



Stadt Zürich
Stadtspital Triemli

AMIS Plus in Perspective with Other Large Registries

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ACS Registries

◆ National Registries

- AMIS Plus
- PRAIS UK
- RIKS HIA (Swedish Intensive Care Registry)

◆ Multinational Registries

- European Heart Survey ACS
- CRUSADE
- NRM (American Registry)
- GRACE

AMIS Plus Registry

- ◆ AMIS Plus (Acute Myocardial Infarction in Switzerland) – national registry, observational study since 1997
 - 76 Swiss hospitals
 - 30,234 cases with AMI and UA
- ◆ Follow-up (started 2005)
 - Three months and one year
 - » 3-month follow-up
 - Total available 4278/4456 (96%)
 - » 12-month follow-up
 - Total available 3314/3423 (97%)

AMIS Plus Questionnaire

- ◆ Over 180 variables that include:
 - Demographics
 - Risk factors, symptoms
 - Immediate therapy
 - Laboratory parameters
 - Hospitalisation course and discharge treatment
- ◆ Since March 2005 long-term follow-up
 - 3-months
 - 12-months

Aims of AMIS Plus

To collect data on:

- Trends in epidemiology (including risk factors) in patients with acute coronary syndrome
 - Diagnostic and therapeutic interventions during hospitalisation
 - Compliance with guidelines
 - Quality of treatment and outcome during hospitalisation
 - Integration of new diagnostic and therapeutic interventions
- ...in order to optimize the care of patients with acute coronary syndrome.

ACS Registries

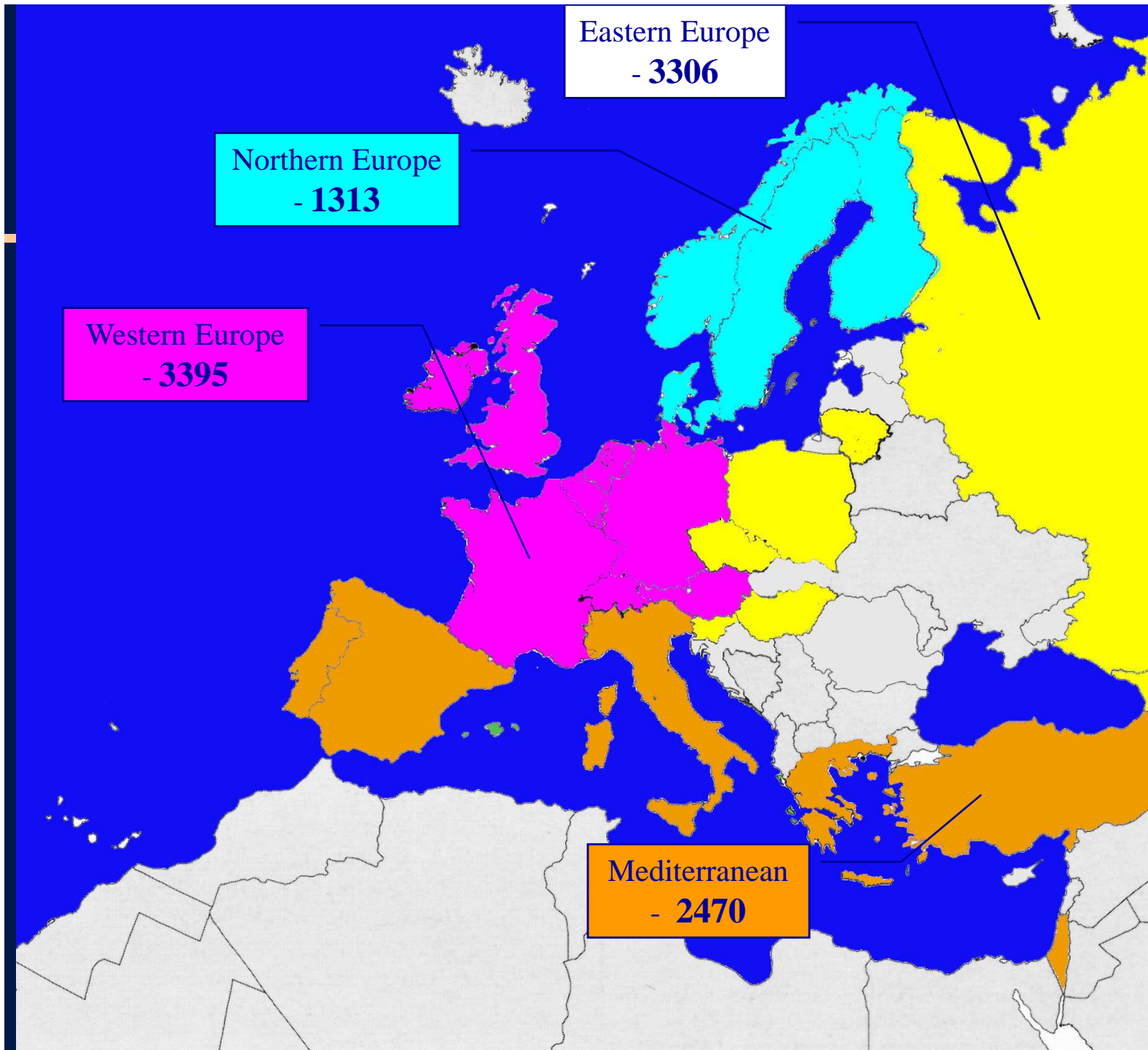
- ◆ AMIS Plus
- ◆ PRAIS UK
- ◆ RIKS HIA (Swedish Intensive Care Registry)

