Guide to GRACE manuscripts (1999 to 2006)

#	Topic	Year of publication (enrollment period)	Patient group	N	Summary	Reference
1.	**Overview: study design**	2001	All ACS	–	**Aim:** To explain the rationale behind GRACE and to describe the methods used. **Conclusions:** Data from the multinational GRACE study will provide important insights into patient demographics and clinical characteristics, practice patterns, and outcomes for patients with ACS.	The GRACE Investigators. Rationale and design of the GRACE (Global Registry of Acute Coronary Events) project: a multinational registry of patients hospitalized with acute coronary syndromes. Am Heart J 2001;141:190-9.
2.	**Age**	2005 (April 99 to Sept 02)	All ACS	24,165	**Aim:** To assess practice variation, patient baseline risk, and outcomes by patient age and type of ACS. **Conclusions:** Many elderly patients (age ≥65 years) with ACS were not given evidence-based therapies (aspirin, beta-blockers, thrombolytic therapy, statins, glycoprotein IIb/IIIa inhibitors, unfractionated heparin) and were less likely to undergo coronary intervention. Age was independently associated with hospital mortality.	Avezum A, Makdisse M, Spencer F, Gore JM, Fox KAA, Montalescot G, Eagle KA, White K, Mehta RH, Knobel E, Collet J-P, for the GRACE Investigators. Impact of age on management and outcome of acute coronary syndrome: observations from the Global Registry of Acute Coronary Events (GRACE). Am Heart J 2005;149:67-73.
3.	**Arrhythmias: atrial fibrillation**	2003 (April 99 to Sept	All ACS	21,785	**Aim:** To compare the presenting characteristics, management and in-hospital outcomes of ACS	Mehta RH, Dabbous OH, Granger CB, Kuznetsova P, Kline-Rogers EM, Anderson FA Jr, Fox KAA, Gore JM, Goldberg RJ,

		01)			patients with or without atrial fibrillation. **Conclusions:** Compared to patients without atrial fibrillation, those with have higher rates of hospital morbidity and mortality. New onset atrial fibrillation was independently associated with hospital adverse events.	Eagle KA, for the GRACE Investigators. Comparison of outcomes of patients with acute coronary syndromes with and without atrial fibrillation. Am J Cardiol 2003;92:1031-6.
4.	**Cardiac catheterization**	2005 (April 99 to Sept 2003)	NSTEMI and unstable angina	8853	**Aim:** To assess whether timing of catheterization is associated with type of non-ST-segment elevation ACS and/or outcome. **Conclusions:** Expeditive catherization is associated with unstable presenting features that contribute significantly towards higher risk of hospital death or death/myocardial infarction compared with patients who undergo later catheterization.	Montalescot G, Dabbous OH, Lim MJ, Flather MD, Mehta RH, for the GRACE Investigators. Relation of timing of cardiac catheterization to outcomes in patients with non-ST-segment elevation myocardial infarction or unstable angina pectoris enrolled in the multinational Global Registry of Acute Coronary Events. Am J Cardiol 2005; 95:1397-1403.
5.	Cardiac catheterization	2005 (April 99 to Mar 2003)	All ACS	28,825	**Aim:** To investigate the relation between access to a cath lab and clinical outcomes in ACS. **Conclusions:** Patients with suspected ACS should be directed to the nearest hospital with acute care facilities, irrespective of whether the hospital has access to cath lab facilities.	Van de Werf F, Gore JM, Avezum Á, Gulba DC, Goodman SG, Budaj A, Brieger D, White K, Fox KAA, Eagle KA, Kennelly BM, and for the GRACE Investigators. Access to catheterisation facilities in patients admitted with acute coronary syndrome: multinational registry study. Br Med J 2005;330:441.
6.	**Clinical:**	2003 (April 99 to Sept	All ACS	24,045	**Aim:** To develop a clinical risk score for predicting major	Moscucci M, Fox KAA, Cannon CP, Klein W, López-Sendón J, Montalescot G, White K, Goldberg RJ, for the GRACE

