, B Noel et al. Long term efficacy of abciximab bolus-only compared to abciximab bolus and infusion after transradial coronary stenting. Catheter.Cardiovasc.Interv. 74 (7):1010-1016, 2009.	EASY trial: wrong comparisons: All patients received abciximab + stenting, then randomised to same day discharge + no abciximab infusion versus overnight hospital stay + abciximab infusion.
F. W. Bar, J. Meyer, F. Vermeer, R. Michels, B. Charbonnier, K. Haerten, M. Spiecker, C. Macaya, et al. Comparison of saruplase and alteplase in acute myocardial infarction. SESAM Study Group. The Study in Europe with Saruplase and Alteplase in Myocardial Infarction. Am.J.Cardiol. 79 (6):727-732, 1997.	SESAM trial - wrong comparison: fPPCI versus fPPCI using different drugs (patients randomised to saruplase versus alteplase), and drugs given at the same time rather than early versus later (thus not fPPCI versus PPCI). Additionally 0% stents used (not mentioned their use in the protocol or results)
G. I. Barbash, A. Roth, H. Hod, M. Modan, H. I. Miller, S. Rath, Y. H. Zahav, G. Keren, M. Motro, and A. Shachar. Randomized controlled trial of late in-hospital angiography and angioplasty versus conservative management after treatment with recombinant tissue-type plasminogen activator in acute myocardial infarction. Am.J.Cardiol. 66 (5):538-545, 1990.	Wrong comparison: fPPCI vs thrombolysis; not true fPPCI as PCI performed 5 days after giving the thrombolytics
F. Bellandi, M. Maioli, M. Gallopin, A. Toso, and R. P. Dabizzi. Increase of myocardial salvage and left ventricular function recovery with intracoronary abciximab downstream of the coronary occlusion in patients with acute myocardial infarction treated with primary coronary intervention. Catheter.Cardiovasc.Interv. 62 (2):186-192, 2004.	Wrong comparisons: abciximab + PCI by different routes of administration
J. Bengtson, M. Adolphson, D. L. Brewer, D. Jacobs, J. L. Gard, L. Cahoon, M. Bloom, B. Kennelly, K. Porter, J. Kmonicek, F. M. Krainin, J. Shane, J. F. Marquis, et al. Multicenter, dose-ranging study of efegatran sulfate versus heparin with thrombolysis for acute myocardial infarction: The Promotion of Reperfusion in Myocardial Infarction Evolution (PRIME) trial. Am.Heart J. 143 (1):95-105, 2002.	PRIME trial - wrong intervention and comparison: thrombolysis at different doses
P. B. Berger, M. R. Bell, Jr Holmes, B. J. Gersh, M. Hopfenspirger, and R. Gibbons. Time to reperfusion with direct coronary angioplasty and thrombolytic therapy in acute myocardial infarction. Am.J.Cardiol. 73 (4):231-236, 1994.	Wrong outcomes: reperfusion directly after procedure (no clinical outcomes)

Reference	Reason for exclusion
J. S. Berger, M. T. Roe, C. M. Gibson, R. Kilaru, C. L. Green, L. Melton, J. D. Blankenship et al. Safety and feasibility of adjunctive antiplatelet therapy with intravenous elinogrel, a direct-acting and reversible P2Y12 ADP-receptor antagonist, before primary percutaneous intervention in patients with ST-elevation myocardial infarction: The Early Rapid ReversAl of Platelet ThromboSis with Intravenous Elinogrel before PCI to Optimize REperfusion in Acute Myocardial Infarction (ERASE MI). Am.Heart J. 158 (6):998, 2009.	Wrong study drugs: patients randomised to elinogrel versus placebo
J. S. Berger, M. T. Roe, C. M. Gibson, R. Kilaru, C. L. Green, L. Melton, J. D. Blankenship, D. C. Metzger, C. B. Granger, D. D. Gretler, C. L. Grines, K. Huber, U. Zeymer, P. Buszman, R. A. Harrington, and P. W. Armstrong. Safety and feasibility of adjunctive antiplatelet therapy with intravenous elinogrel, a direct-acting and reversible P2Y12 ADP-receptor antagonist, before primary percutaneous intervention in patients with ST-elevation myocardial infarction: The Early Rapid ReversAl of Platelet ThromboSis with Intravenous Elinogrel before PCI to Optimize REperfusion in Acute Myocardial Infarction (ERASE MI). Am.Heart J. 158 (6):998, 2009.	Not RCT – comparison of data from several trials
N. Bhala. Enoxaparin in elective percutaneous coronary intervention [6]. N.Engl.J.Med. 355 (26):2788, 2006.	Letter
D L. Bhatt, B I. Lee, P J. Casterella, M Pulsipher, M Rogers, M Cohen, V E. Corrigan, T J. J. Ryan, J A. Breall, et al., and Coronary Revascularization Using Integrilin and Single bolus Enoxaparin Study. Safety of concomitant therapy with eptifibatide and enoxaparin in patients undergoing percutaneous coronary intervention: results of the Coronary Revascularization Using Integrilin and Single bolus Enoxaparin Study. J.Am.Coll.Cardiol. 41 (1):20-25, 2003.	CRUISE trial - wrong comparison: both groups randomised to fPPCI (fPPCI using eptifibatide + enoxaparin versus fPPCI using eptifibatide + UFH); drugs given in both groups at the same time (at time of PCI) rather than early versus later thus would have been fPPCI versus PPCI. Additionally 0% stents used (not mentioned their use in the protocol or results)
D. L. Bhatt and E. J. Topol. Long-term protection from myocardial ischemic events after coronary angioplasty. Cardiol.Rev. 15 (7):18-22, 1998.	Wrong population: not STEMI but mixed
L Bolognese, G Falsini, F Liistro, P Angioli, K Ducci, T Taddei, R Tarducci, F Cosmi et al. Randomized comparison of upstream tirofiban versus downstream high bolus dose tirofiban or abciximab on tissue-level perfusion and troponin release in high-risk acute coronary syndromes treated with percutaneous coronary interventions: the EVEREST trial. J.Am.Coll.Cardiol. 47 (3):522-528, 2006.	EVEREST trial - wrong population: high risk ACS.
E Bonnefoy, P G Steg, F Boutitie, P Y Dubien, F L, J Roncalli, F Dissait, G Vanzetto, A Leizorowicz, G Kirkorian, Investigators CAPTIM, C. Mercier, E. P. McFadden, and P. Touboul. Comparison of primary angioplasty and pre-hospital fibrinolysis in acute myocardial infarction (CAPTIM) trial: a 5-year follow-up. Eur.Heart J. 30 (13):1598-1606, 2009.	CAPTIM trial - wrong comparison: PPCI vs thrombolysis
E Bonnefoy, F Lapostolle, A Leizorovicz, G Steg, E P. McFadden, P Y Dubien, S Cattan, E Boullenger, J Machecourt, et al, and Comparison of Angioplasty and Prehospital Thromboysis in Acute Myocardial Infarction study group. Primary angioplasty versus prehospital fibrinolysis in acute myocardial infarction: a randomised study. Lancet 360 (9336):825-829, 2002.	Wrong comparison: PPCI vs thrombolysis

Reference	Reason for exclusion
D. P. de Bono. What is the role of invasive intervention after coronary thrombolysis? Eur.Heart J. 12 Suppl G:43-46, 1991.	Review
W. B. Borden and D. P. Faxon. Facilitated Percutaneous Coronary Intervention. J.Am.Coll.Cardiol. 48 (6):1120-1128, 2006.	Literature review
J. C. Braga, F. P. Esteves, J. P. Esteves, A. L. Latado, A. G. Godinho, A. Azevedo Junior, J. C. Brito, P. R. Silva, M. S. Teixeira, V. P. Souza, A. Rabelo Junior, and M. S. Rocha. Confirmation that heparin is an alternative means of promoting early reperfusion. Coron.Artery Dis. 9 (6):335-338, 1998.	Wrong % stents used: <85% stents used (66%)
C. E. Buller, G. E. Pate, P. W. Armstrong, B. J. O'Neill, J. G. Webb, R. Gallo, and R. C. Welsh. Catheter thrombosis during primary percutaneous coronary intervention for acute ST elevation myocardial infarction despite subcutaneous low-molecular-weight heparin, acetylsalicylic acid, clopidogrel and abciximab pretreatment. Can.J.Cardiol. 22 (6):511-515, 2006.	Not RCT (case report of 3 patients in an RCT – WEST study)
C. P. Cannon. Bridging the gap with new strategies in acute ST elevation myocardial infarction: bolus thrombolysis, glycoprotein IIb/IIIa inhibitors, combination therapy, percutaneous coronary intervention, and facilitated PCI. Journal of Thrombosis and Thrombolysis 9 (3):235-241, 2000.	Literature review
S. M Chen, Y. K. Hsieh, G. B. Guo, C. Y. Fang, H. K. Yip, C.J. Wu, and M. Fu. Angiographic and clinical outcome in ST-segment elevation myocardial infarction patients receiving an adjunctive double bolus regimen of tirofiban for primary percutaneous coronary intervention. Circulation Journal 70 (5):536-541, 2006.	Not RCT (patients not randomised)
D. P. Chew, P. Aylward, and H. D. White. Facilitated percutaneous coronary intervention: is this strategy ready for implementation? Curr.Cardiol.Rep. 7 (4):235-241, 2005.	Review / overview
J. S. Cho, S.-H. Her, J. Y. Baek, M.-W. Park, H. D. Kim, M. H. Jeong, Y. K. Ahn, S. C. Chae, S. H. Hur, et al. Clinical benefit of low molecular weight heparin for ST-segment elevation myocardial infarction patients undergoing primary percutaneous coronary intervention with glycoprotein IIb/IIIa inhibitor. J.Korean Med.Sci. 25 (11):1601-1608, 2010.	KAMIR study – not RCT: patients divided into 2 groups rather than randomised. Additionally wrong comparison: both groups fPPCI using different drugs GPI versus no GPI then subdivided into use of LMWH versus UFH. Also drugs given at the same time not early versus later, thus is not fPPCI versus PPCI.
W.-Y. Chung, M.-J. Han, Y.-S. Cho, K.-I. Kim, H.-J. Chang, T.-J. Youn, I.-H. Chae, D.-J. Choi, C.-H. Kim, B.-H. Oh, Y.-B. Park, and Y.-S. Choi. Effects of the early administration of heparin in patients with ST-elevation myocardial infarction treated by primary angioplasty. Circulation Journal 71 (6):862-867, 2007.	Not Randomised
B. E. P. M. Claessen, G. D. Dangas, R. Mehran, B. Witzenbichler, G. Gaugliumi, J. Peruga, K. Xu, and G. W. Stone. Clinical outcomes following stent thrombosis occurring in-hospital versus out-of-hospital; Results of the HORIZONS-AMI trial. Eur.Heart J. 32:655, 2011.	Abstract
N. Curzen. Viewpoint: thrombolysis or angioplasty in the real world: a UK perspective. Circulation 113 (23):f89-f91, 2006.	Viewpoint
M. J. De Boer, J. P. Ottervanger, A. W. van 't Hof, J. C. Hoorntje, H. Suryapranata, and F. Zijlstra. Reperfusion therapy in elderly patients with acute myocardial infarction: a randomized comparison of primary angioplasty and	Wrong comparison: thrombolysis not fPPCI

Reference	Reason for exclusion
thrombolytic therapy. J.Am.Coll.Cardiol. 39 (11):1723-1728, 2002.	
Luca G. De, N. Ernst, H. Suryapranata, J. P. Ottervanger, J. C. Hoorntje, A. T. Gosselink, J. H. Dambrink, M. J. De Boer, and A. W. van 't Hof. Relation of interhospital delay and mortality in patients with ST-segment elevation myocardial infarction transferred for primary coronary angioplasty. Am J Cardiol 95 (11):1361-1363, 2005.	Wrong population: all patients undergoing angioplasty (not just STEMI).
G De Luca, H Suryapranata, G W. Stone, D Antoniucci, J E. Tcheng, F J Neumann, F Van de Werf, E M. Antman, and E J. Topol. Abciximab as adjunctive therapy to reperfusion in acute ST-segment elevation myocardial infarction: a meta-analysis of randomized trials. JAMA 293 (14):1759-1765, 2005.	Old meta-analysis in STEMI patients (published 2005 and included trials only up to 2004)
G. De Luca, C. M. Gibson, F. Bellandi, S. Murphy, M. Maioli, M. Noc, U. Zeymer, D. Dudek, H. R. Arntz, S. Zorman, H. M. Gabriel, A. Emre, et al. Early glycoprotein IIb-IIIa inhibitors in primary angioplasty (EGYPT) cooperation: an individual patient data meta-analysis. Heart 94 (12):1548-1558, 2008.	Newer IPD meta-analysis in STEMI patients (published 2008) but included trials only up to 2007)
G. De Luca and P. Marino. Facilitated angioplasty with combo therapy among patients with ST-segment elevation myocardial infarction: a meta-analysis of randomized trials. Am.J.Emerg.Med. 27 (6):683-690, 2009.	Newer meta-analysis in STEMI patients (published 2009) but included trials only up to 2007)
G De Luca, C. M Gibson, F Bellandi, S Murphy, M Maioli, M Noc, U Zeymer, D Dudek, H R Arntz et al. Benefits of pharmacological facilitation with glycoprotein IIb-IIIa inhibitors in diabetic patients undergoing primary angioplasty for STEMI. A subanalysis of the EGYPT cooperation. Journal of Thrombosis and Thrombolysis 28 (3):288-298, 2009.	Newer meta-analysis in STEMI patients (published 2009) but included trials only up to 2007). Also only gives results for diabetic patients with STEMI.
G De Luca, E P Navarese, E Cassetti, M Verdoia, and H Suryapranata. Meta-analysis of randomized trials of glycoprotein IIb/IIIa inhibitors in high-risk acute coronary syndromes patients undergoing invasive strategy. Am.J.Cardiol. 107 (2):198-203, 2011.	Newer meta-analysis (published 2011 and included trials up to 2010) – but wrong population: ACS patients
A. E. Denktas, H. Athar, T. D. Henry, D. M. Larson, M. Simons, R. S. Chan, N. W. Niles, H. Thiele, et al. Reduced-Dose Fibrinolytic Acceleration of ST-Segment Elevation Myocardial Infarction Treatment Coupled With Urgent Percutaneous Coronary Intervention Compared to Primary Percutaneous Coronary Intervention Alone. Results of the AMICO (Alliance for Myocardial Infarction Care Optimization) Registry. JACC: Cardiovascular Interventions 1 (5):504-510, 2008.	AMICO trial: not RCT (registry data)
P Di Pasquale, S Cannizzaro, F Giambanco, S Scalzo, G Tricoli, S Fasullo, and S Paterna. Immediate versus delayed facilitated percutaneous coronary intervention: a pilot study. J.Cardiovasc.Pharmacol. 46 (1):83-88, 2005.	Low % stents used: 38 and 40% in each group.
Hendrik Jan Dieker, Elvira V. van Horssen, Ferry M. R. J. Hersbach, Marc A. Brouwer, Ad J. van Boven, Arnoud W. J. van 't Hof, Wim R. M. Aengevaeren, Freek W. A. Verheugt, and Frits W. H. M. Bar. Transport for abciximab facilitated primary angioplasty versus on-site thrombolysis with a liberal rescue policy: the randomised Holland Infarction Study (HIS). Journal of Thrombosis and Thrombolysis 22 (1):39-45, 2006.	HIS study - wrong fPPCI intervention: fibrinolysis + rescue PCI. Also PCI performed in <85% patients (26% and 98% in each arm; mean 75%).
P DiPasquale, S Cannizzaro, G Parrinello, F Giambanco, G Vitale, S Fasullo, S Scalzo, F Ganci et al. Is delayed facilitated percutaneous coronary intervention better than immediate in reperfused myocardial infarction? Six months follow up findings. Journal of Thrombosis and Thrombolysis 21 (2):147-157, 2006.	Wrong comparison: although this is immediate PCI versus delayed PCI (correct comparison), however different drugs may have been used as before randomisation

Reference	Reason for exclusion
	patients had combination treatment either tirofiban + rtPA or abciximab + rtPA
S Doggrell. Can bivalirudin and provisional GP IIb/IIIa blockade REPLACE heparin and planned glycoprotein IIb/IIIa blockade during percutaneous coronary intervention? Expert Opin Pharmacother 4 (8):1431-1433, 2003.	REPLACE trial - wrong population: not STEMI but mixed all pts undergoing PCI
L. Dong-Bao, H. Qi, L. Hong-Wei, C. Hui, and Z. Shu-Mei. Effects of early angioplasty after fibrinolysis on prognosis of patients with ST-segment elevation acute myocardial infarction. Afr.J.Biotechnol. 10 (70):15801-15804, 2011.	Wrong comparison: fPPCI versus standard treatment (fibrinolytics with PCI only in some patients 7 days later)
C L. Dubois, A Belmans, C B. Granger, P W. Armstrong, L Wallentin, P M. Fioretti, J L. Lopez-Sendon, F W. Verheugt, J Meyer, F Van de Werf, and ASSENT-3 Investigators. Outcome of urgent and elective percutaneous coronary interventions after pharmacologic reperfusion with tenecteplase combined with unfractionated heparin, enoxaparin, or abciximab. J.Am.Coll.Cardiol. 42 (7):1178-1185, 2003.	ASSENT-3 substudy – loss of randomisation: subgroups of urgent versus elective PCI patients
S. G. Ellis, P. Armstrong, A. Betriu, B. Brodie, H. Herrmann, G. Montalescot, F. J. Neumann, J. J. Smith, E. Topol, and Facilitated INtervention with Enhanced Reperfusion Speed to Stop Events Investigators. Facilitated percutaneous coronary intervention versus primary percutaneous coronary intervention: design and rationale of the Facilitated Intervention with Enhanced Reperfusion Speed to Stop Events (FINESSE) trial. Am.Heart J. 147 (4):E16, 2004.	No results: methods and design of FINESSE trial
S. G. Ellis. A clinical trial comparing primary coronary angioplasty with tissue plasminogen activator for acute myocardial infarction. N.Engl.J.Med. 336 (23):1621-1628, 1997.	GUSTO IIb trial – loss of randomisation / indirect comparison: 2 sets of patients randomised. 1 set to PCI versus fibrinolysis (wrong comparison); 2nd set to PCI + hirudin versus PCI + heparin (wrong comparison). To be included in our review we would need to compare 1 arm from each of the randomised sets: PCI versus PCI + heparin, and this is an indirect comparison (as loss of randomisation).
Nicolette M. S. K. Ernst, Harry Suryapranata, Kor Miedema, Robbert J. Slingerland, Jan Paul Ottervanger, Jan C. A. Hoorntje, A. T. M. Gosselink, Jan Henk Dambrink, Menko Jan de Boer, Felix Zijlstra, and Arnoud W. J. van 't Hof. Achieved platelet aggregation inhibition after different antiplatelet regimens during percutaneous coronary intervention for ST-segment elevation myocardial infarction. J.Am.Coll.Cardiol. 44 (6):1187-1193, 2004.	Randomised patients with STEMI to abciximab, tirofiban or no GPI in the cath lab after angiography and just before the PPCI procedure (not a facilitated PPCI strategy – using GPI conventionally in the cath lab). Also the main outcome was platelet aggregation and relevant clinical outcomes beyond hospital admission are not reported.

Reference	Reason for exclusion
J. Exaire, S Butman, R Ebrahimi, N. Kleiman, R. Harrington, M. Schweiger, J. Bittl, K Wolski, E. Topol, A Lincoff, and REPLACE-2 Investigators. Provisional glycoprotein IIb/IIIa blockade in a randomized investigation of bivalirudin versus heparin plus planned glycoprotein IIb/IIIa inhibition during percutaneous coronary intervention: predictors and outcome in the Randomized Evaluation in Percutaneous coronary intervention Linking Angiomax to Reduced Clinical Events (REPLACE)-2 trial. Am.Heart J. 152 (1):157-163, 2006.	Subgroup analysis of REPLACE-2 trial – wrong population: not STEMI but mixed elective and urgent PCI
F. Fernandez-Aviles, J. J. Alonso, G. Pena, J. Blanco, J. Alonso-Briales, J. Lopez-Mesa, F. Fernandez-Vazquez, et al. Primary angioplasty vs. early routine post-fibrinolysis angioplasty for acute myocardial infarction with ST-segment elevation: the GRACIA-2 non-inferiority, randomized, controlled trial. Eur.Heart J. 28 (8):949-960, 2007.	GRACIA-2 trial - wrong comparison: both groups randomised to PCI at different times (early versus later) however the drugs used in each arm were different (abciximab versus tenecteplase).
F. Fernandez-Aviles. Primary versus facilitated percutaneous coronary intervention (tenecteplase plus stenting) in patients with ST-elevated myocardial infarction: the final results of the GRACIA-2 randomized trial. Eur.Heart J. 25 (Suppl):33, 2004.	Abstract. GRACIA-2 trial - wrong comparison: both groups randomised to PCI at different times (early versus later) however the drugs used in each arm were different (abciximab versus tenecteplase).
I. Ferreira-Gonzalez, G. Permanyer-Miralda, J. Marrugat, M. Heras, J. Cunat, E. Civeira, F. Aros, J. J. Rodriguez, P. L. Sanchez, et al. MASCARA (Manejo del Sindrome Coronario Agudo. Registro Actualizado) study. General findings. Rev.Esp.Cardiol. 61 (8):803-816, 2008.	MASCARA trial: not an RCT.
J. Franke. HORIZONS AMI. Harmonizing outcomes with revascularization and stents in AMI: A prospective, randomized comparison of bivalirudin vs. heparin plus glycoprotein IIb/IIIa inhibitors during primary angioplasty in acute myocardial infarction - 30-Day results. Herz 32 (8):671, 2007.	In German; abstract
X.-H. Fu, Q.-Q. Hao, X.-W. Jia, W.-Z. Fan, X.-S. Gu, W.-L. Wu, G.-Z. Hao, S.-Q. Li, Y.-F. Jiang, and W. Geng. Effect of tirofiban plus clopidogrel and aspirin on primary percutaneous coronary intervention via transradial approach in patients with acute myocardial infarction. Chin.Med.J.(Engl). 121 (6):522-527, 2008.	Wrong intervention: not true fPPCI as thrombolysis given 24h before PCI
R l Gao, Y Han, X Yang, J Mao, W Fang, L Wang, W Shen, Z Li, G Jia, S Lu, M Wei, D Zeng, J Chen, X Qin, B Xu, C DU, and Collaborative Research Group of Reperfusion Therapy in Acute Myocardial Infarction (RESTART). Thorombolytic therapy with rescue percutaneous coronary intervention versus primary percutaneous coronary intervention in patients with acute myocardial infarction: a multicenter randomized clinical trial. Chin.Med.J.(Engl). 123 (11):1365-1372, 2010.	RESTART study - wrong comparison: thrombolysis with rescue PCI not fPPCI (55% had rescue PCI)
B. J. Gersh, G. W. Stone, H. D. White, and D. R. J. Holmes. Pharmacological facilitation of primary percutaneous coronary intervention for acute myocardial infarction: is the slope of the curve the shape of the future? JAMA 293 (8):979-986, 2005.	Literature review
C. Michael Gibson, Yuli Ten, Sabina A. Murphy, Lauren N. Ciaglo, Matthew C. Southard, A. Michael Lincoff, and Ron Waksman. Association of	Sunanalysis of REPLACE-2 trial – wrong subgroups:

Reference	Reason for exclusion
prerandomization anticoagulant switching with bleeding in the setting of percutaneous coronary intervention (A REPLACE-2 analysis). Am.J.Cardiol. 99 (12):1687-1690, 2007.	stratified by anti-coagulant use
R R. Giraldez, S D. Wiviott, J C. Nicolau, S Mohanavelu, D A. Morrow, E M. Antman, and R P. Giugliano. Streptokinase and enoxaparin as an alternative to fibrin-specific lytic-based regimens: an ExTRACT-TIMI 25 analysis. Drugs 69 (11):1433-1443, 2009.	EXTRACT-TIMI 25 substudy post-hoc analysis – wrong treatment: patients received streptokinase or alteplase, reteplase or tenecteplase at physician's discretion and were randomised to enoxaparin or UFH. Results have been stratified here by type of fibrinolytic.
R P. Giugliano, L. K Newby, R A. Harrington, C. M Gibson, F Van de Werf, P Armstrong, G Montalescot, J Gilbert, J T. Strony, R M. Califf, E Braunwald, and EARLY ACS Steering Committee. The early glycoprotein IIb/IIIa inhibition in non-ST-segment elevation acute coronary syndrome (EARLY ACS) trial: a randomized placebo-controlled trial evaluating the clinical benefits of early front-loaded eptifibatide in the treatment of patients with non-ST-segment elevation acute coronary syndrome--study design and rationale. Am.Heart J. 149 (6):994-1002, 2005.	Wrong population: NSTEMI-ACS
R P. Giugliano, J A. White, C Bode, P W. Armstrong, G Montalescot, B S. Lewis, A van 't Hof, et al., and A. C. S. EARLY, I. Early versus delayed, provisional eptifibatide in acute coronary syndromes. N.Engl.J.Med. 360 (21):2176-2190, 2009.	Wrong population: NSTEMI
C. L. Grines, D. A. Cox, G. W. Stone, E. Garcia, L. A. Mattos, A. Giambartolomei, B. R. Brodie, O. Madonna, M. Eijgelshoven, A. J. Lansky, W. W. O'Neill, and M. C. Morice. Coronary angioplasty with or without stent implantation for acute myocardial infarction. Stent Primary Angioplasty in Myocardial Infarction Study Group. N Engl J Med 341 (26):1949-1956, 1999.	PAMI trial – wrong comparison: PCI with stenting versus PCI without stenting
M. Gyongyosi, H. Domanovits, W. Benzer, M. Haugk, B. Heinisch, G. Sodeck, R. Hodl, G. Gaul, G. Bonner, et al. Use of abciximab prior to primary angioplasty in STEMI results in early recanalization of the infarct-related artery and improved myocardial tissue reperfusion - results of the Austrian multi-centre randomized ReoPro-BRIDGING Study. Eur.Heart J. 25 (23):2125-2133, 2004.	ReoPRO-BRIDGING study – wrong timing of outcomes: outcome results are only for pre-PCI not post PCI (thus shows effect of fibrinolysis NOT fPPCI)
D. Hartwell, J. Colquitt, E. Loveman, A. J. Clegg, H. Brodin, N. Waugh, P. Royle, P. Davidson, L. Vale, and L. MacKenzie. Clinical effectiveness and cost-effectiveness of immediate angioplasty for acute myocardial infarction: systematic review and economic evaluation. Health.Technol.Assess. 9 (17):1-114, 2005.	Wrong comparison: thrombolysis not fPPCI
T Heestermans, H Suryapranata, J M. ten Berg, A Mosterd, A. T. M. Gosselink, W Kochman, T Dill et al. Facilitated reperfusion with prehospital glycoprotein IIb/IIIa inhibition: predictors of complete ST-segment resolution before primary percutaneous coronary intervention in the On-TIME 2 trial: correlates of reperfusion before primary PCI. J.Electrocardiol. 44 (1):42-48, 2011.	On-TIME 2 SUBSTUDY – wrong outcomes: outcomes during transport and predictors
A. A. C. M. Heestermans, J. W. Van Werkum, C. Hamm, T. Dill, A. T. M. Gosselink, M. J. De Boer, G. Van Houwelingen, J. C. A. Hoorntje, P. C. Koopmans, J. M. Ten Berg, and A. W. J. Van 't Hof. Marked reduction of early stent thrombosis with pre-hospital initiation of high-dose Tirofiban in ST-segment elevation myocardial infarction. J Thromb Haemost 7 (10):1612-1618,	On-TIME 2 SUBSTUDY – wrong outcomes: occurrence of early stent thrombosis

Reference	Reason for exclusion
2009.	
T Heestermans, A W. J. van 't Hof, J M. ten Berg, J W. van Werkum, E Boersma, A Mosterd, P R. Stella et al. The golden hour of prehospital reperfusion with triple antiplatelet therapy: a sub-analysis from the Ongoing Tirofiban in Myocardial Evaluation 2 (On-TIME 2) trial early initiation of triple antiplatelet therapy. Am.Heart J. 160 (6):1079-1084, 2010.	On-TIME 2 SUBSTUDY – wrong outcomes: patency according to time
R. S. Hermanides, Houwelingen G. Van, J. P. Ottervanger, Boer M. J. De, T. Dill, C. Hamm, P. R. Stella, E. Boersma, J. M. Ten Berg, and A. W. J. van't Hof. The impact of age on effects of pre-hospital initiation of high bolus dose of tirofiban before primary angioplasty for st-elevation myocardial infarction. Cardiovasc.Drugs Ther. 25 (4):323-330, 2011.	ONTIME-2 substudy – results stratified by age.
H. C. Herrmann, D. J. Moliterno, E. M. Ohman, A. L. Stebbins, C. Bode, A. Betriu, F. Forycki, et al. Facilitation of early percutaneous coronary intervention after reteplase with or without abciximab in acute myocardial infarction: results from the SPEED (GUSTO-4 Pilot) Trial. J.Am.Coll.Cardiol. 36 (5):1489-1496, 2000.	Substudy of the SPEED (GUSTO-4 pilot) trial - wrong comparison / loss of randomisation: patients originally randomised to abciximab + reteplase (different doses) + PCI versus abciximab + PCI (correct comparison). However this substudy assessed all patients who underwent PCI and divided them into 2 groups and compared – those who had early PCI versus not early PCI.
H. C. Herrmann, J. Lu, B. R. Brodie, P. W. Armstrong, G. Montalescot, A. Betriu, F. J. Neuman, M. B. Effron, E. S. Barnathan, E. J. Topol, S. G. Ellis, and Investigators FINESSE. Benefit of facilitated percutaneous coronary intervention in high-risk ST-segment elevation myocardial infarction patients presenting to nonpercutaneous coronary intervention hospitals. JACC Cardiovasc Interv 2 (10):917-924, 2009.	Retrospective analysis of FINESSE trial – stratification by TIMI risk score
T. Itoh, K. Fukami, T. Suzuki, T. Kimura, Y. Kanaya, M. Orii, I. Goto, H. Matsui, S. Sugawara, S. Nakajima, T. Fusazaki, and M. Nakamura. Comparison of long-term prognostic evaluation between pre-intervention thrombolysis and primary coronary intervention: A prospective randomized trial - Five-year results of the IMPORTANT study. Circulation Journal 74 (8):1625-1634, 2010.	Not true randomisation. The 2 groups of interest were a subgroup of 1 of the original 2 randomised groups. Patients randomised to prior t-PA (n = 50) versus PPCI (n = 51) but the t-PA group was then subdivided into fPPCI (n = 19) and t-PA alone (n = 27). The t-PA alone half of the arm we are not interested in so it would be loss of randomisation to compare the originally randomised PPCI arm (n = 51) to just the fPPCI subgroup (n = 19) of the originally randomised prior t-PA arm (n = 50).
S Khoobiar, N Mejevoi, K Kaid, C Boiangiu, S Setty, A Tanwir, K Khalid, and M Cohen. Primary percutaneous coronary intervention for ST-elevation	Not RCT

Reference	Reason for exclusion
myocardial infarction using an intravenous and subcutaneous enoxaparin low molecular weight heparin regimen. Journal of Thrombosis and Thrombolysis 26 (2):85-90, 2008.	
A. Kastrati, J. Mehilli, K. Schlotterbeck, F. Dotzer, J. Dirschinger, C. Schmitt, S. G. Nekolla, M. Seyfarth, S. Martinoff et al. Early administration of reteplase plus abciximab vs abciximab alone in patients with acute myocardial infarction referred for percutaneous coronary intervention: a randomized controlled trial. JAMA 291 (8):947-954, 2004.	Wrong timing for PPCI arm: adjunctive therapy given in the emergency department or ICU rather than cath lab (as specified in our protocol) thus is a type of fPPCI (patients randomsied to reteplse + abciximab versus abciximab) and drugs in both arms given at the same time in either the ER or ICU.
E. C. Keeley, J. A. Boura, and C. L. Grines. Comparison of primary and facilitated percutaneous coronary interventions for ST-elevation myocardial infarction: quantitative review of randomised trials. Lancet 367 (9510):579-588, 2006.	Old meta-analysis in STEMI patients (published 2006 and included trials only up to 2005)
R. V. Kelly, M. G. Cohen, and E. M. Ohman. Facilitated percutaneous coronary w intervention in acute myocardial infarction: attractive concept but difficult to	Revie
D. J. Kereiakes, N. S. Kleiman, J. Ambrose, M. Cohen, S. Rodriguez, T. Palabrica, H. C. Herrmann, J. M. Sutton, W. D. Weaver, D. B. McKee, V. Fitzpatrick, and F. L. Sax. Randomized, double-blind, placebo-controlled dose-ranging study of tirofiban (MK-383) platelet IIb/IIIa blockade in high risk patients undergoing coronary angioplasty. J.Am.Coll.Cardiol. 27 (3):536-542, 1996.	Wrong population: Angina
T. J. Kiernan, H. H. Ting, and B. J. Gersh. Facilitated percutaneous coronary intervention: current concepts, promises, and pitfalls. Eur.Heart J. 28 (13):1545-1553, 2007.	Literature review
W. Kochman, S. Dobrzycki, K.S. Nowak, S. Chlopicki, P. Kralisz, P. Prokopczuk, H. Bachorzewska-Gajewska, K. Gugala, M. Niewada, G. Mezynski, B. Poniatowski, J. Korecki, and W.J. Musial. Safety and feasibility of a novel dosing regimen of tirofiban administered in patients with acute myocardial infarction with ST elevation before primary coronary angioplasty: a pilot study. Journal of Thrombosis and Thrombolysis 17 (2):127-131, 2004.	Not RCT
V Kodumuri, S Adigopula, P Singh, P Swaminathan, R Arora, and S Khosla. Comparison of low molecular weight heparin with unfractionated heparin during percutaneous coronary interventions: a meta-analysis. Am.J.Ther. 18 (3):180-189, 2011.	Wrong population: not STEMI but mixed
D. D. Kontogianni, N. T. Kouris, and D. D. Babalis. The use of low molecular weight heparins and platelet GP IIb/IIIa inhibitors as adjuncts to thrombolysis: Are there any perspectives? Hell.J.Cardiol. 45 (5):312-323, 2004.	Literature review
J. M. Lablanche, E. P. McFadden, N. Meneveau, J. R. Lusson, B. Bertrand, J. P. Metzger, V. Legrand, et al. Effect of nadroparin, a low-molecular-weight heparin, on clinical and angiographic restenosis after coronary balloon angioplasty: the FACT study. Fraxiparine Angioplastie Coronaire Transluminale. Circulation 96 (10):3396-3402, 1997.	Wrong population: angina
M. Lablanche, E. P. McFadden, N. Meneveau, J. R. Lusson, B. Bertrand, J. P. Metzger, V. Legrand, G. Grollier, C. Macaya,et al. Effect of nadroparin, a low-molecular-weight heparin, on clinical and angiographic restenosis after coronary balloon angioplasty: the FACT study. Fraxiparine Angioplastie	FACT study – wrong population: not STEMI but elective PCI after arterial injury

Reference	Reason for exclusion
Coronaire Transluminale. Circulation 96 (10):3396-3402, 1997.	
A. J. Lansky, Y. Tsuchiya, M. Brener, R. Mehran, E. Cristea, C. Pietras, C. L. Grines, D. A. Cox, E. Garcia, J. E. Tcheng, G. Guagliumi, T. Stuckey, M. Turco, J. D. Carroll, B. D. Rutherford, M. B. Leon, J. Moses, and G. W. Stone. Comparison between ticlopidine and clopidogrel in patients undergoing primary stenting in acute myocardial infarction: Results from the CADILLAC trial. Catheter.Cardiovasc.Interv. 72 (7):917-924, 2008.	Subgroup analysis of CADILLAC trial – wrong subgroups: results stratified by pts who received clopidogrel vs ticlopidine after PCI with stenting
M. Lee, H Liao, T Yang, J Dhoot, J Tobis, G Fonarow, and E Mahmud. Comparison of bivalirudin versus heparin plus glycoprotein IIb/IIIa inhibitors in patients undergoing an invasive strategy: a meta-analysis of randomized clinical trials. Int.J.Cardiol. 152 (3):369-374, 2011.	Meta-analysis – wrong population: not STEMI but mixed
C. W. Lee, D.-H. Moon, M.-K. Hong, J.-H. Lee, S. I. W. Choi, H. S. Yang, J.-J. Kim, S.-W. Park, and S.-J. Park. Effect of Abciximab on myocardial salvage in patients with acute myocardial infarction undergoing primary angioplasty. Am.J.Cardiol. 90 (11):1243-1246, 2002.	Wrong outcomes: pre-PCI results (angiographic only) thus not show effects of fPPCI
Y J Li, S W Rha, K Y Chen, K L. Poddar, Z Jin, Y Minami, L Wang, Q Dang, G P Li, S Ramasamy, J Y Park, C U Choi, et al, and other Korea Acute Myocardial infarction Registry Investigators. Low-molecular-weight heparin versus unfractionated heparin in acute ST-segment elevation myocardial infarction patients undergoing primary percutaneous coronary intervention with drug-eluting stents. Am.Heart J. 159 (4):684, 2010.	KAMIR study – not RCT: patients divided into 2 groups rather than randomised. Additionally wrong comparison: both groups fPPCI using different drugs GPI versus no GPI then subdivided into use of LMWH versus UFH. Also drugs given at the same time not early versus later, thus is not fPPCI versus PPCI.
F. Liang, D. Hu, X. Shi, M. Gao, J. Wei, H. Zhao, L. Wang, S. Jia, H. Wang, R. Liu, Y. Chen, and Y. Lu. Efficacy and safety of single-bolus tenecteplase compared with front-loaded alteplase in Chinese patients with acute myocardial infarction. J.Geriatr.Cardiol. 4 (3):137-141, 2007.	Wrong comparison: both groups randomised to fPPCI (fPPCI using tenecteplase versus fPPCI using alteplase); drugs given in both groups in either the ER or ICU. Additionally <85% had PCI: Only 60-70% had PCI in the end (PCI or CABG was given at the discretion of the physician depending on the angiogram results, angiography was done 90 minutes after the study drugs were administered)
J. P. Leitner and J. D. Abbott. Drug-eluting stents and glycoprotein IIbIIIa inhibitors in the pharmacoinvasive management of ST elevation MI. Intervent.Cardiol. 3 (1):17-21, 2011. Original trial GRACIA-3 = SANCHEZ 2010	GRACIA-3 substudy – results stratified by type of stent rather than GPI versus placebo.
W M Li, X Yang, L F Wang, Y G Ge, H S Wang, L Xu, Z H Ni, and D P Zhang.	Wrong comparison: both

Reference	Reason for exclusion
Comparison of tirofiban combined with dalteparin or unfractionated heparin in primary percutaneous coronary intervention of acute ST-segment elevation myocardial infarction patients. Chin.Med.J.(Engl). 124 (20):3275-3280, 2011.	groups had fPPCI but randomsied to different drugs tirofiban + UFH vs tirofiban + dalteparin. Also drugs given at the same time not early vs. later, thus is not fPPCI vs PPCI.
G.-M. Lin and C.-L. Han. Risk profile and benefits from Gp IIb-IIIa inhibitors among patients with ST-segment elevation myocardial infarction treated with primary angioplasty: A meta-regression analysis of randomized trials. Eur.Heart J. 31 (6):753-754, 2010.	Letter
A. M. Lincoff, R. M. Califf, D. J. Moliterno, S. G. Ellis, J. Ducas, J. H. Kramer, N. S. Kleiman, E. A. Cohen, J. E. Booth, S. K. Sapp, C. F. Cabot, E. J. Topol, J. E. Tcheng, J. D. Talley, P. O. Caramori, J. R. Burton, T. A. Kelly, and T. B. Ivanc. Complementary clinical benefits of coronary-artery stenting and blockade of platelet glycoprotein IIb/IIIa receptors. N.Engl.J.Med. 341 (5):319-327, 1999.	Wrong population: not STEMI (AMI excluded)
T Liu, Ying Xie, Yu jie Zhou, Yue ping Li, Han ying Ma, Yong he Guo, Yu yang Liu, Ying xin Zhao, and Dong mei Shi. Effects of upstream tirofiban versus downstream tirofiban on myocardial damage and 180-day clinical outcomes in high-risk acute coronary syndromes patients undergoing percutaneous coronary interventions. Chin.Med.J.(Engl). 122 (15):1732-1737, 2009.	Wrong population: NSTEMI
M. A. McDonald, Y. Fu, U. Zeymer, G. Wagner, S. G. Goodman, A. Ross, C. B. Granger, F. Van de Werf, P. W. Armstrong, and P. C. I. investigators. Adverse outcomes in fibrinolytic-based facilitated percutaneous coronary intervention: insights from the ASSENT-4 PCI electrocardiographic substudy. Eur.Heart J. 29 (7):871-879, 2008.	ASSENT-4 substudy: wrong outcomes – ECG outcomes
M A. McDonald, Y Fu, U Zeymer, G Wagner, S G. Goodman, A Ross, C B. Granger, F Van de Werf, P W. Armstrong, and P. C. I. investigators. Adverse outcomes in fibrinolytic-based facilitated percutaneous coronary intervention: insights from the ASSENT-4 PCI electrocardiographic substudy. Eur.Heart J. 29 (7):871-879, 2008.	ASSENT-4 SUBSTUDY- wrong outcomes: outcomes stratified by extent of ST resolution
T. Mann, G. Cubeddu, J. Bowen, J. E. Schneider, M. Arrowood, W. N. Newman, M. J. Zellinger, and G. C. Rose. Stenting in acute coronary syndromes: a comparison of radial versus femoral access sites. J.Am.Coll.Cardiol. 32 (3):572-576, 1998.	Not RCT – randomisation not mentioned. Patients in each group were matched by specific characteristics.
L. Marcoff, Z. Zhang, W. Zhang, E. Ewen, C. Jurkovitz, P. Leguet, P. Kolm, and W. S. Weintraub. Cost effectiveness of enoxaparin in acute ST-segment elevation myocardial infarction: the ExTRACT-TIMI 25 (Enoxaparin and Thrombolysis Reperfusion for Acute Myocardial Infarction Treatment-Thrombolysis In Myocardial Infarction 25) study. J.Am.Coll.Cardiol. 54 (14):1271-1279, 2009.	EXTRACT-TIMI 25 study - wrong comparison: thrombolysis with 2 different drugs rather than fPPCI
J. D. Marmur, C. A. Mitre, E. Barnathan, and E. Cavusoglu. Benefit of bolus-only platelet glycoprotein IIb/IIIa inhibition during percutaneous coronary intervention: Insights from the very early outcomes in the Evaluation of 7E3 for the Prevention of Ischemic Complications (EPIC) trial. Am.Heart J. 152 (5):876-881, 2006.	EPIC trial – wrong population: not STEMI but mixed
Marco A. Martinez-Rios, Martin Rosas, Hector Gonzalez, Marco A. Pena-Duque, Carlos Martinez-Sanchez, Jorge Gaspar, Hector Garcia, Efrain Gaxiola, Luis Delgado, Jorge Carrillo, Jose Luis Leyva, Eulo Lupi, and Investigators SASTRE. Comparison of reperfusion regimens with or without tirofiban in ST-elevation acute myocardial infarction. Am.J.Cardiol. 93 (3):280-287, 2004.	Randomised patients with STEMI to 'usual reperfusion' (group A) or to 'combined reperfusion with tirofiban' (group B). They then randomised patients again to either fibrinolysis or PPCI, creating 4 groups (A1, A2,

Reference	Reason for exclusion
	B1,B2). It is unclear whether the PPCI procedures were carried out as quickly as possible and whether the tirofiban was administered as part of a facilitation strategy and the authors refer to 'standard primary stenting PCI'.
A Marzocchi, A Manari, G Piovaccari, C Marrozzini, S Marra, P Magnavacchi, P Sangiorgio et al. and F. A. T. A. Investigators. Randomized comparison between tirofiban and abciximab to promote complete ST-resolution in primary angioplasty: results of the facilitated angioplasty with tirofiban or abciximab (FATA) in ST-elevation myocardial infarction trial. Eur.Heart J. 29 (24):2972-2980, 2008.	FATA trial – wrong comparison: both groups randomised to fPPCI with different drugs (fPPCI using abciximab versus fPPCI using tirofiban); drugs could be administered in ER, ambulance or cath lab in either group (it was not given at a prespecified different time in each group).
G. Medic, M. Schwenkglenks, I. Eijgelshoven, A. Smith, J. Day, S. Plent, G. Bergman, and T. Toward. Relative efficacy of bivalirudin vs. heparin alone in stemi patients treated with primary PCI - An indirect treatment comparison. Value in Health 14 (7):A367, 2011.	Abstract
R Mehran, A J. Lansky, B Weitzenbichler, G Guagliumi, J Z. Peruga, B R. Brodie, et al, and Trial HORIZONS-AMI, I. Bivalirudin in patients undergoing primary angioplasty for acute myocardial infarction (HORIZONS-AMI): 1-year results of a randomised controlled trial. Lancet 374 (9696):1149-1159, 2009.	HORIZONS-AMI trial - wrong comparison: both arms fPPCI using different drugs (Bivalirudin versus Heparin + GPI) then PCI in both.
S. R. Mehta, W. E. Boden, J. W. Eikelboom, M. Flather, P. G. Steg, A. Avezum, R. Afzal, L. S. Piegas, et al, and OASIS 5 and 6 Investigators. Antithrombotic therapy with fondaparinux in relation to interventional management strategy in patients with ST- and non-ST-segment elevation acute coronary syndromes: an individual patient-level combined analysis of the Fifth and Sixth Organization to Assess Strategies in Ischemic Syndromes (OASIS 5 and 6) randomized trials. Circulation 118 (20):2038-2046, 2008.	OASIS 5 and 6 trials – wrong population: NSTEMI/STEMI mixed (not separated into each group)
M. G. Midei, V. J. Coombs, D. R. Lowry, M. N. Drossner, K. C. Prewitt, J. C. Wang, M. B. Loughrey, and S. O. Gottlieb. Clinical outcomes comparing eptifibatide and abciximab in ST elevation acute myocardial infarction patients undergoing percutaneous coronary interventions. Cardiology 107 (3):172-177, 2007.	Not RCT
G. J. Mishkel, A. L. Moore, S. J. Markwell, and R. W. Ligon. Bivalirudin versus heparin plus glycoprotein IIb/IIIa inhibitors in drug-eluting stent implantations in the absence of acute myocardial infarction: clinical and economic results (Provisional abstract). J.Invasive Cardiol. 19 (2):63-68, 2007.	Not RCT
G Montalescot, U Zeymer, J Silvain, B Boulanger, M Cohen, P Goldstein, P Ecollan, X Combes, K Huber et al, and Investigators ATOLL. Intravenous enoxaparin or unfractionated heparin in primary percutaneous coronary intervention for ST-elevation myocardial infarction: the international randomised open-label ATOLL trial. Lancet 378 (9792):693-703, 2011.	ATOLL trial - wrong comparison: both arms fPPCI using different drugs (enoxaparin versus heparin) then PCI in both.