- ◆ **Multinational Registries**
 - European Heart Survey ACS
 - CRUSADE
 - NRM (American Registry)
 - GRACE

EURO Heart Survey – Acute Coronary Syndrome

- Patient enrollment:
- Year 2000: 10484 patients
- Year 2005: 6302 patients

- 65 Clusters of 103 tertiary and community hospitals from 25 member countries of the ESC.



Euro-ACS
Total
Patient No.
by Region

CRUSADE Registry

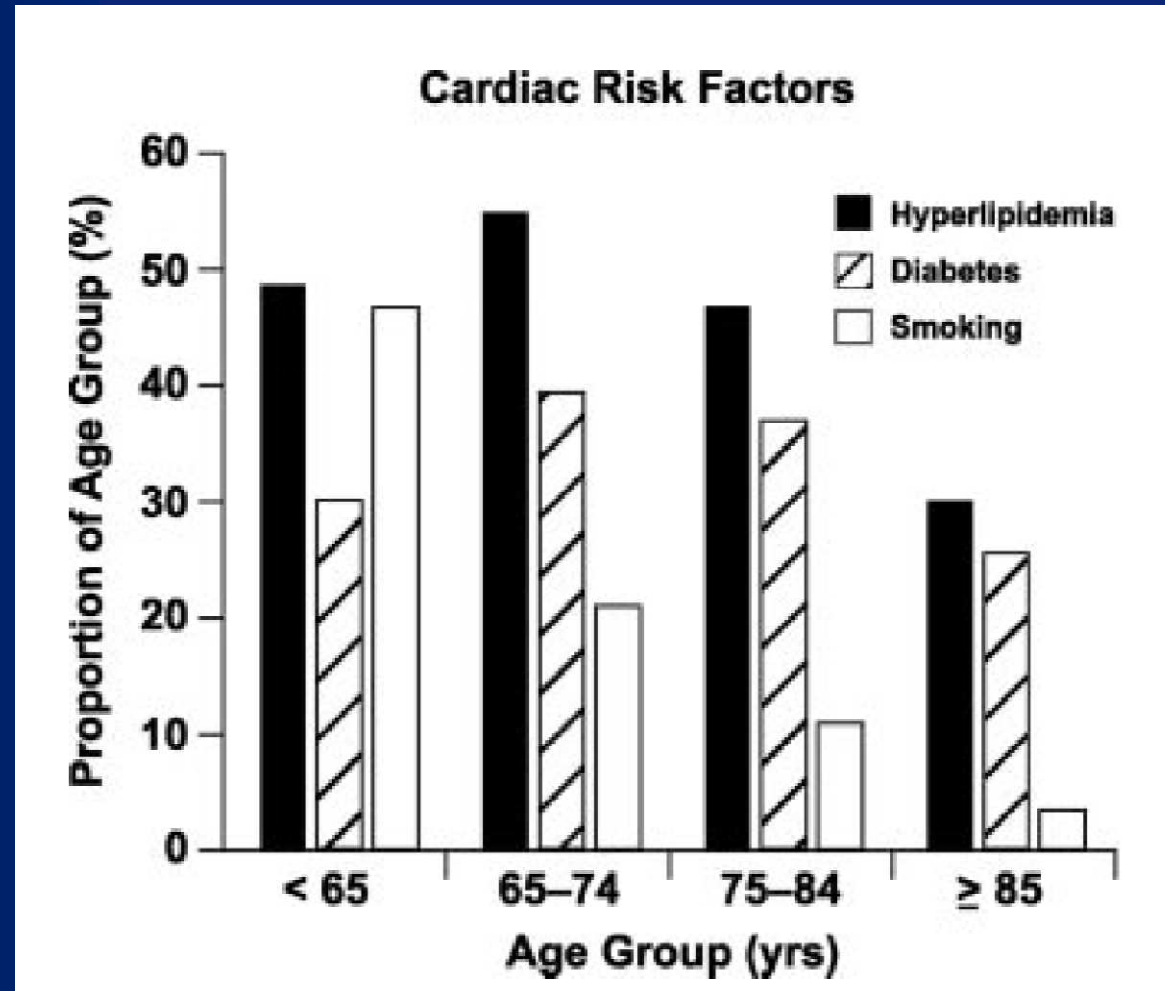
CRUSADE: Quality Improvement Initiative

Promoting collaboration between ER
physicians and cardiologists

400 US hospitals

2001-2003: > 200'000 patients enrolled

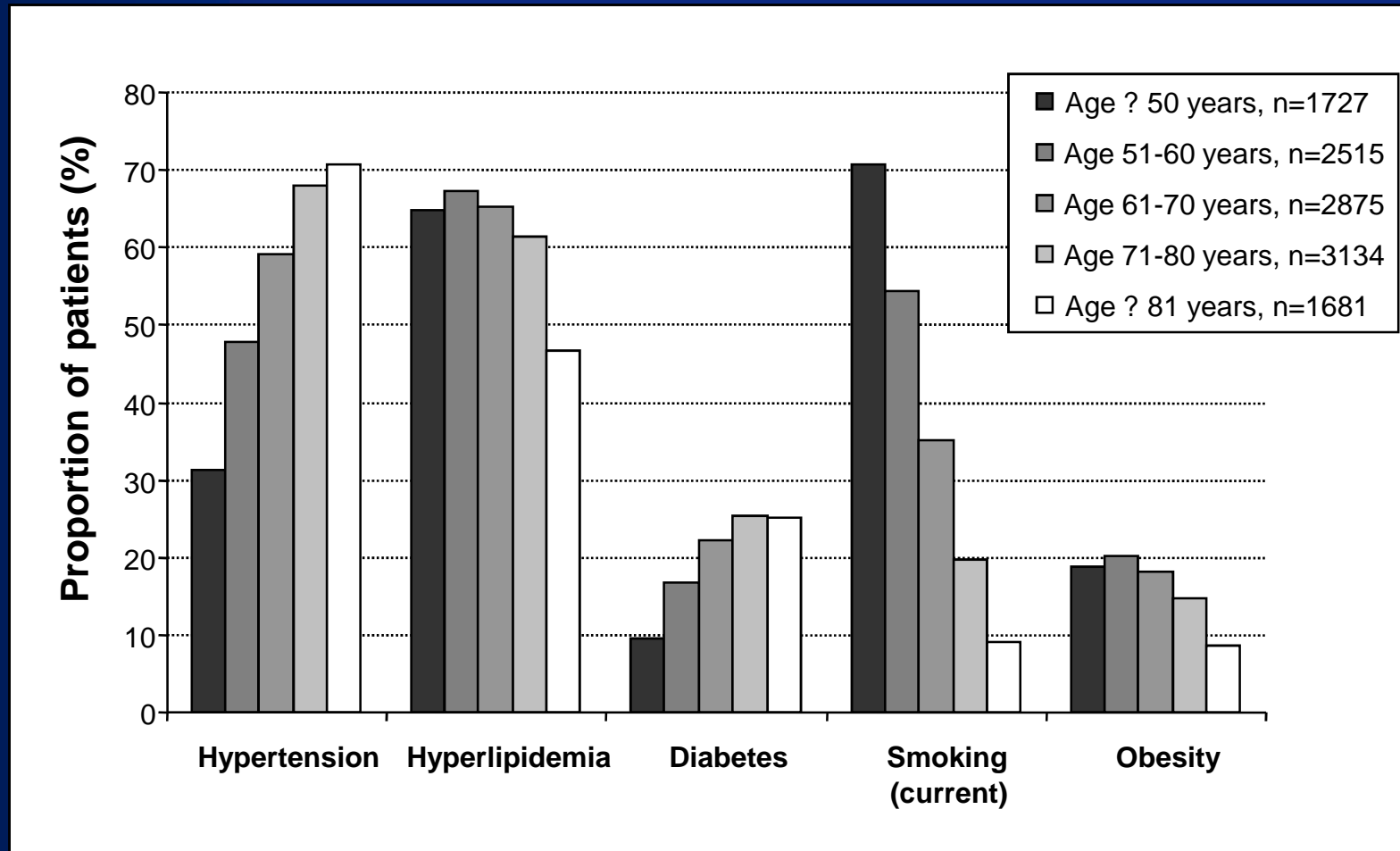
Cardiac Risk Factors According to Age: *Data from Crusade Registry*