	bleeding	02)			bleeding in patients with ACS. **Conclusions:** Advanced age, female gender, renal insufficiency, history of bleeding, and use of pharmacological and mechanical therapeutic interventions were associated with an increased risk of bleeding. Major bleeding was associated with an increased risk of hospital mortality.	Investigators. Predictors of major bleeding in acute coronary syndromes: the Global Registry of Acute Coronary Events (GRACE). Eur Heart J 2003;24:1815-23.
7.	**Clinical: delay**	2002 (April 99 to March 2001)	All ACS	10,582	**Aim:** To examine the extent of, and factors associated with, prehospital delay in patients with ACS. **Conclusions:** Almost 60% of patients with AMI and 70% with unstable angina exhibit prolonged delay (>2 h) in seeking medical attention after the onset of acute symptoms. Prehospital delay was inversely associated with receipt of fibrinolytic therapy in patients with STEMI.	Goldberg RJ, Steg PhG, Sadiq I, Granger CB, Jackson EA, Budaj A, Brieger D, Avezum Á, Goodman S. Extent of, and factors associated with, delay to hospital presentation in patients with acute coronary disease (the GRACE registry). Am J Cardiol 2002;89:791-6.
8.	**Clinical: diabetes**	2004 (April 99 to Sept 01)	All ACS	16,116	**Aim:** To describe the presenting characteristics, management and hospital outcomes of ACS patients with or without diabetes. **Conclusions:** While ACS patients with diabetes are at increased risk of adverse outcomes compared to patients without diabetes, they are less likely to receive effective cardiac medications or undergo coronary	Franklin K, Goldberg RJ, Spencer F, Klein W, Budaj A, Brieger D, Marre M, Steg PhG, Gowda N, Gore JM, for the GRACE Investigators. Implications of diabetes in patients with acute coronary syndromes: the Global Registry of Acute Coronary Events. Arch Intern Med 2004;164:1457-63.

					interventions.	
9.	**Clinical or pharmacologic-thrombolytic reperfusion**	2002	STEMI	9251 (1763)	**Aim:** To investigate whether patients presenting to hospital within 12 h of onset of STEMI receive reperfusion therapy. **Conclusions:** One-third of eligible patients with STEMI did not receive any reperfusion therapy. Older patients, those without chest pain, and patients with a history of diabetes, heart failure, MI, or CABG were less likely than their counterparts to receive reperfusion therapy.	Eagle KA, Goodman SG, Avezum Á, Budaj A, Sullivan CM, López-Sendón J, for the GRACE Investigators. Practice variation and missed opportunities for reperfusion in ST-segment-elevation myocardial infarction: findings from the Global Registry of Acute Coronary Events (GRACE). Lancet 2002;359:373-7.
10.	**Clinical presentation/ diagnosis**	2004	All ACS	20,881	**Aim:** To define the frequency, clinical characteristics and outcomes of patients presenting without chest pain across different diagnostic categories of ACS. **Conclusions:** Patients with atypical symptoms were more likely to be older, female, hypertensive, diabetic, and have a history of heart failure. These patients tend to be misdiagnosed and undertreated, and have greater morbidity and higher mortality compared to those with typical symptoms.	Brieger D, Eagle KA, Goodman SG, Steg PhG, Budaj A, White K, Montalescot G, for the GRACE Investigators. Acute coronary syndromes without chest pain: an underdiagnosed and undertreated high-risk group. Insights from the Global Registry of Acute Coronary Events (GRACE). Chest 2004; 2004;126:461-69.
11.	Clinical presentation/ diagnosis	April 99 to Sept 02	All ACS	26,267	**Aim:** To examine the diagnostic and prognostic value of initial and/or peak creatine kinase, CK-MB and cardiac troponin in patients hospitalized with	Goodman SG, Steg PG, Eagle KA, Fox KAA, López-Sendón J, Montalescot G, Budaj A, Kennelly BM, Gore JM, Allegrone J, Granger CB, Gurfinkel EP, for the GRACE Investigators. The diagnostic and