Reference	Reason for exclusion
D. J. Moliterno and E. J. Topol. Conjunctive use of platelet glycoprotein IIb/IIIa antagonists and thrombolytic therapy for acute myocardial infarction. Thromb.Haemost. 78 (1):214-219, 1997.	Literature review
G Montalescot, SG. Ellis, MA. de Belder, L Janssens, O Katz, W Pluta, P Ecollan, M Tendera, Ad J. van Boven, P Widimsky, HR. Andersen et al, and Facilitated INtervention with Enhanced Reperfusion Speed to Stop Events Investigators. Enoxaparin in primary and facilitated percutaneous coronary intervention A formal prospective nonrandomized substudy of the FINESSE trial (Facilitated INtervention with Enhanced Reperfusion Speed to Stop Events). JACC Cardiovasc Interv 3 (2):203-212, 2010.	FINESSE substudy: non-randomised data and wrong comparison. Analysed results by dividing the fPPCI arm into people who had enoxaparin or unfractionated heparin, depending which was given (so both these groups are fPPCI – the wrong comparison).
G Montalescot, M Borentain, L Payot, J P Collet, and D Thomas. Early vs late administration of glycoprotein IIb/IIIa inhibitors in primary percutaneous coronary intervention of acute ST-segment elevation myocardial infarction: a meta-analysis. JAMA 292 (3):362-366, 2004.	Old meta-analysis in STEMI patients (published 2004 and included trials only up to 2004)
G. Montalescot, D. Antoniucci, A. Kastrati, F. J. Neumann, M. Borentain, A. Migliorini, C. Boutron, J.-P. Collet, and E. Vicaut. Abciximab in primary coronary stenting of ST-elevation myocardial infarction: A European meta-analysis on individual patients' data with long-term follow-up. Eur.Heart J. 28 (4):443-449, 2007.	IPD meta-analysis of just 3 trials (all pre-2008) and not a systematic search.
M K. Natarajan, J L. Velianou, A G. G. Turpie, S R. Mehta, D Raco, D M. Goodhart, R Afzal, and J S. Ginsberg. A randomized pilot study of dalteparin versus unfractionated heparin during percutaneous coronary interventions. Am.Heart J. 151 (1):175, 2006.	Wrong population: not STEMI (mixed)
F. J. Neumann, R. Blasini, C. Schmitt, E. Alt, J. Dirschinger, M. Gawaz, A. Kastrati, and A. Schomig. Effect of glycoprotein IIb/IIIa receptor blockade on recovery of coronary flow and left ventricular function after the placement of coronary-artery stents in acute myocardial infarction. Circulation 98 (24):2695-2701, 1998.	Not true fPPCI: had intervention within 48h of symptoms
F. J. Neumann, A. Kastrati, C. Schmitt, R. Blasini, M. Hadamitzky, J. Mehilli, M. Gawaz, M. Schleef, M. Seyfarth, J. Dirschinger, and A. Schomig. Effect of glycoprotein IIb/IIIa receptor blockade with abciximab on clinical and angiographic restenosis rate after the placement of coronary stents following acute myocardial infarction. J.Am.Coll.Cardiol. 35 (4):915-921, 2000.	Not true fPPCI: had intervention within 48h of symptoms
C. M. O'Connor, R. B. Meese, S. McNulty, K. D. Lucas, R. J. Carney, R. M. LeBoeuf, W. Maddox, C. F. Bethea, N. Shadoff, T. F. Trahey, J. A. Heinsimer, J. M. Burks, G. O'Donnell, M. W. Krucoff, and R. M. Califf. A randomized factorial trial of reperfusion strategies and aspirin dosing in acute myocardial infarction. Am.J.Cardiol. 77 (10):791-797, 1996.	Wrong drug: anisteprase (not used in UK)
W. W. O'Neill, R. Weintraub, C. L. Grines, T. B. Meany, B. R. Brodie, H. Z. Friedman, R. G. Ramos, V. Gangadharan, R. N. Levin, N. Choksi, and . A prospective, placebo-controlled, randomized trial of intravenous streptokinase and angioplasty versus lone angioplasty therapy of acute myocardial infarction. Circulation 86 (6):1710-1717, 1992.	PRAGUE study – wrong intevention: streptokinase (not used in UK)
G. Parodi, R. Sciagra, A. Migliorini, G. Memisha, G. Moschi, R. Valenti, A. Pupi, and D. Antoniucci. A randomized trial comparing clopidogrel versus ticlopidine therapy in patients undergoing infarct artery stenting for acute myocardial infarction with abciximab as adjunctive therapy. *Am.Heart J.* 150 (2):220, 2005.	Wrong comparison: both arms fPPCI using different drugs (clopidogrel versus ticlopidine).
K. Pels, J. Schroder, B. Witzenbichler, D. Muller, A. Morguet, M. Pauschinger, H.	0% stents used (not

Reference	Reason for exclusion
P. Schultheiss, and H. R. Arntz. Prehospital versus periprocedural abciximab in ST-elevation myocardial infarction treated by percutaneous coronary intervention. European journal of emergency medicine : official journal of the European Society for Emergency Medicine 15 (6):324-329, 2008.	mentioned their use in the protocol or results). Comparison fPPCI versus PPCI (early abciximab versus later abciximab).
S Peters, M Truemmel, and B Koehler. Facilitated PCI by combination fibrinolysis or upstream tirofiban in acute ST-segment elevation myocardial infarction: results of the Alteplase and Tirofiban in Acute Myocardial Infarction (ATAMI) trial. Int.J.Cardiol. 130 (2):235-240, 2008.	ATAMI trial – wrong timing (not true fPPCI): PCI given only 43 and 112 hours later
A. S. Petronio, D. Rovai, G. Musumeci, R. Baglini, C. Nardi, U. Limbruno, C. Palagi, D. Volterrani, and M. Mariani. Effects of abciximab on microvascular integrity and left ventricular functional recovery in patients with acute infarction treated by primary coronary angioplasty. Eur.Heart J. 24 (1):67-76, 2003.	Wrong sample size: n<60 (n = 31) already have larger studies or abciximab.
M. Piorkowski, J. Priess, U. Weikert, M. Jaster, P.-L. Schwimmbeck, H.-P. Schultheiss, and U. Rauch. Abciximab therapy is associated with increased platelet activation and decreased heparin dosage in patients with acute myocardial infarction. Thromb.Haemost. 94 (2):422-426, 2005.	Wrong sample size (N<60, 30) for abciximab studies as got larger studies; wrong outcomes: not clinical just platelet activation markers
F Prati, S Petronio, Ad J. van Boven, M Tendera, L De Luca, M A. de Belder, A R. Galassi, F Imola, et al, and substudy investigators FINESSE-ANGIO. Evaluation of infarct-related coronary artery patency and microcirculatory function after facilitated percutaneous primary coronary angioplasty: the FINESSE-ANGIO (Facilitated Intervention With Enhanced Reperfusion Speed to Stop Events-Angiographic) study. JACC Cardiovasc Interv 3 (12):1284-1291, 2010.	FINESSE trial substudy – wrong patients and wrong outcomes: ony looked at a subset of patients and outcomes of TIMI score change.
M. Rabah, D. Mason, D. W. Muller, R. Hundley, A. D. Kugelmass, B. Weiner, L. Cannon, W. W. O'Neill, and R. D. Safian. Heparin after percutaneous intervention (HAPI): a prospective multicenter randomized trial of three heparin regimens after successful coronary intervention. J.Am.Coll.Cardiol. 34 (2):461-467, 1999.	HAPI trial - wrong treatment: treatment post-PCI (not initiated before PCI thus not true fPPCI).
LE. Rabbani, S Iyengar, GD. Dangas, CL. Grines, DA. Cox, E Garcia, JE. Tcheng, JJ. Griffin, G Guagliumi et al. Impact of thienopyridine administration prior to primary stenting in acute myocardial infarction. J.Intervent.Cardiol. 22 (4):378-384, 2009. Original CADILLAC trial = STONE 2006 and STONE 2002	CADILLAC trial substudy - (loss of randomisation) and wrong comparison: looked at effect of patients who received thienopyradine versus no thienopyradine prior to stenting. The original trial randomsied groups were stent + abciximab versus stent.
T. Rakowski, J. Zalewski, J. Legutko, S. Bartus, L. Rzeszutko, A. Dziewierz, D. Sorysz, L. Bryniarski, K. Zmudka, G. L. Kaluza, J. S. Dubiel, and D. Dudek. Early abciximab administration before primary percutaneous coronary intervention improves infarct-related artery patency and left ventricular function in high-risk patients with anterior wall myocardial infarction: A randomized study. Am.Heart J. 153 (3):360-365, 2007.	Early vs later abciximab trial but wrong sample size: N<60 (N=59) already got much larger abciximab studies.
T. Rakowski, Z. Siudak, A. Dziewierz, R. Birkemeyer, J. Legutko, W. Mielecki, R. Depukat, M. Janzon, J. Stefaniak, K. Zmudka, J. S. Dubiel, L. Partyka, and D. Dudek. Early abciximab administration before transfer for primary percutaneous coronary interventions for ST-elevation myocardial infarction reduces 1-year mortality in patients with high-risk profile. Results from EUROTRANSFER Registry. Am.Heart J. 158 (4):569-575, 2009.	EUROTRANSFER study – not an RCT.

Reference	Reason for exclusion
M. T. Roe. Facilitated percutaneous coronary intervention for acute ST-segment elevation myocardial infarction: Results from the prematurely terminated ADdressing the Value of facilitated ANgioplasty after Combination therapy or Eptifibatide monotherapy in acute Myocardial Infarction (ADVANCE MI) trial. Am.Heart J. 150 (1):116-122, 2005.	ADVANCE-MI trial – wrong comparison: although this is fPPCI versus PPCI (tenecteplase + eptifibatide versus placebo + eptifibatide), half the patients in each group were given UFH and the other half no UFH. Additionally 0% stents used (not mentioned their use in the protocol or results).
A. M. Ross, K. S. Coyne, J. S. Reiner, S. W. Greenhouse, C. Fink, A. Frey, E. Moreyra, M. Traboulsi, et al. A randomized trial comparing primary angioplasty with a strategy of short-acting thrombolysis and immediate planned rescue angioplasty in acute myocardial infarction: the PACT trial. PACT investigators. Plasminogen-activator Angioplasty Compatibility Trial. J.Am.Coll.Cardiol. 34 (7):1954-1962, 1999.	Wrong percentage stents: <50% - only 26% received stents
M. S. Sabatine, C. P. Cannon, C. M. Gibson, J. L. Lopez-Sendon, G. Montalescot, P. Theroux, B. S. Lewis, S. A. Murphy, C. H. McCabe, and E. Braunwald. Effect of clopidogrel pretreatment before percutaneous coronary intervention in patients with ST-elevation myocardial infarction treated with fibrinolytics: The PCI-CLARITY study. JAMA 294 (10):1224-1232, 2005.	PCI-CLARITY study – loss of randomisation: subanalysis of the CLARITY study. Only looking at the results of the subgroup of people who had PCI in each of the original randomsied groups (clopidogrel versus placebo).
P. L. Sanchez, F. Gimeno, P. Ancillo, J. J. Sanz, J. H. Alonso-Briales, F. Bosa, I. Santos, J. Sanchis, A. Bethencourt, J. Lopez-Messa et al. Role of the paclitaxel-eluting stent and tirofiban in patients with ST-elevation myocardial infarction undergoing postfibrinolysis angioplasty: the GRACIA-3 randomized clinical trial. Circ Cardiovasc.Interv 3 (4):297-307, 2010.	GRACIA-3 trial: percentage of patients who had PCI <85% (83% overall, range was 77%-90% in each of the 4 arms).
J Saw, A. M Lincoff, W Desmet, A Betriu, W Rutsch, R G. Wilcox, N S. Kleiman, K Wolski, E J. Topol, and REPLACE-2 Investigators. Lack of clopidogrel pretreatment effect on the relative efficacy of bivalirudin with provisional glycoprotein IIb/IIIa blockade compared to heparin with routine glycoprotein IIb/IIIa blockade: a REPLACE-2 substudy. J.Am.Coll.Cardiol. 44 (6):1194-1199, 2004.	REPLACE-2 substudy – wrong population: not STEMI
U. Schaefer, T. Kurz, H. Bonnemeier, A. Dendorfer, F. Hartmann, H. Schunkert, and G. Richardt. Intracoronary enalaprilat during angioplasty for acute myocardial infarction: Alleviation of postischaemic neurohumoral and inflammatory stress? J.Intern.Med. 261 (2):188-200, 2007.	Wrong treatment: treatment DURING angioplasty (not initiated before PCI thus not true fPPCI).
A. Sethi, A. Bahekar, H. Doshi, R. Bhuriya, U. Bedi, S. Singh, and S. Khosla. Tirofiban Use With Clopidogrel and Aspirin Decreases Adverse Cardiovascular Events After Percutaneous Coronary Intervention for ST-Elevation Myocardial Infarction: A Meta-analysis of Randomized Trials. Can.J.Cardiol. 27 (5):548-554, 2011.	New 2011 SR/MA (serch until 2010 so some missing studies) – used for references /conclusions
Rahul A. Shimpi. Low-molecular-weight heparins and glycoprotein IIb/IIIa inhibitors with percutaneous coronary intervention in acute coronary syndromes. J.Invasive Cardiol. 15 (8):460-465, 2003.	Literature review

Reference	Reason for exclusion
J. M. Siller-Matula, K. Huber, G. Christ, K. Schror, J. Kubica, H. Herkner, and B. Jilma. Impact of clopidogrel loading dose on clinical outcome in patients undergoing percutaneous coronary intervention: A systematic review and meta-analysis. Heart 97 (2):98-105, 2011.	Wrong population: not just STEMI
J. Silvain, O. Barthelemy, F. Beygui, J.-P. Collet, and G. Montalescot. Enoxaparin versus unfractionated heparin in percutaneous coronary intervention: A meta-analysis. Circulation 124 (21 SUPPL. 1), 2011.	Abstract
R. W. Smalling, G. M. Giesler, V. R. Julapalli, A. E. Denktas, S. M. Sdringola, M. T. Vooletich, J. J. McCarthy, R. N. Bradley, D. E. Persse, B. K. Richter, M. Yagi, K. Fujise, and H. V. Anderson. Pre-hospital reduced-dose fibrinolysis coupled with urgent percutaneous coronary intervention reduces time to reperfusion and improves angiographic perfusion score compared with prehospital fibrinolysis alone or primary percutaneous coronary intervention: results of the PATCAR Pilot Trial. J.Am.Coll.Cardiol. 50 (16):1612-1614, 2007.	PACTAR pilot trial - short report (not enough detail); feasibility study not powered; results pooled for the two PPCI arms.
J. J. J. Smit, J. W. Van Werkum, Berg J. Ten, R. Slingerland, J. P. Ottervanger, T. Heestermans, T. Dill, C. Hamm, and A. W. J. Van 't Hof. Prehospital triple antiplatelet therapy in patients with acute ST elevation myocardial infarction leads to better platelet aggregation inhibition and clinical outcome than dual antiplatelet therapy. Heart 96 (22):1815-1820, 2010.	ON-TIME 2 substudy – wrong outcomes: effect on platelet aggregation.
J. J. J. Smit, N. M. S. K. Ernst, R. J. Slingerland, J. J. E. Kolkman, H. Suryapranata, J. C. A. Hoorntje, J. H. Dambrink, J. P. Ottervanger, A. T. M. Gosselink, M. J. De Boer, and A. W. J. van't Hof. Platelet microaggregation inhibition in patients with acute myocardial infarction pretreated with tirofiban and relationship with angiographic and clinical outcome. Am.Heart J. 151 (5):1109-1114, 2006.	Wrong outcomes: platelet aggregation
D. Y. So, A. C. Ha, R. F. Davies, M. Froeschl, G. A. Wells, and M. R. Le May. ST segment resolution in patients with tenecteplase-facilitated percutaneous coronary intervention versus tenecteplase alone: Insights from the Combined Angioplasty and Pharmacological Intervention versus Thrombolysis ALone in Acute Myocardial Infarction (CAPITAL AMI) trial. Can.J.Cardiol. 26 (1):e7-12, 2010.	CAPITAL-AMI substudy: wrong outcomes – ST segment resolution in each of the randomised groups
S. R. Steinhubl, S. G. Ellis, K. Wolski, A. M. Lincoff, and E. J. Topol. Ticlopidine pretreatment before coronary stenting is associated with sustained decrease in adverse cardiac events: Data from the evaluation of platelet IIb/IIIa inhibitor for stenting (EPISTENT) trial. Circulation 103 (10):1403-1409, 2001.	EPISTENT trial – wrong population: not STEMI (STEMI excluded)
G. W. Stone, C. L. Grimes, K. F. Browne, J. Marco, D. Rothbaum, J. O'Keefe, G. O. Hartzler, P. Overlie, B. et al. Predictors of in-hospital and 6-month outcome after acute myocardial infarction in the reperfusion era: The primary angioplasty in myocardial infarction (PAMI) trial. J.Am.Coll.Cardiol. 25 (2):370-377, 1995.	PAMI trial subanalysis – wrong outcomes: predictors of outcomes (not RCT results)
G. W. Stone. Impact of new pharmacologic agents in the treatment of acute thrombotic syndromes. Am.J.Cardiol. 83 (9 A):16E-20E, 1999.	Literature review
G. W. Stone, C. L. Grines, D. A. Cox, E. Garcia, J. E. Tcheng, J. J. Griffin, G. Guagliumi, T. Stuckey, M. Turco, J. D. Carroll, B. D. Rutherford, and A. J. Lansky. Comparison of angioplasty with stenting, with or without abciximab, in acute myocardial infarction. N Engl J Med 346 (13):957-966, 2002.	CADILLAC trial - wrong comparison - not representative of current clinical practice / not fPPCI: PPCI with stenting vs. PPCI with no stenting vs. thrombolysis with no stenting
L Svensson, M Aasa, M Dellborg, C. M Gibson, A Kirtane, J Herlitz, A Ohlsson, T Karlsson, and L Grip. Comparison of very early treatment with either fibrinolysis or percutaneous coronary intervention facilitated with abciximab with respect to ST recovery and infarct-related artery epicardial flow in	SWEDES trial – wrong comparison: no PCI in 1 arm (fPPCI versus fibrinolysis)

Reference	Reason for exclusion
patients with acute ST-segment elevation myocardial infarction: the Swedish Early Decision (SWEDES) reperfusion trial. Am.Heart J. 151 (4):798-7, 2006.	
H. Thiele, M. Scholz, L. Engelmann, W. H. Storch, A. Hartmann, G. Dimmel, D. Pfeiffer, G. Schuler, and Leipzig Prehospital Fibrinolysis Group. ST-segment recovery and prognosis in patients with ST-elevation myocardial infarction reperfused by prehospital combination fibrinolysis, prehospital initiated facilitated percutaneous coronary intervention, or primary percutaneous coronary intervention. Am.J.Cardiol. 98 (9):1132-1139, 2006.	PPCI group not randomised
H. Thiele, L. Engelmann, K. Elsner, M. J. Kappl, W. H. Storch, K. Rahimi, A. Hartmann, D. Pfeiffer, G. D. Kneissl, D. Schneider, T. Moller, H. J. Heberling, I. Weise, G. Schuler, and Leipzig Prehospital Fibrinolysis Group. Comparison of pre-hospital combination-fibrinolysis plus conventional care with pre-hospital combination-fibrinolysis plus facilitated percutaneous coronary intervention in acute myocardial infarction. Eur.Heart J. 26 (19):1956-1963, 2005.	Wrong comparison: fPPCI vs thrombolysis
Tilsted-Hansen, L. Thuesen, K. Rasmussen, H. R. Andersen, T. Vesterlund, A. B. Villadsen, A. P. Schroeder, S. E. Husted, and T. T. Nielsen. Percutaneous transluminal coronary angioplasty versus thrombolysis in acute myocardial infarction. Scand.Cardiovasc.J. 34 (4):365-370, 2000.	Wrong intervention: thrombolysis not fPPCI
E. J. Topol, R. M. Califf, M. Vandormael, C. L. Grines, B. S. George, M. L. Sanz, T. Wall, M. O'Brien, M. Schwaiger, et al. A randomized trial of late reperfusion therapy for acute myocardial infarction. Circulation 85 (6):2090-2099, 1992.	Patients randomised twice: second randomisation meant that 50% of patients did not receive angioplasty (angioplasty versus no angioplasty).
M. Valgimigli, G. Percoco, P. Malagutti, G. Campo, F. Ferrari, D. Barbieri, G. Cicchitelli, E. P. McFadden, F. Merlini, et al. Tirofiban and sirolimus-eluting stent vs abciximab and bare-metal stent for acute myocardial infarction: A randomized trial. JAMA 293 (17):2109-2117, 2005.	STRATEGY trial - wrong comparison: both arms fPPCI using different drugs and different stents (abciximab + BMS versus tirofiban + DES).
M. Valgimigli, G. Campo, G. Percoco, L. Bolognese, C. Vassanelli, S. Colangelo, Cesare N. De, A. E. Rodriguez, M. Ferrario, et al. Comparison of angioplasty with infusion of tirofiban or abciximab and with implantation of sirolimus-eluting or uncoated stents for acute myocardial infarction: The Multistrategy randomized trial. JAMA 299 (15):1788-1799, 2008.	MULTISTRATEGY trial - wrong comparison: both arms fPPCI using different drugs and different stents (abciximab versus tirofiban) then PCI with different stents (DES or BMS).
M. Valgimigli, L. Bolognese, M. Anselmi, G. Campo, A. E. Rodriguez, Cesare N. De, D. J. Cohen, I. Sheiban, S. Colangelo, et al. Two-by-two factorial comparison of high-bolus-dose tirofiban followed by standard infusion versus abciximab and sirolimus-eluting versus bare-metal stent implantation in patients with acute myocardial infarction. Design and rationale for the MULTI-STRATEGY trial. Am.Heart J. 154 (1):39-45, 2007.	MULTISTRATEGY trial – wrong comparison: tirofiban + PCI vs abciximab + PCI (both fPPCI arms with different drugs not PPCI)
F. Vermeer, A. J. Oude Ophuis, E. J. vd Berg, L. G. Brunninkhuis, C. J. Werter, A. G. Boehmer, A. H. Lousberg, W. R. Dassen, and F. W. Bar. Prospective randomised comparison between thrombolysis, rescue PTCA, and primary PTCA in patients with extensive myocardial infarction admitted to a hospital without PTCA facilities: a safety and feasibility study. Heart 82 (4):426-431, 1999.	Wrong fPPCI intervention: fibrinolysis + rescue PCI. Also PCI performed in <85% patients (53% and 85% in each arm; mean 74%). Percentage stents <50% (4% and 17% in each arm
C. M. Westerhout, E. Bonnefoy, R. C. Welsh, P. G. Steg, F. Boutitie, and P. W.	IPD analysis of WEST and

Reference	Reason for exclusion
Armstrong. The influence of time from symptom onset and reperfusion strategy on 1-year survival in ST-elevation myocardial infarction: A pooled analysis of an early fibrinolytic strategy versus primary percutaneous coronary intervention from CAPTIM and WEST. Am.Heart J. 161 (2):283-290, 2011.	CAPTIM trials – wrong intervention: thrombolysis not fPPCI
P. Widimsky, L. Groch, M. Zelizko, M. Aschermann, F. Bednar, and H. Suryapranata. Multicentre randomized trial comparing transport to primary angioplasty vs immediate thrombolysis vs combined strategy for patients with acute myocardial infarction presenting to a community hospital without a catheterization laboratory. The PRAGUE study. Eur.Heart J. 21 (10):823-831, 2000.	PRAGUE study – wrong intevention: streptokinase (not used in UK)
P. Widimsky, T. Budesinsky, D. Vorac, L. Groch, M. Zelizko, M. Aschermann, M. Branny, J. St'asek, P. Formanek, and 'PRAGUE' Study Group. Long distance transport for primary angioplasty vs immediate thrombolysis in acute myocardial infarction. Final results of the randomized national multicentre trial--PRAGUE-2. Eur.Heart J. 24 (1):94-104, 2003.	Wrong comparison: thrombolysis not fPPCI
A. Wong, K.-H. Mak, C. Chan, T.-H. Koh, K.-W. Lau, T.-T. Lim, S.-T. Lim, P. Wong, L.-L. Sim, Y.-T. Lim, H.-C. Tan, and Y.-L. Lim. Combined fibrinolysis using reduced-dose alteplase plus abciximab with immediate rescue angioplasty versus primary angioplasty with adjunct use of abciximab for the treatment of acute myocardial infarction: Asia-Pacific Acute Myocardial Infarction Trial (APAMIT) pilot study. Catheter.Cardiovasc.Interv. 62 (4):445-452, 2004.	APAMIT pilot study - wrong intervention: thrombolysis + rescue PCI (not true fPPCI)
B. S. Young, J.-Y. Hahn, H.-C. Gwon, H. K. Jun, Y. L. Sang, H. C. Yeon, S.-H. Choi, J.-H. Choi, and H. L. Sang. Upstream high-dose tirofiban does not reduce myocardial infarct size in patients undergoing primary percutaneous coronary intervention: A magnetic resonance imaging pilot study. Clinical Cardiology 32 (6):321-326, 2009.	Wrong outcomes (MI infarct size and LVEF)
J Zalewski, K Bogaerts, W Desmet, P Sinnaeve, P Berger, C Grines, T Danays, P Armstrong, and F Van de Werf. Intraluminal thrombus in facilitated versus primary percutaneous coronary intervention: an angiographic substudy of the ASSENT-4 PCI (Assessment of the Safety and Efficacy of a New Treatment Strategy with Percutaneous Coronary Intervention) trial. J.Am.Coll.Cardiol. 57 (19):1867-1873, 2011.	ASSENT-4 SUBSTUDY- wrong outcomes: occurrence of intraluminal thrombus
U. Zeymer. The role of eptifibatide in patients undergoing percutaneous coronary intervention. Expert Opin Pharmacother 8 (8):1147-1154, 2007.	Literature review

J.3 Radial versus femoral arterial access for PPCI

Reference	Reason for exclusion
Agostoni P, Biondi-Zoccai GG, de Benedictis ML, Rigattieri S, Turri M, Anselmi M, Vassanelli C, Zardini P, Louvard Y, Hamon M. Radial versus femoral approach for percutaneous coronary diagnostic and interventional procedures; Systematic overview and meta-analysis of randomized trials. J Am Coll Cardiol. 2004; 44(2):349-56.	Not RCT; meta-analysis (used for cross checking)
Bagur R, Bertrand OF, Rodés-Cabau J, Rinfret S, Larose E, Tizón-Marcos H, Gleeton O, Nguyen CM, Roy L, Costerousse O, De Larochellière R. Comparison of outcomes in patients ≥70 years versus <70 years after transradial coronary stenting with maximal antiplatelet therapy for acute coronary syndrome. Am J Cardiol. 2009; 104(5):624-9.	All patients treated using radial access approach; patients presenting with STEMI within 72 hrs were excluded
Bell BP, Pyne CT, and Rao SV. Transradial percutaneous coronary intervention in patients with acute coronary syndromes. Acute Coronary Syndromes.2011; 10: 64-72.	Not RCT; narrative review
Bertrand OF, Belisle P, Joyal D, Costerousse O, Rao S, Jolly S et al. Comparison of transradial and femoral approaches for percutaneous coronary	Not RCT; meta-analysis (used for cross checking)

Reference	Reason for exclusion
interventions: A hierarchical bayesian meta-analysis. Canadian Journal of Cardiology. 2011; 27(5 SUPPL. 1):S114.	
Brueck M, Bandorski D, Kramer W, Wieczorek M, Höltgen R, Tillmanns H. A randomized comparison of transradial versus transfemoral approach for coronary angiography and angioplasty. JACC Cardiovasc Interv. 2009; 2(11):1047-54.	Only 8% of the study population had acute STEMI, remaining recent MI and previous PCI
Cantor WJ, Puley G, Natarajan MK, Dzavik V, Madan M, Fry A et al. Radial versus femoral access for emergent percutaneous coronary intervention with adjunct glycoprotein IIb/IIIa inhibition in acute myocardial infarction--the RADIAL-AMI pilot randomized trial. American Heart Journal. 2005; 150(3):543-549.	RCT intervention not restricted to PPCI
Cantor WJ, Mahaffey KW, Huang Z, Das P, Gulba DC, Glezer S, Gallo R, Ducas J, Cohen M, Antman EM, Langer A, Kleiman NS, White HD, Chisholm RJ, Harrington RA, Ferguson JJ, Califf RM, Goodman SG. Bleeding complications in patients with acute coronary syndrome undergoing early invasive management can be reduced with radial access, smaller sheath sizes, and timely sheath removal. Catheter Cardiovasc Interv. 2007; 69(1):73-83.	Patients not randomised according to femoral versus radial access Wrong population (NSTEMI)
Chung WJ, Fang HY, Tsai TH, Yang CH, Chen CJ, Chen SM, Cheng CI, Fang CY, Hsieh YK, Hang CL, Yip HK, Wu CJ. Transradial approach percutaneous coronary interventions in an out-patient clinic. Int Heart J. 2010; 51(6):371-6.	Not RCT; all patients managed using radial approach
Cohen A, Bertrand OF, Meerkin D. Transradial angioplasty for ST-elevation myocardial infarction. Interventional Cardiology 2011; 3(3): 337-46.	Not RCT, narrative review
Dahm JB, Wolpers HG, Becker J, Hansen C, Felix SB. Transradial access in percutaneous coronary interventions: technique and procedure. Herz. 2010; 35(7):482-487.	Not RCT; narrative review
Dahm JB, van Buuren F. Transradial percutaneous coronary interventions: indications, success rates & clinical outcome. Indian Heart J. 2010; 62(3):218-20.	Not RCT; narrative review
Eichhöfer J, Horlick E, Ivanov J, Seidelin PH, Ross JR, Ing D, Daly P, Mackie K, Ridley B, Schwartz L, Barolet A, Dzavík V. Decreased complication rates using the transradial compared to the transfemoral approach in percutaneous coronary intervention in the era of routine stenting and glycoprotein platelet IIb/IIIa inhibitor use: a large single-center experience. Am Heart J. 2008; 156(5):864-70.	Not RCT; registry
Franchi E, Marino P, Biondi-Zoccai GG, Luca G, Vassanelli C, and Agostoni P. Transradial versus transfemoral approach for percutaneous coronary procedures. Current Cardiology Reports. 2009; 11:391-7.	Not RCT; narrative review
George BS, Candela RJ, Topol EJ, Stack RS, Kereiakes DJ, Abbottsmith CW, Masek R, Pickel A, Dillon J, Harrelson L, et al. Brachial approach to emergency cardiac catheterization during thrombolytic therapy for acute myocardial infarction. TAMI Study Group. Cathet Cardiovasc Diagn. 1990; 20(4):221-6.	Patients randomised to brachial versus femoral approach
Hamon M, Rasmussen LH, Manoukian SV, Cequier A, Lincoff MA, Rupprecht HJ, Gersh BJ, Mann T, Bertrand ME, Mehran R, Stone GW. Choice of arterial access site and outcomes in patients with acute coronary syndromes managed with an early invasive strategy: the ACUITY trial. EuroIntervention. 2009; 5(1):115-20.	Patients not randomised to radial versus femoral radial
Jang J-S, Chung S-R, Jin H-Y, Seo J-S, Yang T-H, Kim D-K et al. Radial versus femoral approach for primary percutaneous coronary intervention in patients with acute myocardial infarction: An update meta-analysis. Journal of the American College of Cardiology. 2011; 58(20 SUPPL. 1):B143.	Not RCT; meta-analysis (used for cross checking)
Jimenez Diaz VA, Colin E, Ortiz A, De MA, Bastos G, Gomez IT et al. Transradial versus transfemoral approach in elderly patients with ST-segment elevation	Not RCT; cohort study

Reference	Reason for exclusion
acute myocardial infarction treated with primary angioplasty: Feasibility, predictors of success and outcome. Journal of the American College of Cardiology. 2011; 58(20 SUPPL. 1):B142.	
Jolly SS, Amlani S, Hamon M, Yusuf S, Mehta SR. Radial versus femoral access for coronary angiography or intervention and the impact on major bleeding and ischemic events: a systematic review and meta-analysis of randomized trials. Am Heart J. 2009; 157(1):132-40.	Not RCT; meta-analysis (used for cross checking)
Joyal D, Bertrand OF, Rinfret S, Shimony A, Eisenberg MJ. Meta-analysis of ten trials on the effectiveness of the radial versus the femoral approach in primary percutaneous coronary intervention. American Journal of Cardiology. 2012; 109(6):813-818.	Not RCT; meta-analysis (used for cross checking)
Kar S, Drury JK, Hajduczki I, Eigler N, Wakida Y, Litvack F, Buchbinder N, Marcus H, Nordlander R, Corday E. Synchronized coronary venous retroperfusion for support and salvage of ischemic myocardium during elective and failed angioplasty. J Am Coll Cardiol. 1991; 18(1):271-82.	Not RCT; cohort study on wrong population
Kassam S, Cantor WJ, Patel D, Gilchrist IC, Winegard LD, Rea ME, Bowman KA, Chisholm RJ, Strauss BH. Radial versus femoral access for rescue percutaneous coronary intervention with adjuvant glycoprotein IIb/IIIa inhibitor use. Can J Cardiol. 2004; 20(14):1439-42.	Not RCT; retrospective analysis
Kim JY, Yoon J, Jung HS, Ko JY, Yoo BS, Hwang SO, Lee SH, Choe KH. Feasibility of the radial artery as a vascular access route in performing primary percutaneous coronary intervention. Yonsei Med J. 2005; 46(4):503-10.	Not RCT; retrospective analysis
Kowalczuk AM, Chodór P, Streb W, Kurek T, Kalarus Z, Zembala M. The utility of duplex ultrasound scanning in reporting the vascular complications after heart catheterization performed from new arterial approaches - Radial or femoral artery access with StarClose usage - A substudy of the RADIAMI II trial. Postepy w kardiologii interwencyjnej. 2010; 6(3):112-6.	Substudy of RADIAMI II (which was included); no additional outcomes of interest reported
Li X-S, Chen Q-W, Wang Z-G, Ke D-Z, Wu Q. Comparison on transradial versus transfemoral approach for coronary angiography and angioplasty in the elderlys with coronary heart disease. Chinese Journal of Interventional Imaging and Therapy. 2011; 8(4):259-262.	Publication not in English
Louvard Y, Lefèvre T, Allain A, Morice M. Coronary angiography through the radial or the femoral approach: The CARAFE study. Catheter Cardiovasc Interv. 2001; 52(2):181-7.	Excluded patients with acute myocardial infarction
Louvard Y, Krol M, Pezzano M, Sheers L, Piechaud JF, Marien C, Benaim R, Lardoux H, Morice MC. Feasibility of routine transradial coronary angiography: a single operator's experience. J Invasive Cardiol. 1999; 11(9):543-8.	Not RCT
Mamas MA, Ratib K, Routledge H, Fath-Ordoubadi F, Neyses L, Louvard Y et al. Influence of access site selection on PCI-related adverse events in patients with STEMI: meta-analysis of randomised controlled trials. Heart. 2012; 98(4):303-311.	Not RCT; meta-analysis (used for cross checking)
Mann T, Cubeddu G, Bowen J, Schneider JE, Arrowood M, Newman WN, Zellinger MJ, Rose GC. Stenting in acute coronary syndromes: a comparison of radial versus femoral access sites. J Am Coll Cardiol. 1998; 32(3):572-6.	Only 14% of patients had Q wave myocardial infarction (29% non-Q-wave MI; 57% unstable angina); no patient underwent direct angioplasty for myocardial infarction
Pristipino C, Trani C, Nazzaro MS, Berni A, Patti G, Patrizi R, Pironi B, Mazzarotto P, Gioffrè G, Biondi-Zoccai GG, Richichi G; Prospective REgistry of Vascular Access in Interventions in Lazio Region Study Group. Major improvement of percutaneous cardiovascular procedure outcomes with radial	Not RCT; cohort study

Reference	Reason for exclusion
artery catheterisation: results from the PREVAIL study. Heart. 2009; 95(6):476-82.	
Ruzsa Z, Ungi I, Horváth T, Sepp R, Zimmermann Z, Thury A, Jambrik Z, Sasi V, Tóth G, Forster T, Nemes A. Five-year experience with transradial coronary angioplasty in ST-segment-elevation myocardial infarction. Cardiovasc Revasc Med. 2009; 10(2):73-9.	Not RCT; cohort study
Schaufele TG et al. Radial access versus conventional femoral puncture: outcome and resource effectiveness in a daily routine: the raptor trial. Circulation 2009; 120:2152-61. Abstract 41	Insufficient information on population (does not appear to be STEMI or to be managed by PPCI);
Siudak Z, Zawislak B, Dziewierz A, Rakowski T, Jakala J, Bartus S, Noworolnik B, Zasada W, Dubiel JS, Dudek D. Transradial approach in patients with ST-elevation myocardial infarction treated with abciximab results in fewer bleeding complications: data from EUROTRANSFER registry. Coron Artery Dis. 2010; 21(5):292-7.	Not RCT; registry analysis
Slagboom T, Kiemeneij F, Laarman GJ, van der Wieken R. Outpatient coronary angioplasty: feasible and safe. Catheter Cardiovasc Interv. 2005; 64(4):421-7.	Excluded patients with acute myocardial infarction
Tizón-Marcos H, Bertrand OF, Rodés-Cabau J, Larose E, Gaudreault V, Bagur R, Gleeton O, Courtis J, Roy L, Poirier P, Costerousse O, De Larochellière R. Impact of female gender and transradial coronary stenting with maximal antiplatelet therapy on bleeding and ischemic outcomes. Am Heart J. 2009; 157(4):740-5.	All patients treated using transradial approach; patients presenting with STEMI within 72 hrs were excluded
Valsecchi O, Musumeci G, Vassileva A, Tespili M, Guagliumi G, Gavazzi A, Ferrazzi P. Safety, feasibility and efficacy of transradial primary angioplasty in patients with acute myocardial infarction. Ital Heart J. 2003; 4(5):329-34.	Not RCT; cohort study
Vazquez-Rodriguez JM et al. Radial vs femoral arterial access in emergent coronary interventions for acute myocardial infarction with ST segment elevation. J Am Coll Cardiol 2007; 49(Suppl 2):12B	Sufficient information detailed in included studies
Vorobcsuk A, Kónyi A, Aradi D, Horváth IG, Ungi I, Louvard Y, Komócsi A. Transradial versus transfemoral percutaneous coronary intervention in acute myocardial infarction Systematic overview and meta-analysis. Am Heart J. 2009; 158(5):814-21.	Not RCT; meta-analysis (used for cross checking)
Wang YB, Fu XH, Wang XC, Gu XS, Zhao YJ, Hao GZ et al. Randomized comparison of radial versus femoral approach for patients with STEMI undergoing early PCI following intravenous thrombolysis. Journal of Invasive Cardiology. 2012; 24(8):412-416.	Indirect intervention, rescue PPCI
Yan ZX, Zhou YJ, Zhao YX, Liu YY, Shi DM, Guo YH, Cheng WJ. Safety and feasibility of transradial approach for primary percutaneous coronary intervention in elderly patients with acute myocardial infarction. Chin Med J (Engl). 2008; 121(9):782-6.	Not RCT; cohort study
Ziakas A, Klinke P, Mildenberger R, Fretz E, Williams M, Della Siega A, Kinloch D, Hilton D. Comparison of the radial and the femoral approaches in percutaneous coronary intervention for acute myocardial infarction. Am J Cardiol. 2003; 91(5):598-600.	Not RCT; retospective study
Ziakas AG, Koskinas KC, Gavrilidis S, Giannoglou GD, Hadjimiltiades S, Gourassas I, Theofilogiannakos E, Economou F, Styliadis I. Radial versus femoral access for orally anticoagulated patients. Catheter Cardiovasc Interv. 2010; 76(4):493-9.	Only 29% of patients underwent PPCI after angiography; ACS (46%, but not stated if NSTEMI or STEMI), stable angina (23%), congestive heart failure (21%) and other (8%) were indications for

Reference	Reason for exclusion
	angiography

J.4 Thrombus extraction during PPCI

Reference	Reason for exclusion
Abdelhamid MA, Tamara AF, Khalil MA, Farag NM. Presenting thrombus aspiration versus standard percutaneous coronary intervention in patients with acute coronary syndrome having large thrombus burden. American Journal of Cardiology. 2011; 107(8 SUPPL. 1):44A.	Wrong population
Amin AP, Mamtani MR, Kulkarni H. Factors influencing the benefit of adjunctive devices during percutaneous coronary intervention in ST-segment elevation myocardial infarction: meta-analysis and meta-regression. Journal of Interventional Cardiology. 2009; 22(1):49-60.	Not RCT; systematic review
Andersen NH, Karlsen FM, Gerdes JC, Kaltoft A, Sloth E, Thuesen L et al. No beneficial effects of coronary thrombectomy on left ventricular systolic and diastolic function in patients with acute S-T elevation myocardial infarction: a randomized clinical trial. Journal of the American Society of Echocardiography: Official Publication of the American Society of Echocardiography. 2007; 20(6):724-730.	No outcomes of interest
Antoniucci D. JETSTENT trial results: impact on ST-segment elevation myocardial infarction interventions. Journal of Invasive Cardiology. 2010; 22(10 Suppl B):23B-25B.	Abstract
Antoniucci D, Migliorini A, Valenti R, Colombo A, Stabile A, Afredo R et al. Randomised comparison of angiojet rheolytic thrombectomy before direct infarct artery stenting to direct stenting alone in patients with acute myocardial infarction: The Jetstent trial. EuroIntervention. 2010; 6.	Abstract
Antoniucci D, Migliorini A, Valenti R, Colombo A, Stabile A, Afredo R et al. Randomised comparison of angiojet rheolytic thrombectomy before direct infarct artery stenting to direct stenting alone in patients with acute myocardial infarction: The Jetstent trial. EuroIntervention Conference: EuroPCR. 2010; 20100525(20100528).	Abstract
Antoniucci D. Rheolytic thrombectomy in acute myocardial infarction: the Florence experience and objectives of the multicenter randomized JETSTENT trial. Journal of Invasive Cardiology. 2006; 18 Suppl C:32C-34C.	Abstract
Ashraf T, Rasool SI, Saghir T, Rizvi SN, Qamar N, Zaman KS et al. Aspiration of thrombus in st segment elevation myocardial infarction. Journal of the Pakistan Medical Association. Pakistan: Pakistan Medical Association. 2007; 57(7):359-362.	Not RCT
Baim DS, Wahr D, George B, Leon MB, Greenberg J, Cutlip DE et al. Randomized trial of a distal embolic protection device during percutaneous intervention of saphenous vein aorto-coronary bypass grafts. Circulation. 2002; 105(11):1285-1290.	Not question of interest
Bar FW, Tzivoni D, Dirksen MT, Fernandez-Ortiz A, Heyndrickx GR, Brachmann J et al. Results of the first clinical study of adjunctive CAldaret (MCC-135) in patients undergoing primary percutaneous coronary intervention for ST-Elevation Myocardial Infarction: the randomized multicentre CASTEMI study. European Heart Journal. 2006; 27(21):2516-2523.	Wrong comparison
Bavry AA, Kumbhani DJ, Bhatt DL. Role of adjunctive thrombectomy and embolic protection devices in acute myocardial infarction: a comprehensive meta-analysis of randomized trials (Structured abstract). European Heart Journal. 2008; 29(24):2989-3001.	Not RCT; systematic review
Bejarano J. Mechanical protection of cardiac microcirculation during percutaneous coronary intervention of saphenous vein grafts. International	Not question of interest

Reference	Reason for exclusion
Journal of Cardiology. 2005; 99(3):365-372.	
Bertrand OF, Larose E, Costerousse O, Mongrain R, Rodés-Cabau J, DéRy JP et al. Effects of aspiration thrombectomy on necrosis size and ejection fraction after transradial percutaneous coronary intervention in acute ST-elevation myocardial infarction. Catheterization and Cardiovascular Interventions: Official Journal of the Society for Cardiac Angiography and Interventions. 2011; 77(4):475-482.	Not RCT; cohort study
Brodie BR. Adjunctive thrombectomy with primary percutaneous coronary intervention for ST-elevation myocardial infarction: summary of randomized trials. Journal of Invasive Cardiology. 2006; 18 Suppl C:C24-C27.	Not RCT; narrative review
Brodie BR. Aspiration thrombectomy with primary PCI for STEMI: review of the data and current guidelines. Journal of Invasive Cardiology. 2010; 22(10 Suppl B):2B-5B.	Not RCT; narrative review
Burzotta F, Testa L, Giannico F, Biondi-Zoccai GGL, Trani C, Romagnoli E et al. Adjunctive devices in primary or rescue PCI: a meta-analysis of randomized trials. International Journal of Cardiology. 2008; 123(3):313-321.	Not RCT
Burzotta F, De Vita M, Gu YL, Isshiki T, Lefevre T, Kaltoft A et al. Clinical impact of thrombectomy in acute ST-elevation myocardial infarction: an individual patient-data pooled analysis of 11 trials. European Heart Journal. 2009; 30(18):2193-2203.	Not RCT; systematic review
Cassese S, Esposito G, Mauro C, Varbella F, Carraturo A, Montinaro A et al. MGUard versus bAre-metal stents plus manual thRombectomy in ST-elevation myocarDial infarction pAtieNts-(GUARDIAN) trial: study design and rationale. Catheterization and Cardiovascular Interventions. 2012; 79(7):1118-1126.	Not question of interest
Chinnaiyan KM, Grines CL, O'Neill WW, Shah D, Raju A, Decker J et al. Safety of AngioJet thrombectomy in acute ST-segment elevation myocardial infarction: a large, single-center experience. Journal of Invasive Cardiology. 2006; 18 Suppl C:17C-21C.	Participants not randomised to intervention
Ciszewski M, Pregowski J, Teresinska A, Karcz M, Kalinczuk L, Pracon R et al. Aspiration coronary thrombectomy for acute myocardial infarction increases myocardial salvage: single center randomized study. Catheterization & Cardiovascular Interventions. 2011; 78(4):523-531.	No outcomes of interest
Cohen R, Domniez T, Foucher R, Sfaxi A, Elhadad S. Intracoronary thrombectomy with the export aspiration catheter before angioplasty in patients with ST-segment elevation myocardial infarction. Journal of Interventional Cardiology. 2007; 20(2):136-142.	Not RCT, cohort
Cutlip DE, Ricciardi MJ, Ling FS, Carrozza JPJ, Dua V, Garringer J et al. Effect of tirofiban before primary angioplasty on initial coronary flow and early ST-segment resolution in patients with acute myocardial infarction. American Journal of Cardiology. 2003; 92(8):977-980.	Wrong comparison
De Luca G, Verdoia M, Cassetti E. Thrombectomy during primary angioplasty: methods, devices, and clinical trial data. Current Cardiology Reports. 2010; 12(5):422-428.	Not RCT; review
De Luca G, Dudek D, Sardella G, Marino P, Chevalier B, Zijlstra F. Adjunctive manual thrombectomy improves myocardial perfusion and mortality in patients undergoing primary percutaneous coronary intervention for ST-elevation myocardial infarction: a meta-analysis of randomized trials (Structured abstract). European Heart Journal. 2008; 29(24):3002-3010.	Not RCT; systematic review
De Luca G, Suryapranata H, Stone GW, Antoniucci D, Neumann FJ, Chiariello M. Adjunctive mechanical devices to prevent distal embolization in patients undergoing mechanical revascularization for acute myocardial infarction: a meta-analysis of randomized trials (Structured abstract). American Heart Journal. 2007; 153(3):343-353.	Not RCT; systematic review

Reference	Reason for exclusion
De Vita M, Burzotta F, Biondi-Zoccai GGL, Lefevre T, Dudek D, Antoniucci D et al. Individual patient-data meta-analysis comparing clinical outcome in patients with ST-elevation myocardial infarction treated with percutaneous coronary intervention with or without prior thrombectomy. ATTEMPT study: a pooled Analysis of Trials on ThrombEctomy in acute Myocardial infarction based on individual PatienT data. Vascular Health and Risk Management. 2009; 5(1):243-247.	Not RCT; systematic review
De Vita M, Burzotta F, Ottani F, De Luca L, Tarantino F, Trani C et al. Effect of thrombectomy on left ventricular remodelling in patients with ST-elevation myocardial infarction: A meta-analysis of 6 randomized trials. European Heart Journal. 2010; 31:642.	Not RCT; systematic review
Dixon SR, Whitbourn RJ, Dae MW, Grube E, Sherman W, Schaer GL et al. Induction of mild systemic hypothermia with endovascular cooling during primary percutaneous coronary intervention for acute myocardial infarction. Journal of the American College of Cardiology. 2002; 40(11):1928-1934.	Wrong comparison
Dudek D, Mielecki W, Legutko J, Chyrchel M, Sorysz D, Bartus S et al. Percutaneous thrombectomy with the RESCUE system in acute myocardial infarction. Kardiologia Polska. 2004; 61(12):523-533.	Not question of interest
Faxon DP, Gibbons RJ, Chronos NAF, Gurbel PA, Sheehan F, HALT-MI I. The effect of blockade of the CD11/CD18 integrin receptor on infarct size in patients with acute myocardial infarction treated with direct angioplasty: the results of the HALT-MI study. Journal of the American College of Cardiology. 2002; 40(7):1199-1204.	Wrong comparison
Fröbert O, Lagerqvist B, Gudnason T, Thuesen L, Svensson R, Olivecrona GK et al. Thrombus Aspiration in ST-Elevation myocardial infarction in Scandinavia (TASTE trial). A multicenter, prospective, randomized, controlled clinical registry trial based on the Swedish angiography and angioplasty registry (SCAAR) platform. Study design and rationale. American Heart Journal. 2010; 160(6):1042-1048.	Not RCT; cohort study
Galiuto L, Garramone B, Burzotta F, Lombardo A, Barchetta S, Rebuzzi AG et al. Thrombus aspiration reduces microvascular obstruction after primary coronary intervention: a myocardial contrast echocardiography substudy of the REMEDIA Trial. Journal of the American College of Cardiology. 2006; 48(7):1355-1360.	Sub study of RCT included in evidence review
Gibson CM, Kirtane AJ, Murphy SA, Rohrbeck S, Menon V, Lins J et al. Early initiation of eptifibatide in the emergency department before primary percutaneous coronary intervention for ST-segment elevation myocardial infarction: results of the Time to Integrilin Therapy in Acute Myocardial Infarction (TITAN)-TIMI 34 trial. American Heart Journal. 2006; 152(4):668-675.	Wrong comparison
Grines CL, Nelson TR, Safian RD, Hanzel G, Goldstein JA, Dixon S. A Bayesian meta-analysis comparing AngioJet thrombectomy to percutaneous coronary intervention alone in acute myocardial infarction (Structured abstract). Journal of Interventional Cardiology. 2008; 21(6):459-482.	Not RCT; meta-analysis
Guang HW, Guo WT, Yun LJ, Qiang Z. The efficiency and safety of the seek aspiration thrombectomy catheter and tirofiban in primary percutaneous coronary intervention of acute myocardial infarction. Heart. 2010; 96:A150-A151.	Abstract
Guetta V, Mosseri M, Shechter M, Matetzky S, Assali A, Almagor Y et al. Safety and efficacy of the FilterWire EZ in acute ST-segment elevation myocardial infarction. American Journal of Cardiology. 2007; 99(7):911-915.	Not question of interest
Guerra E, Morelli I, Palmieri C, De Carlo M, Pieroni A, Chella P et al. Infarct size evaluation in multi-device thrombus Aspiration study. Journal of the American College of Cardiology. 2011; 1):B97.	Abstract

Reference	Reason for exclusion
Gurvitch R, Ajani AE, Yan BP, Waksman R. Protection devices and thrombectomy for native coronary artery ST-elevation myocardial infarction. Journal of Invasive Cardiology. 2008; 20(4):190-195.	Not RCT; review
Haeck JD, Kuijt WJ, Koch KT, Bilodeau L, Henriques JP, Rohling WJ et al. Infarct size and left ventricular function in the PRoximal Embolic Protection in Acute myocardial infarction and Resolution of ST-segment Elevation (PREPARE) trial: ancillary cardiovascular magnetic resonance study. Heart. 2010; 96(3):190-195.	Not question of interest
Haeck JD, Koch KT, Bilodeau L, Van Der Schaaf RJ, Henriques JP, Baan J et al. Randomized comparison of primary percutaneous coronary intervention with combined proximal embolic protection and thrombus aspiration and primary percutaneous coronary intervention alone in ST-segment elevation myocardial infarction. Journal of the American College of Cardiology. 2009; 53 (10):A28.	Not question of interest
Haeck JDE, Koch KT, Gu YL, Bilodeau L, Kuijt WJ, Sjauw KD et al. Proximal embolic protection in patients undergoing primary angioplasty for acute myocardial infarction (PREPARE): core lab adjudicated angiographic outcomes of a randomised controlled trial. Netherlands Heart Journal. 2010; 18(11):531-536.	Not question of interest
Hahn JY, Gwon HC, Choe YH, Rhee I, Choi SH, Choi JH et al. Effects of balloon-based distal protection during primary percutaneous coronary intervention on early and late infarct size and left ventricular remodeling: a pilot study using serial contrast-enhanced magnetic resonance imaging. American Heart Journal. 2007; 153(4):665.	Not question of interest
Halkin A, Masud AZ, Rogers C, Hermiller J, Feldman R, Hall P et al. Six-month outcomes after percutaneous intervention for lesions in aortocoronary saphenous vein grafts using distal protection devices: results from the FIRE trial. American Heart Journal. 2006; 151(4):915.	Not question of interest
Hara M, Saikawa T, Tsunematsu Y, Sakata T, Yoshimatsu H. Predicting no-reflow based on angiographic features of lesions in patients with acute myocardial infarction. Journal of Atherosclerosis and Thrombosis. 2005; 12(6):315-321.	Wrong comparison
Henriques JPS, Zijlstra F, Van 't Hof AWJ, De Boer MJ, Dambrink J-HE, Gosselink ATM et al. Primary percutaneous coronary intervention versus thrombolytic treatment: long term follow up according to infarct location. Heart. 2006; 92(1):75-79.	Wrong comparison
Hofmann R, Kypta A, Kerschner K, Grund M, Steinwender C, Leisch F. Thrombus aspiration prior to primary angioplasty in acute myocardial infarction: estimation of rescued myocardial tissue by return of ST-segment elevation. Clinical Cardiology. 2004; 27(8):451-454.	Not RCT; cohort study
Hopkins LN, Myla S, Grube E, Wehman JC, Levy EI, Bersin RM et al. Carotid artery revascularization in high surgical risk patients with the NexStent and the Filterwire EX/EZ: 1-year results in the CABERNET trial. Catheterization and Cardiovascular Interventions : Official Journal of the Society for Cardiac Angiography and Interventions. 2008; 71(7):950-960.	Not question of interest
Inaba Y, Chen JA, Mehta N, Bergmann SR. Impact of single or multicentre study design on the results of trials examining the efficacy of adjunctive devices to prevent distal embolisation during acute myocardial infarction. Eurointervention. 2009; 5(3):375-383.	Not question of interest
Inoue H, Satoh S, Mori E, Takenaka K, Mori T, Numaguchi K et al. Distal protection with thrombus aspiration versus thrombus aspiration during primary percutaneous coronary intervention in patients with acute ST-elevation myocardial infarction. European Heart Journal. 2010; 31:192.	Abstract
Javaid A, Siddiqi NH, Steinberg DH, Buch AN, Slottow TLP, Roy P et al. Adjunct thrombus aspiration reduces mortality in patients undergoing percutaneous	Not RCT; cohort study

Reference	Reason for exclusion
coronary intervention for ST-elevation myocardial infarction with high-risk angiographic characteristics. American Journal of Cardiology. 2008; 101(4):452-456.	
Kaltoft A, Nielsen SS, Terkelsen CJ, Bøttcher M, Lassen JF, Krusell LR et al. Scintigraphic evaluation of routine filterwire distal protection in percutaneous coronary intervention for acute ST-segment elevation myocardial infarction: a randomized controlled trial. Journal of Nuclear Cardiology : Official Publication of the American Society of Nuclear Cardiology. 2009; 16(5):784-791.	Not question of interest
Kastrati A, Mehilli J, Schlotterbeck K, Dotzer F, Dirschinger J, Schmitt C et al. Early administration of reteplase plus abciximab vs abciximab alone in patients with acute myocardial infarction referred for percutaneous coronary intervention: a randomized controlled trial. JAMA. 2004; 291(8):947-954.	Wrong comparison
Kampinga MA, Vlaar PJ, Fokkema ML, Gu YL, Zijlstra F. Thrombus aspiration during percutaneous coronary intervention in acute non-ST-elevation myocardial infarction study (TAPAS II) - study design. Netherlands Heart Journal. 2009; 17(11):409-413.	Wrong comparison
Kelbaek H, Terkelsen CJ, Helqvist S, Lassen JF, Clemmensen P, Kløvgaard L et al. Randomized comparison of distal protection versus conventional treatment in primary percutaneous coronary intervention: the drug elution and distal protection in ST-elevation myocardial infarction (DEDICATION) trial. Journal of the American College of Cardiology. 2008; 51(9):899-905.	Not question of interest
Kereiakes DJ, Turco MA, Breall J, Farhat NZ, Feldman RL, McLaurin B et al. A novel filter-based distal embolic protection device for percutaneous intervention of saphenous vein graft lesions: results of the AMEthyst randomized controlled trial. JACC Cardiovascular Interventions. 2008; 1(3):248-257.	Not question of interest
Kikkert WJ, Geloven NV, Claessen BEP, Vis MM, Baan J, Koch K et al. Increased 1-year survival after adjunctive thrombus aspiration for ST-elevation myocardial infarction patients. Journal of the American College of Cardiology. 2010; 1):B19-B20.	Abstract
Kilic S, Ottervanger JP, Dambrink J-H, Hoorntje J, Gosselink M, Kolkman E et al. Effectiveness of thrombus aspiration in stemi patients in daily clinical practice: Insights from the zwolle acute myocardial infarction registry. Journal of the American College of Cardiology. 2012; 59(13 SUPPL. 1):E389.	Not RCT; review
Kim BO, Lee BK, Goh CW, Byun YS. Thrombus aspiration during primary percutaneous coronary intervention improves myocardial reperfusion with and without use of platelet glycoprotein IIb/IIIa receptor blockers. American Journal of Cardiology. 2009; 103 (9):44B.	Abstract
Ko B, Malaiapan Y, Hutchison A, Lehman S, Potvin J, Meredith I. Novel thrombus burden guided thrombus aspiration catheter use during primary percutaneous coronary intervention in the management of ST elevation myocardial infarction. Heart Lung and Circulation. 2010; 19:S32.	Abstract
Krstic N, Perisic Z, Pavlovic M, Koracevic G, Salinger-Martinovic S, Apostolovic S et al. Thrombus aspiration during primary percutaneous coronary intervention. Circulation. 2010; 122 (2):e250.	Abstract
Kukreja N, Costopoulos C, Gorog D, Di Mario C. Use of thrombectomy devices in primary percutaneous coronary intervention. Journal of the American College of Cardiology. 2011; 1):B98.	Abstract
Lanjewar C, Jolly S, Mehta SR. Effects of aspiration thrombectomy on mortality in patients with acute myocardial infarction undergoing primary percutaneous coronary intervention: a meta-analysis of the randomized trials (Structured abstract). Indian Heart Journal. 2009; 61(4):335-340.	Not RCT; systematic rveiew
Laarman GJ, Suttorp MJ, Dirksen MT, van Heerebeek L, Kiemeneij F, Slagboom	Wrong comparison

Reference	Reason for exclusion
T et al. Paclitaxel-eluting versus uncoated stents in primary percutaneous coronary intervention. New England Journal of Medicine. 2006; 355(11):1105-1113.	
Lee MS, Singh V, Wilentz JR, Makkar RR. AngioJet thrombectomy. Journal of Invasive Cardiology. 2004; 16(10):587-591.	Not RCT; narrative review
Li N, Yan HB, Zhu XL, Gao H, Ai H, Wang J et al. [Diver CE versus Guardwire Plus for thrombectomy during primary angioplasty for inferior myocardial infarction]. Zhonghua Xin Xue Guan Bing Za Zhi [Chinese Journal of Cardiovascular Diseases]. 2007; 35(5):461-465.	Study not in English
Liem A, Zijlstra F, Ottervanger JP, Hoorntje JC, Suryapranata H, De Boer MJ et al. High dose heparin as pretreatment for primary angioplasty in acute myocardial infarction: the Heparin in Early Patency (HEAP) randomized trial. Journal of the American College of Cardiology. 2000; 35(3):600-604.	Wrong comparison
Limbruno U, Micheli A, De CM, Amoroso G, Rossini R, Palagi C et al. Mechanical prevention of distal embolization during primary angioplasty: safety, feasibility, and impact on myocardial reperfusion. Circulation . 2003; 108(2):171-176.	Not RCT; cohort study
Lipiecki J, Monzy S, Durel N, Cachin F, Chabrot P, Muliez A et al. Effect of thrombus aspiration on infarct size and left ventricular function in high-risk patients with acute myocardial infarction treated by percutaneous coronary intervention. Results of a prospective controlled pilot study. American Heart Journal. 2009; 157(3):583.	No outcomes of interest
Loubeyre C, Morice MC, Lefevre T, Piechaud JF, Louvard Y, Dumas P. A randomized comparison of direct stenting with conventional stent implantation in selected patients with acute myocardial infarction. Journal of the American College of Cardiology. 2002; 39(1):15-21.	Wrong comparison
Margheri M, Falai M, Vittori G, Zoccai GGLB, Chechi T, Ricceri I et al. Safety and efficacy of the AngioJet in patients with acute myocardial infarction: results from the Florence Appraisal Study of Rheolytic Thrombectomy (FAST). Journal of Invasive Cardiology. 2006; 18(10):481-486.	Not RCT; cohort study
Margheri M, Vittori G, Chechi T, Falchetti E, Cosgrave J, Spaziani G et al. Thrombus aspiration with export catheter in ST elevation myocardial infarction. Journal of Interventional Cardiology. 2007; 20(1):38-43.	Not RCT; cohort study
McCormick LM, Brown AJ, Gajendragadkar PR, Basavarajaiah S, West NE. Routine thrombus aspiration and glycoprotein inhibitor use during primary percutaneous coronary intervention for ST elevation myocardial infarction: Do all patients benefit? Journal of the American College of Cardiology. 2011; 1):B103.	Not RCT; cohort study
Mongeon FP, Belisle P, Joseph L, Eisenberg MJ, Rinfret S. Adjunctive thrombectomy for acute myocardial infarction: A bayesian meta-analysis. Circulation: Cardiovascular Interventions. 2010; 3(1):6-16.	Not RCT; systematic review
Naidu SS, Turco MA, Mauri L, Coolong A, Popma JJ, Kereiakes DJ. Contemporary incidence and predictors of major adverse cardiac events after saphenous vein graft intervention with embolic protection (an AMEthyst trial substudy). American Journal of Cardiology. 2010; 105(8):1060-1064.	Not question of interest
Nakagawa Y, Matsuo S, Kimura T, Yokoi H, Tamura T, Hamasaki N et al. Thrombectomy with AngioJet catheter in native coronary arteries for patients with acute or recent myocardial infarction. American Journal of Cardiology. 1999; 83(7):994-999.	Not RCT
Ochala A, Smolka G, Wojakowski W, Gabrylewicz B, Garbocz P, Tendera M. Prospective randomised study to evaluate effectiveness of distal embolic protection compared to abciximab administration in reduction of microembolic complications of primary coronary angioplasty. Kardiologia Polska. 2007; 65(6):672-680.	Not question of interest

Reference	Reason for exclusion
Ozdemir R, Sezgin AT, Barutcu I, Topal E, Gullu H, Acikgoz N. Comparison of direct stenting versus conventional stent implantation on blood flow in patients with ST-segment elevation myocardial infarction. Angiology. 2006; 57(4):453-458.	Wrong comparison
Ozaki Y, Nomura M, Nakayama T, Ogata T, Nakayasu K, Nakaya Y et al. Effects of thrombus suction therapy on myocardial blood flow disorders in males with acute inferior myocardial infarction. Journal of Medical Investigation : JMI. 2006; 53(1-2):167-173.	Not question of interest
Petronio AS, Musumeci G, Limbruno U, De Carlo M, Baglini R, Paterni G et al. Abciximab improves 6-month clinical outcome after rescue coronary angioplasty. American Heart Journal. 2002; 143(2):334-341.	Wrong comparison
Rajagopal R, Musto C, La Manna A, Tanigawa J, Goktekin O, Di Mario C. Thrombectomy and distal protection devices. Minerva Cardioangiologica. 2005; 53(5):415-430.	Not RCT
Santoro GM, Antoniucci D, Bolognese L, Valenti R, Buonamici P, Trapani M et al. A randomized study of intravenous magnesium in acute myocardial infarction treated with direct coronary angioplasty. American Heart Journal. 2000; 140(6):891-897.	Wrong comparison
Sardella G, Mancone M, Canali E, Lucisano L, Stio R, Benedetti G et al. Impact of thrombectomy with export catheter in infarct related artery during primary pci on procedural outcome in patients with AMI (EXPIRA Trial). The importance of thrombectomy on DES implantation clinical outcome substudy. Journal of the American College of Cardiology. 2010; 55(10 SUPPL 1):A188.	Abstract
Sardella G, Mancone M, Nguyen BL, De LL, Di RA, Colantonio R et al. The effect of thrombectomy on myocardial blush in primary angioplasty: the Randomized Evaluation of Thrombus Aspiration by two thrombectomy devices in acute Myocardial Infarction (RETAMI) trial. Catheterization and Cardiovascular Interventions : Official Journal of the Society for Cardiac Angiography and Interventions. 2008; 71(1):84-91.	Wrong comparison
Sardella G, Mancone M, Canali E, Lucisano L, De CC, Stio R et al. Impact of thrombectomy with export catheter in infarctrelated artery during primary pci on procedural outcome in patients with AMI (expira trial). The importance of thrombectomy on DES implantation. Giornale Italiano Di Cardiologia. 2011; 12(12 SUPPL. 3):e209.	Abstract
Scheller B, Hennen B, Severin-Kneib S, Ozbek C, Schieffer H, Markwirth T. Long-term follow-up of a randomized study of primary stenting versus angioplasty in acute myocardial infarction. American Journal of Medicine. 2001; 110(1):1-6.	Wrong comparison
Segev A, Elian D, Marai I, Matetzky S, Agranat O, Har-Zahav Y et al. Thrombus aspiration during primary percutaneous coronary intervention in acute ST-elevation myocardial infarction. Cardiovascular Revascularization Medicine. 2008; 9(3):140-143.	Not RCT; cohort study
Sharma SK, Tamburrino F, Mares AM, Kini AS. Improved outcome with AngioJet thrombectomy during primary stenting in acute myocardial infarction patients with high-grade thrombus. Journal of Invasive Cardiology. 2006; 18 Suppl C:C8-11.	Abstract
Sherev DA, Shavelle DM, Abdelkarim M, Shook T, Mayeda GS, Burstein S et al. AngioJet Rheolytic thrombectomy during rescue PCI for failed thrombolysis: a single-center experience. Journal of Invasive Cardiology. 2006; 18 Suppl C:12C-16C.	Wrong population
Sim DS, Ahn Y, Kim YH, Choi S, Seon HJ, Hwang SH et al. Benefit of manual thrombectomy in limiting infarct expansion during primary percutaneous coronary intervention for acute ST-elevation myocardial infarction. American Journal of Cardiology. 2011; 1):37A-38A.	Abstract

Reference	Reason for exclusion
Sobieraj DM, White CM, Kluger J, Tongbram V, Colby J, Chen WT et al. Systematic review: comparative effectiveness of adjunctive devices in patients with ST-segment elevation myocardial infarction undergoing percutaneous coronary intervention of native vessels. BMC Cardiovascular Disorders. 2011; 11:74.	Not RCT; systematic review
Spaulding C, Henry P, Teiger E, Beatt K, Bramucci E, Carrie D et al. Sirolimus-eluting versus uncoated stents in acute myocardial infarction. New England Journal of Medicine. 2006; 355(11):1093-1104.	Wrong comparison
Stone GW, Rogers C, Ramee S, White C, Kuntz RE, Popma JJ et al. Distal filter protection during saphenous vein graft stenting: technical and clinical correlates of efficacy. Journal of the American College of Cardiology. 2002; 40(10):1882-1888.	Wrong intervention
Stone GW, Webb J, Cox DA, Brodie BR, Qureshi M, Kalynych A et al. Distal microcirculatory protection during percutaneous coronary intervention in acute ST-segment elevation myocardial infarction: a randomized controlled trial. JAMA : the Journal of the American Medical Association. 2005; 293(9):1063-1072.	Wrong intervention
Stone GW, Cox DA, Babb J, Nukta D, Bilodeau L, Cannon L et al. Prospective, randomized evaluation of thrombectomy prior to percutaneous intervention in diseased saphenous vein grafts and thrombus-containing coronary arteries. Journal of the American College of Cardiology. 2003; 42(11):2007-2013.	Wrong intervention
Stone GW, Rogers C, Hermiller J, Feldman R, Hall P, Haber R et al. Randomized comparison of distal protection with a filter-based catheter and a balloon occlusion and aspiration system during percutaneous intervention of diseased saphenous vein aorto-coronary bypass grafts. Circulation. 2003; 108(5):548-553.	Not question of interest
Suryapranata H, Ottervanger JP, Nibbering E, van 't Hof AW, Hoorntje JC, De Boer MJ et al. Long term outcome and cost-effectiveness of stenting versus balloon angioplasty for acute myocardial infarction. Heart. 2001; 85(6):667-671.	Wrong comparison
Suryapranata H, De Luca G, Van 't Hof AWJ, Ottervanger JP, Hoorntje JCA, Dambrink J-HE et al. Is routine stenting for acute myocardial infarction superior to balloon angioplasty? A randomised comparison in a large cohort of unselected patients. Heart. 2005; 91(5):641-645.	Wrong comparison
Tamhane UU, Chetcuti S, Hameed I, Grossman PM, Moscucci M, Gurm HS. Safety and efficacy of thrombectomy in patients undergoing primary percutaneous coronary intervention for acute ST elevation MI: a meta-analysis of randomized controlled trials (Structured abstract). BMC Cardiovascular Disorders. 2010; 10:10.	Not RCT; systematic review
Tanabe K, Kozuma K, Ikari Y, Fujii K, Sakurada M, Hashimoto H et al. Five-year clinical follow-up of the vampire study in ST elevation acute myocardial infarction (STEMI) patients with thrombus aspiration prior to coronary intervention. Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Abstract
Tarsia G, De Michele M, Polosa D, Biondi-Zoccai G, Costantino F, Del Prete G et al. Manual versus nonmanual thrombectomy in primary and rescue percutaneous coronary angioplasty (Provisional abstract). Heart and Vessels. 2010; 25(4):275-281.	Not applicable to question
Uribe J, Ici DO, Hovasse T, Unterseeh T, Benamer H, Chevalier B et al. A randomized comparison of systematic vs angiographic-guided thrombus aspiration (Export catheter) prior to coronary stenting in patients with < 12 h ST-elevation MI. European Heart Journal. 2010; 31:877.	Abstract
van der Horst ICC, Zijlstra F, van 't Hof AWJ, Doggen CJM, de Boer MJ,	Wrong comparison

Reference	Reason for exclusion
Suryapranata H et al. Glucose-insulin-potassium infusion inpatients treated with primary angioplasty for acute myocardial infarction: the glucose-insulin-potassium study: a randomized trial. Journal of the American College of Cardiology. 2003; 42(5):784-791.	
Vink MA, Patterson MS, van Etten J, Ijsselmuiden AJJ, Dirksen MT, Amoroso G et al. A randomized comparison of manual versus mechanical thrombus removal in primary percutaneous coronary intervention in the treatment of ST-segment elevation myocardial infarction (TREAT-MI). Catheterization and Cardiovascular Interventions. 2011; 78(1):14-19.	Wrong intervention
Vink MA, Dirksen MT, Tijssen JGP, Suttorp MJ, Patterson MS, van Geloven N et al. Lack of long-term clinical benefit of thrombus aspiration during primary percutaneous coronary intervention with paclitaxel-eluting stents or bare-metal stents: post-hoc analysis of the PASSION-trial. Catheterization and Cardiovascular Interventions. 2012; 79(6):870-877.	Post-hoc analysis
Wei L, Li-Rong W, Ming-Yu L, Wei-Min W, Jian L, Yu-Liang M. Clinical study of utilisation of thrombus aspiration catheters in patients with recovering from acute myocardial infarction underwent elective percutaneous. Heart. 2011; 97:A157-A158.	Abstract
Whisenant BK, Baim DS, Kuntz RE, Garcia LA, Ramee SR, Carrozza JP. Rheolytic thrombectomy with the Possis AngioJet: technical considerations and initial clinical experience. Journal of Invasive Cardiology. 1999; 11(7):421-426.	Not RCT; narrative review
Yan HB, Wang J, Li N, Zhu XL, Gao H, Ai H et al. Diver CE versus Guardwire Plus for thrombectomy in patients with inferior myocardial infarction: a trial of aspiration of thrombus during primary angioplasty for inferior myocardial infarction. Chinese Medical Journal. 2007; 120(7):557-561.	Wrong comparison
Zhang J, Zhong M-H, Zhang Y-Q, Mi J, Qi X-Q. [Thrombus aspiration during percutaneous coronary intervention in patients with acute myocardial infarction]. Chinese Journal of Interventional Imaging and Therapy. 2006; 3(6):406-409.	Study not in English
Zorman S, Zorman D, Noc M. Effects of abciximab pretreatment in patients with acute myocardial infarction undergoing primary angioplasty. American Journal of Cardiology. 2002; 90(5):533-536.	Not question of interest

J.5 Culprit versus complete revascularisation **Updated, see 2020 evidence review**

Reference	Reason for exclusion
Alhulaimi N, Midodzi W, Welsh RC. Culprit and non-culprit PCI compared to culprit only PCI in multi-vessel coronary artery disease patients with acute ST elevation myocardial infarction treated by primary percutaneous coronary intervention: A systematic review. Journal of the American College of Cardiology. 2010; 55 (10 SUPPL 1):A97.	Systematic review ordered for cross-checking purposes
Aggarwal V, Rajpathak S, Singh M, Romick B, Srinivas VS. Clinical outcomes based on completeness of revascularisation in patients undergoing percutaneous coronary intervention: a meta-analysis of multivessel coronary artery disease studies. EuroIntervention. 2012; 7(9):1095-1102.	Systematic review ordered for cross-checking purposes
Akhtar MM, Graham A, Jones D, Rathod K, Gallagher S, Jain A et al. Treatment of multi-vessel coronary artery disease (CAD) in primary percutaneous coronary intervention (PPCI) for ST segment elevation myocardial infarction (STEMI): Culprit only revascularization is associated with higher major adverse cardiovascular event (MACE) rates. Circulation. 2011; 124(21 SUPPL. 1).	Insufficient details for inclusion in review
Arampatzis CA, Hoye A, Lemos PA, Saia F, Tanabe K, Degertekin M et al. Elective sirolimus-eluting stent implantation for multivessel disease involving significant LAD stenosis: one-year clinical outcomes of 99 consecutive patients-	Not question of interest

Reference	Reason for exclusion
-the Rotterdam experience. Catheterization and Cardiovascular Interventions. 2004; 63(1):57-60.	
Aronow WS, Sukhija R, Palaniswamy C, Singh T, Ahn C, Kalapatapu K et al. Major adverse cardiac events at long-term follow-up in patients treated with single versus multiple stents during single-vessel percutaneous coronary intervention. Journal of Interventional Cardiology. 2009; 22(5):427-430.	Not question of interest
Bagai A, Thavendiranathan P, Sharieff W, Cheema A. Multivessel stenting during primary percutaneous coronary intervention for acute myocardial infarction: A quantitative review. Journal of the American College of Cardiology. 2010; 1):B13.	Systematic review ordered for cross-checking purposes
Bagai A, Thavendiranathan P, Waseem S, Cheema AN. Multivessel stenting during primary percutaneous coronary intervention for acute myocardial infarction: A quantitative review. Canadian Journal of Cardiology. 2010; 26:127D.	Insufficient details for inclusion in review
Bangalore S, Kumar S, Poddar KL, Ramasamy S, Rha SW, Faxon DP. Meta-analysis of multivessel coronary artery revascularization versus culprit-only revascularization in patients with ST-segment elevation myocardial infarction and multivessel disease. American Journal of Cardiology. 2011; 107(9):1300-1310.	Systematic review ordered for cross-checking purposes
Bauer T, Zeymer U, Hochadel M, Mollmann H, Weidinger F, Zahn R et al. Use and outcomes of multivessel percutaneous coronary intervention in patients with acute myocardial infarction complicated by cardiogenic shock (from the EHS-PCI Registry). American Journal of Cardiology. 2012; 109(7):941-946.	Not question of interest
Bedossa M, Guillaume L, Coudert I, Pennec P, Moquet B, Hacot JP et al. Acute myocardial infarction and multi vessel disease: Results of PCI on non culprit lesion in a prospective french brittany registry about 2700 patients (ORBI). Catheterization and Cardiovascular Interventions. 2011; 77:S3.	Not question of interest
Bedotto JB, Rutherford BD, McConahay DR, Johnson WL, Giorgi LV, Shimshak TM et al. Results of multivessel percutaneous transluminal coronary angioplasty in persons aged 65 years and older. American Journal of Cardiology. 1991; 67(13):1051-1055.	Not question of interest
Bell MR, Bailey KR, Reeder GS, Lapeyre AC, Holmes DRJ. Percutaneous transluminal angioplasty in patients with multivessel coronary disease: how important is complete revascularization for cardiac event-free survival? Journal of the American College of Cardiology. 1990; 16(3):553-562.	Wrong population
Berger A, Botman KJ, MacCarthy PA, Wijns W, Bartunek J, Heyndrickx GR et al. Long-term clinical outcome after fractional flow reserve-guided percutaneous coronary intervention in patients with multivessel disease. Journal of the American College of Cardiology. 2005; 46(3):438-442.	Wrong population
Biondi-Zoccai G, Lotrionte M, Moretti C, Sciuto F, Omede P, Agostoni A et al. Culprit-only stenting should be sought instead of multivessel stenting in patients with ST-elevation myocardial infarction and multivessel disease: Evidence from a 30,886-patient meta-analysis. European Heart Journal. 2010; 31:456.	Systematic review ordered for cross-checking purposes
Brener SJ, Murphy SA, Gibson CM, DiBattiste PM, Demopoulos LA, Cannon CP et al. Efficacy and safety of multivessel percutaneous revascularization and tirofiban therapy in patients with acute coronary syndromes. American Journal of Cardiology. 2002; 90(6):631-633.	Wrong population
Brener SJ, Milford-Beland S, Roe MT, Bhatt DL, Weintraub WS, Brindis RG et al. Culprit-only or multivessel revascularization in patients with acute coronary syndromes: an American College of Cardiology National Cardiovascular Database Registry report. American Heart Journal. 2008; 155(1):140-146.	Wrong population
Cavallini C, Risica G, Olivari Z, Marton F, Franceschini E, Giommi L. Clinical and	Wrong population

Reference	Reason for exclusion
angiographic follow-up after coronary angioplasty in patients with two-vessel disease: influence of completeness and adequacy of revascularization on long-term outcome. American Heart Journal. 1994; 127(6):1504-1509.	
Celik T, Iyisoy A, Jata B, Kardesoglu E, Isik E. Culprit only versus multivessel coronary revascularization in patients presenting with acute ST elevation myocardial infarction: unending debate. International Journal of Cardiology. 2009; 137(1):65-66.	Narrative review
Chen LY, Lennon RJ, Grantham JA, Berger PB, Mathew V, Singh M et al. In-hospital and long-term outcomes of multivessel percutaneous coronary revascularization after acute myocardial infarction. American Journal of Cardiology. 2005; 95(3):349-354.	Wrong population
Dib C, Hanna EB, Chaudhry MA, Hennebry TA, Stavrakis S, Abu-Fadel MS. Culprit-Vessel Percutaneous Coronary Intervention Followed by Contralateral Angiography versus Complete Angiography in Patients with ST-Elevation Myocardial Infarction. Texas Heart Institute Journal / From the Texas Heart Institute of St Luke's Episcopal Hospital, Texas Children's Hospital. 2012; 39(3):359-364.	Not question of interest
Faxon DP, Ghalilli K, Jacobs AK, Ruocco NA, Christellis EM, Kellett MAJ et al. The degree of revascularization and outcome after multivessel coronary angioplasty. American Heart Journal. 1992; 123(4 Pt 1):854-859.	Cohort study < 500 patients
Fei G, Yu JZ, Zhi JW, Wei YS, De AJ, Hua S. Three years clinical outcomes in patients with acute myocardial infarction undergoing single versus multiple vessel percutaneous coronary intervention. Heart. 2011; 97:A150.	Insufficient details for inclusion in review
Gaglia J, Torguson R, Xue Z, Gonzalez MA, Ben-Dor I, Suddath WO et al. Outcomes of patients with acute myocardial infarction rom a saphenous vein graft culprit undergoing percutaneous coronary intervention. Catheterization and Cardiovascular Interventions. 2011; 78(1):23-29.	Not question of interest
Gambhir DS, Singh S, Sinha SC, Jain R, Trehan V, Arora R. Immediate and follow-up clinical outcome after multivessel coronary stenting. Indian Heart Journal. 1997; 49(4):391-396.	Not question of interest
Gierlotka M, Gasior M, Tajstra M, Lekston A, Buszman P, Opolski G et al. 12-months mortality of STEMI patients treated by primary PCI with multivessel disease and chronic total occlusions: Analysis from PL-ACS registry. European Heart Journal. 2010; 31:195-196.	Not question of interest
Glaser R, Selzer F, Faxon DP, Laskey WK, Cohen HA, Slater J et al. Clinical progression of incidental, asymptomatic lesions discovered during culprit vessel coronary intervention. Circulation. 2005; 111(2):143-149.	Not question of interest
Grantham J, Culprit vs. complete revascularisation in acute myocardial infarction with multivessel coronary artery disease. Circulation 2008; 114(suppl);P98.	STEMI cohort study < 500 patients
Guttmann O, Jones DA, Rathod K, Weerackody R, Akthar M, Wicks E et al. Treatment of multivessel coronary artery disease in primary PCI for STEMI: Culprit only revascularisation is associated with higher MACE rates. Journal of the American College of Cardiology. 2011; 58(20 SUPPL. 1):B19.	Insufficient details for inclusion in review
Han B, Liu L, Aboud M, Nahir M, Hasin Y. Provisional stenting for multivessel PCI. International Journal of Cardiovascular Interventions. 2005; 7(1):46-51.	Not question of interest
Han Yl, Wang B, Wang Xz, Li Y, Wang Sl, Jing Qm et al. Comparative effects of percutaneous coronary intervention for infarct-related artery only or for both infarct- and non-infarct-related arteries in patients with ST-elevation myocardial infarction and multi-vessel disease. Chinese Medical Journal. 2008; 121(23):2384-2387.	STEMI cohort study < 500 patients
Ho PC, Nguyen ME. Multivessel coronary drug-eluting stenting alone in	Not question of interest

Reference	Reason for exclusion
patients with significant ischemic mitral regurgitation: a 4-year follow up. Journal of Invasive Cardiology. 2008; 20(1):41-43.	
Hollman J, Simpfendorfer C, Franco I, Whitlow P, Goormastic M. Multivessel and single-vessel coronary angioplasty: a comparative study. American Heart Journal. 1992; 124(1):9-12.	Not intervention of interest
Hudzik B, Lekston A, Gasior M, et al. Prognostic impact of complete revascularization and diabetes mellitus in patients with acute myocardial infarction and multivessel coronary artery disease. Eur Heart J 2009; 925.	Insufficient details for inclusion in review
Ijsselmuiden AJJ, Ezechiels J, Westendorp ICD, Tijssen JGP, Kiemeneij F, Slagboom T et al. Complete versus culprit vessel percutaneous coronary intervention in multivessel disease: a randomized comparison. American Heart Journal. 2004; 148(3):467-474.	Wrong population
Jaski BE, Cohen JD, Trausch J, Marsh DG, Bail GR, Overlie PA et al. Outcome of urgent percutaneous transluminal coronary angioplasty in acute myocardial infarction: comparison of single-vessel versus multivessel coronary artery disease. American Heart Journal. 1992; 124(6):1427-1433.	Not question of interest
Jeger RV, Pfisterer ME. Primary PCI in STEMI--dilemmas and controversies: multivessel disease in STEMI patients. Complete versus Culprit Vessel revascularization in acute ST--elevation myocardial infarction. Minerva Cardioangiologica. 2011; 59(3):225-233.	Narrative review
Jensen LO, Thayssen P, Horvath-Puho E, Terkelsen CJ, Tilsted HH, Maeng M et al. Influence of single-vessel disease or multivessel disease with or without further revascularisation on mortality in patients with STEMI. EuroIntervention. 2012; 8:N122.	Insufficient details for inclusion in review
Jo HS, Park JS, Sohn JW, Yoon JC, Sohn CW, Lee SH et al. Culprit-Lesion-Only Versus Multivessel Revascularization Using Drug-Eluting Stents in Patients With ST-Segment Elevation Myocardial Infarction: A Korean Acute Myocardial Infarction Registry-Based Analysis. Korean Circ J. 2011; 41(12):718-725.	More recent publication included in review
Kalarus Z, Lenarczyk R, Kowalczyk J, Kowalski O, Gasior M, Was T et al. Importance of complete revascularization in patients with acute myocardial infarction treated with percutaneous coronary intervention. American Heart Journal. 2007; 153(2):304-312.	Wrong population
Kaul U, Singh B, Sudan D, Sapra R, Kachru R, Ghose T et al. Multi-vessel coronary stenting--procedural results and late clinical outcomes: a comparison with single-vessel stenting. Journal of Invasive Cardiology . 2000; 12(8):410-415.	Wrong population
Khattab AA, Abdel-Wahab M, Rother C, Liska B, Toelg R, Kassner G et al. Multi-vessel stenting during primary percutaneous coronary intervention for acute myocardial infarction: A single-center experience. Clinical Research in Cardiology. 2008; 97(1):32-38.	STEMI cohort study < 500 patients
Kornowski R, Mehran R, Dangas G, Nikolsky E, Assali A, Claessen BE et al. Prognostic impact of staged versus 'one-time' multivessel percutaneous intervention in acute myocardial infarction: analysis from the HORIZONS-AMI (harmonizing outcomes with revascularization and stents in acute myocardial infarction) trial. Journal of the American College of Cardiology. 2011; 58(7):704-711.	Wrong comparison, not staged PCI
Kugelmass AD, Brown PP, Reynolds MR, Culler SD, Simon AW, Cohen DJ. Is multi-vessel primary pci advisable? differences in clinical outcomes among medicare beneficiaries undergoing single versus multi-vessel PCI during a primary ST-segment elevated myocardial infarction hospitalization in fiscal year 2007. Journal of the American College of Cardiology. 2010; 55(10 SUPPL 1):A97.	Insufficient details for inclusion in review
Laham RJ, Ho KK, Baim DS, Kuntz RE, Cohen DJ, Carrozza JPJ. Multivessel	Not question of interest

Reference	Reason for exclusion
Palmaz-Schatz stenting: early results and one-year outcome. Journal of the American College of Cardiology. 1997; 30(1):180-185.	
Lawand S. One year clinical outcomes of patients undergoing multi-vessel PCI who are considered poor candidates for CABG: A single tertiary care center experience. EuroIntervention. 2010; 6.	Wrong population
Le Feuvre C, Bonan R, Cote G, Crepeau J, De Guise P, Lesperance J et al. Five- to ten-year outcome after multivessel percutaneous transluminal coronary angioplasty. American Journal of Cardiology. 1993; 71(13):1153-1158.	Not question of interest
Lee HW, Hong TJ, Ahn SK, Yang MJ, Choi JH, Kim BW et al. Long-term clinical outcomes of infarct-related artery versus multivessel revascularization in acute ST-segment elevation myocardial infarction with multivessel disease: An analysis from KAMIR. European Heart Journal. 2011; 32:869-870.	Duplicate of included study
Lee JM, Wong SC, Minutello RM, Bergman G, Moussa I, Feldman DN. Long-term survival following multivessel versus single-vessel percutaneous coronary interventions in the contemporary drug-eluting stent era. Journal of the American College of Cardiology. 2010; 55(10 SUPPL 1):A191.	Duplicate of included study
Lehmann R, Fichtlscherer S, Schachinger V, Held L, Hobler C, Baier G et al. Complete revascularization in patients undergoing multivessel PCI is an independent predictor of improved long-term survival. Journal of Interventional Cardiology. 2010; 23(3):256-263.	Wrong population
Lo HS, Chen ML, Ong ET, Chiou HC. Double-Vessel Primary Angioplasty in Acute Inferior Myocardial Infarction - Is It a Feasible Therapeutic Modality? Acta Cardiologica Sinica. 2003; 19(4):243-250.	Not question of interest
Lelek M, Wita K, Drzewiecki J, Trusz-Gluza M. Impact of thrombus aspiration on myocardial perfusion and left ventricle function in patients with anterior STEMI treated with primary angioplasty. EuroIntervention. 2011; 7:M176.	Insufficient details for inclusion in review
Maamoun W, Elkhaeat N, Elarasy R. Safety and feasibility of complete simultaneous revascularization during primary PCI in patients with STEMI and multi-vessel disease. Egyptian Heart Journal. 2011; 63(1):39-43.	Not question of interest
Mathew V, Garratt KN, Holmes DRJ. Clinical outcome after multivessel coronary stent implantation. American Heart Journal. 1999; 138(6 Pt 1):1105-1110.	Not question of interest
Mohamad T, Bernal JM, Kondur A, Hari P, Nelson K, Niraj A et al. Coronary revascularization strategy for ST elevation myocardial infarction with multivessel disease: Experience and results at 1-year follow-up. American Journal of Therapeutics. 2011; 18(2):92-100.	Cohort study < 500 patients
Mylotte D, Lefevre T, Eltchaninoff H, Briole N, Tazarourte K, Margenet A et al. Complete revascularization improves survival in patients with STEMI complicated by cardiac arrest and cardiogenic shock. Journal of the American College of Cardiology. 2011; 58(20 SUPPL. 1):B133.	Wrong population
Mylotte D, Lefevre T, Eltchaninoff H, Briole N, Tazarourte K, Margenet A et al. Multivessel versus target lesion percutaneous coronary intervention in resuscitated cardiac arrest patients with STEMI. Circulation. 2011; 124(21 SUPPL. 1).	Wrong population
Navarese E, Buffon A, De Luca G, Napodano M, De Servi S. Clinical impact of complete revascularisation vs. culprit only primary angioplasty in patients with ST-segment elevation myocardial infarction and multivessel disease: A meta-analysis. EuroIntervention. 2010; 20100525(20100528).	Systematic review ordered for cross-checking purposes
Navarese EP, De SS, Buffon A, Suryapranata H, De LG. Clinical impact of simultaneous complete revascularization vs. culprit only primary angioplasty in patients with ST-elevation myocardial infarction and multivessel disease: a meta-analysis (Structured abstract). Journal of Thrombosis and Thrombolysis.	Systematic review ordered for cross-checking purposes

Reference	Reason for exclusion
2011; 31(2):217-225.	
Nikolsky E, Halabi M, Roguin A, Zdorovyak A, Gruberg L, Hir J et al. Staged versus one-step approach for multivessel percutaneous coronary interventions. American Heart Journal. 2002; 143(6):1017-1026.	Wrong population
Norwa-Otto B, Kadziela J, Malek LA, Debski A, Witkowski A, Demkow M et al. Functionally driven complete vs incomplete revascularisation in multivessel coronary artery disease - Long-term results from a large cohort. Kardiologia Polska. 2010; 68(12):1344-1350.	Not question of interest
Novack V, Tsyvine D, Cohen DJ, Pencina M, Dubin J, Dehghani H et al. Multivessel drug-eluting stenting and impact of diabetes mellitus--a report from the EVENT registry. Catheterization and Cardiovascular Interventions. 2009; 73(7):874-880.	Not question of interest
Oemrawsingh P, Imami S, Bax M, Schotborgh C, Savalle L, Bech JW et al. Long term follow up of 4 treatment strategies in multivessel disease following primary percutaneous intervention for acute myocardial infarction. Journal of the American College of Cardiology. 2011; 58(20 SUPPL. 1):B18.	Not question of interest
Pain TE, Jones DA, Rathod K, Weerackody R, Gallagher S, Jain A et al. Treatment of multivessel coronary artery disease in primary PCI for ST elevation myocardial infarction: Culprit only revascularisation is associated with higher MACE rates. European Heart Journal. 2011; 32:867.	Insufficient details for inclusion in review
Palmer ND, Causer JP, Ramsdale DR, Perry RA. Effect of completeness of revascularization on clinical outcome in patients with multivessel disease presenting with unstable angina who undergo percutaneous coronary intervention. Journal of Invasive Cardiology. 2004; 16(4):185-188.	Wrong population
Piraino RA, Calenta CH, Luchessi E, Kirschmann DF. The oculo-stenotic reflex improves survival in patients with acute myocardial infarction and multivessels disease treated with primary angioplasty. European Heart Journal. 2009; 30:791.	STEMI cohort study < 500 patients
Qarawani D, Nahir M, Abboud M, Hazanov Y, Hasin Y. Culprit only versus complete coronary revascularization during primary PCI. International Journal of Cardiology. 2008; 123(3):288-292.	STEMI cohort study < 500 patients
Rha S-W, Choi BG, Choi SY, Im SI, Kim SW, Na JO et al. Chronic total occlusion lesion revascularization alone versus complete revascularization in chronic total occlusion patients with multivessel disease. Journal of the American College of Cardiology. 2012; 60:B128.	Insufficient details for inclusion in review
Rahman M, Nfor T, Allaqaband S, et al. Clinical and angiographic outcomes in patients with ST-segment elevation myocardial infarction undergoing single versus multiple vessel percutaneous coronary intervention. J Am Coll Cardiol 2010; 55:A98.	Insufficient details for inclusion in review
Rathod KS, McGill LA, Sammut E, Rathod VS, Jones DA, Weerackody R et al. Treatment of multivessel coronary artery disease in primary PCI for ST elevation myocardial infarction: Culprit only revascularisation is associated with higher mace rates. Heart. 2011; 97:A15-A16.	No outcome of interest
Rigattieri S, Biondi-Zoccai G, Silvestri P, Russo CD, Musto C, Ferraiuolo G et al. Management of multivessel coronary disease after ST elevation myocardial infarction treated by primary angioplasty. Journal of Interventional Cardiology. 2008; 21(1):1-7.	STEMI cohort study < 500 patients
Roe MT, Cura FA, Joski PS, Garcia E, Guetta V, Kereiakes DJ, Zijlstra F, Brodie BR, Grines CL, Ellis SG. Initial experience with multivessel percutaneous coronary intervention during mechanical reperfusion for acute myocardial infarction. Am J Cardiol. 2001 Jul 15; 88(2):170-3, A6.	STEMI cohort study < 500 patients
Samson M, Meester HJ, De Feyter PJ, Strauss B, Serruys PW. Successful	Not question of interest

Reference	Reason for exclusion
multiple segment coronary angioplasty: Effect of completeness of revascularization in single-vessel multilesions and multivessels. American Heart Journal. 1990; 120(1):1-12.	
Sarno G, Garg S, Onuma Y, Gutierrez-Chico JL, van den Brand MJBM, Rensing BJWM et al. Impact of completeness of revascularization on the five-year outcome in percutaneous coronary intervention and coronary artery bypass graft patients (from the ARTS-II study). American Journal of Cardiology . 2010; 106(10):1369-1375.	Not question of interest
Sen S, Francis D, Petraco R, Broyd C, Nijjer S, Foin N et al. Should we discourage the use of multi-vessel angioplasty during stemi or the use of registry data in comparative efficacy research? An analysis of 35,008 patients. Journal of the American College of Cardiology. 2012; 59(13 SUPPL. 1):E515.	Not question of interest
Seo J-S, Park D-W, Kim SS, et al. Long-term outcomes of culprit only versus complete coronary revascularization during primary percutaneous coronary intervention. J Am Coll Cardiol 2009; 53:A58.	STEMI cohort study < 500 patients
Sheiban I, Sillano D, Biondi-Zoccai G, Moretti C, Garrone P, Lombardi P et al. Impact of multivessel stenting on top of percutaneous revascularization for unprotected left main disease in the drug-eluting stent era: insights from the Turin registry. Journal of Cardiovascular Medicine. 2009; 10(6):461-468.	Not question of interest
Shishehbor MH, Topol EJ, Mukherjee D, Hu T, Cohen DJ, Stone GW et al. Outcome of multivessel coronary intervention in the contemporary percutaneous revascularization era. American Journal of Cardiology. 2006; 97(11):1585-1590.	Not population of interest
Shishehbor MH, Lauer MS, Singh IM, Chew DP, Karha J, Brener SJ et al. In unstable angina or non-ST-segment acute coronary syndrome, should patients with multivessel coronary artery disease undergo multivessel or culprit-only stenting? Journal of the American College of Cardiology. 2007; 49(8):849-854.	Not population of interest
Srinivas VS, Brooks MM, Detre KM, King SB, III, Jacobs AK, Johnston J et al. Contemporary percutaneous coronary intervention versus balloon angioplasty for multivessel coronary artery disease: a comparison of the National Heart, Lung and Blood Institute Dynamic Registry and the Bypass Angioplasty Revascularization Investigation (BARI) study. Circulation. 2002; 106(13):1627-1633.	Not question of interest
Tamburino C, Angiolillo DJ, Capranzano P, Dimopoulos K, La Manna A, Barbagallo R et al. Complete versus incomplete revascularization in patients with multivessel disease undergoing percutaneous coronary intervention with drug-eluting stents. Catheterization and Cardiovascular Interventions. 2008; 72(4):448-456.	Not population of interest
Telayna J. Percutaneous interventional approach in acute myocardial infarction: treatment of culprit lesion versus complete revascularization. Am J Cardiol 2002; 90 (suppl):47H-8H.	STEMI cohort study < 500 patients
Varani E, Balducelli M, Aquilina M, Vecchi G, Hussien MN, Frassineti V et al. Single or multivessel percutaneous coronary intervention in ST-elevation myocardial infarction patients. Catheterization and Cardiovascular Interventions. 2008; 72(7):927-933.	STEMI cohort study < 500 patients
Vlaar PJ, Mahmoud KD, Holmes DR, Jr., van VG, Hillege HL, van der Horst IC et al. Culprit vessel only versus multivessel and staged percutaneous coronary intervention for multivessel disease in patients presenting with ST-segment elevation myocardial infarction: a pairwise and network meta-analysis. Journal of the American College of Cardiology. 2011; 58(7):692-703.	Systematic review ordered for cross-checking purposes
Yang HH, Chen Y, Gao CY. The influence of complete coronary revascularization on long-term outcomes in patients with multivessel coronary heart disease undergoing successful percutaneous coronary intervention. Journal of	Wrong population

Reference	Reason for exclusion
International Medical Research. 2010; 38(3):1106-1112.	
Zapata GO, Lasave LI, Kozak F, Damonte A, Meirino A, Rossi M et al. Culprit-only or multivessel percutaneous coronary stenting in patients with non-ST-segment elevation acute coronary syndromes: one-year follow-up. Journal of Interventional Cardiology. 2009; 22(4):329-335.	Wrong population

J.6 Cardiogenic shock

Reference	Reason for exclusion
Bauer T, Zeymer U, Hochadel M, Mollmann H, Weidinger F, Zahn R et al. Use and outcomes of multivessel percutaneous coronary intervention in patients with acute myocardial infarction complicated by cardiogenic shock (from the EHS-PCI Registry). American Journal of Cardiology. 2012; 109(7):941-946.	Not question of interest
Buerke M, et al. Pathophysiology, diagnosis, and treatment of infarction-related cardiogenic shock. Herz. 2011 Mar; 36(2):73-83. Review.	Review
Hochman, JS et al. One-year survival following: early revascularization for cardiogenic shock. Commentary; JAMA2001:240	Commentary
Jeger RV et al. Interhospital transfer for early revascularization in patients with ST-elevation myocardial infarction complicated by cardiogenic shock--a report from the SHould we revascularize Occluded Coronaries for cardiogenic shocK? (SHOCK) trial and registry. Am Heart J. 2006 Oct; 152(4):686-92.	Subgroup analysis of transfer patients
Lee MS, et al. Outcome after surgery and percutaneous intervention for cardiogenic shock and left main disease. Ann Thorac Surg. 2008 Jul; 86(1):29-34.	Wrong comparison: PCI versus CABG
MarKusohn E et al. Primary percutaneous coronary intervention after out-of-hospital cardiac arrest: patients and outcomes. Isr Med Assoc J. 2007 Apr; 9(4):257-9.	No control group
Prasad A et al. Outcomes of elderly patients with cardiogenic shock treated with early percutaneous revascularization. Am Heart J. 2004 Jun; 147(6):1066-70.	Analysis of early revascularisation patients
Ramanathan K et al. Rapid complete reversal of systemic hypoperfusion after intra-aortic balloon pump counterpulsation and survival in cardiogenic shock complicating an acute myocardial infarction. Am Heart J. 2011 Aug; 162(2):268-75.	Subgroup of IABP patients
Rogers PA, Huang H, Alam M, Paniagua D, Kar B, Jneid H. Early revascularization improves mortality in elderly patients with acute myocardial infarction complicated by cardiogenic shock. Circulation. 2011; 124(21 SUPPL. 1).	Abstract
Webb JG et al. SHOCK Investigators. Percutaneous coronary intervention for cardiogenic shock in the SHOCK Trial Registry. Am Heart J. 2001 Jun; 141(6):964-70.	Analysis of PCI patients only
Webb JG et al SHOCK Investigators. Percutaneous coronary intervention for cardiogenic shock in the SHOCK trial. J Am Coll Cardiol. 2003 Oct 15; 42(8):1380-6.	Investigates only patients who had PCI
White HD et al. Comparison of percutaneous coronary intervention and coronary artery bypass grafting after acute myocardial infarction complicated by cardiogenic shock: results from the Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock (SHOCK) trial. Circulation. 2005 Sep 27; 112(13):1992-2001.	PCI versus CABG
Wong SC et al. SHOCK Investigators. Absence of gender differences in clinical outcomes in patients with cardiogenic shock complicating acute myocardial infarction. A report from the SHOCK Trial Registry. J Am Coll Cardiol. 2001 Nov	Did not compare early revascularisation versus initial medical stabilisation

Reference	Reason for exclusion
1; 38(5):1395-401.	