					suspected ACS. **Conclusions:** Use of cardiac troponin assays leads to an increase in the rate of diagnosis of AMI. The independent prognostic value of cardiac troponin beyond that supplied by CK status, electrocardiogram at presentation, or important baseline characteristics helps to identify patients at increased risk of death.	prognostic impact of the redefinition of acute myocardial infarction: Lessons from the Global Registry of Acute Coronary Events (GRACE). Am Heart J 2006;151:654-60.
12.	**Clinical: renal failure**	2005 (April 99 to Sept 02)	NSTEMI	11,881	**Aim:** To compare LMWH + GP IIb/IIIa inhibitors vs UFH + GP IIb/IIIa inhibitors in patients irrespective of their renal function. **Conclusions:** In patients with NSTE ACS and renal function, UFH appeared to be associated with a higher risk of major bleeding and worse outcomes compared with LMWH. Combination therapy appeared to be better tolerated with LMWH than with UFH.	Collet JP, Montalescot G, Agnelli G, Van de Werf F, Gurfinkel EP, López-Sendón J, Laufenberg CV, Klutman M, Gowda N, Gulba D, for the GRACE Investigators. Non-ST-segment elevation acute coronary syndrome in patients with renal failure in the Global Registry of Acute Coronary Events: benefit of low-molecular-weight heparin alone and with glycoprotein IIb/IIIa inhibitors on outcomes. Eur Heart J 2005; doi:10.1093/eurheartj/ehj337.
13.	Clinical: renal failure	2003	All ACS	11,774	**Aim:** To determine whether creatinine clearance at admission is predictive of adverse outcomes in patients with ACS. **Conclusions:** Creatinine clearance is independently predictive of hospital death and major bleeding in all ACS	Santopinto JJ, Fox KAA, Goldberg RJ, Budaj A, Piñero G, Avezum Á, Gulba D, Esteban J, Gore JM, Johnson J, Gurfinkel EP, on behalf of the GRACE Investigators. Creatinine clearance and adverse hospital outcomes in patients with acute coronary syndromes: findings from the Global Registry of Acute Coronary Events (GRACE). Heart 2003;89:1003-8.

					subgroups.	
14.	**Clinical risk models**		All ACS	15,007	**Aim:** To develop a simple risk model to predict risk of 6-month death in patients surviving admission for ACS. **Conclusions:** The 6-month post-discharge prediction model is a simple robust tool for predicting death in ACS patients and has excellent discriminative ability.	Eagle KA, Lim MJ, Dabbous OH, Pieper KS, Goldberg RJ, Van de Werf F, Goodman SG, Granger CB, Steg PG, Gore JM, Budaj A. Avezum A, Flather MD, Fox KAA, for the GRACE Investigators. A validated prediction model for all forms of acute coronary syndrome: estimating the risk of 6-month postdischarge death in an international registry. J Am Med Assoc 2004;291:2727-33
15.	**Clinical: risk stratification**	2005 (April 99 to Sept 02)	NSTEMI or UA	11,855	**Aim:** To investigate patterns of risk stratification, management practices, and outcomes among ACS patients without high-risk features **Conclusions:** Patients with lower-risk features have a low incidence of death and myocardial infarction in hospital. However, recurrent ischaemia is just as frequent in this population as in high-risk patients. More than one-third of patients do not undergo any form of risk stratification while in hospital.	Devlin GP, Anderson Jr FA, Heald S, López-Sendón J, Avezum Á, Elliott J, Dabbous OH, and Brieger D. Management and outcomes of lower-risk patients presenting with acute coronary syndromes in a multinational observational registry. Heart 2005; doi:10.1136/hrt.2004.054007
16.	**Clinical: smoking**	2005 (April 99 to March 02)	All ACS	19,325	**Aim:** To determine the impact of cigarette smoking on the presentation, treatment and hospital outcomes of patients with the spectrum of ACS. **Conclusions:** Current smokers with ACS have a more favorable risk profile and are more aggressively treated than the	Himbert D, Klutman M, Steg PhG, White K, Gulba DC, for the GRACE Investigators. Cigarette smoking and acute coronary syndromes: a multinational observational study. Int J Cardiol 2005; 100:109-17.