J.7 People who remain unconscious after a cardiac arrest

Reference	Reason for exclusion
Aguila A, Aktas MK, Funderburk M, McNitt S, Delehanty J, Traub D et al. Outcomes following therapeutic hypothermia for patients presenting with cardiac arrest. Heart Rhythm. 2009 (1):S429-S430.	Not study type of interest; abstract
Al-Senani FM, Graffagnino C, Grotta JC, Saiki R, Wood D, Chung W et al. A prospective, multicenter pilot study to evaluate the feasibility and safety of using the CoolGard System and Icy catheter following cardiac arrest. Resuscitation. 2004; 62(2):143-150.	Not question of interest
Aldhoon B, Kettner J, Cihlova M, Kohoutek J, Wiendl M, Al-Hiti H et al. Short-term outcomes of out-of-hospital cardiac arrest after successful resuscitation. Heart Rhythm. 2009; 1):S182.	Not study type of interest; abstract
Alla V, Mathias S, Hunter C, Holmberg M. Aortic and coronary thrombosis following methamphetamine use and resuscitated SCD: Coincidence or shared pathogenesis? Journal of General Internal Medicine. 2010; 25:S493.	Wrong study type; case control
Andrade Ferreira I, Schutte M, Oosterloo E, Dekker W, Mooi BW, Dambrink JHE et al. Therapeutic mild hypothermia improves outcome after out-of-hospital cardiac arrest. Netherlands Heart Journal. 2009; 17(10):378-384.	Not question of interest
Anyfantakis ZA, Baron G, Aubry P, Himbert D, Feldman LJ, Juliard JM et al. Acute coronary angiographic findings in survivors of out-of-hospital cardiac arrest. American Heart Journal. 2009; 157(2):312-318.	Wrong population
Athanasuleas CL, Buckberg GD, Allen BS, Beyersdorf F, Kirsh MM. Sudden cardiac death: Directing the scope of resuscitation towards the heart and brain. Resuscitation. 2006; 70(1):44-51.	Not question of interest
Aurore A, Jabre P, Liot P, Margenet A, Lecarpentier E, Combes X. Predictive factors for positive coronary angiography in out-of-hospital cardiac arrest patients. European Journal of Emergency Medicine. 2011; 18(2):73-76.	Wrong population (mixed STEMI, NSTEMI, Q wave)
Batista LM, Lima FO, Januzzi JL, Donahue V, Snydeman C, Greer DM. Combined cardiac catheterization and therapeutic hypothermia following cardiac arrest is feasible and safe. Stroke. 2010; 41 (4):e260.	Not study type of interest; abstract
Bendz B, Eritsland J, Nakstad AR, Brekke M, Klow NE, Steen PA et al. Long-term prognosis after out-of-hospital cardiac arrest and primary percutaneous coronary intervention. Resuscitation. 2004; 63(1):49-53.	Not study type of interest; case series
Borger Van Der Burg AE, Bax JJ, Boersma E, Bootsma M, Van Erven L, Van Der Wall EE et al. Impact of percutaneous coronary intervention or coronary artery bypass grafting on outcome after nonfatal cardiac arrest outside the hospital. American Journal of Cardiology. 2003; 91(7):785-789.	Wrong population
Borger Van Der Burg AE, Bax JJ, Boersma E, Van Erven L, Bootsma M, Van Der Wall EE et al. Standardized screening and treatment of patients with life-threatening arrhythmias: The leiden out-of-hospital cardiac arrest evaluation study. Heart Rhythm. 2004; 1(1):51-57.	Wrong population
Bray J, Stub D, Bernard S, Smith K. Exploring gender differences and the 'estrogen effect' in an Australian out-of-hospital cardiac arrest (OHCA) population. Academic Emergency Medicine. 2012; 19(6):739.	Not question of interest
Bro-Jeppesen J, Kjaergaard J, Pedersen F, Wanscher M, Nielsen S, Moller J et al. Does the combination of therapeutic hypothermia and acute coronary angiography improve outcome. European Heart Journal. 2011; 32:930.	Not study type of interest; abstract
Busch M, Sooreide E. Have the 2005 european resuscitation council guidelines and the use of percutaneous coronary intervention improved outcome in	Not study type of interest; abstract

Reference	Reason for exclusion
unconscious out-of-hospital cardiac arrest survivors? Intensive Care Medicine. 2010; 36:S297.	
Chakravarthy M, Mitra S, Nonis L. Outcomes of in-hospital, out of intensive care and operation theatre cardiac arrests in a tertiary referral hospital. Indian Heart Journal. 2012; 64(1):7-11.	Not study type of interest; audit
Choudry FA, Weerackody RP, Mills PG, Kjain A. Survival following acute ST elevation myocardial infarction complicated by out of hospital cardiopulmonary arrest. Journal of the American College of Cardiology. 2010; 1):B106.	Not study type of interest; abstract
Chow-In Ko P, Xiong GH, Chiang WC, Wang HC, Yang CW, Huei-Ming Ma M. Hospital characteristics associated with survival after out-of-hospital cardiac arrest: Resuscitation center designation. Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Cokkinos P. Post-resuscitation care: current therapeutic concepts. Acute Cardiac Care. 2009; 11(3):131-137.	Not study type of interest; narrative review used for crosschecking purposes
Derksen R, Van Hemel NM. Coronary revascularisation or ICD implantation in selected survivors of an out-of-hospital cardiac arrest after myocardial infarction? European Journal of Cardiac Pacing and Electrophysiology. 1996; 6(3):171-172.	Not study type of interest; narrative review
Dooris M. Emergency cardiac catheterisation for resuscitated out of hospital cardiac arrest: An ongoing challenge but not futile. Heart Lung and Circulation. 2010; 19:S129-S130.	Not study type of interest; abstract
Dumas F, White L, Stubbs BA, Cariou A, Rea TD. Long-term prognosis following resuscitation from out of hospital cardiac arrest: Role of percutaneous coronary intervention and therapeutic hypothermia. Journal of the American College of Cardiology. 2012; 60(1):21-27.	Not question of interest
Dumas F, Cariou A, Manzo-Silberman S, Grimaldi D, Vivien B, Rosencher J et al. Immediate percutaneous coronary intervention is associated with better survival after out-of-hospital cardiac arrest: Insights from the PROCAT (Parisian Region Out of Hospital Cardiac Arrest) registry. Circulation: Cardiovascular Interventions. 2010; 3(3):200-207.	Not study type of interest; case series
Dumas F, Silberman SM, Giovanetti O, Lemiale V, Vivien B, Carli P et al. Outcome after immediate invasive strategy in out-of-hospital cardiac arrest. Archives of Cardiovascular Diseases Supplements. 2010; 2 (1):111.	Not study type of interest; abstract
Farhat A, Godin M, Abriou C, Borz B, Tron C, Baala B et al. Does primary coronary angioplasty improve outcome in patients who are victims of out-of-hospital cardiac arrest? Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Garot P, Lefevre T, Eltchaninoff H, Morice MC, Tamion F, Abry B et al. Six-month outcome of emergency percutaneous coronary intervention in resuscitated patients after cardiac arrest complicating ST-elevation myocardial infarction. Circulation. 2007; 115(11):1354-1362.	Not study type of interest; case series
Golia E, Piro M, Tubaro M. Out-of-hospital CPR: Better outcome for our patients. Critical Care. 2011; 15(2).	Narrative review
Gorjup V, Radsel P, Kocjancic ST, Erzen D, Noc M. Acute ST-elevation myocardial infarction after successful cardiopulmonary resuscitation. Resuscitation. 2007; 72(3):379-385.	Not study type of interest; case series
Grasner JT, Meybohm P, Caliebe A, Bottiger BW, Wnent J, Messelken M et al. Postresuscitation care with mild therapeutic hypothermia and coronary intervention after out-of-hospital cardiopulmonary resuscitation: A prospective registry analysis. Critical Care. 2011; 15(1).	Not study type of interest; case series

Reference	Reason for exclusion
Gupta N, Kontos MC, Gupta A, Vetrovec GW, Messenger J. Clinical and angiographic characteristics of patients undergoing percutaneous coronary intervention following sudden cardiac arrest: Insights from the ncdr. Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Hosmane VR, Mustafa NG, Reddy VK, Reese ICL, DiSabatino A, Kolm P et al. Survival and Neurologic Recovery in Patients With ST-Segment Elevation Myocardial Infarction Resuscitated From Cardiac Arrest. Journal of the American College of Cardiology. 2009; 53(5):409-415.	Not question of interest
Hovdenes J, Laake JH, Aaberge L, Haugaa H, Bugge JF. Therapeutic hypothermia after out-of-hospital cardiac arrest: Experiences with patients treated with percutaneous coronary intervention and cardiogenic shock. Acta Anaesthesiologica Scandinavica. 2007; 51(2):137-142.	Wrong population
Hreybe H, Singla I, Razak E, Saba S. Predictors of cardiac arrest occurring in the context of acute myocardial infarction. PACE - Pacing and Clinical Electrophysiology. 2007; 30(10):1262-1266.	No outcome of interest
Johnson NJ, Salhi RA, Abella BS, Neumar RW, Carr BG. Emergency department factors associated with survival after out-of-hospital cardiac arrest. Academic Emergency Medicine. 2012; 19:S272-S273.	Narrative review
Kahn JK, Glazier S, Swor R, Savas V, O'Neill WW. Primary coronary angioplasty for acute myocardial infarction complicated by out-of-hospital cardiac arrest. American Journal of Cardiology. 1995; 75(15):1069-1070.	Not study type of interest; case series
Kamal Z, Andersen GO, Eritsland J, Draegni T, Sunde K, Mangschau A. Coronary angiographic findings in patients with or without st-segment elevation resuscitated after out-of-hospital cardiac arrest. Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Kebed KY, Schwartz RS, Newell MC, Browning JA, Sharkey SW, Hauser RG et al. Cardiac arrest: Who goes to the catheterization lab? Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Keelan PC, Bunch TJ, White RD, Packer DL, Holmes Jr DR. Early direct coronary angioplasty in survivors of out-of-hospital cardiac arrest. American Journal of Cardiology. 2003; 91(12):1461-1463.	Not study type of interest; case series
Kelley M, Huang R, Wells Q, Scott C, Fredi J, McPherson J. Outcomes in comatose cardiac arrest patients with st elevation myocardial infarction treated with therapeutic hypothermia and percutaneous coronary intervention. Critical Care Medicine. 2010; 38:A127.	Not study type of interest; abstract
Kelly P, Ruskin JN, Vlahakes GJ, Buckley Jr MJ, Freeman CS, Garan H. Surgical coronary revascularization in survivors of prehospital cardiac arrest: Its effect on inducible ventricular arrhythmias and long-term survival. Journal of the American College of Cardiology. 1990; 15(2):267-273.	Wrong intervention
Kern KB. Importance of invasive interventional strategies in resuscitated patients following sudden cardiac arrest. Interventional Cardiology. 2011; 3(6):649-661.	Narrative review
Keuper W, Dieker HJ, Brouwer MA, Verheugt FWA. Reperfusion therapy in out-of-hospital cardiac arrest: current insights. Resuscitation. 2007; 73(2):189-201.	Narrative review
Kirkland L, Parham W, Edelstein K, Unger B, Mooney M. Simultaneous percutaneous coronary intervention and mild therapeutic hypothermia in comatose survivors of cardiac arrest with st-segment elevation acute myocardial infarction. Critical Care Medicine. 2009; 37 (12 SUPPL.):A32.	Not study type of interest; abstract
Knafelj R, Radsel P, Ploj T, Noc M. Primary percutaneous coronary intervention and mild induced hypothermia in comatose survivors of ventricular fibrillation with ST-elevation acute myocardial infarction. Resuscitation. 2007; 74(2):227-	Not study type of interest; case series

Reference	Reason for exclusion
234.	
Koester R, Kaehler J, Barmeyer A, Mullerleile K, Priefler M, Soeffker G et al. Coronary angiography and intervention during hypothermia can be performed safely without cardiac arrhythmia or vasospasm. Clinical Research in Cardiology. 2011; 100(11):1013-1019.	Not study type of interest; case series (information not included in case series table as no mortality or neurological status outcomes reported)
Kokubu N, Hase M, Nishida J, Funayama N, Mochizuki A, Muranaka A et al. Impacts of gensini score for coronary angiographic severity on outcomes of out-of-hospital cardiac arrest due to acute myocardial infarction patients. American Journal of Cardiology. 2011; 1):5A.	Not study type of interest; abstract
Lee CH, Lemos PA, Degertekin M, Saia F, Tanabe K, Serruys PW In-hospital versus out-of-hospital cardiac arrest complicating myocardial infarction: survival after percutaneous coronary revascularization. Int J Cardiol. 2005 Feb 15; 98(2):359-60.	Not study type of interest; case series
Lettieri C, Savonitto S, De Servi S, Guagliumi G, Belli G, Repetto A et al. Emergency percutaneous coronary intervention in patients with ST-elevation myocardial infarction complicated by out-of-hospital cardiac arrest: Early and medium-term outcome. American Heart Journal. 2009; 157(3):569-575.	Not study type of interest; case series
Lyon RM, Shepherd J, Clegg GR. Early in-hospital management of out-of-hospital cardiac arrest in Scotland: A national survey. European Journal of Emergency Medicine. 2011; 18(2):102-104.	Not study type of interest (survey)
Mager A, Kornowski R, Murninkas D, Vaknin-Assa H, Ukabi S, Brosh D et al. Outcome of emergency percutaneous coronary intervention for acute ST-elevation myocardial infarction complicated bv cardiac arrest. Coronary Artery Disease. 2008; 19(8):615-618.	Not study type of interest (compared cardiac arrest versus non-cardiac arrest patients)
Markusohn E, Roguin A, Sebbag A, Aronson D, Dragu R, Amikam S et al. Primary percutaneous coronary intervention after out-of-hospital cardiac arrest: Patients and outcomes. Israel Medical Association Journal. 2007; 9(4):257-259.	Not study type of interest; case series
Maze R, Le May M, Glover C, So D, Froeschl M, Marquis J et al. Therapeutic hypothermia in patients with ST-segment elevation myocardial infarction surviving out of hospital cardiac arrest in the context of a regional primary PCI program. Canadian Journal of Cardiology. 2010; 26:127D.	Not study type of interest; abstract
Molnar L, Zima E, Geller L, Szabo G, Merkely B. Primary percutaneous coronary intervention during resuscitation with the AutoPulse is feasible. Resuscitation. 2011; 82:S10.	Not study type of interest; abstract
Mylotte D, Lefevre T, Eltchaninoff H, Briole N, Tazarourte K, Margenet A et al. Multivessel versus target lesion percutaneous coronary intervention in resuscitated cardiac arrest patients with STEMI. Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Nanjayya V, Nayyar V, Kim C. Does immediate coronary intervention for patients with out-of-hospital VT/VF arrest improve outcome. Anaesthesia and Intensive Care. 2009; 37 (6):1033.	Insufficient information for inclusion in review
Nanjayya VB, Nayyar V. Immediate coronary angiogram in comatose survivors of out-of-hospital cardiac arrest-An Australian study. Resuscitation. 2012; 83(6):699-704.	Study reported population of acute MI, unclear number of STEMI patients
Nielsen N, Hovdenes J, Nilsson F, Rubertsson S, Stammet P, Sunde K et al. Outcome, timing and adverse events in therapeutic hypothermia after out-of-hospital cardiac arrest. Acta Anaesthesiologica Scandinavica. 2009; 53(7):926-934.	Not study type of interest; case series
Noc M. Mild induced hypothermia and an urgent invasive coronary strategy - a	Narrative review ordered

Reference	Reason for exclusion
Promising protocol for comatose survivors of sudden cardiac arrest. Serbian Journal of Experimental and Clinical Research. 2011; 12(2):53-55.	for cross checking
Noc M. Patients with resuscitated sudden cardiac arrest: Forgotten 'orphans of interventional cardiology? Interventional Cardiology. 2011; 3(6):623-625.	Narrative review ordered for cross checking
Noc M. Urgent coronary angiography and percutaneous coronary intervention as a part of postresuscitation management. Critical Care Medicine. 2008; 36(11 Suppl):S454-S457.	Narrative review ordered for cross checking
Noc M, Radsel P. Urgent invasive coronary strategy in patients with sudden cardiac arrest. Current Opinion in Critical Care. 2008; 14(3):287-291.	Narrative review ordered for cross checking
Panchal AR, Vadeboncoeur TF, Stolz U, Roosa JR, Berg RA, Ewy GA et al. Impact of an aha guideline-based, statewide postarrest system of care on survival from out-of-hospital cardiac arrest. Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Quintero-Moran B, Moreno R, Villarreal S, Perez-Vizcayno MJ, Hernandez R, Conde C et al. Percutaneous coronary intervention for cardiac arrest secondary to ST-elevation acute myocardial infarction. Influence of immediate paramedical/medical assistance on clinical outcome. Journal of Invasive Cardiology. 2006; 18(6):269-272.	Not study type of interest; case series
Reddy VK, Hosmane VR, Doorey A, Weintraub WS, Rahman E. Is it appropriate to take all post-resuscitation patients suspected of having an acute MI for urgent angiography? Journal of the American College of Cardiology. 2011; 1):B131.	Not study type of interest; abstract
Reynolds JC, Callaway CW, El Khoudary SR, et al. Coronary angiography predicts improved outcome following cardiac arrest: Propensity-adjusted analysis. J Intensive Care Med 2009; 24:179-86.R	Not study type of interest; case series
Schefold JC, Storm C, Joerres A, Hasper D. Mild therapeutic hypothermia after cardiac arrest and the risk of bleeding in patients with acute myocardial infarction. International Journal of Cardiology. 2009; 132(3):387-391.	Not question of interest
Siudak Z, Birkemeyer R, Dziewierz A, Rakowski T, Zmudka K, Dubiel JS et al. Out-of-hospital cardiac arrest in patients treated with primary PCI for STEMI. Long-term follow up data from EUROTRANSFER registry. Resuscitation. 2012; 83(3):303-306.	Not question of interest
Spaulding CM, Joly LM, Rosenberg A, Monchi M, Weber SN, Dhainaut JFA et al. Immediate coronary angiography in survivors of out-of-hospital cardiac arrest. New England Journal of Medicine. 1997; 336(23):1629-1633.	Wrong population (mixed STEMI, NSTEMI, Q wave)
Stub D, Hengel C, Chan W, Jackson D, Sanders K, Dart A et al. Cooling and coronary catheterisation is associated with improved survival in out of hospital cardiac arrest. Heart Lung and Circulation. 2010; 19:S127.	Not study type of interest; abstract
Stub D, Hengel C, Chan W, Jackson D, Sanders K, Dart AM et al. Usefulness of cooling and coronary catheterization to improve survival in out-of-hospital cardiac arrest. American Journal of Cardiology. 2011; 107(4):522-527.	Not question of interest
Swanson LA, Edelstein KM, Parham WM, Kapsner CE, Unger BT, Kalb ME et al. Cool it: Therapeutic hypothermia for cardiac arrest in patients with ST-elevation myocardial infarction and unique benefits with combined treatment. Journal of the American College of Cardiology. 2009; 53 (10):A347.	Not study type of interest; abstract
Tachibana E, Nagao K, Kikushima K, Takayama T, Satoh N, Yamada A et al. The effect of emergency percutaneous coronary intervention for patients with post cardiac arrest syndrome in tokyo CCU network. Circulation Conference: American Heart Association's Scientific Sessions. 2011; 124(21 SUPPL. 1).	Not study type of interest; abstract
Tadel-Kocjancic S, Radsel P, Knafelj R, Gorjup V, Noc M. Improved hospital outcome of comatose survivors of cardiac arrest of presumed cardiac origin. European Heart Journal, Supplement. 2010; 12:F123.	Not study type of interest; abstract

Reference	Reason for exclusion
Valente S, Lazzeri C, Saletti E, Chiostri M, Gensini GF. Primary percutaneous coronary intervention in comatose survivors of cardiac arrest with ST-elevation acute myocardial infarction: a single-center experience in Florence. Journal of Cardiovascular Medicine (Hagerstown, Md). 2008; 9(11):1083-1087.	Not study type of interest; case series
Werling M, Thoren AB, Axelsson C, Herlitz J. Treatment and outcome in post-resuscitation care after out-of-hospital cardiac arrest when a modern therapeutic approach was introduced. Resuscitation. 2007; 73(1):40-45.	Data on population of interest not analysed separately from other populations
Wijesekera V, Mullany D, Savage M, Walters D. Survivors of out of hospital cardiac arrests proceeding to coronary angiogram: Clinical, angiographic features and in-hospital outcomes-a single centre experience. Heart Lung and Circulation. 2010; 19:S35-S36.	Wrong population
Wolfrum S, Pierau C, Radke PW, Schunkert H, Kurowski V. Mild therapeutic hypothermia in patients after out-of-hospital cardiac arrest due to acute ST-segment elevation myocardial infarction undergoing immediate percutaneous coronary intervention. Critical Care Medicine. 2008; 36(6):1780-1786.	Not study type of interest; case series
Zanuttini D, Armellini I, Nucifora G, Carchietti E, Trillo G, Spedicato L et al. Impact of Emergency Coronary Angiography on In-Hospital Outcome of Unconscious Survivors After Out-of-Hospital Cardiac Arrest. American Journal of Cardiology. 2012.	Mixed population; only 34% STEMI
Zoffoli G, Nicolini F, Beghi C, Budillon AM, Agostinelli A, Borrello B et al. Acute coronary syndromes without persistent st-segment elevation: Advances in surgical revascularization. Acta Biomedica De L'Ateneo Parmense. 2005; 76(2):99-106+127.	Wrong population

J.8 Hospital volumes of PPCI

Reference	Reason for exclusion
Adogwa, Owoicho, Costich, Julia F., Hill, Raymond, and Slavova, Svetla. Does higher surgical volume predict better patient outcomes? Journal of the Kentucky Medical Association 107(1), 10-16. 2009.	Wrong intervention - all PCIs
Birkmeyer, J. D., Finlayson, E. V., and Birkmeyer, C. M. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog initiative. Surgery 130(3), 415-422. 2001.	Wrong intervention - all PCIs
Birkmeyer, John D. and Dimick, Justin B. Potential benefits of the new Leapfrog standards: effect of process and outcomes measures. Surgery 135(6), 569-575. 2004.	Wrong intervention - all PCIs
Brown, David L. Analysis of the institutional volume-outcome relations for balloon angioplasty and stenting in the stent era in California. American Heart Journal 146(6), 1071-1076. 2003.	Wrong intervention - all PCIs
Burton, K. R., Slack, R., Oldroyd, K. G., Pell, A. C. H., Flapan, A. D., Starkey, I. R., Eteiba, H., Jennings, K. P., Northcote, R. J., Hillis, W. Stewart, and Pell, J. P. Hospital volume of throughput and periprocedural and medium-term adverse events after percutaneous coronary intervention: retrospective cohort study of all 17,417 procedures undertaken in Scotland, 1997-2003. Heart 92(11), 1667-1672. 2006.	Wrong intervention - all PCIs
Carey, Joseph S., Danielsen, Beate, Junod, Forrest L., Rossiter, Stephen J., and Stabile, Bruce E. The California Cardiac Surgery and Intervention Project: evolution of a public reporting program. American Surgeon 72(10), 978-983. 2006	Wrong intervention - all PCIs
Epstein, Andrew J., Rathore, Saif S., Volpp, Kevin G. M., and Krumholz, Harlan M. Hospital percutaneous coronary intervention volume and patient mortality, 1998 to 2000: does the evidence support current procedure volume	Wrong intervention - all PCIs

Reference	Reason for exclusion
minimums? Journal of the American College of Cardiology 43(10), 1755-1762. 2004.	
Hannan, E. L., Racz, M., Ryan, T. J., McCallister, B. D., Johnson, L. W., Arani, D. T., Guerci, A. D., Sosa, J., and Topol, E. J. Coronary angioplasty volume-outcome relationships for hospitals and cardiologists. JAMA 277(11), 892-898. 1997.	Wrong intervention - all PCIs
Hannan, Edward L., Wu, Chuntao, Walford, Gary, King, Spencer B., Holmes, David R. J., Ambrose, John A., Sharma, Samin, Katz, Stanley, Clark, Luther T., and Jones, Robert H. Volume-outcome relationships for percutaneous coronary interventions in the stent era. Circulation 112(8), 1171-1179. 2005.	Narative review
Ho, V. Evolution of the volume-outcome relation for hospitals performing coronary angioplasty. Circulation 101(15), 1806-1811. 2000.	Data collected before cut-off and wrong intervention (all PCIs)
Ho, Vivian. Certificate of need, volume, and percutaneous transluminal coronary angioplasty outcomes. American Heart Journal 147(3), 442-448. 2004.	Wrong intervention - all PCIs
Jollis, J. G., Peterson, E. D., DeLong, E. R., Mark, D. B., Collins, S. R., Muhlbaier, L. H., and Pryor, D. B. The relation between the volume of coronary angioplasty procedures at hospitals treating Medicare beneficiaries and short-term mortality. New England Journal of Medicine 331(24), 1625-1629. 1994.	Data collected before cut-off and wrong intervention (all PCIs)
Jollis, J. G., Peterson, E. D., Nelson, C. L., Stafford, J. A., DeLong, E. R., Muhlbaier, L. H., and Mark, D. B. Relationship between physician and hospital coronary angioplasty volume and outcome in elderly patients. Circulation 95(11), 2485-2491. 1997.	Data collected before cut-off and wrong intervention (all PCIs)
Kenney, Kimberly M., Marzo, Mitchell C., Ondrasik, Nicholas R., and Wisenbaugh, Thomas. Percutaneous coronary intervention outcomes in a low-volume center: survival, stent thrombosis, and repeat revascularization. Circulation.Cardiovascular quality and outcomes 2(6), 671-677. 2009.	Population not specified. Wrong intervention - all PCIs
Kimmel, Stephen E., Sauer, William H., Brensinger, Colleen, Hirshfeld, John, Haber, Howard L., and Localio, A. Russell. Relationship between coronary angioplasty laboratory volume and outcomes after hospital discharge. American Heart Journal 143(5), 833-840. 2002.	Data collected before cut-off and wrong intervention (all PCIs)
Kuwabara, Hiroyo, Fushimi, Kiyohide, and Matsuda, Shinya. Relationship between hospital volume and outcomes following primary percutaneous coronary intervention in patients with acute myocardial infarction. Circulation Journal 75(5), 1107-1112. 2011.	Wrong population. Codes for inclusion relate to both STEMI and NSTEMI.
Lin, Herng Ching, Lee, Hsin Chien, and Chu, Chien Heng. The volume-outcome relationship of percutaneous coronary intervention: can current procedure volume minimums be applied to a developing country? American Heart Journal 155(3), 547-552. 2008.	Wrong intervention - all PCIs
Machino, T. O., Toyama, M., Obara, K., Takeyasu, N., Watanabe, S., and Aonuma, K. Effect of hospital case volume on treatment and in-hospital outcomes in patients undergoing percutaneous coronary intervention for acute myocardial infarction: Results from the Ibaraki Coronary Artery Disease Study (ICAS) registry. International heart journal 49(3), 249-260. 2008.	Wrong population – STEMI and NSTEMI
Maynard, C., Every, N. R., Chapko, M. K., and Ritchie, J. L. Institutional volumes and coronary angioplasty outcomes before and after the introduction of stenting. Effective Clinical Practice 2(3), 108-113. 1999.	Wrong intervention - all PCIs
Maynard, C., Every, N. R., Chapko, M. K., and Ritchie, J. L. Outcomes of coronary angioplasty procedures performed in rural hospitals. American Journal of Medicine 108(9), 710-713. 2000.	Wrong intervention - all PCIs
McGrath, P. D., Wennberg, D. E., Malenka, D. J., Kellett, M. A. J., Ryan, T. J. J., O'Meara, J. R., Bradley, W. A., Hearne, M. J., Hettleman, B., Robb, J. F.,	Wrong intervention - all PCIs

Reference	Reason for exclusion
Shubrooks, S., VerLee, P., Watkins, M. W., Lucas, F. L., and O'Connor, G. T. Operator volume and outcomes in 12,998 percutaneous coronary interventions. Northern New England Cardiovascular Disease Study Group. Journal of the American College of Cardiology 31(3), 570-576. 1998	
McGrath, P. D., Wennberg, D. E., Dickens, J. D. J., Siewers, A. E., Lucas, F. L., Malenka, D. J., Kellett, M. A. J., and Ryan, T. J. J. Relation between operator and hospital volume and outcomes following percutaneous coronary interventions in the era of the coronary stent. JAMA 284(24), 3139-3144. 2000.	Wrong intervention - all PCIs
Mukherjee, Debabrata, Wainess, Reid M., Dimick, Justin B., Cowan, John A., Rajagopalan, Sanjay, Chetcuti, Stanley, Grossman, Paul M., and Upchurch, Gilbert R. Variation in outcomes after percutaneous coronary intervention in the United States and predictors of periprocedural mortality. Cardiology 103(3), 143-147. 2005.	Wrong intervention - all PCIs
Ohtsuka Machino, Tomoko, Toyama, Masahiro, Obara, Kenichi, Takeyasu, Noriyuki, Watanabe, Shigeyuki, Aonuma, Kazutaka, and Ibaraki Coronary Artery Disease Study (ICAS) Registry. Effect of hospital case volume on treatment and in-hospital outcomes in patients undergoing percutaneous coronary intervention for acute myocardial infarction. Results from the Ibaraki Coronary Artery Disease Study (ICAS) Registry. International heart journal 49(3), 249-260. 2008.	Wrong population – STEMI and NSTEMI reported together
Spaulding, C. M., Joly, L. M., Rosenberg, A., Monchi, M., Weber, S. N., Dhainaut, J. F. A., and Carli, P. Immediate coronary angiography in survivors of out-of-hospital cardiac arrest. New England Journal of Medicine 336(23), 1629-1633. 1997.	Not relevant to question
Spaulding, Christian, Morice, Marie Claude, Lancelin, Bernard, El Haddad, Simon, Lepage, Eric, Bataille, Sophie, Tresca, Jean Pierre, Mouranche, Xavier, Fosse, Sandrine, Monchi, Mehran, de Vernejoul, Nikita, and CARDIO-ARIF, registry, I. Is the volume-outcome relation still an issue in the era of PCI with systematic stenting? Results of the greater Paris area PCI registry. European Heart Journal 27(9), 1054-1060. 2006.	Unclear population – contained 'emergency' PCI for AMI of more than 12 hours but less than 24 hours of duration if the operator considered emergency PCI necessary because of continuous ischaemia.
Tsuchihashi, Miyuki, Tsutsui, Hiroyuki, Tada, Hideo, Shihara, Miwako, Takeshita, Akira, Kono, Suminori, and Japanese Coronary Intervention Study (JCIS) Group. Volume-outcome relation for hospitals performing angioplasty for acute myocardial infarction: results from the Nationwide Japanese Registry. Circulation Journal 68(10), 887-891. 2004.	Wrong intervention - all PCIs
Vakili, Babak A., Brown, David L., and Coronary Angioplasty Reporting System of the New York State Department of Health. Relation of total annual coronary angioplasty volume of physicians and hospitals on outcomes of primary angioplasty for acute myocardial infarction (data from the 1995 Coronary Angioplasty Reporting System of the New York State Department of Health). American Journal of Cardiology 91(6), 726-728. 2003.	Mixed population – elective and emergent PCI
Vakili, B. A., Kaplan, R., and Brown, D. L. Volume-outcome relation for physicians and hospitals performing angioplasty for acute myocardial infarction in New York state. Circulation 104(18), 2171-2176. 2001.	Mixed population – elective and emergent PCI
Vakili, B. A., Kaplan, R., and Brown, D. L. Volume-outcome relation for physicians and hospitals performing angioplasty for acute myocardial infarction in New York state. Circulation 104(18), 2171-2176. 2001.	Unclear population and intervention
West, Robert M., Cattle, Brian A., Bouyssie, Marianne, Squire, Iain, de Belder, Mark, Fox, Keith A. A., Boyle, Roger, McLenachan, Jim M., Batin, Philip D., Greenwood, Darren C., and Gale, Chris P. Impact of hospital proportion and volume on primary percutaneous coronary intervention performance in	No outcomes of interest reported

Reference	Reason for exclusion
England and Wales. European Heart Journal 32(6), 706-711. 2011.	
Zahn, R., Vogt, A., Zeymer, U., Gitt, A. K., Seidl, K., Gottwik, M., Weber, M. A., Niederer, W., Modl, B., Engel, H. J., Tebbe, U., Senges, J., and Arbeitsgemeinschaft Leitender, Kardiologischer Krankenhausarzte. In-hospital time to treatment of patients with acute ST elevation myocardial infarction treated with primary angioplasty: determinants and outcome. Results from the registry of percutaneous coronary interventions in acute myocardial infarction of the Arbeitsgemeinschaft Leitender Kardiologischer Krankenhausarzte. Heart 91(8), 1041-1046. 2005.	Not relevant to question
Zahn, R., Gottwik, M., Hochadel, M., Senges, J., Zeymer, U., Vogt, A., Meinertz, T., Dietz, R., Hauptmann, K. E., Grube, E., Kerber, S., Sechtem, U., and Registry of Percutaneous Coronary Interventions of the Arbeitsgemeinschaft Leitende Kardiologische Krankenhausarzte (ALKK). Volume-outcome relation for contemporary percutaneous coronary interventions (PCI) in daily clinical practice: is it limited to high-risk patients? Results from the Registry of Percutaneous Coronary Interventions of the Arbeitsgemeinschaft Leitende Kardiologische Krankenhausarzte (ALKK). Heart 94(3), 329-335. 2008.	Wrong intervention - all PCIs

J.9 Pre-hospital versus in-hospital fibrinolysis

Reference	Reason for exclusion
P. W. Armstrong and WEST Steering Committee. A comparison of pharmacologic therapy with/without timely coronary intervention vs. primary percutaneous intervention early after ST-elevation myocardial infarction: the WEST (Which Early ST-elevation myocardial infarction Therapy) study. Eur.Heart J. 27 (13):1530-1538, 2006.	Wrong comparison – pooled in-hospital and pre-hospital data
H. R. Arntz. Prehospital thrombolysis in acute myocardial infarction. Thromb Res 103 Suppl 1:S91-S96, 2001.	Review
I. Bata, P. W. Armstrong, C. M. Westerhout, A. Travers, S. Sookram, E. Caine, J. Christenson, and R. C. Welsh. Time from first medical contact to reperfusion in ST elevation myocardial infarction: A Which Early ST Elevation Myocardial Infarction Therapy (WEST) substudy. Can.J.Cardiol. 25 (8):463-468, 2009.	Considers time to reperfusion, not pre-hospital versus in-hospital fribrinolysis
L. Belle, D. Savary, N. Dumonteil, M. Villaceque, S. Charpentier, L. Soulat, C. Loubeyre, P.-G. Steg, Y. Cottin, D. Miljkovic, and J. Puel. Are there good and bad responders to prehospital thrombolysis in the acute phase of myocardial infarction? OPTIMAL study rationale. Arch.Mal.Coeur Vaiss. 99 (9):823-827, 2006.	Not English language
BEPS Collaborative Group. Prehospital thrombolysis in acute myocardial infarction: the Belgian eminase prehospital study (BEPS). Eur.Heart J. 12 (9):965-967, 1991.	Not RCT
A. Boland, Y. Dundar, A. Bagust, A. Haycox, R. Hill, R. M. Mota, T. Walley, and R. Dickson. Early thrombolysis for the treatment of acute myocardial infarction: a systematic review and economic evaluation (Provisional abstract). Health.Technol.Assess. 7 (15):1-136, 2003.	Wrong comparison – considers drugs used in pre-hospital fibrinolysis
M. J. M. Bouten and M. L. Simoons. Strategies for pre-hospital thrombolysis: An overview. Eur.Heart J. 12 (SUPPL. G):39-42, 1991.	Review
D. B. Brieger, K.-H. Mak, H. D. White, N. S. Kleiman, D. P. Miller, A. Vahanian, A. M. Ross, R. M. Califf, and E. J. Topol. Benefit of early sustained reperfusion in patients with prior myocardial infarction (The GUSTO-I Trial). Am.J.Cardiol. 81 (3):282-287, 1998.	Wrong comparison
J. Brugemann, J. van der Meer, P. A. de Graeff, L. H. Takens, and K. I. Lie. Logistical problems in prehospital thrombolysis. Eur.Heart J. 13 (6):787-788, 1992.	None of the specified outcomes were reported in trial

Reference	Reason for exclusion
C. P. Cannon, A. J. Sayah, and R. M. Walls. ER TIMI-19: testing the reality of prehospital thrombolysis. J.Emerg.Med. 19 (3 Suppl):21S-25S, 2000.	Not RCT
C. P. Cannon and M. Smith. Advances in alliteration in acute myocardial infarction: From 'Time to treatment' to 'Onset to opening'. Journal of Thrombosis and Thrombolysis 6 (1):5-7, 1998.	Review
A. D. Castaigne, C. Hervé, A. M. Duval-Moulin, M. Gaillard, J. L. Dubois-Randé, and D. Lellouche. Pre-hospital thrombolysis, is it useful? Eur.Heart J. 11 Suppl F:43-47, 1990.	Review article
P. A. Castillo, C. S. Palmer, M. T. Halpern, E. J. Hatziandreu, and B. J. Gersh. Cost-effectiveness analysis Cost-effectiveness of thrombolytic therapy for acute myocardial infarction. with incorrect comparison Ann.Pharmacother. 31 (5):596-603, 1997.	
P. Chareonthaitawee, R. J. Gibbons, R. S. Roberts, T. F. Christian, R. Burns, and S. Yusuf. The impact of time to thrombolytic treatment on outcome in patients with acute myocardial infarction. Heart 84 (2):142-148, 2000.	Considered time to reperfusion, not relevant comparison
S. Coccolini, G. Berti, S. Bosi, M. Pretolani, and G. Tumiotto. Prehospital thrombolysis in rural emergency room and subsequent transport to a coronary care unit: Ravenna Myocardial Infarction (RaMI) trial. Int.J.Cardiol. 49 Suppl:S47-S58, 1995.	Wrong comparison - emergency room versus coronary care unit
J. L. Cox, E. Lee, A. Langer, P. W. Armstrong, and C. D. Naylor. Time to treatment with thrombolytic therapy: determinants and effect on short-term nonfatal outcomes of acute myocardial infarction. Canadian GUSTO Investigators. Global Utilization of Streptokinase and + PA for Occluded Coronary Arteries. CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne 156 (4):497-505, 1997.	Secondary cohort analysis
Joseph S. Crowder, Michael W. Hubble, Sanjay Gandhi, Henderson McGinnis, Stacie Zelman, William Bozeman, and James Winslow. Prehospital Administration of Tenecteplase for ST-segment Elevation Myocardial Infarction in a Rural EMS System. Prehosp.Emerg.Care 15 (4):499-505, 2011.	Retrospective case series
J. E. Dalen, J. M. Gore, E. Braunwald, J. Borer, R. J. Goldberg, E. R. Passamani, S. Forman, and G. Knatterud. Six- and twelve-month follow-up of the phase I Thrombolysis in Myocardial Infarction (TIMI) trial. Am.J.Cardiol. 62 (4):179-185, 1988.	Wrong comparison (recombinant tissue plasminogen activator (rt-PA) versus streptokinase)
P. Dussoix, O. Reuille, V. Verin, J. M. Gaspoz, and P. F. Unger. Time savings with prehospital thrombolysis in an urban area. Eur.J.Emerg.Med. 10 (1):2-5, 2003.	Reported on time saving in pre-hospital fibrinolysis – no relevant outcomes reported
R. Gatenby, K. Lyons, T. Stewart, J. Taylor, J. Scott, G. Payne, J. Reid, D. Glass, D. Carroll, A. McLean, G. Mennie, F. Mair, D. Barclay, M. McCrone, K. Morton, N. Kennedy, J. Anderson, D. Innes, and D. Scott. Feasibility, safety, and efficacy of domiciliary thrombolysis by general practitioners: Grampian region early anistreplase trial. Br.Med.J. 305 (6853):548-553, 1992.	Not STEMI population
R. J. Goldberg, M. Mooradd, J. H. Gurwitz, W. J. Rogers, W. J. French, H. V. Barron, and J. M. Gore. Impact of time to treatment with tissue plasminogen activator on morbidity and mortality following acute myocardial infarction (The second National Registry of Myocardial Infarction). Am.J.Cardiol. 82 (3):259-264, 1998.	Retrospective registry data
V. Gomes, J. Trigo, P. Gago, J. Mimoso, R. Faria, N. Marques, W. Santos, and V. Brandao. Emergency department bypass reduces the time to reperfusion therapy. Eur.Heart J. 30:337, 2009.	Abstract
E. W. M. Grijseels, M. J. M. Bouten, T. Lenderink, J. W. Deckers, A. W. Hoes, J. A. M. Hartman, Dde Van, and M. L. Simoons. Pre-hospital thrombolytic therapy with either alteplase or streptokinase. Practical applications, complications and	Wrong comparison – pre-hospital alteplase versus pre-hospital streptokinase

Reference	Reason for exclusion
long-term results in 529 patients. Eur.Heart J. 16 (12):1833-1838, 1995.	
D. G. Julian. Time as a factor in thrombolytic therapy. Eur.Heart J. 11 Suppl F:53-55, 1990.	Review article
J. W. Kennedy and W. D. Weaver. Potential use of thrombolytic therapy before hospitalization. Am.J.Cardiol. 64 (2):8A-26A, 1989.	Phase 1 results of MITI trial
N. S. Kleiman, H. D. White, E. M. Ohman, A. M. Ross, L. H. Woodlief, R. M. Califf, D. R. Holmes, E. Bates, M. Pfisterer, and A. Vahanian. Mortality within 24 hours of thrombolysis for myocardial infarction. The importance of early reperfusion. The GUSTO Investigators, Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries. Circulation 90 (6):2658-2665, 1994.	Considered mortality within 24 hours of fibrinolysis; not relevant comparison
J. Koefoed-Nielsen, E. F. Christensen, H. Melchiorsen, and A. Foldspang. Acute myocardial infarction: does pre-hospital treatment increase survival? Eur.J.Emerg.Med. 9 (3):210-216, 2002.	Not RCT
C. T. Lambrew, L. J. Bowlby, W. J. Rogers, N. C. Chandra, and Weaver W. Douglas. Factors influencing the time to thrombolysis in acute myocardial infarction. Arch.Intern.Med. 157 (22):2577-2582, 1997.	Identifies factors that delay fibrinolytic treatment
A. Leizorovicz, M. C. Haugh, C. Mercier, and J.-P. Boissel. Pre-hospital and hospital time delays in thrombolytic treatment in patients with suspected acute myocardial infarction. Analysis of data from the EMIP study. Eur.Heart J. 18 (2):248-253, 1997.	Considers time delay information only. No relevant outcomes reported
J. A. de Lemos, E. M. Antman, R. P. Giugliano, D. A. Morrow, C. H. McCabe, S. S. Cutler, A. Charlesworth, R. Schröder, and E. Braunwald. Comparison of a 60- versus 90-minute determination of ST-segment resolution after thrombolytic therapy for acute myocardial infarction. In TIME-II Investigators. Intravenous nPA for Treatment of Infarcting Myocardium Early-II. Am.J.Cardiol. 86 (11):1235-7, A5, 2000..	Wrong comparison
B. McAleer, B. Ruane, E. Burke, M. Cathcart, A. Costello, G. Dalton, J. R. Williams, and M. P. Varma. Prehospital thrombolysis in a rural community: short- and long-term survival. Cardiovasc Drugs Ther 6 (4):369-372, 1992.	Open allocation; participants not randomly allocated
C. Maynard, R. Althouse, M. Olsufka, J. L. Ritchie, K. B. Davis, and J. W. Kennedy. Early versus late hospital arrival for acute myocardial infarction in the western Washington thrombolytic therapy trials. Am.J.Cardiol. 63 (18):1296-1300, 1989.	Wrong comparison
Laurie J. Morrison, Valeria E. Rac, James M. Bowen, Brian Schwartz, Tyrone Perreira, Welson Ryan, Cathy Zahn, Rishab Chadha, Alan Craig, Daria O'Reilly, and Ron Goeree. Prehospital evaluation and economic analysis of different coronary syndrome treatment strategies--PREDICT--rationale, development and implementation. BMC Emergency Medicine 11:4, 2011.	Systematic review that didn't meet protocol requirements
David A. Morrow, Elliott M. Antman, Assaad Sayah, Kristin C. Schuhwerk, Robert P. Giugliano, James A. deLemos, Michael Waller, Sidney A. Cohen, Donald G. Rosenberg, Sally S. Cutler, Carolyn H. McCabe, Ron M. Walls, and Eugene Braunwald. Evaluation of the time saved by prehospital initiation of reteplase for ST-elevation myocardial infarction: results of The Early Retavase-Thrombolysis in Myocardial Infarction (ER-TIMI) 19 trial. J.Am.Coll.Cardiol. 40 (1):71-77, 2002.	Feasibility study – retavase given at different time points
L. K. Newby, W. R. Rutsch, R. M. Califf, M. L. Simoons, P. E. Aylward, P. W. Armstrong, L. H. Woodlief, K. L. Lee, E. J. Topol, and F. Van de Werf. Time from symptom onset to treatment and outcomes after thrombolytic therapy. GUSTO-1 Investigators. J.Am.Coll.Cardiol. 27 (7):1646-1655, 1996.	Secondary cohort analysis from GUSTO on time to fibrinolytic treatment
P. Ohlmann, P. Reydel, L. Jacquemin, F. Adnet, O. Wolf, J.-C. Bartier, A. Weiss, F. Lapostolle, C. Gaultier, E. Salengro, H. Benamer, P. Guyon, B. Chevalier, S. Catan, P. Ecollan, T. Chouihed, M. Angioi, M. Zupan, F. Bronner, P. Bareiss, G.	Wrong intervention