					other smoking groups. The 'smoker's paradox' could be explained by confounding factors related to the lower risk profile of current smokers, primarily their younger age.	
17.	**Clinical: stroke**	2005 (April 99 to Dec 03)	All ACS	35,233	**Aim:** To examine the incidence and outcomes of hemorrhagic and non-hemorrhagic stroke, and risk factors associated with stroke, in patients with ACS. **Conclusions:** Stroke was an uncommon event in ACS patients but was an independent risk factor for death. Despite the use of current treatments, the incidence of post-discharge stroke was not low.	Budaj A, Flasińska K, Gore JM, Anderson FA, Dabbous OH, Spencer FA, Goldberg RJ, Fox KAA, on behalf of the GRACE Investigators. Magnitude of and risk factors for stroke in patients with acute coronary syndromes. Findings from a Global Registry of Acute Coronary Events. Circulation 2005; 111:3242-7.
18.	**Clinical: treatment**	2004 (April 99 to Sept 02)	STEMI	2975	**Aim:** To compare the effectiveness of primary PCI versus thrombolytic therapy in patients aged ≥70 years with AMI. **Conclusions:** In elderly patients with STEMI, primary PCI may be associated with a reduction in hospital reinfarction and mortality compared with thrombolytic therapy with no differences in other outcome measures.	Mehta RH, Sadiq I, Goldberg RJ, Gore JM, Avezum Á, Spencer F, Kline-Rogers E, Allegrone J, Pieper K, Fox KAA, Eagle KA, for the GRACE Investigators. Effectiveness of primary percutaneous coronary intervention compared with that of thrombolytic therapy in elderly patients with acute myocardial infarction. Am Heart J 2004;147:253-9.
19.	**Clinical: white cell count**	2004	All ACS	8269	**Aim:** To examine the association between elevated leukocyte count and hospital mortality and	Furman MI, Gore JM, Anderson FA, Budaj A, Goodman SG, Avezum Á, López-Sendón J, Klein W, Mukherjee D, Eagle KA, Dabbous OH, Goldberg RJ, for the GRACE Investigators. Elevated leukocyte count and

					heart failure in ACS patients. **Conclusions:** In men and women of all ages, initial leukocyte count is an independent predictor of hospital death and the development of heart failure.	adverse hospital events in patients with acute coronary syndromes: findings from the Global Registry of Acute Coronary Events (GRACE). Am Heart J 2004;147:42-8.
20.	**Global atherosclerosis**	2006 (in press)	All ACS		**Aim:** To assess treatment practices and hospital outcomes in patients with ACS and prior peripheral arterial disease (PAD). **Conclusions:** ACS patients with prior PAD received less aggressive treatment with proven cardiac medications than patients without PAD. Utilization of beneficial medical therapies in patients with PAD prior to hospitalization with ACS was also less than optimal.	Froehlich JB, Mukherjee D, Avezum A, Budaj A, Kline-Rogers EM, López-Sendón J, Agnelli G, Allegrone J, Eagle KA, Mehta RH, Goldberg RJ, for the GRACE Investigators. Association of peripheral artery disease with treatment and outcomes in acute coronary syndromes. The Global Registry of Acute Coronary Events (GRACE). Am Heart J (in press).
21.	**Heart failure**	2004 (April 99 to Sept 01)	All ACS	13,707	**Aim:** To identify the determinants of heart failure and the impact on outcomes of heart failure complicating ACS. **Conclusions:** Heart failure complicating ACS was associated with reduced hospital and 6-month survival in all ACS subsets including those with normal markers of necrosis.	Steg PhG, Dabbous OH, Feldman LJ, Cohen-Solal A, Aumont M-C, López-Sendón J, Budaj A, Goldberg RJ, Klein W, Anderson FA, for the Global Registry of Acute Coronary Events (GRACE) Investigators. Determinants and prognostic impact of heart failure complicating acute coronary syndromes: observations from the Global Registry of Acute Coronary Events (GRACE). Circulation 2004;109:494-9.
22.	**Outcomes**	2003 (April 99 to March	All ACS	11,389	**Aim:** To develop a simple model to assess the risk of hospital mortality for the spectrum of ACS patients treated in general clinical	Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, Van de Werf F, Avezum Á, Goodman SG, Flather MD, Fox KAA, for the Global Registry of