Reference	Reason for exclusion
Steg, G. Montalescot, J.-P. Monassier, and O. Morel. Prehospital abciximab in st-segment elevation myocardial infarction results of the randomized, double-blind MISTRAL study. Circ.Cardiovasc.Interventions 5 (1):69-76, 2012.	
E. Rapaport. Early versus late opening of coronary arteries: the effect of timing. Clinical Cardiology 13 (8 Suppl 8):VIII18-VIII22, 1990.	Review article
J. Rawles. Halving of mortality at 1 year by domiciliary thrombolysis in the Grampian Region Early Anistreplase Trial (GREAT). J.Am.Coll.Cardiol. 23 (1):1-5, 1994.	Inclusion criteria did not include ECG diagnosis – mixed population
Alyson M. Smith, Pamela J. Hardy, David A. Sandler, and Justin Cooke. Paramedic decision making: prehospital thrombolysis and beyond. Emergency Medicine Journal 28 (8):700-702, 2011.	Observational data
S. A. Spinler and P. A. Mikhail. Prehospital-initiated thrombolysis. Ann.Pharmacother. 31 (11):1339-1346, 1997.	Review

J.10 Use of antithrombin as an adjunct to fibrinolysis

Exclusion List	Reason for exclusion
Armstrong PW, et al. Efficacy and safety of unfractionated heparin versus enoxaparin: a pooled analysis of ASSENT-3 and -3 PLUS data CMAJ. 2006; 174(10):1421-6.	Not RCT
Bates ER. Anticoagulant therapy in acute coronary syndromes. Future Cardiol. 2007; 3(3):301-8.	Not RCT
Bogaty P, et al. Routine invasive management after fibrinolysis in patients with ST-elevation myocardial infarction: A systematic review of randomized clinical trials. BMC Cardiovasc Disord. 2011; 11:34	Not question of interest
Bøhmer E, et al. Health and cost consequences of early versus late invasive strategy after thrombolysis for acute myocardial infarction. Eur J Cardiovasc Prev Rehabil. 2011; 18(5):717-23	Not question of interest
Brouwer MA, et al. Influence of early prehospital thrombolysis on mortality and event-free survival (the Myocardial Infarction Triage and Intervention [MITI] Randomized Trial). MITI Project Investigators. Am J Cardiol. 1996; 78(5):497-502.	Patients randomised to pre-hospital versus in-hospital fibrinolysis
Cannon CP, et al. ER TIMI-19: testing the reality of prehospital thrombolysis. J Emerg Med. 2000; 19(3 Suppl):21S-25S.	Not question of interest
Clever YP et al. Long-term follow-up of early versus delayed invasive approach after fibrinolysis in acute myocardial infarction. Circ Cardiovasc Interv. 2011; 4(4):342-8.	Not question of interest
Crowder JS et al. Prehospital Administration of Tenecteplase for ST-segment Elevation Myocardial Infarction in a Rural EMS System. Prehosp Emerg Care. 2011; 15(4):499-505	Not RCT
Danchin N et al. Pre-hospital thrombolysis in perspective. Eur Heart J. 2008; 29(23):2835-42.	Not RCT
Dawson S et al. Guidelines for pre-hospital administration of fibrinolytic therapy by New Zealand general practitioners. N Z Med J. 2004; 117(1197):U958.	Not RCT
Dussoix P et al. Time savings with prehospital thrombolysis in an urban area. Eur J Emerg Med. 2003; 10(1):2-5.	Patients randomised to pre-hospital versus in-hospital fibrinolysis or PPCI
Eikelboom JW, et al. Unfractionated and low-molecular-weight heparin as adjuncts to thrombolysis in aspirin-treated patients with ST-elevation acute	Not RCT

Exclusion List	Reason for exclusion
myocardial infarction: A meta-analysis of the randomized trials. Circulation. 2005; 112(25):3855-67.	
Ferreira-Gonzalez I, et al. Composite endpoints in clinical trials. Rev Esp Cardiol. 2008; 61(3):283-90.	Not question of interest
Gatenby R, et al. Feasibility, safety, and efficacy of domiciliary thrombolysis by general practitioners: Grampian region early anistreplase trial. BMJ. 1992; 305(6853):548-53.	Not question of interest; anistreplase was used
Hermanides RS, et al. Net clinical benefit of prehospital glycoprotein IIb/IIIa inhibitors in patients with ST-elevation myocardial infarction and high risk of bleeding: effect of tirofiban in patients at high risk of bleeding using CRUSADE bleeding score. Journal of invasive cardiology: 2012; 24: 84-89.	Not RCT
Herve C, Castaigne A, Jan F. Pre-hospital thrombolysis in myocardial infarction. Therapie 1988; 80	Non-English language
Horne S, et al. The impact of pre-hospital thrombolytic treatment on varction rates: analysis of the Myocardial Infarction National Audit Project (MINAP). Heart 2009; 95(7):559-63.	Not RCT
Huber K et al. Pre-hospital reperfusion therapy: A strategy to improve therapeutic outcome in patients with ST-elevation myocardial infarction. Eur Heart J. 2005; 26(19):2063-74.	Not RCT
Kennedy JW, Weaver WD. Potential use of thrombolytic therapy before hospitalization. Am J Cardiol. 1989; 64(2):8A-11A; discussion 24A-26A.	Not question of interest
Koefoed-Nielsen J, et al. Acute myocardial infarction: does pre-hospital treatment increase survival? Eur J Emerg Med. 2002; 9(3):210-6.	Not RCT
Koeth O, et al. Primary PCI and thromboysis in survivors of prehospital resuscitation. Eur Heart J. 2009; 30:693	Not question of interest
Morrison LJ, et al. Mortality and prehospital thrombolysis for acute myocardial infarction: A meta-analysis. JAMA. 2000; 283(20):2686-92.	Not RCT
Morrow DA, et al. One-year outcomes after a strategy using enoxaparin vs. unfractionated heparin in patients undergoing fibrinolysis for ST-segment elevation myocardial infarction: 1-year results of the ExTRACT-TIMI 25 Trial. Eur Heart J. 2010; 31(17):2097-102.	Not question of interest
Rubboli A. Efficacy and safety of low-molecular-weight heparins as an adjunct to thrombolysis in acute ST-elevation myocardial infarction. Curr Cardiol Rev. 2008; 4(1):63-71.	Not RCT
Rubboli A, et al. Low-molecular-weight heparins in conjunction with thrombolysis for ST-elevation acute myocardial infarction: A critical review of the literature. Cardiology. 2007; 107(2):132-9.	Not RCT
Smith AM, et al. Paramedic decision making: prehospital thrombolysis and beyond. Emerg Med J. 2011; 28(8):700-2.	Not RCT
Svensson L et al. Safety and delay time in prehospital thrombolysis of acute myocardial infarction in urban and rural areas in Sweden. Am J Emerg Med. 2003; 21(4):263-70.	All patients received pre-hospital heparin immediately before pre-hospital fibrinolysis
The Task Force on the Management of Acute Myocardial Infarction of the European Society of Cardiology. Acute myocardial infarction: pre-hospital and in-hospital management. Eur Heart J. 1996; 17(1):43-63.	Not RCT
Woollard M. Early thrombolysis: Time to change? A discussion paper. Journal of Emergency Primary Health Care: 2005; 3.	Not RCT

J.11 Rescue PCI

Exclusion List	Reason for exclusion
After thrombolysis for myocardial infarction, early routine angiography reduces cardiac events and death compared with conservative treatment. Evidence-Based Healthcare and Public Health.2005; 9:127-8	Not question of interest
Outcome of attempted rescue coronary angioplasty after failed thrombolysis for acute myocardial infarction. The CORAMI Study Group. Cohort of Rescue Angioplasty in Myocardial Infarction. Am J Cardiol. 1994; 74(2):172-4.	Not RCT
SWIFT trial of delayed elective intervention v conservative treatment after thrombolysis with anistreplase in acute myocardial infarction. SWIFT (Should We Intervene Following Thrombolysis?) Trial Study Group. BMJ. 1991; 302(6776):555-60.	Not question of interest
Barbash GI, Birnbaum Y, Bogaerts K, Hudson M, Lesaffre E, Fu Y, Goodman S, Houbracken K, Munsters K, Granger CB, Pieper K, Califf RM, Topol EJ, Van De Werf F. Treatment of reinfarction after thrombolytic therapy for acute myocardial infarction: an analysis of outcome and treatment choices in the global utilization of streptokinase and tissue plasminogen activator for occluded coronary arteries (gusto I) and assessment of the safety of a new thrombolytic (assent 2) studies. Circulation. 2001; 103(7):954-60.	Not RCT
Barbash GI, Roth A, Hod H, Modan M, Miller HI, Rath S, Zahav YH, Keren G, Motro M, Shachar A, et al. Randomized controlled trial of late in-hospital angiography and angioplasty versus conservative management after treatment with recombinant tissue-type plasminogen activator in acute myocardial infarction. Am J Cardiol. 1990; 66(5):538-45.	Not question of interest
Baron SJ, Giugliano RP. Effectiveness and safety of percutaneous coronary intervention after fibrinolytic therapy for ST-segment elevation acute myocardial infarction. Am J Cardiol. 2011; 107(7):1001-9.	Not RCT
Bonnet JL, Bory M, Jau P, Joly P, D'Houdain F, Habib G. Immediate or delayed coronary angioplasty after intravenous thrombolytic therapy for acute myocardial infarction. A prospective study. Original: ANGIOPLASTIE CORONAIRE PRECOCE OU DIFFEREE APRES THROMBOLYSE INTRAVEINEUSE POUR INFARCTUS DU MYOCARDE. ETUDE PROSPECTIVE. Archives Des Maladies Du Coeur Et Des Vaisseaux. 1990; 83(9):1375-1379.	Non-English language
Borgia F, Goodman SG, Halvorsen S, Cantor WJ, Piscione F, Le May MR, Fernández-Avilés F, Sánchez PL, Dimopoulos K, Scheller B, Armstrong PW, Di Mario C. Early routine percutaneous coronary intervention after fibrinolysis vs. standard therapy in ST-segment elevation myocardial infarction: a meta-analysis. Eur Heart J. 2010; 31(17):2156-69.	Not RCT
Buller CE, Welsh RC, Westerhout CM, Webb JG, O'Neill B, Gallo R, Armstrong PW. Guideline adjudicated fibrinolytic failure: incidence, findings, and management in a contemporary clinical trial. Am Heart J. 2008; 155(1):121-7	Not question of interest; No comparator
Cantor WJ, Brunet F, Ziegler CP, Kiss A, Morrison LJ. Immediate angioplasty after thrombolysis: a systematic review. CMAJ. 2005; 173(12):1473-81.	Not RCT
Cantor WJ, Burnstein J, Choi R, Heffernan M, Dzavik V, Lazzam C, Duic M, Fitchett D, Tan M, Wawrzyniak J, Kassam S, Dhingra S, Morrison LJ, Langer A, Goodman SG. Transfer for urgent percutaneous coronary intervention early after thrombolysis for ST-elevation myocardial infarction: the TRANSFER-AMI pilot feasibility study. Can J Cardiol. 2006; 22(13):1121-6.	Not question of interest
Cantor WJ, Fitchett D, Borgundvaag B, Ducas J, Heffernan M, Cohen EA, Morrison LJ, Langer A, Dzavik V, Mehta SR, Lazzam C, Schwartz B, Casanova A, Goodman SG; TRANSFER-AMI Trial Investigators. Routine early angioplasty after fibrinolysis for acute myocardial infarction. N Engl J Med. 2009; 360(26):2705-18.	Not question of interest

Exclusion List	Reason for exclusion
Cantor WJ, Kaplan AL, Velianou JL, Sketch MH Jr, Barsness GW, Berger PB, Ohman EM. Effectiveness and safety of abciximab after failed thrombolytic therapy. Am J Cardiol. 2001; 87(4):439-42, A4.	Not RCT
Collet JP, Montalescot G, Le May M, Borentain M, Gershlick A. Percutaneous coronary intervention after fibrinolysis: a multiple meta-analyses approach according to the type of strategy. J Am Coll Cardiol. 2006; 48(7):1326-35	Not RCT
Czarnecki A, Welsh RC, Yan RT, DeYoung JP, Gallo R, Rose B et al. Reperfusion strategies and outcomes of ST-segment elevation myocardial infarction patients in Canada: observations from the Global Registry of Acute Coronary Events (GRACE) and the Canadian Registry of Acute Coronary Events (CANRACE). Canadian Journal of Cardiology. 2012; 28(1):40-47.	Observational data
Dakik HA, Kleiman NS, Farmer JA, He ZX, Wendt JA, Pratt CM, Verani MS, Mahmarian JJ. Intensive medical therapy versus coronary angioplasty for suppression of myocardial ischemia in survivors of acute myocardial infarction: a prospective, randomized pilot study. Circulation. 1998; 98(19):2017-23.	Not question of interest
Desch S, Eitel I, Rahimi K, de Waha S, Schuler G, Thiele H. Timing of invasive treatment after fibrinolysis in ST elevation myocardial infarction--a meta-analysis of immediate or early routine versus deferred or ischemia-guided randomised controlled trials. Heart. 2010; 96(21):1695-702	Not RCT
Di Mario C, Dudek D, Piscione F, Mielecki W, Savonitto S, Murena E, Dimopoulos K, Manari A, Gaspardone A, Ochala A, Zmudka K, Bolognese L, Steg PG, Flather M; CARESS-in-AMI (Combined Abciximab RE-teplase Stent Study in Acute Myocardial Infarction) Investigators. Immediate angioplasty versus standard therapy with rescue angioplasty after thrombolysis in the Combined Abciximab REteplase Stent Study in Acute Myocardial Infarction (CARESS-in-AMI): an open, prospective, randomised, multicentre trial. Lancet. 2008; 371(9612):559-68.	Not question of interest
Di Pasquale P, Cannizzaro S, Scalzo S, Maringhini G, Vitrano GM, Giubilato A, Giambanco F, Sarullo FM, Paterna S. Safety and tolerability of abciximab in patients with acute myocardial infarction and failed thrombolysis. Int J Cardiol. 2003; 92(2-3):265-70	Abciximab versus placebo
Di Pasquale P, Sarullo FM, Cannizzaro S, Vitrano MG, Giubilato A, Scalzo S, Giambanco F, Paterna S. Increased reperfusion by glycoprotein IIb/IIIa receptor antagonist administration in case of unsuccessful and failed thrombolysis in patients with acute myocardial infarction: a pilot study. Ital Heart J. 2001; 2(10):751-6.	Not question of interest
Di Pasquale P, Sarullo FM, Cannizzaro S, Vitrano MG, Vincenzo B, Giambanco F, Scandurra A, Calcaterra G, and Paterna S. Effects of administration of glycoprotein IIb/IIIa receptor antagonists in patients with failed thrombolysis: A pilot study. Clinical Drug Investigation.2001; 21:545-3	Not question of interest
D'Souza SP, Mamas MA, Fraser DG, Fath-Ordoubadi F. Routine early coronary angioplasty versus ischaemia-guided angioplasty after thrombolysis in acute ST-elevation myocardial infarction: a meta-analysis. Eur Heart J. 2011; 32(8):972-82.	Not RCT
Edmond JJ, French JK, Aylward PE, Wong CK, Stewart RA, Williams BF, De Pasquale CG, O'connell RL, Van den Berg K, Van de Werf FJ, Simes RJ, White HD; for the HERO-2 Investigators. Variations in the use of emergency PCI for the treatment of re-infarction following intravenous fibrinolytic therapy: impact on outcomes in HERO-2. Eur Heart J. 2007; 28(12):1418-24	Not question of interest
Ellis SG, Lincoff AM, George BS, Kereiakes DJ, Ohman EM, Krucoff MW, Califf RM, Topol EJ. Randomized evaluation of coronary angioplasty for early TIMI 2 flow after thrombolytic therapy for the treatment of acute myocardial infarction: a new look at an old study. The Thrombolysis and Angioplasty in	Post-hoc subgroup analysis of a study published < 1990 (Enrolment ended October

Exclusion List	Reason for exclusion
Myocardial Infarction (TAMI) Study Group. Coron Artery Dis. 1994; 5(7):611-5.	1986)
Ellis SG, Van de Werf F, Ribeiro-daSilva E, Topol EJ. Present status of rescue coronary angioplasty: current polarization of opinion and randomized trials. J Am Coll Cardiol. 1992; 19(3):681-6.	Not RCT
Feit F, Mueller HS, Braunwald E, Ross R, Hodges M, Herman MV, Knatterud GL. Thrombolysis in Myocardial Infarction (TIMI) phase II trial: outcome comparison of a 'conservative strategy' in community versus tertiary hospitals. The TIMI Research Group. J Am Coll Cardiol. 1990; 16(7):1529-34.	Wrong comparators
Geltman EM. Conservative management after thrombolysis: the strategy of choice. J Am Coll Cardiol. 1990; 16(7):1535-7.	Not RCT
Gibson CM, Cannon CP, Greene RM, Sequeira RF, Margorien RD, Leya F, Diver DJ, Baim DS, Braunwald E. Rescue angioplasty in the thrombolysis in myocardial infarction (TIMI) 4 trial. Am J Cardiol. 1997; 80(1):21-6.	Not RCT
Gibson CM, Murphy SA, Montalescot G, Morrow DA, Ardissino D, Cohen M, Gulba DC, Kracoff OH, Lewis BS, Roguin N, Antman EM, Braunwald E; ExTRACT-TIMI 25 Investigators. Percutaneous coronary intervention in patients receiving enoxaparin or unfractionated heparin after fibrinolytic therapy for ST-segment elevation myocardial infarction in the ExTRACT-TIMI 25 trial. J Am Coll Cardiol. 200; 49(23):2238-46.	Not question of interest
Gill S, Haastrup B, Haghfelt T, Dellborg M, Clemmensen PM. Early reperfusion assessment and repeated thrombolysis in acute myocardial infarction estimated by repeated standard electrocardiography. A randomised, double-blind, placebo-controlled pilot study. Cardiology. 2000; 94(1):58-65.	No outcomes of interest
Granger CB, Califf RM, Young S, Candela R, Samaha J, Worley S, Kereiakes DJ, Topol EJ. Outcome of patients with diabetes mellitus and acute myocardial infarction treated with thrombolytic agents. The Thrombolysis and Angioplasty in Myocardial Infarction (TAMI) Study Group. J Am Coll Cardiol. 1993; 21(4):920-5.	Not RCT
Gulba DC, Merx, W., Kochs, M., Altstidel, H., Sabin, G., and R, A.M. The 'planned rescue PTCA' after thrombolytic therapy of acute heart attack shortens the duration of reperfusion, but is not connected with an extra PTCA risk. Zeitschrift Fur Kardiologie. 1998; 87(Suppl. 1):208.	Non-English language
Harrington RA, Califf RM. The role of angioplasty after failed thrombolysis for acute myocardial infarction. Coron Artery Dis. 1994; 5(5):392-8.	Not RCT
Jariwala P, Chandra S. Diagnosis and management of failed thrombolytic therapy for acute myocardial infarction. Indian Heart J. 2010; 62(1):21-8.	Not RCT
Jovell AJ, Lau J, Berkey C, Kupelnick B, and Chalmers TC. Early angiography and angioplasty following thrombolytic therapy of acute myocardial infarction. Metaanalysis of the randomized control trials. Online Journal of Current Clinical Trials. 1993;Doc No 67: 3714	Not RCT
Kunadian B, Vijayalakshmi K, Dunning J, Sutton A, de Belder MA. Towards an understanding of the role of rescue angioplasty for failed fibrinolysis: comparison of the MERLIN, RESCUE and REACT trials. J Invasive Cardiol. 2007; 19(9):359-68	Not RCT
La Vecchia L, Favero L, Martini M, Vincenzi P, Rubboli A, Ottani F, Bottero M, Fontanelli A. Systematic coronary stenting after failed thrombolysis in high-risk patients with acute myocardial infarction: procedural results and long-term follow-up. Coron Artery Dis. 2003; 14(5):395-400.	No comparator
Madsen JK, Grande P, Saunamäki K, Thayssen P, Kassis E, Eriksen U, Rasmussen K, Haunsø S, Nielsen TT, Haghfelt T, Fritz-Hansen P, Hjelms E, Paulsen PK, Alstrup P, Arendrup H, Niebuhr-Jørgensen U, Andersen LI. Danish multicenter randomized study of invasive versus conservative treatment in patients with	Not question of interest

Exclusion List	Reason for exclusion
inducible ischemia after thrombolysis in acute myocardial infarction (DANAMI). DANish trial in Acute Myocardial Infarction. Circulation. 1997; 96(3):748-55.	
Madsen JK, Nielsen TT, Grande P, Eriksen UH, Saunamäki K, Thayssen P, Kassis E, Rasmussen K, Haunsø S, Haghfelt T, Fritz-Hansen P, Hjelms E, Paulsen PK, Alstrup P, Arendrup H, Niebuhr-Jørgensen U, Andersen LI; DANAMI study group. Revascularization compared to medical treatment in patients with silent vs. symptomatic residual ischemia after thrombolyzed myocardial infarction--the DANAMI study. Cardiology. 2007; 108(4):243-51.	Not question of interest
Mendoza CE, Bhatt MR, Virani S, Schob AH, Levine S, Ferreira AC, de Marchena E. Management of failed thrombolysis after acute myocardial infarction: an overview of current treatment options. Int J Cardiol. 2007; 114(3):291-9	Not RCT
Miller JM, Smalling R, Ohman EM, Bode C, Betriu A, Kleiman NS, Schildcrout JS, Bastos E, Topol EJ, Califf RM. Effectiveness of early coronary angioplasty and abciximab for failed thrombolysis (reteplase or alteplase) during acute myocardial infarction (results from the GUSTO-III trial). Global Use of Strategies To Open occluded coronary arteries. Am J Cardiol. 1999; 84(7):779-84.	Abciximab versus placebo
Ozbek C, Dyckmans J, Sen S, Rettig G, Isringhaus H, Hammer B, and SH. Invasive vs conservative procedures after streptokinase therapy (SK) of acute myocardial infarction (AMI); Results of a randomised study (SIAM). Zeitschrift Fur Kardiologie. 1990; 79 Suppl 1:53.	Non-English language
Patel TN, Bavry AA, Kumbhani DJ, Ellis SG. A meta-analysis of randomized trials of rescue percutaneous coronary intervention after failed fibrinolysis. Am J Cardiol. 2006; 97(12):1685-90	Not RCT (used for quality assessment)
Rebuzzi AG, Niccoli G, Ferrante G. Acute myocardial infarction interventional procedures: primary percutaneous coronary intervention versus facilitated percutaneous coronary intervention, rescue angioplasty, rescue excimer laser. Minerva Cardioangiol. 2007; 55(1):73-82.	Not RCT
Rekik S, Mnif S, Sahnoun M, Krichen S, Charfeddine H, Trabelsi I, Triki F, Hentati M, Kammoun S. Total absence of ST-segment resolution after failed thrombolysis is correlated with unfavorable short- and long-term outcomes despite successful rescue angioplasty. J Electrocardiol. 2009; 42(1):73-8	No comparator
Rogers WJ, Baim DS, Gore JM, Brown BG, Roberts R, Williams DO, Chesebro JH, Babb JD, Sheehan FH, Wackers FJ, et al. Comparison of immediate invasive, delayed invasive, and conservative strategies after tissue-type plasminogen activator. Results of the Thrombolysis in Myocardial Infarction (TIMI) Phase II-A trial. Circulation. 1990; 81(5):1457-76.	Not question of interest
Ross AM, Lundergan CF, Rohrbeck SC, Boyle DH, van den Brand M, Buller CH, Holmes DR Jr, Reiner JS. Rescue angioplasty after failed thrombolysis: technical and clinical outcomes in a large thrombolysis trial. GUSTO-1 Angiographic Investigators. Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries. J Am Coll Cardiol. 1998; 31(7):1511-7.	Patients not randomised to rescue PCI versus conservative therapy
Ruocco NA Jr, Bergelson BA, Jacobs AK, Frederick MM, Faxon DP, Ryan TJ. Invasive versus conservative strategy after thrombolytic therapy for acute myocardial infarction in patients with antecedent angina. A report from Thrombolysis in Myocardial Infarction Phase II (TIMI II). J Am Coll Cardiol. 1992; 20(7):1445-51	Not question of interest
Sarullo FM, Schicchi R, Schiro M, Americo L, Bonni G, Faraone N, Di PP, Castello A, Mauri F. Safety and efficacy of rescue thrombolysis in acute myocardial infarction. Italian Heart Journal Supplement. 2000; 1(1):81-87.	Non-English language
Scheller B, Hennen B, Hammer B, Walle J, Hofer C, Hilpert V, Winter H, Nickenig G, Böhm M; SIAM III Study Group. Beneficial effects of immediate	Not question of interest

Exclusion List	Reason for exclusion
stenting after thrombolysis in acute myocardial infarction. J Am Coll Cardiol. 2003; 42(4):634-41.	
Shavelle DM, Salami A, Abdelkarim M, French WJ, Shook TL, Mayeda GS, Burstein S, Matthews RV. Rescue percutaneous coronary intervention for failed thrombolysis. Catheter Cardiovasc Interv. 2006; 67(2):214-20.	Not RCT
Sohal M, Foo F, Sirker A, Rajani R, Khawaja MZ, Pegge N, Hatrick R, Kneale B, Signy M, Holmberg S, de Belder A, Hildick-Smith D. Rescue angioplasty for failed fibrinolysis--long-term follow-up of a large cohort. Catheter Cardiovasc Interv. 2011; 77(5):599-604.	Not RCT
Steg PG, Francois L, Iung B, Himbert D, Aubry P, Charlier P, Benamer H, Feldman LJ, Juliard JM. Long-term clinical outcomes after rescue angioplasty are not different from those of successful thrombolysis for acute myocardial infarction. Eur Heart J. 2005; 26(18):1831-7	Not RCT
Taglieri N, Di Mario C. Percutaneous coronary intervention following thrombolysis: for whom and when? Acute Card Care. 2009; 11(4):195-203.	Not RCT
Testa L, van Gaal WJ, Biondi-Zoccai GG, Abbate A, Agostoni P, Bhindi R, Banning AP. Repeat thrombolysis or conservative therapy vs. rescue percutaneous coronary intervention for failed thrombolysis: systematic review and meta-analysis. QJM. 2008; 101(5):387-95	Not RCT (used for quality assessment)
Verheugt FW. Timing of angiography after fibrinolysis for ST-elevation acute myocardial infarction. Curr Opin Cardiol. 2010; 25(4):302-4	Not RCT
Vetrano A, Carotenuto R, Corsini F, Schioppa M, Martone A, Melorio S, Sideri F, Romano S, Chieffo C, Corsini G. Effectiveness of tirofiban for failed thrombolysis during acute myocardial infarction. Am J Cardiol. 2004; 93(7):914-6.	Not RCT
Wijeysundera HC, Vijayaraghavan R, Nallamothu BK, Foody JM, Krumholz HM, Phillips CO, Kashani A, You JJ, Tu JV, Ko DT. Rescue angioplasty or repeat fibrinolysis after failed fibrinolytic therapy for ST-segment myocardial infarction: a meta-analysis of randomized trials. J Am Coll Cardiol. 2007; 49(4):422-30.	Not RCT (used for quality assessment)
Yan AT, Yan RT, Cantor WJ, Borgundvaag B, Cohen EA, Fitchett DH et al. Relationship between risk stratification at admission and treatment effects of early invasive management following fibrinolysis: insights from the Trial of Routine ANgioplasty and Stenting After Fibrinolysis to Enhance Reperfusion in Acute Myocardial Infarction (TRANSFER-AMI). European Heart Journal . 2011; 32(16):1994-2002.	Post-hoc analysis
Yan AT, Yan RT, Mehta SR, Morrison LJ, Cantor WJ, Heffernan M et al. Efficacy of early invasive management postfibrinolysis in men versus women with ST-elevation myocardial infarction: A subgroup analysis from transfer-AMI. Canadian Journal of Cardiology. 2011; 27(5 SUPPL. 1):S152-S153.	Abstract

J.12 Routine early angiography following fibrinolysis

Study	Reason for exclusion
Abdul-Rahman S, Nammas W, Gamal A, Adel A, Zaki T. Routine invasive versus ischemia-guided strategy in patients with acute inferior ST-elevation myocardial infarction who received fibrinolytic therapy: a prospective randomized controlled pilot trial. J Invasive Cardiol. 2011; 23(8):316-21.	Protocol specified that angiography in the 'early routine group' was performed within 48 hours (actual time to angiography was not recorded)
Arnold AE, Simoons ML, Detry JM, von Essen R, Van de Werf F, Deckers JW, Lubsen J, Verstraete M. Prediction of mortality following hospital discharge	Not RCT

Study	Reason for exclusion
after thrombolysis for acute myocardial infarction: is there a need for coronary angiography? European Cooperative Study Group. Eur Heart J. 1993; 14(3):306-15.	
Barbash GI, Roth A, Hod H, Modan M, Miller HI, Rath S, Zahav YH, Keren G, Motro M, Shachar A, et al. Randomized controlled trial of late in-hospital angiography and angioplasty versus conservative management after treatment with recombinant tissue-type plasminogen activator in acute myocardial infarction. Am J Cardiol. 1990; 66(5):538-45.	Early routine angio was performed 3–7 days after fibrinolysis; quasi randomisation (alternating 2 month periods); enrolment started before 1996
Baron SJ, Giugliano RP. Effectiveness and safety of percutaneous coronary intervention after fibrinolytic therapy for ST-segment elevation acute myocardial infarction. Am J Cardiol. 2011; 107(7):1001-9.	Not RCT
Bednár F, et al. Interhospital transport for primary angioplasty improves the long-term outcome of acute myocardial infarction compared with immediate thrombolysis in the nearest hospital (one-year follow-up of the PRAGUE-1 study). Can J Cardiol. 2003; 19(10):1133-7.)	PCI rather than fibrinolysis was the primary reperfusion strategy in the routine early arm; randomised patients in the early routine arm to pre-hospital streptokinase
Bøhmer E, Arnesen H, Abdelnoor M, Mangschau A, Hoffmann P, Halvorsen S. The NORwegian study on DIstrict treatment of ST-elevation myocardial infarction (NORDISTEMI). Scand Cardiovasc J. 2007; 41(1):32-8.	Preliminary results – final results reported in another article that was included
SWIFT trial of delayed elective intervention v conservative treatment after thrombolysis with anistreplase in acute myocardial infarction. SWIFT (Should We Intervene Following Thrombolysis?) Trial Study Group.	Enrolment finished November 1988 and <50% stenting
Borgia F, Goodman SG, Halvorsen S, Cantor WJ, Piscione F, Le May MR, Fernández-Avilés F, Sánchez PL, Dimopoulos K, Scheller B, Armstrong PW, Di Mario C. Early routine percutaneous coronary intervention after fibrinolysis vs. standard therapy in ST-segment elevation myocardial infarction: a meta-analysis. Eur Heart J. 2010; 31(17):2156-69.	Not RCT (used for quality assessment)
Califf RM, Topol EJ, Stack RS, Ellis SG, George BS, Kereiakes DJ, Samaha JK, Worley SJ, Anderson JL, Harrelson-Woodlief L, et al. Evaluation of combination thrombolytic therapy and timing of cardiac catheterization in acute myocardial infarction. Results of thrombolysis and angioplasty in myocardial infarction--phase 5 randomized trial. TAMI Study Group. Circulation. 1991; 83(5):1543-56.	Factorial design that does not directly compare routine early angiography with deferred or selective approach; enrolment ended May 1989 and <50% stenting
Cantor WJ, Brunet F, Ziegler CP, Kiss A, Morrison LJ. Immediate angioplasty after thrombolysis: a systematic review. CMAJ. 2005; 173(12):1473-81.	Not RCT
Cantor WJ, Burnstein J, Choi R, Heffernan M, Dzavik V, Lazzam C, Duic M, Fitchett D, Tan M, Wawrzyniak J, Kassam S, Dhingra S, Morrison LJ, Langer A, Goodman SG. Transfer for urgent percutaneous coronary intervention early after thrombolysis for ST-elevation myocardial infarction: the TRANSFER-AMI pilot feasibility study. Can J Cardiol. 2006; 22(13):1121-6.	Not RCT
Cantor WJ, Fitchett D, Borgundvaag B, Heffernan M, Cohen EA, Morrison LJ, Ducas J, Langer A, Mehta S, Lazzam C, Schwartz B, Dzavik V, Goodman SG. Rationale and design of the Trial of Routine ANgioplasty and Stenting After Fibrinolysis to Enhance Reperfusion in Acute Myocardial Infarction (TRANSFER-AMI). Am Heart J. 2008; 155(1):19-25.	Trial design – no results
Chaitman BR, Thompson BW, Kern MJ, Vandormael MG, Cohen MB, Ruocco NA, Solomon RE, Braunwald E. Tissue plasminogen activator followed by	Original article published before 1990 cut-off and

Study	Reason for exclusion
percutaneous transluminal coronary angioplasty: one-year TIMI phase II pilot results. TIMI Investigators. Am Heart J. 1990; 119(2 Pt 1):213-23.	<50% stenting
Desch S, Eitel I, Rahimi K, de Waha S, Schuler G, Thiele H. Timing of invasive treatment after fibrinolysis in ST elevation myocardial infarction--a meta-analysis of immediate or early routine versus deferred or ischemia-guided randomised controlled trials. Heart. 2010; 96(21):1695-702	Not RCT (used for quality assessment)
Dieker H-J, Aengevaeren WR, French J, Huber K, Brouwer M, Verheugt F. Early stenting versus conservative treatment after successful fibrinolysis for stemi: Results of the randomized angiographic APRICOT-3 trial. Journal of the American College of Cardiology. 2012; 59(13 SUPPL. 1):E373.	Abstract
Di Mario C, Bolognese L, Maillard L, Dudek D, Gambarati G, Manari A, Guiducci V, Patrizi G, Rusconi LC, Piovaccari G, Hibon AR, Belpomme V, Indolfi C, Olivari Z, Steffenino G, Zmudka K, Airoldi F, Panzarasa R, Flather M, Steg PG. Combined Abciximab REteplase Stent Study in acute myocardial infarction (CARESS in AMI). Am Heart J. 2004; 148(3):378-85.	Trial design – no results
Di Mario C, et al. Immediate angioplasty versus standard therapy with rescue angioplasty after thrombolysis in the Combined Abciximab REteplase Stent Study in Acute Myocardial Infarction (CARESS-in-AMI): an open, prospective, randomised, multicentre trial. Lancet. 2008; 371(9612):559-68.	Randomised both treatment arms to unconventional fibrinolysis strategies not used in the UK (that is, half-dose reteplase plus abciximab, rather than a full-dose fibrinolytic agent)
Dong-Bao L, Qi H, Hong-Wei L, Hui C, Shu-Mei Z. Effects of early angioplasty after fibrinolysis on prognosis of patients with ST-segment elevation acute myocardial infarction. African Journal of Biotechnology. 2011; 10(70):15801-15804.	Not randomised data
D'Souza SP, Mamas MA, Fraser DG, Fath-Ordoubadi F. Routine early coronary angioplasty versus ischaemia-guided angioplasty after thrombolysis in acute ST-elevation myocardial infarction: a meta-analysis. Eur Heart J. 2011; 32(8):972-82.	Not RCT (used for quality assessment)
Dudek D, Dziewierz A, Rakowski T, Siudak Z, Wizimirski M, Legutko J, Batruś S, Mielecki W, Rzeszutko L, Zmudka K, Dubiel JS. Angiographic and clinical outcome after percutaneous coronary interventions following combined fibrinolytic therapy in acute myocardial infarction. Kardiol Pol. 2006; 64(3):239-47	Not RCT
Hochman, JS et al. One-year survival following: early revascularization for cardiogenic shock. Commentary; JAMA2001:240	Commentary
Krupicka J, Widimský P, Nechvatál L, Bednár F, Línková H, Gregor P, Groch L, Zelízko M, Aschermann M. Inter-hospital transport for primary angioplasty does not compromise left ventricular function: six-month echocardiographic follow-up of the PRAGUE 1 Study. Jpn Heart J. 2003; 44(3):313-22.	No outcomes of interest
Lee MS, Tseng CH, Barker CM, Menon V, Steckman D, Shemin R, Hochman JS. Outcome after surgery and percutaneous intervention for cardiogenic shock and left main disease. Ann Thorac Surg. 2008 Jul; 86(1):29-34.	PCI versus CABG
McCullough PA, Gibson CM, Dibattiste PM, Demopoulos LA, Murphy SA, Weintraub WS, Neumann FJ, Khanal S, Cannon CP; TACTICS-TIMI-18 Investigators. Timing of angiography and revascularization in acute coronary syndromes: an analysis of the TACTICS-TIMI-18 trial. J Interv Cardiol. 2004; 17(2):81-6.	Not RCT (analysis of single arm)
Marcusohn E, Roguin A, Sebbag A, Aronson D, Dragu R, Amikam S, Boulus M, Grenadier E, Kerner A, Nikolsky E, Markiewicz W, Hammerman H, Kapeliovich M. Primary percutaneous coronary intervention after out-of-hospital cardiac	No control group

Study	Reason for exclusion
arrest: patients and outcomes. Isr Med Assoc J. 2007 Apr; 9(4):257-9.	
Muller DW, Topol EJ, Ellis SG, Woodlief LH, Sigmon KN, Kereiakes DJ, George BS, Worley SJ, Samaha JK, Phillips H 3rd, et al. Determinants of the need for early acute intervention in patients treated conservatively after thrombolytic therapy for acute myocardial infarction. TAMI-5 Study Group. J Am Coll Cardiol. 1991; 18(7):1594-601.	Factorial design that does not directly compare routine early angiography with deferred or selective approach; enrolment ended May 1989 and <50% stenting
Pilote L, Miller DP, Califf RM, Rao JS, Weaver WD, Topol EJ. Determinants of the use of coronary angiography and revascularization after thrombolysis for acute myocardial infarction. N Engl J Med. 1996; 335(16):1198-205.	Not question of interest
Reiner JS, Lundergan CF, van den Brand M, Boland J, Thompson MA, Machecourt J, Py A, Pilcher GS, Fink CA, Burton JR, et al. Early angiography cannot predict postthrombolytic coronary reocclusion: observations from the GUSTO angiographic study. Global Utilization of Streptokinase and t-PA for Occluded Coronary Arteries. J Am Coll Cardiol. 1994; 24(6):1439-44.	Study design does not directly compare routine early angiography with deferred or selective approach; enrolment ended February 1993 and <50% stenting
Rogers WJ, Babb JD, Baim DS, Chesebro JH, Gore JM, Roberts R, Williams DO, Frederick M, Passamani ER, Braunwald E. Selective versus routine predischarge coronary arteriography after therapy with recombinant tissue-type plasminogen activator, heparin and aspirin for acute myocardial infarction. TIMI II Investigators. J Am Coll Cardiol. 1991; 17(5):1007-16.	Not RCT (comparison of arms from 2 different trials)
Rogers WJ, Baim DS, Gore JM, Brown BG, Roberts R, Williams DO, Chesebro JH, Babb JD, Sheehan FH, Wackers FJ, et al. Comparison of immediate invasive, delayed invasive, and conservative strategies after tissue-type plasminogen activator. Results of the Thrombolysis in Myocardial Infarction (TIMI) Phase II-A trial. Circulation. 1990; 81(5):1457-76.	Enrolment finished June 1988 and <50% stenting
Ross AM, Lundergan CF, Rohrbeck SC, Boyle DH, van den Brand M, Buller CH, Holmes DR Jr, Reiner JS. Rescue angioplasty after failed thrombolysis: technical and clinical outcomes in a large thrombolysis trial. GUSTO-1 Angiographic Investigators. Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries. J Am Coll Cardiol. 1998; 31(7):1511-7.	Not question of interest
Ruocco NA Jr, Bergelson BA, Jacobs AK, Frederick MM, Faxon DP, Ryan TJ. Invasive versus conservative strategy after thrombolytic therapy for acute myocardial infarction in patients with antecedent angina. A report from Thrombolysis in Myocardial Infarction Phase II (TIMI II). J Am Coll Cardiol. 1992; 20(7):1445-51.	Enrolment finished June 1988; wrong population
Simes RJ, Topol EJ, Holmes DR Jr, White HD, Rutsch WR, Vahanian A, Simoons ML, Morris D, Betriu A, Califf RM, et al. Link between the angiographic substudy and mortality outcomes in a large randomized trial of myocardial reperfusion. Importance of early and complete infarct artery reperfusion. GUSTO-I Investigators. Circulation. 1995; 91(7):1923-8.	Not question of interest
Smalling RW, Giesler GM, Julapalli VR, Denktas AE, Sdringola SM, Vooletich MT, McCarthy JJ, Bradley RN, Persse DE, Richter BK, Yagi M, Fujise K, Anderson HV. Pre-hospital reduced-dose fibrinolysis coupled with urgent percutaneous coronary intervention reduces time to reperfusion and improves angiographic perfusion score compared with prehospital fibrinolysis alone or primary percutaneous coronary intervention: results of the PATCAR Pilot Trial. J Am Coll Cardiol. 2007; 50(16):1612-4	Not question of interest
So DY, Ha AC, Davies RF, Froeschl M, Wells GA, Le May MR. ST segment resolution in patients with tenecteplase-facilitated percutaneous coronary intervention versus tenecteplase alone: Insights from the Combined	No outcomes of interest

Study	Reason for exclusion
Angioplasty and Pharmacological Intervention versus Thrombolysis ALone in Acute Myocardial Infarction (CAPITAL AMI) trial. Can J Cardiol. 2010; 26(1):e7-12	
Terrin ML, Williams DO, Kleiman NS, Willerson J, Mueller HS, Desvigne-Nickens P, Forman SA, Knatterud GL, Braunwald E. Two- and three-year results of the Thrombolysis in Myocardial Infarction (TIMI) Phase II clinical trial. J Am Coll Cardiol. 1993; 22(7):1763-72.	Original article published before 1990 cut-off; enrolment finished June 1988 and <50% stenting
Thiele H, et al. Comparison of pre-hospital combination-fibrinolysis plus conventional care with pre-hospital combination-fibrinolysis plus facilitated percutaneous coronary intervention in acute myocardial infarction. Eur Heart J. 2005; 26(19):1956-63.	Randomised both treatment arms to unconventional fibrinolysis strategies not used in the UK (that is, half-dose reteplase plus abciximab, rather than a full-dose fibrinolytic agent)
Thiele H, Scholz M, Engelmann L, Storch WH, Hartmann A, Dimmel G, Pfeiffer D, Schuler G; Leipzig Prehospital Fibrinolysis Group. ST-segment recovery and prognosis in patients with ST-elevation myocardial infarction reperfused by prehospital combination fibrinolysis, prehospital initiated facilitated percutaneous coronary intervention, or primary percutaneous coronary intervention. Am J Cardiol. 2006; 98(9):1132-9.	Original study excluded, no additional outcomes of interest, or further follow-up data of outcomes of interest
Topol EJ, Califf RM, George BS, Kereiakes DJ, Abbottsmith CW, Candela RJ, Lee KL, Pitt B, Stack RS, O'Neill WW. A randomized trial of immediate versus delayed elective angioplasty after intravenous tissue plasminogen activator in acute myocardial infarction. N Engl J Med. 1987; 317(10):581-8.	Article published before 1990 cut-off; enrolment finished October 1986 and <50% stenting
Tsukahara K, Kimura K, Usui T, Okuda J, Kitamura Y, Kosuge M, Sano T, Tohyama S, Nemoto T, Yamanaka O, Yoshii Y, Tochikubo O, Umemura S. Efficacy of low-dose mutant tissue-type plasminogen activator followed by planned rescue percutaneous transluminal coronary angioplasty as reperfusion therapy for acute myocardial infarction. J Cardiol. 2001; 37(3):143-50.	Non-English language
Widimský P, et al. Multicentre randomized trial comparing transport to primary angioplasty vs immediate thrombolysis vs combined strategy for patients with acute myocardial infarction presenting to a community hospital without a catheterization laboratory. The PRAGUE study. Eur Heart J. 2000; 21(10):823-31.	PCI rather than fibrinolysis was the primary reperfusion strategy in the routine early arm; randomised patients in the early routine arm to pre-hospital streptokinase
Wijeysundera HC, You JJ, Nallamothu BK, Krumholz HM, Cantor WJ, Ko DT An early invasive strategy versus ischemia-guided management after fibrinolytic therapy for ST-segment elevation myocardial infarction: a meta-analysis of contemporary randomized controlled trials. Am Heart J. 2008; 156(3):564-572, 572.e1-2.	Not RCT (used for quality assessment)
Williams DO, Braunwald E, Knatterud G, Babb J, Bresnahan J, Greenberg MA, Raizner A, Wasserman A, Robertson T, Ross R. One-year results of the Thrombolysis in Myocardial Infarction investigation (TIMI) Phase II Trial. Circulation. 1992; 85(2):533-42.	Original article published before 1990 cut-off; enrolment finished 1988; <50% stenting
van Den Brand MJ, Betriu A, Bescos LL, Nijssen K, Pfisterer ME, Renkin J, Cusi LS, Zijlstra F, Simoons ML. Randomized trial of deferred angioplasty after thrombolysis for acute myocardial infarction. Coronary Artery Disease 1993; 3:393-401.	Patients not initially randomised to early versus deferred angiography; angiography was undertaken 48–120 hours after fibrinolysis; performed balloon angioplasty

Study	Reason for exclusion
Verheugt FW. Timing of angiography after fibrinolysis for ST-elevation acute myocardial infarction. Curr Opin Cardiol. 2010; 25(4):302-4.	Not RCT
Vermeer F, Oude Ophuis AJ, vd Berg EJ, Brunninkhuis LG, Werter CJ, Boehmer AG, Lousberg AH, Dassen WR, Bär FW. Prospective randomised comparison between thrombolysis, rescue PTCA, and primary PTCA in patients with extensive myocardial infarction admitted to a hospital without PTCA facilities: a safety and feasibility study. Heart. 1999; 82(4):426-31.	Enrolment: Sep 1995 – August 1997 and <50% stenting
Webb JG, Lowe AM, Sanborn TA, White HD, Sleeper LA, Carere RG, Buller CE, Wong SC, Boland J, Dzavik V, Porway M, Pate G, Bergman G, Hochman JS; SHOCK Investigators. Percutaneous coronary intervention for cardiogenic shock in the SHOCK trial. J Am Coll Cardiol. 2003 Oct 15; 42(8):1380-6.	Investigates only patients who had PCI
Buerke M, Lemm H, Dietz S, Werdan K. Pathophysiology, diagnosis, and treatment of infarction-related cardiogenic shock. Herz. 2011 Mar; 36(2):73-83. Review.	Review
Wong SC, Sleeper LA, Monrad ES, Menegus MA, Palazzo A, Dzavik V, Jacobs A, Jiang X, Hochman JS; SHOCK Investigators. Absence of gender differences in clinical outcomes in patients with cardiogenic shock complicating acute myocardial infarction. A report from the SHOCK Trial Registry. J Am Coll Cardiol. 2001 Nov 1; 38(5):1395-401.	Wrong comparison
White HD, Assmann SF, Sanborn TA, Jacobs AK, Webb JG, Sleeper LA, Wong CK, Stewart JT, Aylward PE, Wong SC, Hochman JS. Comparison of percutaneous coronary intervention and coronary artery bypass grafting after acute myocardial infarction complicated by cardiogenic shock: results from the Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock (SHOCK) trial. Circulation. 2005 Sep 27; 112(13):1992-2001.	PCI versus CABG
Ramanathan K, Farkouh ME, Cosmi JE, French JK, Harkness SM, Džavík V, Sleeper LA, Hochman JS. Rapid complete reversal of systemic hypoperfusion after intra-aortic balloon pump counterpulsation and survival in cardiogenic shock complicating an acute myocardial infarction. Am Heart J. 2011 Aug; 162(2):268-75.	Registry data. Subgroup analysis of patients who underwent IABP
Webb JG, Sanborn TA, Sleeper LA, Carere RG, Buller CE, Slater JN, Baran KW, Koller PT, Talley JD, Porway M, Hochman JS; SHOCK Investigators. Percutaneous coronary intervention for cardiogenic shock in the SHOCK Trial Registry. Am Heart J. 2001 Jun; 141(6):964-70.	Analysis of PCI patients only
Jeger RV, Tseng CH, Hochman JS, Bates ER. Interhospital transfer for early revascularization in patients with ST-elevation myocardial infarction complicated by cardiogenic shock--a report from the SHould we revascularize Occluded Coronaries for cardiogenic shocK? (SHOCK) trial and registry. Am Heart J. 2006 Oct; 152(4):686-92.	Subgroup analysis of transfer patients
Prasad A, Lennon RJ, Rihal CS, Berger PB, Holmes DR Jr. Outcomes of elderly patients with cardiogenic shock treated with early percutaneous revascularization. Am Heart J. 2004 Jun; 147(6):1066-70.	Analysis of only early revascularisation patients
Madan M, Tan M, Halvorsen S, Westernout CM, Cantor W, Le May MR et al. Timing of angiography and clinical outcomes after fibrinolysis: A patient-level analysis of randomized early invasive clinical trials. Journal of the American College of Cardiology. 2012; 59(13 SUPPL. 1):E353.	Abstract
Magno JDA, Alcover JD, Javier ADC, Punzalan FER. Routine angioplasty after fibrinolytic therapy for ST-segment elevation myocardial infarction: An updated meta-analysis (RAFT-STEMI). Journal of the American College of Cardiology. 2011; 58(20 SUPPL. 1):B94.	Abstract
Rodriguez De Leiras OS, Prado GB, Sayago S, I, Vizcaino AM, Marcos SF,	Abstract

Study	Reason for exclusion
Carrascosa RC et al. Primary percutaneous coronary intervention and culprit vessel revascularisation versus thrombolysis and early complete revascularisation: Comparison of two strategies. EuroIntervention. 2010; 6.	
van Loon RB, Veen G, Baur LHB, Kamp O, Bronzwaer JGF, Twisk JWR et al. Improved clinical outcome after invasive management of patients with recent myocardial infarction and proven myocardial viability: primary results of a randomized controlled trial (VIAMI-trial). Trials. 2012; 13:1.	Not all patients received fibrinolysis
Yan AT, Cantor WJ, Yan RT, Borgundvaag B, Cohen EA, Dzavik V et al. Risk stratification at admission to identify ST-segment elevation myocardial infarction patients receiving fibrinolysis who may benefit from early angioplasty: Insights from the trial of routine angioplasty and stenting after fibrinolysis to enhance reperfusion in acute myocardial infarction (transfer-AMI). Circulation. 2010; 122:A15640.	Post-hoc subgroup analysis and abstract
Yan AT, Yan RT, Mehta SR, Morrison LJ, Cantor WJ, Heffernan M et al. Efficacy of early invasive management postfibrinolysis in men versus women with ST-elevation myocardial infarction: A subgroup analysis from transfer-AMI. Canadian Journal of Cardiology. 2011; 27(5 SUPPL. 1):S152-S153.	Abstract
Yan AT, Yan RT, Cantor WJ, Borgundvaag B, Cohen EA, Fitchett DH et al. Relationship between risk stratification at admission and treatment effects of early invasive management following fibrinolysis: insights from the Trial of Routine ANgioplasty and Stenting After Fibrinolysis to Enhance Reperfusion in Acute Myocardial Infarction (TRANSFER-AMI). European Heart Journal. 2011; 32(16):1994-2002.	Post-hoc analysis
Zhang B-C. A meta-analysis of early percutaneous coronary intervention within 24 hours of thrombolysis in acute st-elevation myocardial infarction. American Journal of Cardiology. 2012; 109(7 SUPPL. 1):6S-7S.	Abstract

Appendix K: Excluded economic studies

K.1 Time to reperfusion

Reference	Reason for exclusion
Concannon TWK. Comparative effectiveness of ST-segment-elevation myocardial infarction regionalization strategies. Circulation: Cardiovascular Quality and Outcomes 3(5): 506-513, 2010.	Excluded due to availability of more applicable evidence. US perspective used and effectiveness data based on PCI-TPI (Percutaneous Coronary Intervention-Thrombolytic Predictive Instrument) which was not included in the clinical review. The 2 included studies both used a UK perspective.