		01)			practice. **Conclusions:** A robust prediction model was developed that can discriminate risk for the entire spectrum of ACS in a general practice population. The most important factors – Killip class, age, blood pressure, resuscitated cardiac arrest, positive cardiac markers, creatinine, ST-segment shift and heart rate – contained 89% of the prognostic information.	Acute Coronary Events Investigators. Predictors of hospital mortality in the Global Registry of Acute Coronary Events. Arch Intern Med 2003;163:2345-53.
23.	**Outcomes: long-term**	2004 (April 99 to Sept 02)	All ACS	16,834	**Aim:** To describe the 6-month outcomes of patients with ACS. **Conclusions:** A considerable proportion of patients discharged from hospital after an ACS are rehospitalized for their underlying condition, and remain at increased risk of death during this period.	Goldberg RJ, Currie K, White K, Brieger D, Steg PhG, Goodman SG, Dabbous O, Fox KAA, Gore JM. Six-month outcomes in a multinational registry of patients hospitalized with an acute coronary syndrome (the Global Registry of Acute Coronary Events [GRACE]). Am J Cardiol 2004;93:288-93.

24.	**Pharmacologic therapy: anticoagulant**	2003	All ACS	16,116	**Aim:** To identify patterns of use of UFH and LMWH across the spectrum of ACS patients. **Conclusions:** UFH and LMWH were used with approximately equal frequency in patients with UA/NSTEMI whereas UFH is used more often in STEMI. Both UFH and LMWH were used in 23% of patients, often in those undergoing invasive procedures. Patterns of use varied widely with geographical location and other factors. Rates of hospital mortality, major bleeding and stroke were lower with LMWH than with UFH.	Klein W, Kraxner W, Hödl R, Steg PhG, Budaj A, Gulba D, Sadiq I, Van de Werf F, White K, Fox KAA, for the GRACE investigators. Patterns of use of heparins in ACS. Correlates and hospital outcomes: the Global Registry of Acute Coronary Events (GRACE). Thromb Haemost 2003;90:519-27.
25.	**Practice variation: overview**	2000	–	–	**Aim:** To provide a rationale for, and an introduction to, the GRACE registry. **Conclusions:** The results from GRACE will provide insights into clinical practice variations and outcomes from a multinational perspective and for patients with the spectrum of ACSs.	Fox KAA. An introduction to the Global Registry of Acute Coronary Events: GRACE. Eur Heart J 2000;2(Suppl F):F21-4.
26.	Practice variation: overview	2002	All ACS	11,543	**Aim:** To describe the initial findings – clinical and demographic characteristics, management practices and outcomes – from the GRACE registry.	Steg PhG, Goldberg RJ, Gore JM, Fox KAA, Eagle KA, Flather MD, Sadiq I, Kasper R, Rushton-Mellor SK, Anderson FA, for the GRACE Investigators. Baseline characteristics, management practices, and in-hospital outcomes of patients hospitalized with acute coronary syndromes in the Global