K.2 Facilitated PPCI

Reference	Reason for exclusion
Coleman CI, McKay RG, Boden WE, Mather JF, and White CM. Effectiveness and cost-effectiveness of facilitated percutaneous coronary intervention compared with primary percutaneous coronary intervention in patients with ST-segment elevation myocardial infarction transferred from community hospitals. Clinical Therapeutics. 28(7): 1054-1062, 2006.	Excluded due to a combination of lack of applicability and very serious methodological limitations. The clinical review was based on RCTs only, and so within-trial economic analyses were included only if based on RCTs. This was an observational study and so was not randomised. Health outcomes were based on this study only and not on the full effectiveness evidence included in the clinical review. In addition fPPCI with fibrinolytics and/or GPIs was compared with PPCI without any fibrinolytics or GPIs, which has limited applicability to the current context where periprocedural GPI use is common.

K.3 Radial versus femoral arterial access for PPCI

Reference	Reason for exclusion
Saito S, Tanaka S, Hiroe Y, Miyashita Y, Takahashi S, Tanaka K, et al. Comparative study on transradial approach vs. transfemoral approach in primary stent implantation for patients with acute myocardial infarction: results of the test for myocardial infarction by prospective unicenter randomization for access sites (TEMPURA) trial. Cathetarization and cardiovascular intervention. 59(1): 26-33, 2003.	Excluded due to a combination of partial lack of applicability and very serious methodological limitations. Based on a trial carried out in Japan more than 10 years ago. No explanation of which costs are included in the total costs or of the sources of resource and cost data used. The length of stay for patients is unrepresentative of current UK practice, which would alter the costs by a substantial but incalculable amount.

K.4 Thrombus extraction during PPCI

Reference	Reason for exclusion
Anzai H, Yoneyama S, Tsukagoshi M, Miyake T, Kikuchi T, and Sakurada M. Rescue percutaneous thrombectomy system provides better angiographic coronary flow and does not increase the in-hospital cost in patients with acute myocardial infarction. Circulation Journal 67(9): 768-774, 2003.	Excluded due to a combination of partial lack of applicability and very serious methodological limitations. The clinical review was based on RCTs only, and so within-trial economic analyses were included only if based on RCTs. This was based on a before-after observational study without randomisation or blinding. Some patients were non-randomly excluded from the intervention arm but not from the control arm due to doctor decision about their suitability for the procedure. Health outcomes were based on this study only and not on the full effectiveness evidence included in the clinical review. The resource use and unit costs are Japanese and more than 10 years old.
Tarsia G, De MM, Polosa D, Biondi ZG, Costantino F, Del PG, et al. Manual versus nonmanual thrombectomy in primary and rescue percutaneous coronary angioplasty. Heart and Vessels 25(4): 275-281, 2010.	Excluded due to a combination of lack of applicability and very serious methodological limitations. The clinical review was based on RCTs only, and so within-trial economic analyses were included only if based on RCTs. This was based on a before-after observational study without randomisation or blinding and with a substantial time difference between arms (2000–2005 versus 2005–2007). Exclusion criteria are not clear. Health outcomes were based on this study only and not on the full effectiveness evidence included in the clinical review. No information was given on the source of resource use and unit cost data.

K.5 Culprit versus complete revascularisation **Updated, see 2020 evidence review**

None.

K.6 Cardiogenic shock

None.

K.7 People who remain unconscious after a cardiac arrest

None.

K.8 Hospital volumes of PPCI

None.

K.9 Pre-hospital versus in-hospital fiobrinolysis

Reference	Reason for exclusion
Vale L, Silcock J, and Rawles J. An economic evaluation of thrombolysis in a remote rural community. BMJ. 314(7080): 570-572, 1997.	Excluded due to a combination of lack of applicability and very serious methodological limitations. Analysis based on GREAT study, the inclusion criteria of which did not include a definitive diagnosis of STEMI by electrocardiogram and hence the population included people without STEMI. It also used only a simple outcome measure and so is less relevant than Vale 2004.
Vale L, Steffens H, and Donaldson C. The costs and benefits of community thrombolysis for acute myocardial infarction: a decision-analytic model. PharmacoEconomics 22(14): 943-954, 2004.	Excluded due to a combination of lack of applicability and potentially serious methodological limitations. Analysis based on GREAT study, the inclusion criteria of which did not include a definitive diagnosis of STEMI by electrocardiogram and hence the population included people without STEMI. It also does not reflect the whole effectiveness evidence identified in the clinical review or include long-term healthcare costs.

K.10 Use of antithrombin as an adjunct to fibrinolysis

None.

K.11 Rescue PCI

None.

K.12 Routine early angiography following fibrinolysis

None.

Appendix L: Comparative cost analysis: Radial versus femoral arterial access for PPCI

L.1 Introduction

No relevant economic evaluations were identified that compared radial access with femoral access for PPCI. Given that both approaches are in common usage in England and Wales, and that it is not clear which approach is most cost effective, the GDG decided to conduct a comparative cost analysis for an NHS context.

L.2 Methods

L.2.1 Approach to analysis

The analysis was undertaken in line with the NICE reference case.[86] The population and interventions considered were the same as in the clinical evidence review for this question (see review protocol, Appendix C). The costs considered were the direct cost of all healthcare received by individuals from an NHS and personal social services perspective. As this is a cost analysis, health outcomes, including health-related quality of life, were not considered. Only costs incurred during the initial hospital stay were included. The time horizon was less than 1 year, and hence discounting was not required. In line with the NICE Guide to the methods of technology appraisal,[86] VAT was excluded from the analysis, and hence the costs quoted below do not include VAT.

Five factors were considered, each of which the GDG believed may give rise to a difference in costs between procedures carried out by radial access and those carried out by femoral access.

- Equipment used in standard PPCI procedures.
- Equipment used in crossover PPCI procedures.
- Treatment of complications.
- Length of PPCI procedures.
- Length of hospital stay.

The GDG did not believe that there were any other factors likely to give rise to differences in procedural or in-hospital costs. Differences in healthcare usage after the initial hospital stay were not considered due to a lack of biological plausibility that the arterial access route used could affect the need for healthcare beyond the initial hospital stay, and because the clinical evidence review for this question found no evidence of difference in long-term outcomes.

L.2.2 Resource use

L.2.2.1 Equipment used in standard PPCI procedures

The opinion of the GDG was that the equipment used during uncomplicated PPCI procedures is largely equivalent regardless of which arterial approach is used. The only difference identified was in the equipment needed to close the artery at the end of the procedure.

In femoral procedures this may be carried out in one of three ways:

- pressing manually on the entry site
- using an external compression device
- using an vascular closure device.

The relative use of each of these 3 methods in the UK is unknown as practice varies between PPCI centres.

In radial procedures closure may be carried out either by manual pressure or by using a vascular closure device. In practice manual pressure is rarely used as the vascular closure devices are relatively inexpensive. It was assumed that closure devices are used in 100% of radial PPCI procedures.

L.2.2.2 Equipment used in crossover PPCI procedures

A 'crossover' occurs when access to the coronary arteries is found not to be possible through the intended access route, in which case the operator will withdraw any equipment already inserted from that artery and instead attempt to access the coronary arteries through the alternative approach. For example a crossover occurs in a radial procedure when the operator intends to carry out the procedure through the radial artery and initially attempts this, but is not able to complete the procedure using the radial artery and so instead restarts the process using a femoral artery and continues as for a standard femoral procedure.

The repetition involved in this process means that some addition equipment is required in crossover procedures.

Crossovers are also likely to increase the total length of a PPCI procedure. However this effect will be captured in the mean lengths of procedures reported in studies and analysed below, which average the lengths of all procedures carried out in the included trials, whether or not a crossover was involved.

Crossovers are more common in radial procedures than in femoral procedures. The weighted frequency of crossovers observed in the clinical evidence review is shown in Table 111 and in Figure 157, Appendix I.

Table 111: Crossover rates

	Radial access	Femoral access	Increase in rate with radial access	Studies reporting crossover
Crossover rate	6.8%	2.0%	4.8%	TEMPURA 2003,[95] Brasselet 2007,[14] Li 2007,[73] Gan 2009,[48] RADIAMI 2009,[26] Hou 2010,[56] RIVAL 2011,[60] RADIAMI II 2011,[27] RIFLE-STEACS 2012[93]

The opinion of the GDG was that the additional equipment needed when a crossover occurs (either from radial to femoral access or from femoral to radial access) is as follows:

- In approximately 70% of cases the decision to crossover is taken early due to difficulties in initially accessing the artery. In these cases a replacement sheath only is required.
- In approximately 30% of cases the decision to crossover is taken later due to a failure to successfully negotiate the artery. In these cases a replacement sheath is still needed but a new introducing wire is also likely to be required. In around half of these cases (approximately 15% of all cases) a new guide catheter is also likely to be necessary.
- It was noted that small quantities of additional supplies would also be needed, such as an additional introducing needle, one or two syringes, some local anaesthetic and cleaning swabs. However, the low cost of these items compared with the overall extra costs calculated in this section meant that adding the cost of these items into this calculation explicitly would be unnecessary as the extra cost involved would be insignificant.

L.2.2.3 Treatment of complications

The clinical trials reported a variety of complications, with differing definitions (see Chapter 7). Some of these complications would not need any treatment (for example, some minor bleeding). The GDG judged that the complications which were likely to need treatment and so were most relevant for costing were cases with bleeding requiring blood transfusion, and haematomas (which were assumed to include all cases of pseudoaneurysm). Weighted means of the complication rates observed in the clinical evidence review are shown in Table 112.

Table 112: Frequencies of complications requiring treatment

Complication rate	Radial acces	Femoral access	Increase in rate with femoral access	Studies reporting complication
Bleeding requiring blood transfusion (Figure 164)	0.8%	2.7%	1.9%	TEMPURA 2003,[95] Brasselet 2007,[14] RADIAMI 2009,[26] Hou 2010,[56] RIVAL 2011,[60] RIFLE-STEACS 2012,[93] RADIAMI II 2011[27]
Haematoma (Figure 165)	7.3%	14.4%	7.1%	Brasselet 2007,[14] Li 2007,[73] Gan 2009,[48] RADIAMI 2009,[26] Hou 2010,[56] RADIAMI II 2011[27]

Small haematomas require no additional treatment. Larger haematomas will be investigated by ultrasound to check for the presence of a pseudoaneursym. Pseudoaneursym may be treated by compression, by thrombin injection or, in rare cases, by surgery. The relative frequencies of these interventions are not known, and so the GDG estimated these values based on their clinical experience.

The opinion of the GDG was that the additional resources needed to treat complications would be as follows:

- Every patient requiring blood transfusion is assumed to receive on average a transfusion of two units of blood.
- It is assumed that 50% of patients with a haematoma will receive an ultrasound to check for pesudoaneursym (false aneurysm).
- It is assumed that 50% of those given an ultrasound will be diagnosed with pesudoaneursym.
- It is assumed that 50% of those diagnosed with pesudoaneursym will be treated with compression, requiring an external compression device; that 45% will be treated by injection with thrombin; and that 5% would require surgery.
    - o It is noted that, depending on which means of closing femoral arteries is routinely adopted (as discussed in L.2.2.1 above) the use of an external compression device may not be an additional cost.

L.2.2.4 Length of PPCI procedures

If PPCI procedures using one arterial approach take longer than those using the other approach, then that will involve additional staff time and additional time using the cardiac catheter laboratory with the overheads that that involves. If the difference in length of time is sufficient that the staff and laboratory time could have alternatively been used in treating another patient then that will mean that this approach has additional costs.

The mean procedure length in each of the clinical studies is recorded and meta-analysed in Figure 163, Appendix I. As already noted, the mean length will take into account any additional time spent in crossover procedures and in treating complications which arise during the procedure, as well as any difference in the length of uncomplicated procedures.

The results, shown in Figure 163, are that radial procedures are 1.66 minutes (95% CI 0.73, 2.59) longer than femoral procedures. This is an increase of only 100 seconds in a procedure which usually takes between 30 and 60 minutes, and was considered by the GDG not to be clinically significant, as it is implausible that a difference of that magnitude would in practice lead to staff and facility resources being available to treat another patient instead.

It was therefore concluded that there was no evidence that there would be a significant difference in costs between the two approaches on the basis of procedure length. It was therefore not found to be necessary to establish the exact resources used in a PPCI procedure for each additional minute, or the cost of these resources, and hence these are not reported here or in the cost section below.

L.2.2.5 Length of hospital stay

The weighted means of the studies included in the clinical evidence review (Figure 162, Appendix I and Table 113 below) gave the length of stay as 7.3 days for radial access, and 8.0 days for femoral access (evidence quality: Very Low). The reduction in length of stay varied between 0.3 days[14] and 4.1 days.[56] These data were from studies undertaken in France, China, Japan and Poland and published between 2003 and 2010. The GDG agreed that these were not applicable to the current UK context since current UK length of stay for both radial and femoral access is typically very much shorter.

The British Cardiovascular Intervention Society (BCIS) carries out an annual audit of all PPCI procedures carried out in the UK.[77] This includes the arterial access route used in each procedure. BCIS does not routinely publish length of stay data by access route, but have made that available for this guideline (Ludman PF: unpublished evidence 2012). It shows 3.28 days for radial access and 4.58 days for femoral access (Table 113). This is the only UK hospital data routinely collected which is separated by access route, as other sources such as NHS episode statistics and NHS reference costs do not disaggregate their data. No UK clinical trial has been identified which published disaggregated data.

Table 113: Length of stay in hospital during and following a PPCI procedure

Data source	Population	LOS (days), radial access	LOS (days), femoral access	Reduction in LOS with radial (days)
Clinical trial data				
TEMPURA 2003,[95] Brasselet 2007,[14] Gan 2009,[48] RADIAMI 2009,[26] Hou 2010[56] (Figure 162)	n = 758	7.9 (mean) 7.3 (weighted mean)	10.5 (mean) 8.0 (weighted mean)	2.5 (24%) 0.6 (8%)
UK data				
BCIS audit 2011[77] (a)	n = 19,787	3.28	4.58	1.30 (28%)

LOS = Length of hospital stay, mean
(a) Non-randomised cohort. Does not account for patients treated then transferred to a different hospital. Does not include crossovers (mean LOS: 5.19 days).

The BCIS audit data are therefore likely to be the most applicable data for the context of England and Wales. However, they have a number of significant limitations. They are non-randomised and as such are likely to be heavily confounded. In the opinion of the GDG, patients with some of the most complicated cases, such as those patients with cardiogenic shock, are very much more likely to be treated using a femoral procedure than a radial procedure. These patients have poorer outcomes than patients without complications (see Chapter 10), and are more likely to require intensive care following the PPCI procedure. As a result, the population receiving femoral access PPCI may be expected to have worse outcomes and a longer length of stay than the population receiving radial access on this account.

Procedures including crossovers are associated with a longer length of stay (5.19 days), but are omitted from the mean lengths of stay by approach. Assuming that the rate of excess crossovers in radial access in the UK is 4.8%, as in the clinical review, adding in this effect would be likely to increase the mean length of stay for patient receiving radial access, but only by around 0.07 days.

The BCIS data is also complicated by the fact that it only records the length of stay in the hospital carrying out the procedure. There is at least one high volume PPCI centre in England and Wales, which carries out a majority of radial procedures, whose patients routinely transfer to other hospitals for their recovery, staying at the first centre for less than one day. This would be expected to make the data favour radial access. It is possible that there are other centres following a similar practice of transferring patients, and they may predominantly have patients with radial access or femoral access.

As a result of these limitations, it is the opinion of the GDG that the difference in mean length of stay seen in the BCIS data (1.3 days) is likely to be the upper bound of the possible difference in length of stay between radial and femoral access. It is therefore judged that the true difference in length of stay is likely to lie between 0 days and 1.3 days. The GDG does not believe there is sufficient evidence to judge the likely true difference within this range. No evidence has been identified suggesting a shorter length of stay for femoral access compared to radial access.

L.2.3 Costs

L.2.3.1 Equipment used in standard PPCI procedures

The prices of the items of equipment needed were agreed by the GDG by consensus, based on their experience of purchasing these items in clinical practice in the previous year. It was agreed that the range of prices shown in Table 114 represents the costs at which NHS providers were able to purchase these items in 2012 across England and Wales. These items are not reusable.

The staff time involved in applying manual pressure has not been costed, as the length of time for which manual pressure needs to be maintained has not been measured, and it is not clear whether the staff member responsible might have spent his or her time otherwise observing, talking to or attending to the patient during this time if they had not been applying pressure, so it is unclear whether this is additional staff time which could otherwise have been used in dealing with a different patient, or not. If it was to be costed it would be expected to be less than £10.

Table 114: Cost of equipment used in standard PPCI procedures

Item	Price (range)
Femoral closure	
Manual pressure	Staff time only
External compression device	£50–£60
Vascular closure device (femoral)	£90–£130
Radial closure	
Vascular closure device (radial)	£10–£14

L.2.3.2 Equipment used in crossover PPCI procedures

The prices of the items of equipment needed were agreed by the GDG by consensus, based on their experience of purchasing these items in clinical practice in the previous year. It was agreed that the range of prices shown in Table 115 represents the costs at which NHS providers were able to purchase these items in 2012 across England and Wales. These items are not reusable.

Table 115: Cost of equipment used in crossover PPCI procedures

Item	Price (range)
Sheath	£10–£20
Introducing wire	£17–£21
Guide catheter	£20–£30

L.2.3.3 Treatment of complications

The costs of the procedures needed to treat the complications referred to above were found or estimated from the most appropriate sources (Table 116). Standard NHS Reference Costs were used where available.[31,32] There are no NHS costs specifically for a minor vascular operation to repair a pseudoaneursym. It was therefore assumed that the cost of this would be similar to a simple hernia operation.

Table 116: Cost of procedures used in treating complications

Item	Price	Source
Blood transfusion	£58	NHS Reference Costs (2010-11)[31]: transfusion for outpatient, mean. Number of units not stated; equivalent cost not available for inpatients or for 2011-12[32]
Blood transfusion of 2 units	£58–£116	Based on the assumption that this will cost between the price of 1 and 2 average blood transfusions
Ultrasound	£50 (£33–£59)	NHS Reference Costs[32]: ultrasound < 20 minutes, direct access patients, mean (interquartile range)
Compression device	£50–£60	GDG opinion (where not already used and paid for as standard)
Thrombin injection	£200–£300	GDG opinion
Vascular surgery	£1100–£1500	GDG opinion, assumed to be similar to hernia surgery (NHS Reference Costs[32]: adult day-case hernia surgery)

L.2.3.4 Length of hospital stay

The national average unit cost for one excess bed day for PCI in non-elective patients is £326 (NHS Reference Costs, 2011-12).[32]

L.3 Results

L.3.1 Equipment used in standard PPCI procedures

The equipment needed to close a radial artery costs £10–£14 per procedure.

No data come be found regarding the relative usage of different strategies of femoral closure in the UK, and so it can only be stated with certainty that the cost of the equipment needed to close a femoral artery lies between £0 and £130 per procedure. It is most likely to lie around the middle of that range, and is very likely to be greater than the £10–£14 cost in radial procedures. It is therefore very likely that the equipment used for femoral procedures is more expensive than that used in radial procedures by around £0–£120 per procedure.

L.3.2 Equipment used in crossover PPCI procedures

Based on the costs and resource use assumptions stated above:

- The average additional cost per crossover (radial to femoral or femoral to radial) is between £18.10 and £30.80 (midpoint £24.45).

- Therefore, the average excess cost per radial PPCI procedure, given an excess rate of crossover in radial cases of 4.8%, is between £0.88 and £1.49 (midpoint £1.18).
- It is noted that if the additional low cost items referred to in Section L.2.2.2 were added in, this average cost would increase slightly, but not by more than a few pence.

L.3.3 Treatment of complications

Based on the costs and resource use assumptions stated above:

- The additional cost for patients requiring a blood transfusion is £58–£116.
- The average excess cost of blood transfusions per femoral PPCI patient is hence £1.08–£2.17.
- The additional cost of treating a patient with haematoma is £51.50–£82 if external compression devices are already being used as standard, and £57.75–£89.50 if manual pressure would otherwise have been used and so additional external compression devices are needed.
- The average excess cost of treating haematomas per femoral PPCI patient is hence £3.65–£5.82 without compression devices or £4.10–£6.35 including compression devices.
- Therefore, the average excess cost due to complications for each femoral PPCI procedure is £4.74–£7.99 without compression devices or £5.18–£8.52 including compression devices.

There are further comments on these figures in Section L.4.2 below.

L.3.4 Length of PPCI procedures

There was found to be no evidence of a clinically significant difference in procedure times between the two approaches, and it was hence concluded that there was likely to be no difference in costs on the basis of procedure length.

L.3.5 Length of hospital stay

Based on an additional length of stay for procedures using femoral access of between 0 and 1.3 days, there could be an excess cost of between £0 and £425 for femoral procedures, but the GDG is unable to judge with any confidence where in that range the cost difference is most likely to lie.

L.4 Discussion

L.4.1 Summary of results

The analysis presented here suggests:

- Equipment used in standard PPCI procedures costs £0–£120 more in femoral procedures.
- Equipment used in crossover PPCI procedures costs around £1 more in radial procedures.
- Treating complications costs around £5–£8 more in femoral procedures.
- The length of PPCI procedures does not give rise to any difference in costs.
- The length of hospital stay could cost £0–£425 more in femoral procedures.

No difference is seen in procedure length, and the excess costs incurred by crossovers and complications are negligible in the context of an intervention which cost around £2900 per procedure (NHS Reference Costs, 2010-11).[32,32] The remaining two factors both favour radial over femoral access, but with a very high degree of uncertainty.

L.4.2 Limitations and interpretation

All the data presented and analysed above are subject to substantial limitations, with the exception of the procedure length, which was found to be differ between approaches by a very small amount with a high degree of confidence (95% CI 0.73 minutes, 2.59 minutes).

It is not clear whether the excess rate of crossovers in radial access procedures in England and Wales is in line with the 4.8% difference found in the clinical evidence review. However the very small absolute value of the excess cost (88p–£1.49) means that if this rate was somewhat higher or lower this would have minimal impact for NHS resources.

The assumptions regarding complications are subject to substantial uncertainty as to which complications should be considered, the proportion of patients with a complication needing treatment, the methods of treatment used, and the proportion of patients receiving each treatment method. The costs of each treatment method were presented as a range of prices available in the NHS and not as exact values, and the cost of vascular surgery was estimated based on hernia surgery. The costs of these 2 procedures are unlikely to be the same, and using the hernia surgery cost as an estimate may be an overestimate as it will include double-counting of hospital bed stay costs. However, the small absolute value of the excess cost (£5.18–£8.52) means that these findings would be robust to very different assumptions. Even if the proportion of patients treated for complications was to double, the average net cost per femoral patient would not be greater than £17, still a very small difference.

It is clear that the cost of arterial closure in femoral procedures is highly likely to be higher than in radial procedures, but without data on the relative use and effectiveness of the 3 alternative closure methods outlined it is not possible to calculate how much higher. The experience of the GDG members suggests that each method is currently used in England and Wales to at least a moderate extent, and so the difference in cost is perhaps more likely to be towards the centre than at the extremes of the £0–£120 range suggested.

The cost difference resulting from potential differences in length of stay is even more uncertain. As previously stated, there is no data on length of stay from randomised controlled trials of femoral access versus radial access in a UK or directly equivalent context. The BCIS data which is available must be highly qualified by the fact that it is non-randomised, and the case mix of those patients selected for femoral and radial access are not equivalent. Due to this, and the additional effects of not including crossovers or inter-hospital transfers, the difference in length of stay in a typical PPCI patient is very unlikely to be as high as 1.3 days. The cost difference due to this factor is therefore very likely to be lower than £425. However, it is not possible to be more precise in this result. This is particularly regrettable since this factor has the potential to give rise to the largest cost difference in this analysis if length of stay with radial access is indeed substantially reduced from length of stay with femoral access. It would however be inappropriate to attempt greater certainty than the evidence permits.

L.4.3 Conclusion

Taking together the costs of the equipment used in standard PPCI procedures, in crossover procedures and to treat complications, the length of the PPCI procedure and the length of hospital stay, the evidence suggests that PPCI carried out in the NHS in England and Wales by femoral access is very likely to be more expensive than PPCI carried out by radial access. There is insufficient evidence to reliably predict the size of the cost difference which might be expected.

L.4.4 Implications for future research

Research into the frequency, cost and effectiveness of arterial closure methods used in femoral access PPCI procedures in the UK would be beneficial.

Research into the length of stay of comparable patients following PPCI by radial access versus femoral access in the UK would be highly beneficial.

Appendix M: Comparative cost analysis: The use of thrombus extraction devices during PPCI

M.1 Introduction

No relevant economic evaluations were identified that compared PPCI with and without the use of thrombus extraction devices. Given that both approaches are in common usage in England and Wales, and that it is not clear which approach is most cost effective, the GDG decided to conduct a comparative cost analysis for an NHS context.

M.2 Methods

M.2.1 Approach to analysis

The analysis was undertaken in line with the NICE reference case.[86] The population and interventions considered were the same as in the clinical evidence review for this question (see review protocol, Appendix C). The costs considered were the direct cost of all healthcare received by individuals from an NHS and personal social services perspective. As this is a cost analysis, health outcomes, including health-related quality of life, were not considered. Only costs incurred during the PPCI procedure were included. The time horizon was less than 1 year, and hence discounting was not relevant. In line with the NICE Guide to the methods of technology appraisal,[86] VAT was excluded from the analysis, and hence the costs quoted below do not include VAT.

This analysis examines the usage and costs of three items of equipment used in PPCI procedures:

- thrombus extraction devices
  - thrombus aspiration devices (these are also referred to as manual devices, suction devices or aspiration catheters)
  - mechanical thrombus extraction devices (these are also referred to as non-manual or fragmenting devices)
- stents
- balloon catheters.

The use of thrombus extraction devices results in an additional cost for the procedure as these are single-use items which must be purchased for each procedure. However, the use of such devices may also be associated with differential usage of stents or balloon catheters. The GDG therefore believed it was important to investigate the usage of these items of equipment with and without thrombus extraction to see if this use differed, and if so what effect that would have on the cost of each approach.

The duration of PPCI procedures with and without thrombus extraction was also investigated as a difference in procedure length could give rise to differential costs between the two approaches.

The GDG did not believe that the usage of any other items of equipment (including guide catheters and guidewires) were likely to vary between PPCI procedures with or without thrombus extraction. The costs of healthcare beyond the initial procedure were not included. It was considered that the evidence that future healthcare usage could differ according to whether or not thrombus extraction was carried out was not sufficiently certain or accurate to allow useful costing to be undertaken, and so it was assumed that there would not be any difference in longer-term costs.

M.2.2 Resource use

M.2.2.1 Thrombus extraction devices

By definition there is clearly additional resource use in PPCI procedures adopting a thrombus-extraction approach compared to procedures not carrying out thrombus extraction. These procedures will use either one thrombus aspiration device or one mechanical thrombus extraction device. There is no other resource use directly connected with the use of a thrombus extraction device. Mechanical thrombus extraction devices require the PPCI centre to have use of a machine which allows the delivery of the device. However these machines are typically loaned to hospitals by the device manufacturers in return for commitments to purchase individual devices from the company and so are not an additional cost on the NHS provider.

Unpublished data from the BCIS 2011 audit shows that 0.2% of devices used in PPCI procedures were mechanical thrombus extraction devices, 84.5% were thrombus aspiration devices, with the remaining 15.3% of devices not stated (Ludman PF: unpublished evidence 2012). The GDG agreed that in their clinical experience mechanical thrombus extraction devices are used only rarely.

M.2.2.2 Stents

The proportion of procedures in which at least one stent was used with and without thrombus extraction devices in shown in Table 117 and in the forest plot in Figure 177, Appendix I. The number of stents used per procedure with and without thrombus extraction devices in shown in Table 118.

Table 117: Proportion of procedures in which ≥1 stent was used during PPCI when thrombus extraction device used versus when no thrombus extraction device used

Study	Stent use: thrombus device used	Stent use: no thrombus device used	Difference in usage rate
Thrombus aspiration devices			
Bulum 2012[17]	100%	100%	0
DEAR-MI 2006[102]	99%	97%	+1.4%
De Luca 2006[30]	100%	100%	0
EXPIRA 2010[96]	100%	100%	0
INFUSE-AMI 2012[106] (a)	74%	71%	+3.4%
Kaltoft 2006[61]	95%	97%	−1.8%
Liistro 2009[74]	100%	100%	0
PIHRATE 2010[34]	99%	96.9%	+2.1%
TAPAS 2008[118]	100%	100%	0
VAMPIRE 2008[57]	94%	93%	+0.7%
Mechanical thrombus extraction devices			
AIMI 2006[2]	93%	95%	−1.3%
Antoniucci 2004[3]	98%	98%	0
Napodano 2003[85]	93%	91%	+2.2%
X AMINE ST[72]	100%	98%	+2.0%

Beran 2002,[9] JETSTENT 2010,[83] EXPORT 2008,[25] ITTI 2012[75] and REMEDIA 2005[19] did not report stent usage.

(a) Use of drug-eluting stents. It was not reported whether or not bare metal stents were used in additional cases

Table 118: Number of stents used per procedure in patients when thrombus extraction device used versus when no thrombus extraction device used

Study	Number of stents: thrombus device used	Number of stents: no thrombus device used	Difference in means
Thrombus aspiration devices			
Bulum 2012[17]	1.50	1.47	+0.03
ITTI 2012[75] (a)	1.4 ± 0.7 (a)	1.1 ± 0.3 (a)	+0.3
REMEDIA 2005[19] (a)	1.3 ± 0.6 (a)	1.3 ± 0.6 (a)	0
Mechanical thrombus extraction devices			
AIMI 2006[2] (b)	1.28 (b)	1.21 (b)	+0.07
Beran 2002[9]	1.26 ± 0.54	1.03 ± 0.48	+0.23
JETSTENT 2010[83]	1.26 ± 0.54	1.40 ± 0.73	−0.14
Napodano 2003[85]	1.20 ± 0.65	1.13 ± 0.50	+0.07
X AMINE ST 2005[72]	1.32 ± 0.61	1.37 ± 0.65	−0.05

Antoniucci 2004,[3] DEAR-MI 2006,[102] De Luca 2006,[30] EXPORT 2008,[25] EXPIRA 2010,[96] INFUSE-AMI 2012,[106] Kaltoft 2006,[61] LIISTRO 2009,[74] PIHRATE 2010,[34] TAPAS 2008,[118] and VAMPIRE 2008[57] did not report number of stents used.

(a) Number of stents used per lesion not per procedure

(b) Calculated from number of procedures using 0,1,2,≥3 stents, assuming 3 for ≥3

Figure 177 shows a risk ratio of 1.01 (95% CI 0.99, 1.02): that is that there is no difference in the number of procedures using at least one stent. Those studies which reported the actual numbers of stents used do not give evidence for concluding that the numbers of stents used would differ either.

The GDG has hence concluded that there is no evidence that the usage of stents will differ dependent on the usage of thrombus extraction devices, and therefore there would be no difference in costs due to stent usage.

M.2.2.3 Balloon catheters

Balloon catheter usage is reported in Table 119 and Figure 178, Appendix I. Most studies did not report balloon catheter usage directly, but reported direct stenting (that is, inserting a stent without first using a balloon) and so it is only possible to state the relative usage of balloons in patients who also received a stent. Since stents were used in a large majority of procedures in all of these studies (see Section M.2.2.2), this is unlikely to affect the results.

Table 119: Proportion of patients who received a stent during PPCI procedure who also received ≥ 1 balloon catheter when thrombus extraction device used versus when no thrombus extraction device used

Study	Balloon use: device	Balloon use: no device	Difference
Thrombus aspiration devices			
DEAR-MI 2006[102] (a)	28%	73%	−45%
De Luca 2006A[30] (b)	8%	95%	−87%
EXPIRA 2010[96] (b)	24%	98%	−74%
Liistro 2009[74] (b)	78%	91%	−13%
PIHRATE 2010[34] (c)(d)	24%	92%	−68%
TAPAS 2008[118] (b)(e)	34%	100%	−66%
Mechanical thrombus extraction devices			
Antoniucci 2004[3] (f)	4%	16%	−12%
JETSTENT 2010[83] (b)(g)	10%	14%	−4%

Study	Balloon use: device	Balloon use: no device	Difference
Napodano 2003[85] (h)	33%	63%	−30%
X AMINE ST 2005[72] (i)	40%	64%	−24%

AIMI 2006,[2] Bulum 2012,[17] EXPORT 2008,[25] INFUSE-AMI 2012,[106] ITTI 2012,[75] Kaltoft 2006,[61] REMEDIA 2005[19] and VAMPIRE 2008[57] did not report balloon catheter usage. Beran 2002[9] reported the mean number of balloons used (0.60 ± 0.62 with device; 1.45 ± 0.72 with no device)

(a) 1 patient (1%) in device arm and 2 patients (3%) in no device arm did not receive a stent; balloon use in these patients not reported

(b) 0 patients in each arm did not receive a stent; results therefore reflect all patients

(c) 1 patient (1%) in device arm and 3 patients (3%) in no device arm did not receive a stent; balloon use in these patients not reported

(d) Protocol directed that direct stenting be attempted in procedures using a thrombus extraction device and that balloons be used in procedures not using a thrombus extraction device

(e) Protocol directed that balloons be used in procedures not using a thrombus extraction device

(f) 1 patient (2%) in each arm did not receive a stent; balloon use in these patients not reported

(g) Protocol directed that direct stenting be attempted in all cases

(h) 3 patients (7%) in device arm and 4 patients (9%) in no device arm did not receive a stent; balloon use in these patients not reported

(i) 0 patients in device arm and 2 patients (2%) in no device arm did not receive a stent; balloon use in these patients not reported

Figure 178 shows a risk ratio of 0.35 (95% CI 0.31, 0.38) for thrombus aspiration devices: that is a relative reduction of 65% in the proportion of procedures using at least one balloon catheter when aspiration devices are used. This relates to a reduction from a mean of 95.6% of procedures without aspiration receiving at least one balloon to 33.0% of procedures with aspiration receiving a balloon, an absolute reduction of 62.6% of procedures.

Figure 178 shows a risk ratio of 0.60 (95% CI 0.48, 0.75) for mechanical thrombus extraction devices: that is a relative reduction of 40% in the proportion of procedures using at least one balloon catheter when mechanical devices are used, and an absolute reduction of 12.6% from 30.8% to 18.1%. The usage of balloon catheters in the control groups in these two comparisons are very different (95.6% versus 30.8%) which makes it hard to compare the two groups directly. This is partially explained by the protocol for JETSTENT[83] which directed that direct stenting be attempted in all patients in both arms of the trial wherever possible.

With the exception of Beran 2002,[9] the studies did not report the number of balloons used in each patient. It is assumed that either one or no balloons will normally be used in the initial phase of the procedure (before stent implantation). Additional balloons may also be used at later points in the procedure, but this usage will be unaffected by the use of thrombus extraction devices.

M.2.2.4 Length of PPCI procedures

If PPCI procedures using thrombus extraction take longer than without thrombus extraction this will involve additional time spent by staff and additional time using the cardiac catheter laboratory with the overheads that that involves. If the difference in length of time is sufficient that the staff and laboratory time could have alternatively been used in treating another patient then that will mean that this approach has additional costs.

The mean procedure length in each of the clinical studies is shown in Table 120 and Figure 179, Appendix I.

Table 120: Procedure time for PPCI when thrombus extraction device used versus when no thrombus extraction device used

Study	Procedure time (minutes): thrombus device used (mean ± SD)	Procedure time (minutes): no thrombus device used (mean ± SD)
Thrombus aspiration devices		
DEAR-MI 2006[102]	57 ± 19	54 ± 21
EXPORT 2008[25]	36.7 ± 18.0	34.5 ± 21.5
ITTI 2012[75]	53 ± 32	41 ± 16
REMEDIA 2005[19]	81 ± 43	72 ± 34
VAMPIRE 2008[57]	87.0 ± 32.4	93.6 ± 78.6
Mechanical thrombus extraction devices		
AIMI 2006[2]	75.4 ± 30.9	59.2 ± 26.8
JETSTENT 2010[83]	59.5 (44.7–70) (a)	46 (35–50) (a)
X AMINE ST 2005[72]	54 ± 28	45 ± 25

Antoniucci 2004,[3] Beran 2002,[9] Bulum 2012,[17] Napodano 2003,[85] De Luca 2006,[30] EXPIRA 2010,[96] INFUSE-AMI 2012,[106] Kaltoft 2006,[61] Liistro 2009,[74] PIHRATE 2010,[34] and TAPAS 2008[118] did not report procedure length.

(a) Median (interquartile range)

Figure 179 shows that the use of thrombus aspiration devices was associated with an increase in procedure length of 2.94 minutes (95% CI −1.29, 7.17) compared to procedures not involving thrombus extraction. This increase is not statistically significant, but it is also considered by the GDG not to be a clinically significant increase, as it is implausible that a difference of that magnitude would in practice lead to staff and facility resources actually being available to treat another patient instead.

Figure 179 further shows that the use of mechanical thrombus extraction devices was associated with an increase of 13.81 minutes (CI 9.58, 18.04) compared to procedures not involving thrombus extraction. This result is based on only two studies,[2,72] but is also consistent with the median procedure length reported for JETSTENT [83] (see Table 120 above). This provides relatively good evidence that there is a real increase in procedure length when mechanical thrombus extraction devices are used.

Whether a difference of 14 minutes is clinically significant depends to a great extent on the organisation of coronary services in a particular PCI centre. Saving time – meaning that the staff and the cardiac catheter laboratory are free to treat other patients – is only an advantage if there are other patients needing treatment at that particular time. This is a particularly significant consideration for an emergency procedure such as PPCI, but is complicated by the overlap of staff and facilities between PPCI and non-emergency procedures such as elective PCI. For further discussion on this point see Chapter 12. In the opinion of the GDG, an increase in procedure length of 14 minutes is unlikely to be clinically significant in any but very high volume centres. Any possible cost implications would also be small in comparison to the effect of the cost of the mechanical thrombus extraction devices themselves. It was therefore concluded that it would be both very difficult to attempt to reliably cost the effect of differing procedure length, and it was unnecessary. No costs were therefore calculated.

M.2.3 Costs

M.2.3.1 Thrombus extraction devices

Thrombus extraction devices are not procured by the NHS centrally, and there are no published national list prices. Prices are set by manufacturers in negotiation with NHS buyers.

We contacted the manufacturers of all thrombus extraction devices currently used in the UK and they provided us with the price or range of prices at which they sell their products. The prices given were the nationally available prices at which these items could be purchased by an NHS buyer in 2012. The prices for individual devices were provided on a confidential basis, but summary measures for each class of device are presented below, with the consent of the manufacturers. The products for which prices were received were: AngioJet, ThrombCat, Diver CE, Export, Eliminate, QuickCat and Pronto. The distributer of Hunter aspiration catheters agreed to provide cost data but did not do so in time for the publication of this guideline, so Hunter has been excluded from these calculations.

Thrombus aspiration devices

Thrombus aspiration devices cost between £140 and £180, with a mean of £153.

Mechanical thrombus extraction devices

Mechanical thrombus extraction devices have a mean cost of £1244 with a small range.

M.2.3.2 Balloon catheters

The price of balloon catheters was agreed by the GDG by consensus, based on their experience of purchasing these items in clinical practice in the previous year. It was agreed that the range of prices shown in Table 121 represent the costs at which NHS providers were able to purchase these items in 2012 across England and Wales.

Table 121: Cost of balloon catheters

Item	Price (range)
Balloon catheter	£45–£65

M.3 Results

M.3.1 Thrombus extraction devices

Thrombus aspiration devices

Procedures involving the use of a thrombus aspiration device will cost an average of £153 more than procedures involving no thrombus extraction device.

Mechanical thrombus extraction devices

Procedures involving the use of a mechanical thrombus extraction device will cost an average of £1244 more than procedures involving no thrombus extraction device.

M.3.2 Stents

There was found to be no evidence of a difference in usage of stents between the two approaches, and it was hence concluded that there was not likely to be any difference in costs between the approaches on the basis of stent usage.

M.3.3 Balloon catheters

Given the frequency of balloon catheter use shown in the studies included in the clinical evidence review, and a cost of £45–£65 per balloon catheter:

- For thrombus aspiration devices: an absolute reduction of 62.6% will lead to a cost saving of £28–£41 per procedure when a thrombus aspiration device is used compared to no thrombus extraction.
- For mechanical thrombus extraction devices: an absolute reduction of 12.6% will lead to a cost saving of £5.70–£8.20 per procedure when a mechanical thrombus extraction device is used compared to no thrombus extraction.

The results for mechanical thrombus extraction devices are based on a baseline rate of balloon catheter usage in the control group much lower than in the aspiration group, and lower than seems likely in clinical practice. If the baseline rate was higher then greater savings would be expected, though the savings would remain lower than the savings shown above for the use of aspiration devices, due to the lesser relative reduction in use of balloon catheters seen with mechanical devices.

M.3.4 Length of PPCI procedures

There was found to be no evidence of a clinically significant difference in procedure times between thrombus aspiration and no thrombus extraction, and it is hence concluded that there was likely to be no difference in costs on the basis of procedure length for thrombus extraction.

There was found to be an increase of procedure length by 14 minutes with mechanical thrombus extraction compared to no thrombus extraction. In some settings this will not give rise to any difference in costs; in other settings this may cause mechanical thrombus extraction to be more expensive than no thrombus extraction.

M.4 Discussion

M.4.1 Summary of results

The analysis presented here suggests that there will not be any cost difference on account of the usage of stents or, for thrombus aspiration devices, procedure length.

The greatest impact on costs is the price of the thrombus extraction devices themselves: around £150 per PPCI procedure for thrombus aspiration devices and over £1200 per PPCI procedure for mechanical thrombus extraction devices.

The use of balloon catheters partly counteracts this for thrombus aspiration devices, with a reduction in costs of £28–41 when a thrombus aspiration device is used. The result is that procedures using thrombus aspiration devices are likely to cost around £110–£125 more than procedures not using any thrombus extraction device.

The cost saving in the use of balloon catheters for mechanical thrombus extraction procedures is smaller but less certain, due to less reliable clinical evidence. However, any possible cost saving will be minimal compared to the cost of the mechanical thrombus extraction device itself. There is also a possibility of increased cost due to longer procedure times with mechanical thrombus extraction devices, however that will be dependent on the setting: it is unlikely to make any difference in most centres, and even in the busier centres the additional effect is unlikely to be large. Hence the overall additional cost of using a mechanical thrombus extraction device is likely to be around £1200 compared to procedures not using any thrombus extraction device.

M.4.2 Limitations and interpretation

This analysis was informed wherever possible with data from the clinical evidence review for this question. It is not clear whether current UK practice is the same. Stent use in the UK is widespread

(92.3% of all PPCI procedures in the UK, 2011[77]) and there is no evidence to suggest that it differs between procedures using or not using a thrombus extraction device. The usage of balloon catheters is much less certain however.

The clinical data for balloon catheter usage were limited in two ways. Firstly, figures were not available for the absolute number of balloon catheters used or saved, only the cases receiving at least one balloon catheter. Secondly, the control groups for the two classes of devices were not comparable, which suggests that one or both of the reductions in usage shown may have been substantially inaccurate. No UK data were identified for balloon usage. However, the relatively small saving (up to £41) shown with a large (63%) reduction in balloon usage for thrombus aspiration devices indicates that it is unlikely the maximum saving could be much larger than this.

Thus the finding that both classes of thrombus extraction devices incur increased costs seems robust, but the exact magnitude of the increased cost is not certain for aspiration devices.

M.4.3 Conclusion

The evidence considered here suggests that a PPCI procedure carried out in the NHS in England and Wales using a thrombus aspiration device will cost more than PPCI carried out with no thrombus extraction device, the cost difference is most likely to be around £110–£125.

The evidence considered here suggests that a PPCI procedure carried out in the NHS in England and Wales using a thrombus aspiration device will cost around £1200 more than PPCI carried out with no thrombus extraction device.

M.4.4 Implications for future research

Research into the usage of balloon catheters in comparable patients undergoing PPCI in the UK with and without the use of thrombus aspiration devices would be beneficial.

Appendix N: Additional review data

N.1 Time to reperfusion (chapter 5)

Table 122: Search strategies of the pooled RCT analysis studies of PPCI versus fibrinolysis

Study	RCTs identified	RCTs analysed	Search strategy
Kent 2001	10	10	• Based on earlier meta-analysis (Weaver 1997) RCTs identified through MEDLINE (January 1985–March 1996) and by queries of principal investigators for exact data and additional studies. Also searched the scientific session abstracts in Circulation, The Journal of the American College of Cardiology and the European Heart Journal over the same period. • One study was excluded because individual patient data were unavailable (DeWood 1992) • One additional study identified (Akhras 1997); published after Weaver 1997 meta-analysis
Zijlstra 2002	11	10	• Based on earlier meta-analysis (Weaver 1997) RCTs identified through MEDLINE (January 1985–March 1996) and by queries of principal investigators for exact data and additional studies. Also searched the scientific session abstracts in Circulation, The Journal of the American College of Cardiology and the European Heart Journal over the same period. • One study was excluded because individual patient data were unavailable (DeWood 1992) • One additional study identified (Akhras 1997); published after Weaver 1997 meta-analysis
Boersma 2006	25	22	• All RCTs (n > 50) published between January 1990 and December 2002 were considered (non-English articles were not excluded). They were identified by OVID MEDLINE and ISI Web of Science® using a broad range of key words; References of identified papers and abstract listings of annual meetings of the American Heart Association, American College of Cardiology and European Society of Cardiology were also examined during the same period. • Two studies were excluded because individual patient data were unavailable (DeWood 1992; Morais 1997) • One study was excluded because CAPTIM investigators judged that their protocol (which included pre-hospital fibrinolysis) was incompatible with the other trials included in the pooled analysis (Steg 2003); included in sensitivity analysis
Asseburg 2007	24	22	• Updated earlier meta-analysis http://www.ncbi.nlm.nih.gov/pubmed/12517460 (Keeley 2003) by searching: Cochrane Controlled Trials Register, UK National Research Register, Medline, Embase, Database of Abstracts of Reviews of Effects, UK National Health Service Economic Evaluation Databases, and the Health Technology Assessment Database for English language studies published between 2002 and 2004. Inclusion criteria were consistent with Keeley 2003 and Cochrane review (Cucherat 2003) • One additional trial was identified (de Boer 1994) • One study was excluded because emergency revascularisation arm did not differentiate results by type of intervention

Study	RCTs identified	RCTs analysed	Search strategy
			(angioplasty 64%, surgery 36%) (Hochman 1999) • An additional study was excluded because it did not report data on the delay to primary angioplasty (Akhras 1997) • Preliminary data from 3 conference abstracts was updated with final trial reports (Berrocal 2003; Widimsky 2003; Andersen 2003) • Other inaccuracies were corrected
Tarantini 2010	19	16	• All RCTs (n > 50), published and unpublished (non-English articles were not excluded) comparing fibrin-specific fibrinolysis to PPCI. MEDLINE, CENTRAL, EMBASE, and the Cochrane Central Register of Controlled Trials were searched from January 1990 to December 2008 using a broad range of keywords. Also searched for abstracts reported in the New England Journal of Medicine, Circulation, European Heart Journal, Journal of the American College of Cardiology, and Heart. References of identified papers, relevant studies, and meta-analyses were additionally scanned. Furthermore, oral presentations and expert slide presentations identified from www.theheart.org, www.tctmd.com, www.crtonline.com, www.clinicaltrialresults.org, www.esccardio.org, www.europcr.com, and www.acc.org were also examined. • Two studies were excluded due to missing data (Aoki 1997; Morais 1997) • One study was excluded because it did not directly compare PPCI to fibrinolysis (Hochman 1999)

Table 123: RCTs published subsequent to the pooled RCT analysis studies of PPCI versus fibrinolysis

		Fibrinolysis				PPCI				
Study	Age (years)	n	Agent	TN (min)	1-month all-cause mortality n (%)	n	Stent used	TB (min)	1-month all-cause mortality n (%)	OR (95%CI) PPCI versus fibrinolysis
Armstrong PW, WEST Steering Committee. A comparison of pharmacologic therapy with/without timely coronary intervention vs. primary percutaneous intervention early after ST-elevation myocardial infarction: the WEST (Which Early ST-elevation myocardial infarction Therapy) study. European Heart Journal. 2006; 27(13):1530-1538.	≥18	100	TNK	113*	4(4.0)	100	Yes (97%)	176*	1(1.0)	0.24 (0.027 to 2.21)
Bueno H, Betriu A, Heras M, Alonso JJ, Cequier A, Garcia EJ et al. Primary angioplasty vs. fibrinolysis in very old patients with acute myocardial infarction: TRIANA (TRatamiento del Infarto Agudo de miocardio eN Ancianos) randomized trial and pooled analysis with previous studies. European Heart Journal. 2011;	≥ 75	134	TNK	195*	23(17.2)	132	Yes (93%)	245*	18(13.6)	0.76(0.39 to 1.49)

Study	Age	Fibrinolysis	PPCI	OR (95%CI)
32(1):51-60.				

** from symptom onset, **from randomisation; ¥59% of patients in fibrinolysis armunderwent PPCI*
TNK = Telecteplase, rt-PA = XX = recombinant tissue-type plasminogen activator, r-Sak = staphylokinase

N.2 Facilitated primary percutaneous coronary intervention (fPPCI) (chapter 6)

N.2.1 GPIs: fPPCI versus PPCI – all GPIs subgroup analysis

Table 124: Clinical evidence profile: fPPCI with GPIs – fPPCI versus PPCI – all GPIs, subgroup analysis of trials using background of clopidogrel + aspirin or aspirin alone

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs (all): fPPCI	PPCI (clopidogrel subgroup)	Relative (95% CI)	Absolute	Quality	Importance
Mortality - all-cause (In-hospital) - Clopidogrel + aspirin (background treatment) (assessed with: No studies)												
0	No studies											CRITICAL
Mortality - all-cause (In-hospital) - Aspirin (background treatment) (assessed with: Zorman)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	0/56 (0%)	5/51 (9.8%)	RR 0.08 (0 to 1.46)	90 fewer per 1000 (from 98 fewer to 45 more)	VERY LOW	CRITICAL
Mortality - all-cause (short-term) - Clopidogrel + aspirin (background treatment) (assessed with: ASSIST; BRAVE-3; ON-TIME2)												
3	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	31/1075 (2.9%)	33/1075 (3.1%)	RR 0.94 (0.58 to 1.52)	2 fewer per 1000 (from 13 fewer to 16 more)	VERY LOW	CRITICAL
Mortality - all-cause (short-term) - Aspirin (background treatment) (assessed with: No studies)												
0	No studies											CRITICAL
Mortality - all-cause (longer-term) - Clopidogrel + aspirin (background treatment) (assessed with: ASSIST; BRAVE-3; ON-TIME 2)												
3	Randomised	Very serious	Serious (d)	No serious	Serious (e)	None	52/1069	47/1068	RR 1.11 (0.75 to	5 more per 1000 (from	VERY	CRITICAL

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs (all): fPPCI	PPCI (clopidogrel subgroup)	Relative (95% CI)	Absolute		
	trials	(c)		indirectness			(4.9%)	(4.4%)	1.63)	11 fewer to 28 more)	LOW	
Mortality - all-cause (longer-term) - Aspirin (background treatment) (assessed with: Zorman)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Serious (f)	None	0/56 (0%)	7/51 (13.7%)	RR 0.06 (0 to 1.04)	129 fewer per 1000 (from 137 fewer to 5 more)	VERY LOW	CRITICAL
Stroke - all-cause (short-term) - Clopidogrel + aspirin (background treatment) (assessed with: ASSIST; BRAVE-3; ON-TIME 2)												
3	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	Serious (f)	None	2/1075 (0.19%)	9/1075 (0.84%)	RR 0.26 (0.07 to 1.06)	6 fewer per 1000 (from 8 fewer to 1 more)	VERY LOW	CRITICAL
Stroke - all-cause (short-term) - Aspirin (background treatment) (assessed with: FINESSE)												
1	Randomised trials	Serious (g)	No serious inconsistency	No serious indirectness	Very serious (b)	None	9/814 (1.1%)	8/715 (1.1%)	RR 1.10 (0.43 to 2.83)	1 more per 1000 (from 6 fewer to 20 more)	VERY LOW	CRITICAL
Stroke - all-cause (longer-term) - Clopidogrel + aspirin (background treatment) (assessed with: ASSIST; BRAVE-3)												
2	Randomised trials	Very serious (h)	Serious (d)	No serious indirectness	Very serious (b)	None	3/602 (0.5%)	5/598 (0.84%)	RR 0.63 (0.17 to 2.4)	3 fewer per 1000 (from 7 fewer to 12 more)	VERY LOW	CRITICAL
Stroke - all-cause (longer-term) - Aspirin (background treatment) (assessed with: No Studies)												
0	No studies											CRITICAL
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (short-term) - Clopidogrel + aspirin (background treatment) (assessed with: ASSIST; BRAVE-3; ON-TIME 2)												
3	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	19/1075 (1.8%)	19/1075 (1.8%)	RR 1 (0.54 to 1.88)	0 fewer per 1000 (from 8 fewer to 16 more)	VERY LOW	IMPORTANT
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (short-term) - Aspirin (background treatment) (assessed with: FINESSE)												

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs (all): fPPCI	PPCI (clopidogrel subgroup)	Relative (95% CI)	Absolute	Quality	Importance
1	Randomised trials	Serious (g)	No serious inconsistency	No serious indirectness	Very serious (b)	None	16/602 (2.7%)	13/598 (2.2%)	RR 1.05 (0.52 to 2.11)	1 more per 1000 (from 10 fewer to 24 more)	VERY LOW	IMPORTANT
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (longer-term) - Clopidogrel + aspirin (background treatment) (assessed with: ASSIST; BRAVE-3)												
2	Randomised trials	Very serious (h)	No serious inconsistency	No serious indirectness	Very serious (b)	None	16/602 (2.7%)	13/598 (2.2%)	RR 1.22 (0.59 to 2.52)	5 more per 1000 (from 9 fewer to 33 more)	VERY LOW	IMPORTANT
Major bleeding (In-hospital) - Aspirin (background treatment) (assessed with: Zorman)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Serious (i)	None	16/56 (28.6%)	6/51 (11.8%)	RR 2.43 (1.03 to 5.73)	168 more per 1000 (from 4 more to 556 more)	VERY LOW	IMPORTANT
Major bleeding (short-term) - Clopidogrel + aspirin (background treatment) (assessed with: BRAVE-3; ON-TIME 2)												
2	Randomised trials	Serious (j)	No serious inconsistency	No serious indirectness	Very serious (b)	None	26/874 (3%)	21/876 (2.4%)	RR 1.24 (0.71 to 2.19)	6 more per 1000 (from 7 fewer to 29 more)	VERY LOW	IMPORTANT
Major bleeding (short-term) - Aspirin (background treatment) (assessed with: FINESSE)												
1	Randomised trials	Serious (g)	No serious inconsistency	No serious indirectness	Serious (i)	None	39/814 (4.8%)	21/795 (2.6%)	RR 1.81 (1.08 to 3.06)	21 more per 1000 (from 2 more to 54 more)	LOW	IMPORTANT
Heart failure (In-hospital) - Aspirin (background treatment) (assessed with: Zornam)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	No serious imprecision	None	4/56 (7.1%)	15/51 (29.4%)	RR 0.24 (0.09 to 0.68)	224 fewer per 1000 (from 94 fewer to 268 fewer)	LOW	IMPORTANT

(a)1/1 study poor/unclear randomisation, allocation concealment and blinding.

(b) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect
(c) 3/3 studies poor/unclear allocation concealment; 1/3 studies poor/unclear blinding
(d) Heterogeneity: I^2 > 50% and < 75%
(e) Confidence interval crosses 1 default MID (1.25) and line of no effect
(f) Confidence interval crosses 1 default MID (0.75) and line of no effect
(g) 1/1 study poor/unclear allocation concealment
(h) 2/2 studies poor/unclear allocation concealment; 1/2 studies poor/open blinded
(i) onfidence interval crosses 1 default MID (1.25)
(j) 2/2 studies poor/unclear allocation concealment

N.2.2 GPIs: fPPCI versus PPCI – individual GPIs

Table 125: Clinical evidence profile: fPPCI with GPIs – fPPCI versus PPCI: abciximab

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Abciximab fPPCI	PPCI (placebo / no drug)	Relative (95% CI)	Absolute	Quality	Importance
Mortality - all-cause (In-hospital) (assessed with: Zorman)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	0/56 (0%)	5/51 (9.8%)	RR 0.08 (0 to 1.46)	90 fewer per 1000 (from 98 fewer to 45 more)	VERY LOW	CRITICAL
Mortality - all-cause (short-term) (assessed with: BRAVE-3)												
1	Randomised trials	Serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	13/401 (3.2%)	10/399 (2.5%)	RR 1.29 (0.57 to 2.92)	7 fewer per 1000 (from 11 fewer to 48 more)	VERY LOW	CRITICAL
Mortality - all-cause (longer-term) (assessed with: BRAVE-3; Zorman)												
2	Randomised trials	Very serious (d)	Very serious (e)	No serious indirectness	Very serious (b)	None	27/457 (5.9%)	23/450 (5.1%)	RR 1.15 (0.67 to 1.96)	8 more per 1000 (from 17 fewer to 49 more)	VERY LOW	CRITICAL
Stroke - all-cause (short-term) (assessed with: BRAVE-3; FINESSE)												
2	Randomised	Serious	No serious	No serious	Very serious	None	10/1215	9/1194	RR 1.09	1 more per	VERY LOW	CRITICAL

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Abciximab fPPCI	PPCI (placebo / no drug)	Relative (95% CI)	Absolute	Quality	Importance
	trials	(f)	inconsistency	indirectness	(b)		(0.82%)	(0.75%)	(0.44 to 2.66)	1000 (from 4 fewer to 13 more)		
Stroke - all-cause (longer-term) (assessed with: BRAVE-3)												
1	Randomised trials	Serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	3/401 (0.75%)	1/399 (0.25%)	RR 2.99 (0.31 to 28.58)	5 more per 1000 (from 2 fewer to 69 more)	VERY LOW	CRITICAL
Stroke - fatal (short-term) (assessed with: FINESSE)												
1	Randomised trials	Serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	3/814 (0.37%)	0/795 (0%)	RR 6.84 (0.35 to 132.14)	Not estimable as 0 events in 1 arm	VERY LOW	CRITICAL
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (short-term) (assessed with: BRAVE-3; FINESSE)												
2	Randomised trials	Serious (f)	No serious inconsistency	No serious indirectness	Serious (h)	None	19/1219 (1.6%)	19/1205 (1.6%)	RR 0.99 (0.53 to 1.85)	0 fewer per 1000 (from 7 fewer to 13 more)	LOW	IMPORTANT
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (longer-term) (assessed with: BRAVE-3)												
1	Randomised trials	Serious (c)	No serious inconsistency	No serious indirectness	Serious (b)	None	12/401 (3%)	11/309 (3.6%)	RR 1.09 (0.48 to 2.43)	3 more per 1000 (from 19 fewer to 51 more)	LOW	IMPORTANT
Intracranial bleeding / intracranial haemorrhage (short-term) (assessed with: FINESSE)												
1	Randomised trials	Serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	5/814 (0.61%)	1/795 (0.13%)	RR 4.88 (0.57 to 41.71)	5 more per 1000 (from 1 fewer to 51 more)	VERY LOW	CRITICAL
Major bleeding (In-hospital) (assessed with: Zorman)												
1	Randomised trials	Very serious	No serious inconsistency	No serious indirectness	Serious (j)	None	16/56 (28.6%)	6/51 (11.8%)	RR 2.43 (1.03 to	168 more per 1000	VERY LOW	IMPORTANT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Abciximab fPPCI	PPCI (placebo / no drug)	Relative (95% CI)	Absolute	Quality	Importance
				(i)					5.73)	(from 4 more to 556 more)		
Major bleeding (short-term) (assessed with: BRAVE-3; FINESSE)												
2	Randomised trials	Serious (f)	No serious inconsistency	No serious indirectness	Serious (j)	None	46/1215 (3.8%)	28/1194 (2.3%)	RR 1.61 (1.01 to 2.56)	14 more per 1000 (from 0 more to 37 more)	LOW	IMPORTANT
Minor bleeding (short-term) (assessed with: BRAVE-3; FINESSE)												
2	Randomised trials	Serious (f)	No serious inconsistency	No serious indirectness	No serious imprecision	None	94/1215 (7.7%)	41/1194 (3.4%)	RR 1.61 (1.01 to 2.56)	21 more per 1000 (from 0 more to 51 more)	MODERATE	IMPORTANT
Repeat revascularisation (revascularisation or reintervention); (short-term) (assessed with: FINESSE)												
1	Randomised trials	Serious (c)	No serious inconsistency	No serious indirectness	No serious imprecision	None	111/818 (13.6%)	111/806 (13.8%)	RR 0.99 (0.77 to 1.26)	1 fewer per 1000 (from 32 fewer to 36 more)	MODERATE	IMPORTANT
Repeat revascularisation (revascularisation or reintervention); (longer-term) (assessed with: BRAVE-3)												
1	Randomised trials	Serious (k)	No serious inconsistency	No serious indirectness	Serious (l)	None	53/401 (13.2%)	76/399 (19%)	RR 0.69 (0.5 to 0.96)	59 fewer per 1000 (from 8 fewer to 95 fewer)	LOW	IMPORTANT
Heart failure / fatal heart failure (In-hospital) (assessed with: Zorman)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	No serious imprecision	None	4/56 (7.1%)	15/51 (29.4%)	RR 0.24 (0.09 to 0.68)	224 fewer per 1000 (from 94 fewer to 268 fewer)	LOW	IMPORTANT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Abciximab fPPCI	PPCI (placebo / no drug)	Relative (95% CI)	Absolute	Quality	Importance
Heart failure / fatal heart failure (short-term) (assessed with: FINESSE)												
1	Randomised trials	Serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	45/818 (5.5%)	52/806 (6.5%)	RR 0.85 (0.58 to 1.26)	10 fewer per 1000 (from 27 fewer to 17 more)	VERY LOW	IMPORTANT

(a) 1/1 study unclear randomisation and allocation concealment, 1/1 study unblinded.
(b) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect
(c) 1/1 study poor/unclear allocation concealment
(d) 1/2 studies poor randomisation, 2/2 studies unclear allocation concealment, 1/2 studies poor blinding
(e) Unexplained heterogeneity I^2 >75%
(f) 2/2 studies poor/unclear allocation concealment
(g) 1/1 study poor/open blinded
(h) Confidence interval crosses 1 default MID (0.75) and line of no effect
(i) 1/1 study poor/unclear randomisation; 1/1 study poor/unclear allocation concealment; 1/1 study poor/open blinded
(j) 95% CI crosses 1 default MID (1.25)
(k) 1/1 studies poor/unclear allocation concealment
(l) 96% CI crosses 1 MID (0.75)

Table 126: Clinical evidence profile: fPPCI with GPIs – fPPCI versus PPCI: tirofiban

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Tirofiban fPPCI	PPCI (placebo)	Relative (95% CI)	Absolute	Quality	Importance
Mortality - all-cause (short-term) (assessed with: ON-TIME 2)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Serious (b)	None	11/473 (2.3%)	19/477 (4%)	RR 0.58 (0.28 to 1.21)	17 fewer per 1000 (from 29 fewer to 8 more)	LOW	CRITICAL
Mortality - all-cause (longer-term) (assessed with: ON-TIME 2)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Serious (b)	None	16/467 (3.4%)	25/470 (5.3%)	RR 0.64 (0.35 to 1.19)	19 fewer per 1000 (from 35 fewer to 10 more)	LOW	CRITICAL
Stroke - all-cause (short-term) (assessed with: ON-TIME 2)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Serious (b)	None	1/473 (0.2%)	7/477 (1.5%)	RR 0.14 (0.02 to 1.17)	13 fewer per 1000 (from 14 fewer to 2 more)	LOW	CRITICAL
Reinfarction /non-fatal reinfarction/recurrent myocardian infarction (short-term) (assessed with: ON-TIME 2)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (c)	None	13/473 (2.7%)	14/477 (2.9%)	RR 0.94 (0.44 to 1.97)	2 fewer per 1000 (from 16 fewer to 28 more)	VERY LOW	IMPORTANT
Major bleeding (short-term) (assessed with: ON-TIME 2)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (c)	None	19/473 (4%)	14/477 (2.9%)	RR 1.37 (0.69 to 2.7)	11 more per 1000 (from 9 fewer to 50 more)	VERY LOW	IMPORTANT
Minor bleeding (short-term) (assessed with: ON-TIME 2)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Serious (d)	None	29/473 (6.1%)	21/477 (4.4%)	RR 1.39 (0.81 to 2.41)	17 more per 1000 (from 8 fewer to 62 more)	LOW	LESS IMPORTANT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Tirofiban fPPCI	PPCI (placebo)	Relative (95% CI)	Absolute	Quality	Importance
Repeat revascularisation (repeat or urgent revascularisation); (short-term) (assessed with: ON-TIME 2)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (c)	None	18/473 (3.8%)	20/477 (4.2%)	RR 0.91 (0.49 to 1.69)	4 fewer per 1000 (from 21 fewer to 29 more)	VERY LOW	IMPORTANT

(a) 1/1 study poor/unclear allocation concealment
(b) Confidence interval crosses 1 default MIDs (0.75) and line of no effect
(c) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect
(d) Confidence interval crosses 1 default MID (1.25) and line of no effect

Table 127: Clinical evidence profile: fPPCI with GPIs – fPPCI versus PPCI: eptifibatide

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Eptifibatide fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
Mortality - all-cause (short-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	7/201 (3.5%)	4/199 (2%)	RR 1.73 (0.52 to 5.83)	15 more per 1000 (from 10 fewer to 97 more)	VERY LOW	CRITICAL
Mortality - all-cause (longer-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	9/201 (4.5%)	6/199 (3%)	RR 1.49 (0.54 to 4.09)	15 more per 1000 (from 14 fewer to 93 more)	VERY LOW	CRITICAL
Stroke - all-cause (short-term) (assessed with: ASSIST)												
1	Randomised	Serious	No serious	No serious	Very serious	None	0/201	1/199	RR 0.33	3 fewer	VERY LOW	CRITICAL

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Eptifibatide fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
	trials	(a)	inconsistency	indirectness	(b)		(0%)	(0.5%)	(0.01 to 8.05)	per 1000 (from 5 fewer to 35 more)		
Stroke - all-cause (longer-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	0/201 (0%)	4/199 (2%)	RR 0.11 (0.01 to 2.03)	18 fewer per 1000 (from 20 fewer to 21 more)	VERY LOW	CRITICAL
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (short-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	3/201 (1.5%)	1/199 (0.5%)	RR 2.97 (0.31 to 28.31)	10 more per 1000 (from 3 fewer to 137 more)	VERY LOW	IMPORTANT
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (longer-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	4/201 (2%)	2/199 (1%)	RR 1.98 (0.37 to 10.69)	10 more per 1000 (from 6 fewer to 97 more)	VERY LOW	IMPORTANT
Heart failure / fatal heart failure (short-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	15/201 (7.5%)	22/199 (11.1%)	RR 0.68 (0.36 to 1.26)	35 fewer per 1000 (from 71 fewer to 29 more)	VERY LOW	IMPORTANT
Heart failure / fatal heart failure (longer-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Serious imprecision	None	15/201 (7.5%)	24/199 (12.1%)	RR 0.62 (0.33 to	46 fewer per 1000	LOW	IMPORTANT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	GPIs: Eptifibatide fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
					(c)				1.14)	(from 81 fewer to 17 more)		
Repeat revascularisation (repeat or urgent revascularisation); (short-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	8/201 (4%)	4/199 (2%)	RR 1.98 (0.61 to 6.47)	20 more per 1000 (from 8 fewer to 110 more)	VERY LOW	IMPORTANT
Repeat revascularisation (repeat or urgent revascularisation); (longer-term) (assessed with: ASSIST)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	8/201 (4%)	6/199 (3%)	RR 1.32 (0.47 to 3.74)	10 more per 1000 (from 16 fewer to 83 more)	VERY LOW	IMPORTANT

(a) 1/1 study unclear allocation concealment and poor blinding
(b) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect
(c) Confidence interval crosses one default MID (0.75) and line of no effect

N.2.3 GPIs: pre-catheter laboratory versus in-catheter laboratory administration – individual GPIs

Table 128: Clinical evidence profile: fPPCI with GPIs – pre-catheter laboratory versus in-catheter laboratory administration: abciximab

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FPPCI - Early	Later - ABCIXIMAB	Relative (95% CI)	Absolute	Quality	Importance
Mortality - all-cause (In-hospital) (assessed with: MISTRAL; Zorman)												
2	Randomised trials	Very serious	Serious (b)	No serious indirectness	Very serious (c)	None	2/183 (1.1%)	5/185 (2.7%)	RR 0.46 (0.10 to	15 fewer per 1000	VERY LOW	CRITICAL

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FPPCI - Early	Later - ABCIXIMAB	Relative (95% CI)	Absolute		
		(a)							2.01)	(from 24 fewer to 27 more)		
Mortality - all-cause (short-term) (assessed with: Bellandi; Dudek; MISTRAL; ERAMI)												
4	Randomised trials	Very serious (d)	No serious inconsistency	No serious indirectness	Very serious (c)	None	8/214 (3.7%)	7/222 (3.2%)	RR 1.19 (0.47 to 3.06)	6 more per 1000 (from 17 fewer to 65 more)	VERY LOW	CRITICAL
Mortality - all-cause (longer-term) (assessed with: MISTRAL; Zorman)												
2	Randomised trials	Very serious (a)	Serious (e)	No serious indirectness	Very serious (c)	None	2/183 (1.1%)	6/185 (3.2%)	RR 0.39 (0.09 to 1.64)	20 fewer per 1000 (from 30 fewer to 21 more)	VERY LOW	CRITICAL
Intracranial bleeding / intracranial haemorrhage (In-hospital) (assessed with: Bellandi)												
1	Randomised trials	Serious (f)	No serious inconsistency	No serious indirectness	No serious imprecision	None	0/27 (0%)	0/28 (0%)	Not pooled	Not pooled	MODERATE	CRITICAL
Intracranial bleeding / intracranial haemorrhage (short-term) (assessed with: Dudek; RELAX-AMI)												
2	Randomised trials	Very serious (g)	No serious inconsistency	No serious indirectness	No serious imprecision	None	0/129 (0%)	0/132 (0%)	Not pooled	Not pooled	LOW	CRITICAL
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (In-hospital) (assessed with: MISTRAL)												
1	Randomised trials	Serious (h)	No serious inconsistency	No serious indirectness	Very serious (c)	None	2/127 (1.6%)	2/129 (1.6%)	RR 1.02 (0.15 to 7.1)	0 more per 1000 (from 13 fewer to 95 more)	VERY LOW	IMPORTANT
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (short-term) (assessed with: Bellandi, Dudek, MISTRAL, ERAMI, RELAX-AMI)												
5	Randomised trials	Very serious (i)	No serious inconsistency	No serious indirectness	Very serious (c)	None	5/319 (1.6%)	7/327 (2.1%)	RR 0.74 (0.25 to 2.21)	6 fewer per 1000 (from 16 fewer to 26 more)	VERY LOW	IMPORTANT
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (longer-term) (assessed with: MISTRAL)												

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FPPCI - Early	Later - ABCIXIMAB	Relative (95% CI)	Absolute	Quality	Importance
1	Randomised trials	Serious (h)	No serious inconsistency	No serious indirectness	Very serious (c)	None	3/127 (2.4%)	2/129 (1.6%)	RR 1.52 (0.26 to 8.97)	8 more per 1000 (from 11 fewer to 124 more)	VERY LOW	IMPORTANT
Bleeding (In-hospital) (assessed with: Zorman)												
1	Randomised trials	Very serious (j)	No serious inconsistency	No serious indirectness	Serious (k)	None	16/56 (28.6%)	11/56 (19.6%)	RR 1.45 (0.74 to 2.85)	88 more per 1000 (from 51 fewer to 363 more)	VERY LOW	CRITICAL
Major bleeding (short-term) (assessed with: Bellandi, Dudek, ERAMI, RELAX-AMI)												
4	Randomised trials	Very serious (l)	No serious inconsistency	No serious indirectness	Very serious (c)	None	4/192 (2.1%)	4/198 (2%)	RR 1.05 (0.29 to 3.8)	1 more per 1000 (from 14 fewer to 57 more)	VERY LOW	IMPORTANT
Minor bleeding (short-term) (assessed with: Dudek; ERAMI; RELAX-AMI)												
3	Randomised trials	Very serious (m)	No serious inconsistency	No serious indirectness	Very serious (c)	None	12/165 (7.3%)	8/170 (4.7%)	RR 1.54 (0.65 to 3.67)	25 more per 1000 (from 16 fewer to 126 more)	VERY LOW	IMPORTANT
Repeat revascularisation (repeat or urgent revascularisation); (short-term) (assessed with: Bellandi; Dudek; ERAMI; RELAX-AMI)												
4	Randomised trials	Very serious (l)	No serious inconsistency	No serious indirectness	Very serious (c)	None	3/192 (1.6%)	1/198 (0.51%)	RR 2.38 (0.36 to 15.84)	7 more per 1000 (from 3 fewer to 75 more)	VERY LOW	IMPORTANT
Heart failure (In-hospital) (assessed with: Zorman)												
1	Randomised trials	Very serious (j)	No serious inconsistency	No serious indirectness	Serious (n)	None	4/56 (7.1%)	10/56 (17.9%)	RR 0.40 (0.13 to 1.20)	107 fewer per 1000 (from 155 fewer to 36 more)	VERY LOW	CRITICAL

(a) 2/2 studies poor/unclear randomisation and allocation concealment; 1/2 studies poor/unclear blinding
(b) Significant heterogeneity: I^2 = 59%
(c) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect

(d) 4/4 studies poor/unclear randomisation; 3/4 studies poor/unclear allocation concealment; 2/4 studies poor/open blinded; 1/4 studies no/unclear ITT analysis
(e) Significant heterogeneity: I^2 = 65%
(f) 1/1 studies poor/unclear randomisation; 1/1 studies poor/open blinded
(g) 2/2 studies poor/unclear randomisation; 2/2 studies poor/unclear allocation concealment; 2/2 studies poor/open blinded; 2/2 studies no/unclear ITT analysis
(h) 1/1 study poor/unclear randomisation; 1/1 study poor/unclear allocation concealment
(i) 5/5 studies poor/unclear randomisation; 4/5 studies poor/unclear allocation concealment; 3/5 studies poor/open blinded; 2/5 studies no/unclear ITT analysis
(j) 1/1 study poor/unclear randomisation, allocation concealment and blinding
(k) Confidence interval crosses 1 default MID (1.25) and line of no effect
(l) 4/4 studies poor/unclear randomisation; 3/4 studies poor/unclear allocation concealment; 3/4 studies poor/open blinded; 2/4 studies no/unclear ITT analysis
(m) 3/3 studies poor/unclear randomisation; 3/3 studies poor/unclear allocation concealment; 2/3 studies poor/open blinded; 2/3 studies no/unclear ITT analysis
(n) Confidence Interval crosses 1 default MID (0.75) and line of no effect

Table 129: Clinical evidence profile: fPPCI with GPIs – pre-catheter laboratory versus in-catheter laboratory administration: tirofiban

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Early	Later TIROFIBAN	Relative (95% CI)	Absolute	Quality	Importance
Mortality- all-cause (in-hospital) (assessed with: AGIR)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	5/156 (3.2%)	9/164 (5.5%)	RR 0.58 (0.2 to 1.7)	23 fewer per 1000 (from 44 fewer to 38 more)	VERY LOW	CRITICAL
Mortality - all-cause (short-term) (assessed with: Emre; ON-TIME)												
2	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	Serious (d)	None	9/277 (3.2%)	2/281 (0.7%)	RR 4.54 (0.99 to 20.78)	25 more per 1000 (from 0 fewer to 141 more)	VERY LOW	CRITICAL
Mortality - all-cause (longer-term) (assessed with: ON-TIME)												
1	Randomised trials	Very serious (e)	No serious inconsistency	No serious indirectness	Very serious (b)	None	11/245 (4.5%)	9/244 (3.7%)	RR 1.22 (0.51 to 2.88)	8 more per 1000 (from 18 fewer to 69 more)	VERY LOW	CRITICAL
Stroke - all-cause (in-hospital) (assessed with: AGIR)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	1/156 (0.6%)	2/164 (1.2%)	RR 0.53 (0.05 to 5.74)	6 fewer per 1000 (from 12 fewer to 58 more)	VERY LOW	CRITICAL

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Early	Later TIROFIBAN	Relative (95% CI)	Absolute	Quality	Importance
Stroke - all-cause (short-term) (assessed with: ON-TIME)												
1	Randomised trials	Very serious (e)	No serious inconsistency	No serious indirectness	Very serious (b)	None	0/245 (0%)	1/256 (0.4%)	RR 0.35 (0.01 to 8.51)	3 fewer per 1000 (from 4 fewer to 29 more)	VERY LOW	CRITICAL
Reinfarction or non-fatal reinfarction or recurrent myocardial infarction (short-term) (assessed with: Emre; ON-TIME)												
2	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	3/277 (1.1%)	3/281 (1.1%)	RR 1.02 (0.23 to 4.48)	0 more per 1000 (from 8 fewer to 37 more)	VERY LOW	IMPORTANT
Reinfarction / non-fatal reinfarction / recurrent myocardial infarction (longer-term) (assessed with: ON-TIME)												
1	Randomised trials	Very serious (e)	No serious inconsistency	No serious indirectness	Very serious (b)	None	6/245 (2.4%)	9/244 (3.7%)	RR 0.66 (0.24 to 1.84)	13 fewer per 1000 (from 28 fewer to 31 more)	VERY LOW	IMPORTANT
Intracranial bleeding or intracranial haemorrhage (short-term) (assessed with: ON-TIME)												
1	Randomised trials	Very serious (e)	No serious inconsistency	No serious indirectness	No serious imprecision	None	0/245 (0%)	0/256 (0%)	Not estimable as zero events in each arm		LOW	CRITICAL
Major bleeding (In hospital) (assessed with: AGIR)												
1	Randomised trials	Serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	2/156 (1.3%)	6/164 (3.7%)	RR 0.35 (0.07 to 1.71)	24 fewer per 1000 (from 34 fewer to 26 more)	VERY LOW	IMPORTANT
Major bleeding (short-term) (assessed with: Emre; ON-TIME)												
2	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	Very serious (b)	None	11/277 (4%)	8/290 (2.8%)	RR 1.44 (0.59 to 3.51)	12 more per 1000 (from 11 fewer to 69 more)	VERY LOW	IMPORTANT
Minor bleeding (short-term) (assessed with: Emre)												
1	Randomised	Very serious	No serious	No serious	Very serious	None	3/32	2/34	RR 1.59 (0.28 to	35 more per 1000 (from 42	VERY	IMPORTANT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Early	Later TIROFIBAN	Relative (95% CI)	Absolute	Quality	Importance
	trials	(f)	inconsistency	indirectness	(b)		(9.4%)	(5.9%)	8.93)	fewer to 466 more)	LOW	

(a) 1/1 study poor/unclear bliding; 1/1 study no/unclear ITT analysis
(b) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect
(c) 2/2 studies poor/unclear randomisation; 2/2 studies poor/unclear allocation concealment; 1/2 studies poor/open blinded; 1/2 studies no/unclear ITT analysis
(d) Confidence interval crosses 1 default MID (1.25) and line of no effect
(e) 1/1 study poor/unclear randomisation; 1/1 study poor/unclear allocation concealment
(f) 1/1 study poor/unclear randomisation; 1/1 study poor/unclear allocation concealment; 1/1 study poor/open blinded; 1/1 study no/unclear ITT analysis

Table 130: Clinical evidence profile: fPPCI with GPIs – pre-catheter laboratory versus in-catheter laboratory administration: eptifibatide

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Early	Later EPTIFIBATIDE	Relative (95% CI)	Absolute	Quality	Importance
Mortality - all-cause (short-term) (assessed with: INTAMI-pilot)												
1	Randomised trials	Very serious	No serious inconsistency	No serious indirectness (a)	Very serious (b)	None	2/53 (3.8%)	2/49 (4.1%)	RR 0.92 (0.14 to 6.31)	3 fewer per 1000 (from 35 fewer to 217 more)	VERY LOW	CRITICAL
Stroke - all-cause (short-term) (assessed with: INTAMI-pilot)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	No serious imprecision	None	0/53 (0%)	0/49 (0%)	Not estimable as zero events in each arm		LOW	CRITICAL
Reinfarction / non-fatal reinfarction /recurrent myocardial infarction (short-term) (assessed with: INTAMI-pilot)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	3/53 (5.7%)	0/49 (0%)	RR 6.48 (0.34 to 122.37)	Not estimable as 0 events in 1 arm	VERY LOW	IMPORTANT
Major bleeding (short-term) (assessed with: INTAMI-pilot)												
1	Randomised trials	Very serious	No serious inconsistency	No serious indirectness	Very serious (b)	None	2/53 (3.8%)	2/49 (4.1%)	RR 0.92 (0.14 to	3 fewer per 1000 (from	VERY LOW	IMPORTANT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Early	Later EPTIFIBATIDE	Relative (95% CI)	Absolute	Quality	Importance
		(a)							6.31)	35 fewer to 217 more)		
Repeat revascularisation (repeat TVR); (short-term) (assessed with: INTAMI-pilot)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	2/53 (3.8%)	1/49 (2%)	RR 1.85 (0.17 to 19.76)	17 more per 1000 (from 17 fewer to 383 more)	VERY LOW	IMPORTANT

(a) 1/1 study poor/unclear randomisation; 1/1 study poor/open blinded; 1/1 study no/unclear ITT analysis
(b) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect

N.2.4 Fibrinolytics: fPPCI versus PPCI – individual fibrinolytics

Table 131: Clinical evidence profile: fPPCI with fibrinolytics – fPPCI versus PPCI: tenecteplase

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FIBRINOLYTICS : Tenecteplase fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
Mortality- all-cause (In hospital) (assessed with: ASSENT; ATHENS)												
2	Randomised trials	Very serious (a)	Very serious (b)	No serious indirectness	No serious imprecision	None	23/862 (2.7%)	5/904 (0.6%)	RR 4.33 (1.74 to 10.75)	18 more per 1000 (from 4 more to 54 more)	VERY LOW	CRITICAL
Mortality - all-cause(short-term) (assessed with: ASSENT; LIPSIA-STEMI)												
2	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	Serious (d)	None	60/903 (6.6%)	45/909 (5%)	RR 1.34 (0.92 to 1.95)	17 more per 1000 (from 4 fewer to 47 more)	VERY LOW	CRITICAL
Stroke - all-cause (In hospital) (assessed with: ATHENS; ASSENT-4)												

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FIBRINOLYTICS : Tenecteplase fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
2	Randomised trials	Very serious (e)	No serious inconsistency	No serious indirectness	No serious imprecision	None	16/972 (1.6%)	0/979 (0%)	RR 17.06 (2.29 to 127.32)	Not estimable as 0 events in 1 arm	LOW	CRITICAL
Stroke - all-cause (short-term) (assessed with: LIPSIA-STEMI; ASSENT-4)												
2	Randomised trials	Very serious (f)	No serious inconsistency	No serious indirectness	Serious (d)	None	8/909 (0.88%)	2/916 (0.22%)	RR 4.00 (0.86 to 18.67)	7 more per 1000 (from 0 fewer to 39 more)	VERY LOW	CRITICAL
Stroke - non-fatal (In hospital) (assessed with: ATHENS)												
1	Randomised trials	Very serious (e)	No serious inconsistency	No serious indirectness	Very serious (g)	None	1/143 (0.7%)	0/141 (0%)	RR 2.96 (0.12 to 72.01)	Not estimable as 0 events in 1 arm	VERY LOW	CRITICAL
Reinfarction /non-fatal reinfarction/recurrent MI (short-term) (assessed with: ASSENT; LIPSIA-STEMI)												
2	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	No serious imprecision	None	54/885 (6.1%)	34/898 (3.8%)	RR 1.61 (1.06 to 2.45)	23 more per 1000 (from 2 more to 55 more)	LOW	IMPORTANT
Intracranial bleeding / intracranial haemorrhage (In hospital) (assessed with: ASSENT; ATHENS)												
2	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	No serious imprecision	None	8/862 (0.9%)	0/904 (0%)	RR 18.04 (1.04 to 311.96)	Not estimable as 0 events in 1 arm	LOW	CRITICAL
Intracranial bleeding / intracranial haemorrhage (short-term) (assessed with: ASSENT)												
1	Randomised trials	Very serious	No serious inconsistency	No serious indirectness	Very serious (g)	None	1/829 (0.1%)	1/838 (0.1%)	RR 1.01 (0.06 to	0 more per 1000	VERY LOW	CRITICAL

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FIBRINOLYTICS : Tenecteplase fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
		(h)							16.13)	(from 1 fewer to 18 more)		
Major bleeding (In hospital) (assessed with: ASSENT; ATHENS)												
2	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Serious (d)	None	54/862 (6.3%)	42/904 (4.6%)	RR 1.35 (0.91 to 2)	16 more per 1000 (from 4 fewer to 46 more)	VERY LOW	IMPORTANT
Minor bleeding (In hospital) (assessed with: ASSENT)												
1	Randomised trials	Very serious (h)	No serious inconsistency	No serious indirectness	No serious imprecision	None	210/719 (29.2%)	159/763 (20.8%)	RR 1.4 (1.17 to 1.68)	83 more per 1000 (from 35 more to 142 more)	LOW	IMPORTANT
Heart failure (In hospital) (assessed with: ATHENS)												
1	Randomised trials	Very serious (e)	No serious inconsistency	No serious indirectness	No serious imprecision	None	24/143 (16.8%)	5/141 (3.5%)	RR 4.73 (1.86 to 12.06)	132 more per 1000 (from 30 more to 392 more)	LOW	IMPORTANT
Heart failure (short-term) (assessed with: ASSENT; LIPSIA-STEMI)												
2	Randomised trials	Very serious (c)	No serious inconsistency	No serious indirectness	No serious imprecision	None	103/887 (11.6%)	78/896 (8.7%)	RR 1.34 (1.01 to 1.77)	30 more per 1000 (from 1 more to 67 more)	LOW	IMPORTANT
Repeat revascularisation (repeat or urgent revascularisation); (short-term) (assessed with: ASSENT)												
1	Randomised trials	Very serious (h)	No serious inconsistency	No serious indirectness	No serious imprecision	None	53/805 (6.6%)	28/818 (3.4%)	RR 1.92 (1.23 to 3.01)	31 more per 1000 (from 8 more to	LOW	IMPORTANT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FIBRINOLYTICS : Tenecteplase fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
										69 more)		

(a) 1/2 studies poor/unclear randomisation; 1/2 studies poor/unclear allocation concealment; 2/2 studies poor/open blinded; 2/2 studies no/unclear ITT analysis
(b) Unexplained heterogeneity I^2 >75%
(c) 1/2 studies poor/unclear randomisation; 1/2 studies poor/unclear allocation concealment; 2/2 studies poor/open blinded; 1/2 studies no/unclear ITT analysis
(d) Confidence interval crosses 1 default MID (1.25) and line of no effect
(e) 1/1 studies poor/unclear randomisation; 1/1 studies poor/unclear allocation concealment; 1/1 studies poor/open blinded; 1/1 studies no/unclear ITT analysis
(f) 1/2 studies poor/unclear randomisation; 1/2 studies poor/unclear allocation concealment; 2/2 studies poor/open blinded; 1/2 studies no / unclear ITT analysis
(g) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect
(h) 1/1 study poor/unclear allocation concealment; 1/1 study poor/open blinded; 1/1 study no/unclear ITT analysis

Table 132: Clinical evidence profile: fPPCI with fibrinolytics - fPPCI versus PPCI: reteplase

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FIBRINOLYTICS: Reteplase fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
Mortality - all-cause (longer-term) (assessed with: Liu)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	1/72 (1.4%)	6/71 (8.5%)	RR 0.16 (0.02 to 1.33)	71 fewer per 1000 (from 83 fewer to 28 more)	VERY LOW	CRITICAL
Reinfarction /Non-fatal reinfarction/recurrent MI (short-term) (assessed with: Liu)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	1/72 (1.4%)	3/71 (4.2%)	RR 0.33 (0.04 to 3.09)	28 fewer per 1000 (from 41 fewer to 88 more)	VERY LOW	IMPORTANT
Intracranial bleeding / intracranial haemorrhage (longer-term) (assessed with: Liu)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	No serious imprecision (c)	None	0/72 (0%)	0/71 (0%)	Not estimable as zero events in both arms		LOW	CRITICAL

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	FIBRINOLYTICS: Reteplase fPPCI	PPCI	Relative (95% CI)	Absolute	Quality	Importance
Major bleeding (long term) (assessed with: Liu)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	No serious imprecision (c)	None	0/72 (0%)	0/71 (0%)	Not estimable as zero events in both arms		LOW	IMPORTANT
Minor bleeding (longer-term) (assessed with: Liu)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Very serious (b)	None	8/72 (11.1%)	7/71 (9.9%)	RR 1.13 (0.43 to 2.94)	13 more per 1000 (from 56 fewer to 191 more)	VERY LOW	IMPORTANT
Heart failure (longer-term) (assessed with: Liu)												
1	Randomised trials	Very serious (a)	No serious inconsistency	No serious indirectness	Serious (d)	None	2/72 (2.8%)	9/71 (12.7%)	RR 0.22 (0.05 to 0.98)	99 fewer per 1000 (from 3 fewer to 120 fewer)	VERY LOW	IMPORTANT

(a) Randomisation and allocation concealment not reported. Unblinded.
(b) Confidence interval crosses both default MIDs (0.75 and 1.25) and line of no effect
(c) Zero events in both arms
(d) Confidence interval crosses 1 default MID (0.75)

Appendix O: Research recommendations

O.1 PPCI and fibrinolyis in people with acute STEMI who present very early

****This research question has been removed from the 2020 update****

Research question:

If a person with acute STEMI presents within 1 hour of the onset of symptoms, is it better for that person to be given fibrinolysis with a short call to needle time rather than to be transferred to a centre that carries out primary PCI for primary PCI with a delay of up to 120 minutes?

Why this is important:

Fibrinolytic drugs are administered intravenously and can be given out of hospital by an ambulance crew or in the emergency department of a hospital. Benefit from fibrinolysis declines significantly with time from onset of symptoms. Primary PCI, on the other hand, requires transfer to an interventional cardiology service, which inevitably delays the start of reperfusion treatment. Regardless of the reperfusion method used, delays to treatment are associated with an increased risk of impaired left ventricular systolic function and death.

It is unclear whether people with acute STEMI with a very short presentation delay would benefit more from immediate fibrinolysis (usually pre-hospital for people who do not self-present to hospital emergency departments) compared with transfer to a centre that carries out primary PCI.

To answer this question, a randomised controlled trial of pre-hospital fibrinolysis versus primary PCI in people with acute STEMI who have a short presentation delay of 1 hour or less is needed. Primary end points would include cardiovascular and all-cause mortality and other major adverse cardiovascular events. The STREAM study has recruited people who present early (less than 3 hours from onset of symptoms), and those presenting very early (less than 1 hour) could be analysed as a subgroup. However, it is not known whether this cohort will be big enough to allow a statistically significant conclusion to be drawn.

Criteria for selecting high-priority research recommendations:

PICO question	If a person with acute STEMI presents within 1 hour of the onset of symptoms, is it better for that person to be given fibrinolysis with a short call to needle time rather than to be transferred to a centre that carries out primary PCI for primary PCI with a delay of up to 120 minutes?
Importance to patients or the population	Delays to reperfusion treatment in STEMI are associated with an increased risk of death or heart failure. Up to 60 deaths per thousand treated are prevented if fibrinolysis is delivered within one hour of onset of symptoms. For people with acute STEMI who have a very short presentation delay but an anticipated long PPCI-delay this scenario potentially maximises the benefit of fibrinolysis when compared to a strategy of PPCI.
Relevance to NICE guidance	Results would inform a recommendation for, or against, fibrinolysis for people with acute STEMI who present within 1 hour after the onset of chest pain.
Relevance to the NHS	If results show benefit for fibrinolysis versus PPCI, a recommendation could state that for people with STEMI and short presentation delay, paramedics should make a judgement on acute management. This would require a more bespoke service than currently delivered and would have implications for ambulance services delivering fibrinolysis as soon as possible, which include training in pre-hospital fibrinolysis, potential for transmitting ECGs to hospitals for diagnosis

	and ambulance coverage if people are to be taken to a PPCI centre for rescue PCI.
National priorities	No
Current evidence base	Limited. The CAPTIM study[105] found a trend to mortality benefit in STEMI patients with presentation delay less than 2 hours who received pre-hospital fibrinolysis compared to PPCI.
Equality	The research question has no particular equality issues.
Study design	Randomised controlled trial of early fibrinolysis (usually pre-hospital since only a minority of people [around 15%] self-present to hospital emergency departments) versus PPCI in people with STEMI who have a very short presentation delay of 1 hour or less and an anticipated PPCI-related delay of up to 120 minutes. Primary end points would include cardiovascular and all-cause mortality and other major adverse cardiovascular events.
Feasibility	This research would require close collaboration between ambulance services and PPCI capable hospitals.
Other comments	None
Importance	Medium: the research is relevant to the recommendations in the guideline, but the research recommendations are not key to future updates

O.2 Primary PCI and fibrinolysis in people with acute STEMI who have a long anticipated transfer time for primary PCI

Research question:

In people with acute STEMI who present more than 1 hour after the onset of symptoms, is a primary PCI-related delay of 120-180 minutes associated with outcomes similar to, better or worse than pre-hospital administered fibrinolysis?

Why this is important:

Primary PCI is the preferred coronary reperfusion therapy provided it can be delivered 'in a timely fashion'. It is suggested that primary PCI is the preferred reperfusion strategy for primary PCI-related delays of at least up to 2 hours. However, there is inadequate evidence to conclude whether primary PCI is still preferable at primary PCI-related time delays of more than 2 hours.

No specifically designed randomised controlled trial or observational study has addressed the issue of the extent to which primary PCI-related time delay (and other factors such as presentation delay and a person's risk profile) diminishes the advantages of primary PCI over fibrinolysis. For example, in more geographically remote areas, a short presentation delay together with an anticipated long primary PCI-related delay could favour a strategy of pre-hospital fibrinolysis.