					Conclusions: GRACE provides a detailed and comprehensive overview of patients with the spectrum of ACS.	Registry of Acute Coronary Events (GRACE). Am J Cardiol 2002;90:358-63.
27.	**Practice variation**	2004 (April 99 to March 02)	All ACS		**Aim:** To determine to what extent evidence-based guidelines are followed in the management of ACS in the UK, Europe, and multinationally; and to compare clinical outcomes in these regions. **Conclusions:** UK clinical practice more closely follows the National Service Framework than British or European guidelines. Practice variation may account for the higher 6-month death rate observed in patients with STEMI or NSTEMI in UK.	Carruthers KF, Dabbous OH, Flather MD, Starkey I, Jacob A, MacLeod D, Fox KAA, on behalf of the GRACE Investigators. Contemporary management of acute coronary syndromes: does the practice match the evidence? The Global Registry of Acute Coronary Events (GRACE). Heart 2005;91:290-8.
28.	Practice variation	2002 (April 99 to June 01)	All ACS	>15,500	**Aim:** To present an overview about the role of registries in ACS, and the initial findings from the GRACE registry. **Conclusions:** More than one-third of patients with STEMI receive no form of reperfusion therapy. Of those who do, one-third undergo primary PCI. LMWH therapy is rarely used adjunctively with either PCI or thrombolytics therapy. GP IIb/IIIa antagonists is underutilized as adjunctive therapy with thrombolytics drugs, but is used in almost 60% of cases of	Eagle K. Lessons from GRACE: the Global Registry of Acute Coronary Events. Eur Heart J 2002;4(Suppl E):E24-31.

					primary PCI.	
29.	Practice variation	2003 (April 99 to Dec 01)	All ACS	12,666	**Aim:** To determine whether hospital and geographic characteristics influence the time course of uptake of evidence-based guidelines for ACS. **Conclusions:** Hospital status, access to resources, and geographic characteristics appear to have a marked influence on the use of antithrombotic and interventional strategies for ACS. The publication of evidence-based guidelines did not appear to influence clinical practice.	Fox KAA, Goodman SG, Anderson FA, Granger CB, Moscucci M, Flather MD, Spencer F, Budaj A, Dabbous OH, Gore JM, on behalf of the GRACE Investigators. From guidelines to clinical practice: the impact of hospital and geographical characteristics on temporal trends in the management of acute coronary syndromes. The Global Registry of Acute Coronary Events (GRACE). Eur Heart J 2003;24:1414-24.
30.	Practice variation	2002 (April 99 to Dec 00)	All ACS	11,543	**Aim:** To evaluate whether hospital characteristics and geographic location influence the use of medications and interventions. **Conclusions:** Substantial differences exist in the treatment of ACS patients based on hospital status and geographic location.	Fox KAA, Goodman SG, Klein W, Brieger D, Steg PhG, Dabbous O, Avezum Á, for the GRACE Investigators. Management of acute coronary syndromes. Variations in practice and outcome. Findings from the Global Registry of Acute Coronary Events (GRACE). Eur Heart J 2002;23:1177-89.
31.	Practice variation	2004 (April 99 to 2003)	All ACS	~39,000	**Aim:** To provide an overview of the initial key findings from the GRACE registry. **Conclusions:** GRACE is the largest multinational registry of ACS patients to date. Data from GRACE can be used as reference indicators to compare	Fox KAA. An international perspective on acute coronary syndrome care. Insights from the Global Registry of Acute Coronary Events. Am Heart J 2004;148:S40-5.

					with hospital practice and help guide management of patients.	
32.	Practice variation	2000	–	–	**Aim:** To describe the rationale behind the GRACE registry. **Conclusions:** The GRACE registry will provide information on patients with the spectrum of ACS, with the aim of providing information about diagnostic and treatment strategies and clinical outcomes, and developing hypotheses for future clinical research.	Granger CB. Strategies of patient care in acute coronary syndromes: rationale for the Global Registry of Acute Coronary Events (GRACE) registry. Am J Cardiol 2000;86(Suppl):4M-9M.
33.	Practice variation	2005	All ACS	3220	**Aim:** To investigate whether a major financial crisis [in Argentina] impacts medical management and outcomes in ACS. **Conclusions:** The financial crisis may have had a negative impact on hospital cardiovascular mortality and complications.	Gurfinkel EP, Bozovich GE, Dabbous O, Mautner B, Anderson F. Socio economic crisis and mortality. Epidemiological testimony of the financial collapse of Argentina. Thromb J. 2005;3:22.
34.	**Pharmacologic therapy: antiplatelet**	2003 (April 99 to March 01)	All ACS	12,665	**Aim:** To describe patterns of use of antiplatelent and antithrombotic therapies in ACS. **Conclusions:** Despite the availability of evidence-based clinical practice guidelines, substantial geographic and practice variations exist in the use of antithrombotic and antiplatelet treatments for ACS.	Budaj A, Brieger D, Steg PhG, Goodman SG, Dabbous OH, Fox KAA, Avezum Á, Cannon CP, Mazurek T, Flather MD, Van de Werf F, for the GRACE Investigators. Global patterns of use of antithrombotic and antiplatelet therapies in patients with acute coronary syndromes: insights from the Global Registry of Acute Coronary Events (GRACE). Am Heart J 2003;146:999-1006.

35.	Pharmacologic therapy antiplatelet	2005	NSTEMI/ UA	15,693	**Aim:** To evaluate the impact on outcomes of clopidogrel combined with statin vs clopidogrel alone in patients with NSTEMI/UA who are taking aspirin. **Conclusions:** Patients prescribed clopidogrel, statin and aspirin at discharge had a lower mortality rate than those given clopidogrel and aspirin alone. Prescription of clopidogrel was associated with more frequent performance of cardiac catheterization and PCI.	Lim MJ, Spencer FA, Gore JM, Dabbous OH, Agnelli G, Kline-Rogers EM, DiBenedetto D, Eagle KA, Mehta RH, for the GRACE Investigators. Impact of combined pharmacologic treatment with clopidogrel and a statin on outcomes of patients with non-ST-segment elevation acute coronary syndromes. Perspectives from a large multinational registry. Eur Heart J 2005; doi: 10.1093/eurheartj/ehi139.
36.	Pharmacologic therapy: antiplatelet	2005 (April 99 to Dec 03)	NSTEMI/ UA	8081	**Aim:** To characterize the combined use of thienopyridines, aspirin, and glycoprotein IIb/IIIa inhibitors in patients with ACS. **Conclusions:** Triple therapy was associated with the performance of catheterization and/or PCI as well as high-risk patient features. While no differences in hospital mortality rates were evident in patients receiving triple therapy, this population was at significantly increased risk for major bleeding while in hospital.	Lim MJ, Eagle KA, Gore JM, Goldberg RJ, Mehta RJ, Granger CB, Anderson FA, Flather M, Dabbous OH, Spencer FA. Treating patients with acute coronary syndromes with aggressive antiplatelet therapy (from the Global Registry of Acute Coronary Events). Am J Cardiol 2005;96:917-21.
37.	Pharmacologic therapy: antiplatelet	2003	AMI	9083	**Aim:** To investigate the use of stents and GP IIb/IIIa inhibitors and the impact on 30-day and 6-month mortality in patients with AMI undergoing PCI. **Conclusions:** The mortality rate was highest in patients who underwent PCI but received	Montalescot G, Van de Werf F, Gulba DC, Avezum Á, Brieger D, Kennelly BM, Mazurek T, Spencer F, White K, Gore JM, for the GRACE Investigators. Stenting and glycoprotein IIb/IIIa inhibition in patients with acute myocardial infarction undergoing percutaneous coronary intervention: findings from the Global Registry of Acute Coronary Events (GRACE). Catheter Cardiovasc