To answer this question, a randomised controlled trial of pre-hospital fibrinolysis versus primary PCI in people with acute STEMI who have a primary PCI-related time delay of 2 hours or more is needed. Primary end points would include cardiovascular and all-cause mortality and other major adverse cardiovascular events.

Criteria for selecting high-priority research recommendations:

PICO question	In people with acute STEMI who present more than 1 hour after the onset of symptoms, is a primary PCI-related delay of 120–180 minutes associated with outcomes similar to, better or worse than pre-hospital administered fibrinolysis?
Importance to patients or the population	Time to reperfusion is crucial in STEMI and for those people with acute STEMI who have long PPCI-related delays, it is important to ascertain whether PPCI is still preferable to fibrinolysis.

Relevance to NICE guidance	If results show a benefit for fibrinolysis versus PPCI then this would inform a recommendation of a bespoke revascularisation service in geographically remote areas. A negative result would inform a recommendation of PPCI for all people with STEMI, irrespective of PPCI-related time delay.
Relevance to the NHS	If results show a benefit for fibrinolysis versus PPCI, a recommendation could state that for people with long travel times to a PPCI centre the paramedics should make a judgement on acute STEMI management. This would require a more bespoke service than currently delivered and would have implications for ambulance services delivering fibrinolysis as soon as possible, which include training in pre-hospital fibrinolysis, potential for transmitting ECGs to hospitals for diagnosis and ambulance coverage if people are to be taken to a PPCI centre for rescue PCI.
National priorities	No
Current evidence base	There are no studies addressing this issue.
Equality	The research focuses on those people who live in geographically more remote areas of the UK.
Study design	Randomised controlled trial of pre-hospital fibrinolysis versus PPCI, in people with STEMI who present within 12 hours of chest pain and who have a PPCI-related delay of 2 hours or more. Primary end points should include all-cause and cardiovascular mortality.
Feasibility	This would require recruitment of patients in geographically remote areas and there are few areas in England and Wales where patients could not be transferred to a PPCI service within a PPCI related delay of 2 hours.
Other comments	None
Importance	Medium: the research is relevant to the recommendations in the guideline, but the research recommendations are not key to future updates.

O.3 Radial arterial access primary PCI versus femoral arterial access primary PCI

****This research recommendation has been removed from the 2020 update****

Research question:

What is the clinical and cost effectiveness of radial arterial access compared with femoral arterial access for coronary angiography or primary PCI in people with acute STEMI managed by primary PCI?

Why this is important:

There is no current evidence that demonstrates if there is a mortality difference between radial arterial access primary PCI compared with femoral arterial access primary PCI. It is unclear if operator experience has influenced current evidence. Operators may need additional training if 1 approach was shown to be superior. A randomised controlled trial comparing the 2 interventions for longer- term outcomes of all-cause mortality and major adverse cardiovascular events would answer the question. The trial would need to address the impact of operator expertise on the clinical outcomes. In addition, the need for operator training could be informed by an observational study that looked at the effectiveness and impact on clinical outcomes of experienced radial operators primarily using the radial approach versus experienced femoral operators primarily using the femoral approach including closure devices. The study would need a sufficient number of participants to enable differences in outcomes to be detected

Criteria for selecting high-priority research recommendations:

PICO question	What is the clinical and cost effectiveness of radial arterial access compared with femoral arterial access for coronary angiography or primary PCI in people with acute STEMI managed by primary PCI?
Importance to patients or the population	Demonstration of superiority of one intervention over another would provide the appropriate intervention for patients presenting with STEMI.
Relevance to NICE guidance	Results would inform a recommendation for either radial arterial access PPCI or femoral access PPCI.
Relevance to the NHS	Additional training of operators may be required, dependent upon the results.
National priorities	No.
Current evidence base	Published randomised controlled trials do not reflect current UK practice, furthermore, the femoral arms of the trials do not have a consistent approach with respect to haemostasis, and the femoral arms have low closure device utilisation.
Equality	No equality issues.
Study design	Randomised controlled trial comparing radial access PPCI versus femoral access PPCI with adjustment for operator expertise, non-randomised comparison of experienced radial operators primarily using the radial approach versus experienced femoral operators primarily using the femoral approach with closure device. A non-randomised study would require very large patient numbers. Outcomes should include: All-cause mortality, major adverse cardiovascular events, vascular complications, requirement for transfusion, length of hospital stay, cost of procedure, door to balloon times.
Feasibility	A randomised controlled trial and a non-randomised study would require sufficient patient numbers for adequate power to detect differences in clinical end points.
Other comments	None
Importance	Medium: the research is relevant to the recommendations in the guideline, but the research recommendations are not key to future updates.

O.4 Culprit vessel primary PCI versus multivessel PCI

****This research recommendation has been removed by the 2020 update****

Research question:

Does multivessel PCI, at the time of presentation of people with acute STEMI, confer an advantage over a strategy of 'culprit vessel only' primary PCI, followed by further elective revascularisation driven by symptoms and evidence of ischaemia?

Why this is important:

One-third of people presenting with STEMI have multivessel coronary artery disease at the time of presentation. Currently, there is uncertainty about whether to initially treat only the vessel likely to have caused the presentation or whether to treat all significant lesions. Most of the current evidence that examines 'culprit vessel only' primary PCI versus multivessel PCI in these people comes from studies that are underpowered or non-randomised. Answering this question would clarify the appropriate revascularisation strategy for this patient group. A randomised controlled trial powered to examine all-cause mortality and major adverse cardiovascular events with a 5-year follow-up would be the optimum design.

Criteria for selecting high-priority research recommendations:

PICO question	Does multivessel PCI, at the time of presentation of people with acute STEMI, confer an advantage over a strategy of 'culprit vessel only' primary PCI, followed by further elective revascularisation driven by symptoms and evidence of ischaemia?
Importance to patients or the population	Approximately 20,000 people per annum are treated in England with PPCI for STEMI. Of these, around one-third will have multivessel disease at the time of presentation. Answering this question would clarify the appropriate initial treatment for this population.
Relevance to NICE guidance	Results would inform a recommendation for an appropriate revascularisation strategy in people with STEMI and multivessel disease.
Relevance to the NHS	If research demonstrated that multivessel PCI at the time of initial presentation of STEMI was superior to culprit vessel only PCI, this would have limited consequences for the setting up of PPCI services and would have downstream effects on the subsequent investigation and management of people presenting with STEMI.
National priorities	No
Current evidence base	Most of the current evidence base comes from studies that are under-powered or non-randomised. One current ongoing study is randomised but the randomisation occurs only after the angiogram has been performed. This introduces a bias and will reduce the applicability of the results.
Equality	The research recommendation would be relevant to all people presenting with STEMI although the population with multivessel disease will include a higher proportion of elderly people and people with diabetes.
Study design	A randomised controlled trial powered to examine major adverse cardiovascular events over a 5-year follow-up would be the optimum design. One of the key issues is whether it is possible to assess the severity of non-culprit lesions in the setting of acute myocardial infarction. To address this, people presenting with STEMI and multivessel disease could have the culprit vessel treated in the usual way and the remaining lesions assessed visually by the operator and classed as significant or non-significant. People could then be assessed electively with functional imaging or with pressure wire assessment to determine the reliability of the operator's initial assessment of the significance of non-culprit coronary lesion(s). Outcomes should include: all-cause mortality, myocardial infarction, stroke and the need for unplanned revascularisation at 5 years.
Feasibility	A study examining clinically relevant end points including all-cause mortality, recurrent myocardial infarction, stroke and the need for further unplanned revascularisation would probably require 5-year follow-up and several thousand patients. This may present considerable organisational difficulties.
Other comments	It is quite likely that the differences between the two strategies will be relatively small. In the absence of data favouring multivessel PCI at the time of STEMI presentation, most operators favour the more conservative treatment of culprit vessel only PCI at the time of initial presentation followed by outpatient assessment of residual ischaemia 4–8 weeks after the acute event. This may involve stress perfusion scanning, stress echo, stress MRI or pressure wire assessment.
Importance	Medium: the research is relevant to the recommendations in the guideline, but the research recommendations are not key to future updates

O.5 Relationship between volume of procedures and clinical outcomes

Research question:

What is the relationship between hospital volume of primary PCI procedures and optimal outcomes in people with acute STEMI?

Why this is important:

There is a suggestion that outcomes may be better in larger-volume primary PCI units, and some retrospective registries have reported data to support this. However, the quality of the data is poor and still leaves the question open. In the UK, primary PCI is provided by units that vary greatly in the number of cases per year. The development of services has been ad hoc and not designed specifically around the provision of primary PCI. If it was possible to conclusively show that people were or were not better off being treated in larger volume units, then it would have important implications for the national provision of primary PCI.

Criteria for selecting high-priority research recommendations:

PICO question	What is the relationship between hospital volume of primary PCI procedures and optimal outcomes in people with acute STEMI?
Importance to patients or the population	The results would have important implications for service provision. If no significant difference was noted then PPCI service could be devolved to smaller local centres thus providing shorter call to balloon times and better outcomes. If there were a significant difference then provision would need to be concentrated in larger but more distant centres and transport and delivery of patients would become a focus.
Relevance to NICE guidance	Findings would inform a recommendation for optimal centre volumes of PPCI procedures, most likely aimed at commissioners.
Relevance to the NHS	Results could inform the strategy for delivery of PPCI across the country.
National priorities	No
Current evidence base	The current evidence base is not applicable to modern UK practice. It is in the form of retrospective registry analysis in the 1990s in the US, at a time when the majority of hospitals involved were using both fibrinolysis and PPCI and most of the 'low volume' centres were providing very low levels of PPCI (< 5 patients).
Equality	No equality issues.
Study design	It would be very difficult to conduct an RCT to answer this question. Retrospective registry data or cohorts of small patient number would not necessarily answer the question, because many other confounders may influence the outcomes. A prospective comparison of low volume centres versus high volume centres ensuring that total number patients were included in each group (for example, 2 units at 600 (high volume) versus 6 units at 100 (low volume) for 3 years may be the best way of providing a comparison. Outcomes should include: risk-adjusted in-hospital and 30-day all-cause mortality.
Feasibility	The variation in the presentation of STEMI is great so the trial would have to go on for a sufficient length of time to gather enough patient numbers to make robust statistical analysis possible. There are no technical or ethical issues.
Other comments	None
Importance	Low: the research is of interest and will fill existing evidence gaps.

O.6 People who remain unconscious after a cardiac arrest

****This research recommendation has been removed from the 2020 update****

Research question:

In people with return of spontaneous circulation following out-of-hospital cardiac arrest, does acute coronary angiography with coronary intervention compared to conventional treatment improve survival?

Why this is important:

The majority of people resuscitated from out-of-hospital cardiac arrest due to acute STEMI remain unconscious. Although early revascularisation is a treatment priority for all patients with ST-elevation myocardial infarction, people who remain unconscious following resuscitation from cardiac arrest may require immediate medical stabilisation. This competes with, and may take priority over, early revascularisation, delaying intervention in these people. With the knowledge that the benefits of early revascularisation are time-critical, it is not known whether the delays that inevitably occur in order to stabilise these people may contribute further to their mortality and morbidity.

A prospective randomised study of people resuscitated from cardiac arrest who remain unconscious (requiring intubation) following return of spontaneous circulation, comparing concurrent PPCI (while medical stabilisation is carried out), with delayed PCI in people admitted to intensive care for a period of stabilisation is needed to assess the clinical and cost effectiveness of these two strategies in this population. Outcomes should include survival to neurologically intact hospital discharge, myocardial function at 30 days and length of hospital stay. Although patient numbers are relatively small, with minimal cost implications for the NHS, the individual benefits to patients may be significant.

Criteria for selecting high-priority research recommendations:

PICO question	In people with return of spontaneous circulation following out-of-hospital cardiac arrest, does acute coronary angiography with coronary intervention compared to conventional treatment improve survival?
Importance to patients or the population	The majority of people resuscitated from out-of-hospital cardiac arrest are unconscious on arrival in the Emergency Department. Understanding the optimal management strategies could potentially benefit a large proportion of people admitted with return of spontaneous circulation from out-of-hospital cardiac arrest.
Relevance to NICE guidance	The answer to this question would directly influence the recommendations in NICE guidelines for people who remain unconscious following out-of-hospital cardiac arrest, where evidence is currently limited.
Relevance to the NHS	People with STEMI are likely to require PPCI shortly after admission to hospital. Prioritising or delaying this intervention is unlikely to have significant financial impact, effect on staff, impact on strategic planning or service delivery.
National priorities	Although clinically important, this question is not considered a national priority area.
Current evidence base	No randomised studies exist on acute coronary angiography following out-of-hospital cardiac arrest. An increasing number of observational studies support feasibility and a possible survival benefit of an early invasive approach, but a randomised controlled trial is required to address this question adequately.
Equality	There are no equality issues with regards to this research recommendation.
Study design	Prospective randomised studies would be required to address this question definitively.

Feasibility	A randomised study would present significant ethical challenges. Outcomes should include survival to neurologically intact hospital discharge, myocardial

	function at 30 days and length of hospital stay.
Other comments	Outcome from cardiac arrest varies significantly between hospitals and relatively large numbers of patients would therefore be required to control for cofounding variables.
Importance	Low: the research is of interest and will fill existing evidence gaps.

Appendix P: References

1 Agati L, Funaro S, Madonna M, Sardella G, Garramone B, Galiuto L. Does coronary angioplasty after timely thrombolysis improve microvascular perfusion and left ventricular function after acute myocardial infarction? American Heart Journal. 2007; 154(1):151-157

2 Ali A, Cox D, Dib N, Brodie B, Berman D, Gupta N et al. Rheolytic thrombectomy with percutaneous coronary intervention for infarct size reduction in acute myocardial infarction: 30-day results from a multicenter randomized study. Journal of the American College of Cardiology. 2006; 48(2):244-252

3 Antoniucci D, Valenti R, Migliorini A, Parodi G, Memisha G, Santoro GM et al. Comparison of rheolytic thrombectomy before direct infarct artery stenting versus direct stenting alone in patients undergoing percutaneous coronary intervention for acute myocardial infarction. American Journal of Cardiology. 2004; 93(8):1033-1035

4 Armstrong PW, WEST Steering Committee. A comparison of pharmacologic therapy with/without timely coronary intervention vs. primary percutaneous intervention early after ST-elevation myocardial infarction: the WEST (Which Early ST-elevation myocardial infarction Therapy) study. European Heart Journal. 2006; 27(13):1530-1538

5 Asseburg C, Vergel YB, Palmer S, Fenwick E, de BM, Abrams KR et al. Assessing the effectiveness of primary angioplasty compared with thrombolysis and its relationship to time delay: a Bayesian evidence synthesis. Heart. 2007; 93(10):1244-1250

6 Barbash GI, Roth A, Hod H, Miller HI, Modan M, Rath S et al. Improved survival but not left ventricular function with early and prehospital treatment with tissue plasminogen activator in acute myocardial infarction. American Journal of Cardiology. 1990; 66(3):261-266

7 Belenkie I, Traboulsi M, Hall CA, Hansen JL, Roth DL, Manyari D et al. Rescue angioplasty during myocardial infarction has a beneficial effect on mortality: a tenable hypothesis. Canadian Journal of Cardiology. 1992; 8(4):357-362

8 Bellandi F, Maioli M, Leoncini M, Toso A, Dabizzi RP. Early abciximab administration in acute myocardial infarction treated with primary coronary intervention. International Journal of Cardiology. 2006; 108(1):36-42

9 Beran G, Lang I, Schreiber W, Denk S, Stefenelli T, Syeda B et al. Intracoronary thrombectomy with the X-sizer catheter system improves epicardial flow and accelerates ST-segment resolution in patients with acute coronary syndrome: a prospective, randomized, controlled study. Circulation. 2002; 105(20):2355-2360

10 Boersma E, Primary Coronary Angioplasty vs.Thrombolysis Group. Does time matter? A pooled analysis of randomized clinical trials comparing primary percutaneous coronary intervention and in-hospital fibrinolysis in acute myocardial infarction patients. European Heart Journal. 2006; 27(7):779-788

11 Bohmer E, Hoffmann P, Abdelnoor M, Arnesen H, Halvorsen S. Efficacy and safety of immediate angioplasty versus ischemia-guided management after thrombolysis in acute myocardial

infarction in areas with very long transfer distances results of the NORDISTEMI (NORwegian study on DIstrict treatment of ST-elevation myocardial infarction). Journal of the American College of Cardiology. 2010; 55(2):102-110

12 Bohmer E, Kristiansen IS, Arnesen H, Halvorsen S. Health and cost consequences of early versus late invasive strategy after thrombolysis for acute myocardial infarction. European Journal of Cardiovascular Prevention and Rehabilitation. 2011; 18(5):717-723

13 Boissel JP. The European Myocardial Infarction Project: an assessment of pre-hospital thrombolysis. International Journal of Cardiology. 1995; 49 Suppl:S29-S37

14 Brasselet C, Tassan S, Nazeyrollas P, Hamon M, Metz D. Randomised comparison of femoral versus radial approach for percutaneous coronary intervention using abciximab in acute myocardial infarction: results of the FARMI trial. Heart. 2007; 93(12):1556-1561

15 Bravo Vergel Y, Palmer S, Asseburg C, Fenwick E, de Belder M, Abrams K et al. Is primary angioplasty cost effective in the UK? Results of a comprehensive decision analysis. Heart. 2007; 93(10):1238-1243

16 Brouwer MA, Martin JS, Maynard C, Wirkus M, Litwin PE, Verheugt FW et al. Influence of early prehospital thrombolysis on mortality and event-free survival (the Myocardial Infarction Triage and Intervention [MITI] Randomized Trial). MITI Project Investigators. American Journal of Cardiology. 1996; 78(5):497-502

17 Bulum J, Ernst A, Strozzi M. The impact of successful manual thrombus aspiration on in-stent restenosis after primary PCI: angiographic and clinical follow-up. Coronary Artery Disease. 2012; 23(7):487-491

18 Bulut S, Aengevaeren WRM, Luijten HJE, Verheugt FWA. Successful out-of-hospital cardiopulmonary resuscitation: What is the optimal in-hospital treatment strategy? Resuscitation. 2000; 47(2):155-161

19 Burzotta F, Trani C, Romagnoli E, Mazzari MA, Rebuzzi AG, De VM et al. Manual thrombus-aspiration improves myocardial reperfusion: the randomized evaluation of the effect of mechanical reduction of distal embolization by thrombus-aspiration in primary and rescue angioplasty (REMEDIA) trial. Journal of the American College of Cardiology. 2005; 46(2):371-376

20 Canto JG, Every NR, Magid DJ, Rogers WJ, Malmgren JA, Frederick PD et al. The volume of primary angioplasty procedures and survival after acute myocardial infarction. National Registry of Myocardial Infarction 2 Investigators. New England Journal of Medicine. 2000; 342(21):1573-1580

21 Cantor WJ, Fitchett D, Borgundvaag B, Ducas J, Heffernan M, Cohen EA et al. Routine early angioplasty after fibrinolysis for acute myocardial infarction. New England Journal of Medicine. 2009; 360(26):2705-2718

22 Carver A, Rafelt S, Gershlick AH, Fairbrother KL, Hughes S, Wilcox R et al. Longer-term follow-up of patients recruited to the REACT (Rescue Angioplasty Versus Conservative Treatment or Repeat Thrombolysis) trial. Journal of the American College of Cardiology. 2009; 54(2):118-126

23 Castaigne AD, Herve C, Duval-Moulin AM, Gaillard M, Dubois-Rande JL, Boesch C et al. Prehospital use of APSAC: results of a placebo-controlled study. American Journal of Cardiology. 1989; 64(2):30A-33A

24 Cavender MA, Milford-Beland S, Roe MT, Peterson ED, Weintraub WS, Rao SV. Prevalence, predictors, and in-hospital outcomes of non-infarct artery intervention during primary percutaneous coronary intervention for ST-segment elevation myocardial infarction (from the National Cardiovascular Data Registry). American Journal of Cardiology. 2009; 104(4):507-513

25 Chevalier B, Gilard M, Lang I, Commeau P, Roosen J, Hanssen M et al. Systematic primary aspiration in acute myocardial percutaneous intervention: a multicentre randomised controlled trial of the export aspiration catheter. EuroIntervention. 2008; 4(2):222-228

26 Chodór P, Krupa H, Kurek T, Sokal A, Swierad M, Was T et al. RADIal versus femoral approach for percutaneous coronary interventions in patients with Acute Myocardial Infarction (RADIAMI): A prospective, randomized, single-center clinical trial. Cardiology Journal. 2009; 16(4):332-340

27 Chodór P, Kurek T, Kowalczuk A, Swierad M, Was T, Honisz G et al. Radial vs femoral approach with StarClose clip placement for primary percutaneous coronary intervention in patients with ST-elevation myocardial infarction. RADIAMI II: A prospective, randomised, single centre trial. Kardiologia Polska. 2011; 69(8):763-771

28 Clever YP, Cremers B, Link A, Bohm M, Scheller B. Long-term follow-up of early versus delayed invasive approach after fibrinolysis in acute myocardial infarction. Circulation Cardiovascular Interventions. 2011; 4(4):342-348

29 Corpus RA, House JA, Marso SP, Grantham JA, Huber KC, Jr., Laster SB et al. Multivessel percutaneous coronary intervention in patients with multivessel disease and acute myocardial infarction. American Heart Journal. 2004; 148(3):493-500

30 De Luca G, Suryapranata H, van 't Hof AWJ, Ottervanger JP, Hoorntje JCA, Dambrink JH et al. Impact of routine stenting on myocardial perfusion and the extent of myocardial necrosis in patients undergoing primary angioplasty for ST-segment elevation myocardial infarction. American Heart Journal. 2006; 151(6):1296

31 Department of Health. NHS reference costs 2010-11. 2011. Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_131140 [Last accessed: 27 March 2012]

32 Department of Health. NHS reference costs 2011-12. 2012. Available from: https://www.gov.uk/government/publications/nhs-reference-costs-financial-year-2011-to-2012 [Last accessed: 22 April 2013]

33 Di Mario C, Mara S, Flavio A, Imad S, Antonio M, Anna P et al. Single vs multivessel treatment during primary angioplasty: results of the multicentre randomised HEpacoat for cuLPrit or multivessel stenting for Acute Myocardial Infarction (HELP AMI) Study. International Journal of Cardiovascular Interventions. 2004; 6(3-4):128-133

34 Dudek D, Mielecki W, Burzotta F, Gasior M, Witkowski A, Horvath IG et al. Thrombus aspiration followed by direct stenting: a novel strategy of primary percutaneous coronary intervention in ST-segment elevation myocardial infarction. Results of the Polish-Italian-Hungarian RAndomized ThrombEctomy Trial (PIHRATE Trial). American Heart Journal. 2010; 160(5):966-972

35 Dudek D, Rakowski T, Bartus S, Giszterowicz D, Dobrowolski W, Zmudka K et al. Impact of early abciximab administration on myocardial reperfusion in patients with ST-segment elevation myocardial infarction pretreated with 600 mg of clopidogrel before percutaneous coronary intervention. Journal of Thrombosis and Thrombolysis. 2010; 30(3):347-353

36 Dzavik V, Sleeper LA, Picard MH, Sanborn TA, Lowe AM, Gin K et al. Outcome of patients aged >=75 years in the SHould we emergently revascularize Occluded Coronaries in cardiogenic shocK (SHOCK) trial: Do elderly patients with acute myocardial infarction complicated by cardiogenic shock respond differently to emergent revascularization? American Heart Journal. 2005; 149(6):1128-1134

37 Dziewierz A, Siudak Z, Rakowski T, Zasada W, Dubiel JS, Dudek D. Impact of multivessel coronary artery disease and noninfarct-related artery revascularization on outcome of patients with ST-elevation myocardial infarction transferred for primary percutaneous coronary intervention (from the EUROTRANSFER Registry). American Journal of Cardiology. 2010; 106(3):342-347

38 El Khoury C, Dubien PY, Mercier C, Belle L, Debaty G, Capel O et al. Prehospital high-dose tirofiban in patients undergoing primary percutaneous intervention. The AGIR-2 study. Archives of Cardiovascular Diseases. 2010; 103(5):285-292

39 Ellis SG, Da Silva ER, Heyndrickx G, Talley JD, Cernigliaro C, Steg G et al. Randomized comparison of rescue angioplasty with conservative management of patients with early failure of thrombolysis for acute anterior myocardial infarction. Circulation. 1994; 90(5):2280-2284

40 Ellis SG, Da Silva ER, Spaulding CM, Nobuyoshi M, Weiner B, Talley JD. Review of immediate angioplasty after fibrinolytic therapy for acute myocardial infarction: insights from the RESCUE I, RESCUE II, and other contemporary clinical experiences. American Heart Journal. 2000; 139(6):1046-1053

41 Ellis SG, Tendera M, de Belder MA, van Boven AJ, Widimsky P, Andersen HR et al. 1-year survival in a randomized trial of facilitated reperfusion: results from the FINESSE (Facilitated Intervention with Enhanced Reperfusion Speed to Stop Events) trial. JACC Cardiovascular Interventions. 2009; 2(10):909-916

42 Ellis SG, Tendera M, de Belder MA, van Boven AJ, Widimsky P, Janssens L et al. Facilitated PCI in patients with ST-elevation myocardial infarction. New England Journal of Medicine. 2008; 358(21):2205-2217

43 Emre A, Ucer E, Yesilcimen K, Bilsel T, Oz D, Sayar N et al. Impact of early tirofiban administration on myocardial salvage in patients with acute myocardial infarction undergoing infarct-related artery stenting. Cardiology. 2006; 106(4):264-269

44 Every NR, Maynard C, Schulman K, Ritchie JL. The association between institutional primary angioplasty procedure volume and outcome in elderly Americans. Journal of Invasive Cardiology. 2000; 12(6):303-308

45 Farkouh ME, Ramanathan K, Aymong ED, Webb JG, Harkness SM, Sleeper LA et al. An early revascularization strategy is associated with a survival benefit for diabetic patients in cardiogenic shock after acute myocardial infarction. Clinical Cardiology. 2006; 29(5):204-210

46 Fernandez-Aviles F, Alonso JJ, Castro-Beiras A, Vazquez N, Blanco J, Alonso-Briales J et al. Routine invasive strategy within 24 hours of thrombolysis versus ischaemia-guided conservative approach for acute myocardial infarction with ST-segment elevation (GRACIA-1): a randomised controlled trial. Lancet. 2004; 364(9439):1045-1053

47 Gabriel HM, Oliveira JA, da Silva PC, da Costa JM, da Cunha JAC. Early administration of abciximab bolus in the emergency department improves angiographic outcome after primary PCI as assessed by TIMI frame count: results of the early ReoPro administration in myocardial infarction (ERAMI) trial. Catheterization and Cardiovascular Interventions. 2006; 68(2):218-224

48 Gan L, Lib Q, Liuc R, Zhaoc Y, Qiuc J, Liao Y. Effectiveness and feasibility of transradial approaches for primary percutaneous coronary intervention in patients with acute myocardial infarction. Journal of Nanjing Medical University. 2009; 23(4):270-274

49 Gershlick AH, Stephens-Lloyd A, Hughes S, Abrams KR, Stevens SE, Uren NG et al. Rescue angioplasty after failed thrombolytic therapy for acute myocardial infarction. New England Journal of Medicine. 2005; 353(26):2758-2768

50 Goodacre, S, Sampson, F, Carter, A, Wailoo, A, O'Cathain, A, Wood, S et al. Evaluation of the National Infarct Angioplasty Project. Report for the National Co-ordinating Centre for NHS Service Delivery and Organisation R&D (NCCSDO). National Coordinating Centre for the Service Delivery and Organisation (NCCSDO), 2008

51 Hannan EL, Samadashvili Z, Walford G, Holmes DR, Jr., Jacobs AK, Stamato NJ et al. Culprit vessel percutaneous coronary intervention versus multivessel and staged percutaneous coronary intervention for ST-segment elevation myocardial infarction patients with multivessel disease. JACC Cardiovascular Interventions. 2010; 3(1):22-31

52 Hochman J. Results of the should we emergently revascularize occluded coronary arteries for cardiogenic shock (shock: an international randomized trial of emergency ptca/cabg). American Heart Journal. 1999; 138(1 (Pt 1)):176-177

53 Hochman JS, Sleeper LA, Webb JG, Sanborn TA, White HD, Talley JD et al. Early revascularization in acute myocardial infarction complicated by cardiogenic shock. New England Journal of Medicine. 1999; 341(9):625-634

54 Hochman JS, Sleeper LA, White HD, Dzavik V, Wong SC, Menon V et al. One-year survival following early revascularization for cardiogenic shock. JAMA. 2001; 285(2):190-192

55 Hochman JS, Sleeper LA, Webb JG, Dzavik V, Buller CE, Aylward P et al. Early revascularization and long-term survival in cardiogenic shock complicating acute myocardial infarction. JAMA. 2006; 295(21):2511-2515

56 Hou L, Wei YD, Li WM, Xu YW. Comparative study on transradial versus transfemoral approach for primary percutaneous coronary intervention in Chinese patients with acute myocardial infarction. Saudi Medical Journal. 2010; 31(2):158-162

57 Ikari Y, Sakurada M, Kozuma K, Kawano S, Katsuki T, Kimura K et al. Upfront thrombus aspiration in primary coronary intervention for patients with ST-segment elevation acute myocardial infarction: report of the VAMPIRE (VAcuuM asPIration thrombus REmoval) trial. JACC Cardiovascular Interventions. 2008; 1(4):424-431

58 Jeger RV, Urban P, Harkness SM, Tseng CH, Stauffer JC, LeJemtel TH et al. Early revascularization is beneficial across all ages and a wide spectrum of cardiogenic shock severity: A pooled analysis of trials. Acute Cardiac Care. 2011; 13(1):14-20

59 Jolly SS, Niemela K, Xavier D, Widimsky P, Budaj A, Valentin V et al. Design and rationale of the radial versus femoral access for coronary intervention (RIVAL) trial: a randomized comparison of radial versus femoral access for coronary angiography or intervention in patients with acute coronary syndromes. American Heart Journal. 2011; 161(2):254

60 Jolly SS, Yusuf S, Cairns J, NiemelÃ¤ K, Xavier D, Widimsky P et al. Radial versus femoral access for coronary angiography and intervention in patients with acute coronary syndromes (RIVAL): a randomised, parallel group, multicentre trial. The Lancet. 2011; 377(9775):1409-1420

61 Kaltoft A, Bøttcher M, Nielsen SS, Hansen HH, Terkelsen C, Maeng M et al. Routine thrombectomy in percutaneous coronary intervention for acute ST-segment-elevation myocardial infarction: a randomized, controlled trial. Circulation. 2006; 114(1):40-47

62 Kanakakis J, Nanas JN, Tsagalou EP, Maroulidis GD, Drakos SG, Ntalianis AS et al. Multicenter randomized trial of facilitated percutaneous coronary intervention with low-dose tenecteplase in patients with acute myocardial infarction: the Athens PCI trial. Catheterization and Cardiovascular Interventions. 2009; 74(3):398-405

63 Kent DM, Lau J, Selker HP. Balancing the benefits of primary angioplasty against the benefits of thrombolytic therapy for acute myocardial infarction: the importance of timing. Effective Clinical Practice. 2001; 4(5):214-220

64 Kong JA, Chou ET, Minutello RM, Wong SC, Hong MK. Safety of single versus multi-vessel angioplasty for patients with acute myocardial infarction and multi-vessel coronary artery disease: report from the New York State Angioplasty Registry. Coronary Artery Disease. 2006; 17(1):71-75

65 Kuhn P, Atzenhofer-Baumgartner K, Chmelizek F, Schnoll F, Ursin C, Grobl SO et al. Prehospital thrombolytic therapy in patients with suspected acute myocardial infarction. New England Journal of Medicine. 1993; 329(6):383-389

66 Kumbhani DJ, Cannon CP, Fonarow GC, Liang L, Askari AT, Peacock WF et al. Association of hospital primary angioplasty volume in ST-segment elevation myocardial infarction with quality and outcomes. JAMA. 2009; 302(20):2207-2213

67 Kunadian B, Sutton AG, Vijayalakshmi K, Thornley AR, Gray JC, Grech ED et al. Early invasive versus conservative treatment in patients with failed fibrinolysis--no late survival benefit: the final analysis of the Middlesbrough Early Revascularisation to Limit Infarction (MERLIN) randomized trial. American Heart Journal. 2007; 153(5):763-771

68 Le May MR, Wells GA, Labinaz M, Davies RF, Turek M, Leddy D et al. Combined angioplasty and pharmacological intervention versus thrombolysis alone in acute myocardial infarction (CAPITAL AMI study). Journal of the American College of Cardiology. 2005; 46(3):417-424

69 Le May MR, Wells GA, Glover CA, So DY, Froeschl M, Marquis JF et al. Primary percutaneous coronary angioplasty with and without eptifibatide in ST-segment elevation myocardial infarction: a safety and efficacy study of integrilin-facilitated versus primary percutaneous coronary intervention in ST-segment elevation myocardial infarction (ASSIST). Circulation Cardiovascular Interventions. 2009; 2(4):330-338

70 Lee DP, Herity NA, Hiatt BL, Fearon WF, Rezaee M, Carter AJ et al. Adjunctive platelet glycoprotein IIb/IIIa receptor inhibition with tirofiban before primary angioplasty improves angiographic outcomes: results of the TIrofiban Given in the Emergency Room before Primary Angioplasty (TIGER-PA) pilot trial. Circulation. 2003; 107(11):1497-1501

71 Lee HW, Hong TJ, Yang MJ, An SG, Oh J-H, Choi JH et al. Comparison of infarct-related artery vs multivessel revascularization in ST-segment elevation myocardial infarction with multivessel disease: Analysis from Korea acute myocardial infarction registry. Cardiology Journal. 2012; 19(3):256-266

72 Lefèvre T, Garcia E, Reimers B, Lang I, Di MC, Colombo A et al. X-sizer for thrombectomy in acute myocardial infarction improves ST-segment resolution: results of the X-sizer in AMI for negligible

embolization and optimal ST resolution (X AMINE ST) trial. Journal of the American College of Cardiology. 2005; 46(2):246-252

73 Li WM, Li Y, Zhao JY, Duan YN, Sheng L, Yang BF et al. Safety and feasibility of emergent percutaneous coronary intervention with the transradial access in patients with acute myocardial infarction. Chin Med J (Engl). 2007; 120(7):598-600

74 Liistro F, Grotti S, Angioli P, Falsini G, Ducci K, Baldassarre S et al. Impact of thrombus aspiration on myocardial tissue reperfusion and left ventricular functional recovery and remodeling after primary angioplasty. Circulation Cardiovascular Interventions. 2009; 2(5):376-383

75 Liu CP, Lin MS, Chiu YW, Lee JK, Hsu CN, Hung CS et al. Additive benefit of glycoprotein IIb/IIIa inhibition and adjunctive thrombus aspiration during primary coronary intervention: results of the Initial Thrombosuction and Tirofiban Infusion (ITTI) trial. International Journal of Cardiology. 2012; 156(2):174-179

76 Liu Hw, Pan W, Wang Lf, Sun Ym, Li Zq, Wang Zh. Impact of emergency percutaneous coronary intervention on outcomes of ST-segment elevation myocardial infarction patients complicated by out-of-hospital cardiac arrest. Chinese Medical Journal. 2012; 125(8):1405-1409

77 Ludman PF. BCIS audit returns: adult interventional procedures Jan 2011 to Dec 2011. http://www.bcis.org.uk/resources/D56_BCIS_Audit_2011_data_for_web_11102012.pdf. Glasgow: British Cardiology Intervention Society. 2012;

78 Magid DJ, Calonge BN, Rumsfeld JS, Canto JG, Frederick PD, Every NR et al. Relation between hospital primary angioplasty volume and mortality for patients with acute MI treated with primary angioplasty vs thrombolytic therapy. JAMA. 2000; 284(24):3131-3138

79 Maioli M, Bellandi F, Leoncini M, Toso A, Dabizzi RP. Randomized early versus late abciximab in acute myocardial infarction treated with primary coronary intervention (RELAx-AMI Trial). J Am Coll Cardiol. 2007; 49(14):1517-1524

80 McAleer B, Varma MP. Feasibility and long term outcome of home vs hospital initiated thrombolysis. Irish Journal of Medical Science. 2006; 175(4):14-19

81 Mehilli J, Kastrati A, Schulz S, Frungel S, Nekolla SG, Moshage W et al. Abciximab in patients with acute sT-segment-elevation myocardial infarction undergoing primary percutaneous coronary intervention after clopidogrel loading a randomized double-blind trial. Circulation. 2009; 119(14):1933-1940

82 Meliga E, Fiorina C, Valgimigli M, Belli R, Gagnor A, Sheiban I et al. Early angio-guided complete revascularization versus culprit vessel pci followed by ischemia-guided staged PCI in STEMI patients with multivessel disease. Journal of Interventional Cardiology. 2011; 24(6):535-541

83 Migliorini A, Stabile A, Rodriguez AE, Gandolfo C, Rodriguez Granillo AM, Valenti R et al. Comparison of AngioJet rheolytic thrombectomy before direct infarct artery stenting with direct stenting alone in patients with acute myocardial infarction. The JETSTENT trial. Journal of the American College of Cardiology. 2010; 56(16):1298-1306

84 Mounsey JP, Skinner JS, Hawkins T, MacDermott AF, Furniss SS, Adams PC et al. Rescue thrombolysis: alteplase as adjuvant treatment after streptokinase in acute myocardial infarction. British Heart Journal. 1995; 74(4):348-353

85 Napodano M, Pasquetto G, Saccà S, Cernetti C, Scarabeo V, Pascotto P et al. Intracoronary thrombectomy improves myocardial reperfusion in patients undergoing direct angioplasty for acute myocardial infarction. Journal of the American College of Cardiology. 2003; 42(8):1395-1402

86 National Institute for Health and Clinical Excellence. Guide to the methods of technology appraisal. London: National Institute for Health and Clinical Excellence; 2008. Available from: http://www.nice.org.uk/aboutnice/howwework/devnicetech/developing_nice_technology_appraisals.jsp

87 National Institute for Health and Clinical Excellence. The guidelines manual. London: National Institute for Health and Clinical Excellence; 2009. Available from: http://www.nice.org.uk/aboutnice/howwework/developingniceclinicalguidelines/clinicalguidelinedevelopmentmethods/GuidelinesManual2009.jsp

88 Ohlmann P, Reydel P, Jacquemin L, Adnet Fdr, Wolf O, Bartier JC et al. Prehospital Abciximab in ST-Segment Elevation Myocardial Infarction. Circulation Cardiovascular Interventions. 2012;

89 Organisation for Economic Co-operation and Development (OECD). Purchasing power parities (PPP). 2012. Available from: http://www.oecd.org/std/ppp [Last accessed: 30 January 2013]

90 Pinto DS, Kirtane AJ, Nallamothu BK, Murphy SA, Cohen DJ, Laham RJ et al. Hospital delays in reperfusion for ST-elevation myocardial infarction: implications when selecting a reperfusion strategy. Circulation. 2006; 114(19):2019-2025

91 Pleskot M, Babu A, Hazukova R, Stritecky J, Bis J, Matejka J et al. Out-of-hospital cardiac arrests in patients with acute ST elevation myocardial infarctions in the East Bohemian region over the period 2002-2004. Cardiology. 2008; 109(1):41-51

92 Politi L, Sgura F, Rossi R, Monopoli D, Guerri E, Leuzzi C et al. A randomised trial of target-vessel versus multi-vessel revascularisation in ST-elevation myocardial infarction: major adverse cardiac events during long-term follow-up. Heart (British Cardiac Society). 2010; 96(9):662-667

93 Romagnoli E, Biondi-Zoccai G, Sciahbasi A, Politi L, Rigattieri S, Pendenza G et al. Radial Versus Femoral Randomized Investigation in ST-Segment Elevation Acute Coronary Syndrome: The RIFLE-STEACS (Radial Versus Femoral Randomized Investigation in ST-Elevation Acute Coronary Syndrome) Study. Journal of the American College of Cardiologists. 2012; 60(24):2481-2489

94 Roth A, Barbash GI, Hod H, Miller HI, Rath S, Modan M et al. Should thrombolytic therapy be administered in the mobile intensive care unit in patients with evolving myocardial infarction? A pilot study. Journal of the American College of Cardiology. 1990; 15(5):932-936

95 Saito S, Tanaka S, Hiroe Y, Miyashita Y, Takahashi S, Tanaka K et al. Comparative study on transradial approach vs. transfemoral approach in primary stent implantation for patients with acute myocardial infarction: results of the test for myocardial infarction by prospective unicenter randomization for access sites (TEMPURA) trial. Catheterization and Cardiovascular Interventions. 2003; 59(1):26-33

96 Sardella G, Mancone M, Canali E, Di RA, Benedetti G, Stio R et al. Impact of thrombectomy with EXPort Catheter in Infarct-Related Artery during Primary Percutaneous Coronary Intervention (EXPIRA Trial) on cardiac death. American Journal of Cardiology. 2010; 106(5):624-629

97 Sarullo FM, Americo L, Di PP, Castello A, Mauri F. Efficacy of rescue thrombolysis in patients with acute myocardial infarction: preliminary findings. Cardiovascular Drugs & Therapy. 2000; 14(1):83-89

98 Schofer J, Büttner J, Geng G, Gutschmidt K, Herden HN, Mathey DG et al. Prehospital thrombolysis in acute myocardial infarction. American Journal of Cardiology. 1990; 66(20):1429-1433

99 Schulz S, Birkmeier KA, Ndrepepa G, Moshage W, Dotzer F, Huber K et al. One-year clinical outcomes with abciximab in acute myocardial infarction: Results of the BRAVE-3 randomized trial. Clinical Research in Cardiology. 2010; 99(12):795-802

100 Shen J, Zhang Q, Zhang RY, Zhang JS, Hu J, Yang Zk et al. Clinical benefits of adjunctive tirofiban therapy in patients with acute ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention. Coronary Artery Disease. 2008; 19(4):271-277

101 Shindler DM, Palmeri ST, Antonelli TA, Sleeper LA, Boland J, Cocke TP et al. Diabetes mellitus in cardiogenic shock complicating acute myocardial infarction: a report from the SHOCK Trial Registry. SHould we emergently revascularize Occluded Coronaries for cardiogenic shocK? Journal of the American College of Cardiology. 2000; 36(3 Suppl A):1097-1103

102 Silva-Orrego P, Colombo P, Bigi R, Gregori D, Delgado A, Salvade P et al. Thrombus aspiration before primary angioplasty improves myocardial reperfusion in acute myocardial infarction: the DEAR-MI (Dethrombosis to Enhance Acute Reperfusion in Myocardial Infarction) study. Journal of the American College of Cardiology. 2006; 48(8):1552-1559

103 Sleeper LA, Ramanathan K, Picard MH, LeJemtel TH, White HD, Dzavik V et al. Functional status and quality of life after emergency revascularization for cardiogenic shock complicating acute myocardial infarction. Journal of the American College of Cardiology. 2005; 46(2):266-273

104 Srinivas VS, Hailpern SM, Koss E, Monrad ES, Alderman MH. Effect of physician volume on the relationship between hospital volume and mortality during primary angioplasty. Journal of the American College of Cardiology. 2009; 53(7):574-579

105 Steg PG, Bonnefoy E, Chabaud S, Lapostolle F, Dubien PY, Cristofini P et al. Impact of time to treatment on mortality after prehospital fibrinolysis or primary angioplasty: data from the CAPTIM randomized clinical trial. Circulation. 2003; 108(23):2851-2856

106 Stone GW, Maehara A, Witzenbichler B, Godlewski J, Parise H, Dambrink JH et al. Intracoronary abciximab and aspiration thrombectomy in patients with large anterior myocardial infarction: the INFUSE-AMI randomized trial. JAMA. 2012; 307(17):1817-1826

107 Sutton AG, Campbell PG, Graham R, Price DJ, Gray JC, Grech ED et al. A randomized trial of rescue angioplasty versus a conservative approach for failed fibrinolysis in ST-segment elevation myocardial infarction: the Middlesbrough Early Revascularization to Limit INfarction (MERLIN) trial. Journal of the American College of Cardiology. 2004; 44(2):287-296

108 Sutton AG, Campbell PG, Graham R, Price DJ, Gray JC, Grech ED et al. One year results of the Middlesbrough early revascularisation to limit infarction (MERLIN) trial. Heart. 2005; 91(10):1330-1337

109 Svilaas T, Vlaar PJ, van der Horst IC, Diercks GF, de Smet BJ, van den Heuvel AF et al. Thrombus aspiration during primary percutaneous coronary intervention. New England Journal of Medicine. 2008; 358(6):557-567

110 Tarantini G, Razzolini R, Napodano M, Bilato C, Ramondo A, Iliceto S. Acceptable reperfusion delay to prefer primary angioplasty over fibrin-specific thrombolytic therapy is affected (mainly) by the patient's mortality risk: 1 h does not fit all. European Heart Journal. 2010; 31(6):676-683

111 Ten Berg JM, Van 't Hof AWJ, Dill T, Heestermans T, Van Werkum JW, Mosterd A et al. Effect of Early, Pre-Hospital Initiation of High Bolus Dose Tirofiban in Patients With ST-Segment Elevation Myocardial Infarction on Short- and Long-Term Clinical Outcome. Journal of the American College of Cardiology. 2010; 55(22):2446-2455

112 Thiele H, Eitel I, Meinberg C, Desch S, Leuschner A, Pfeiffer D et al. Randomized comparison of pre-hospitalinitiated facilitated percutaneous coronary intervention versus primary percutaneous coronary intervention in acute myocardial infarction very early after symptom onset: The LIPSIA-STEMI trial (Leipzig Immediate Prehospital Facilitated Angioplasty in ST-segment myocardial infarction). JACC: Cardiovascular Interventions. 2011; 4(6):605-614

113 Toma M, Buller CE, Westerhout CM, Fu Y, O'Neill WW, Holmes DR, Jr. et al. Non-culprit coronary artery percutaneous coronary intervention during acute ST-segment elevation myocardial infarction: insights from the APEX-AMI trial. European Heart Journal. 2010; 31(14):1701-1707

114 Van de Werf F. Primary versus tenecteplase-facilitated percutaneous coronary intervention in patients with ST-segment elevation acute myocardial infarction (ASSENT-4 PCI): Randomised trial. Lancet. 2006; 367(9510):569-578

115 van't Hof AW, Hamm C, Rasoul S, Guptha S, Paolini JF, Ten Berg JM. Ongoing tirofiban in myocardial infarction evaluation (On-TIME) 2 trial: rationale and study design. EuroIntervention. 2007; 3(3):371-380

116 van't Hof AWJ, Ernst N, de Boer MJ, de Winter R, Boersma E, Bunt T et al. Facilitation of primary coronary angioplasty by early start of a glycoprotein 2b/3a inhibitor: results of the ongoing tirofiban in myocardial infarction evaluation (On-TIME) trial. European Heart Journal. 2004; 25(10):837-846

117 van't Hof AWJ, ten Berg J, Heestermans T, Dill T, Funck RC, van Werkum W et al. Prehospital initiation of tirofiban in patients with ST-elevation myocardial infarction undergoing primary angioplasty (On-TIME 2): a multicentre, double-blind, randomised controlled trial. Lancet. 2008; 372(9638):537-546

118 Vlaar PJ, Svilaas T, van der Horst IC, Diercks GF, Fokkema ML, de Smet BJ et al. Cardiac death and reinfarction after 1 year in the Thrombus Aspiration during Percutaneous coronary intervention in Acute myocardial infarction Study (TAPAS): a 1-year follow-up study. Lancet. 2008; 371(9628):1915-1920

119 Wailoo A, Goodacre S, Sampson F, Alava MH, Asseburg C, Palmer S et al. Primary angioplasty versus thrombolysis for acute ST-elevation myocardial infarction: An economic analysis of the National Infarct Angioplasty project. Heart. 2010; 96(9):668-672

120 Weaver WD, Cerqueira M, Hallstrom AP, Litwin PE, Martin JS, Kudenchuk PJ et al. Prehospital-initiated vs hospital-initiated thrombolytic therapy. The Myocardial Infarction Triage and Intervention Trial. JAMA : the Journal of the American Medical Association. 1993; 270(10):1211-1216

121 Zeymer U, Zahn R, Schiele R, Jansen W, Girth E, Gitt A et al. Early eptifibatide improves TIMI 3 patency before primary percutaneous coronary intervention for acute ST elevation myocardial

infarction: results of the randomized integrilin in acute myocardial infarction (INTAMI) pilot trial. European Heart Journal. 2005; 26(19):1971-1977

122 Zijlstra F, Patel A, Jones M, Grines CL, Ellis S, Garcia E et al. Clinical characteristics and outcome of patients with early (<2 h), intermediate (2-4 h) and late (>4 h) presentation treated by primary coronary angioplasty or thrombolytic therapy for acute myocardial infarction. European Heart Journal. 2002; 23(7):550-557