					neither a stent or a GP IIb/IIIa inhibitor compared with patients who receive a stent alone, a GP IIb/IIIa alone, or both.	Interv 2003;60:360-7.
38.	Pharmacologic therapy: antiplatelet	2002 (April 99 to June 01)	All ACS	11,388	**Aim:** To examine patterns of use of aspirin and hospital outcomes in patients with ACS. **Conclusions:** Patients with a history of coronary artery disease who developed an ACS despite acute aspirin therapy had a less severe presentation, fewer hospital events and a lower hospital mortality rate than their counterparts who were not on prior aspirin therapy.	Spencer F, Santopinto J, Gore JM, Goldberg RJ, Fox KAA, Moscucci M, White K, Gurfinkel EP. Impact of aspirin on presentation and hospital outcomes in patients with acute coronary syndromes (The Global Registry of Acute Coronary Events [GRACE]). Am J Cardiol 2002;90:1056-61.
39.	**Pharmacologic therapy antilipidemia**	2004 (April 99 to Sept 02)	All ACS	19,537	**Aim:** To examine the association with previous and early statin therapy and presentation and outcomes in patients with an ACS. **Conclusions:** Patients on prior statin therapy were less likely to present with ST elevation or MI, or to develop hospital complications or die than patients who had never taken statin therapy. Statin therapy may modulate the early pathophysiologic processes in patients with ACS.	Spencer FA, Allegrone J, Goldberg RJ, Gore JM, Fox KAA, Granger CB, Mehta RH, Brieger D, for the GRACE Investigators. Association of statin therapy with outcomes of acute coronary syndromes: The GRACE Study. Annal Int Med 2004;140:857-66.
40.	**Pharmacologic therapy: evidence-based**	2004 (April 99 to March 03)	All ACS	13,830	**Aim:** To evaluate patients' adherence to key medications (aspirin, beta-blockers, statins, ACE inhibitors) 6 months after hospital discharge. **Conclusions:** Between 8% and	Eagle KA, Kline-Rogers E, Goodman SG, Gurfinkel EP, Avezum Á, Flather MD, Granger CB, Erickson S, White K, Steg PhG, for the GRACE Investigators. Adherence to evidence-based therapies after discharge for acute coronary syndromes. An ongoing, prospective,

					20% of patients had ceased to take their cardiac medications 6 months after discharge for an ACS.	observational study. Am J Med 2004;117:73-81.
41.	Pharmacologic therapy: evidence-based	2005 (April 99 to March 02)	All ACS	20,140	**Aim:** To identify patient and healthcare factors related to use of medical treatments that comprise quality measures and to assess the relationship between these measures and mortality. **Conclusions:** The results of this study show substantial opportunity to improve core healthcare performance measures that are being widely used by healthcare agencies to measure and reward quality of ACS care. These performance measures reflect quality of care as evidenced by better hospital mortality.	Granger CB, López-Sendón J, Van de Werf F, Kline-Rogers E, Anderson FA, Dabbous OH, Allegrone J, Klein W, Eagle KA. Medication performance measures and mortality following acute coronary syndromes. Am J Med 2005;118:858-65
42.	**Reperfusion or Clinical Cardiogenic Shock**	2002 (April 99 to June 01)	AMI with cardiogenic shock	583	**Aim:** To examine the use of coronary reperfusion strategies, adjunctive therapy and hospital mortality in patients with AMI complicated by cardiogenic shock. **Conclusions:** Cardiogenic shock is a devastating complication in AMI patients, with 59% of patients dying while in hospital. Underuse of revascularization strategies may account for the large number of elderly patients in this population. Coronary stenting was the strongest	Dauerman HL, Goldberg RJ, White K, Gore JM, Sadiq I, Gurfinkel E, Budaj A, Lopez de Sa E, López-Sendón J, for the GRACE Investigators. Revascularization, stenting, and outcomes of patients with acute myocardial infarction complicated by cardiogenic shock. Am J Cardiol 2002;90:838-42.

					independent predictor of hospital survival.	