N = 56 963

AMIS-Registry 1997-2004

Risk Factors in 11'932 Patients With Acute Myocardial Infarction



Nationale Registry of Myocardial Infarction (NORMI)

Large observational registry

> 1'600 US hospitals

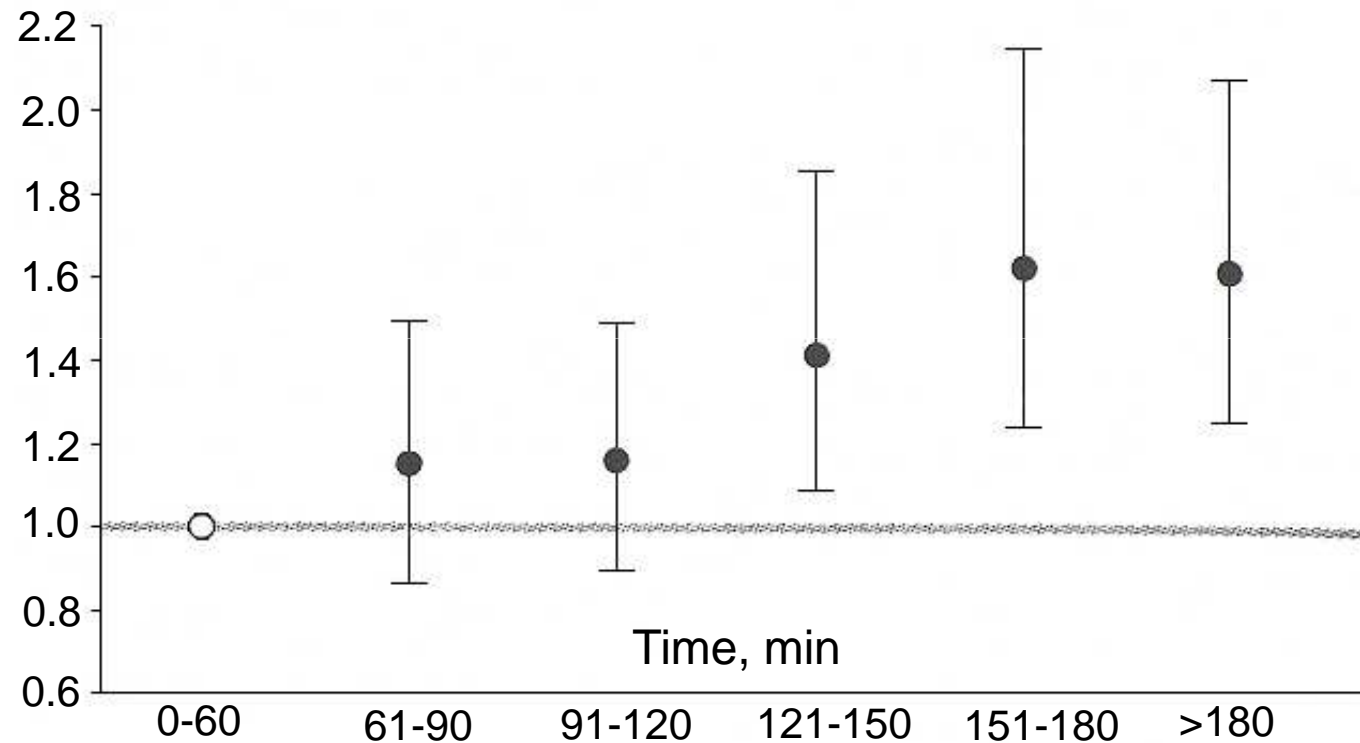
demographic, procedural, therapeutic and outcome data

NSTEMI and STEMI

1994-2003 > 1 million patients enrolled.

Door-to-Balloon Time

C. P. Cannon et al. JAMA 2000;283:2941-2947



No. of Patients	2230	5734	6616	4461	2627	5412
Multivariate OR	1.0	1.14	1.15	1.41	1.62	1.61
95% CI		0.87-1.48	0.89-1.4	1.08-1.84	1.23-2.14	1.25-2.08
P Value		.35	.29	.01	<.001	<.001

GRACE: 80 Active Core Study Sites: 16 Clusters in 13 Countries



58,866 cases enrolled

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GRACE Registry

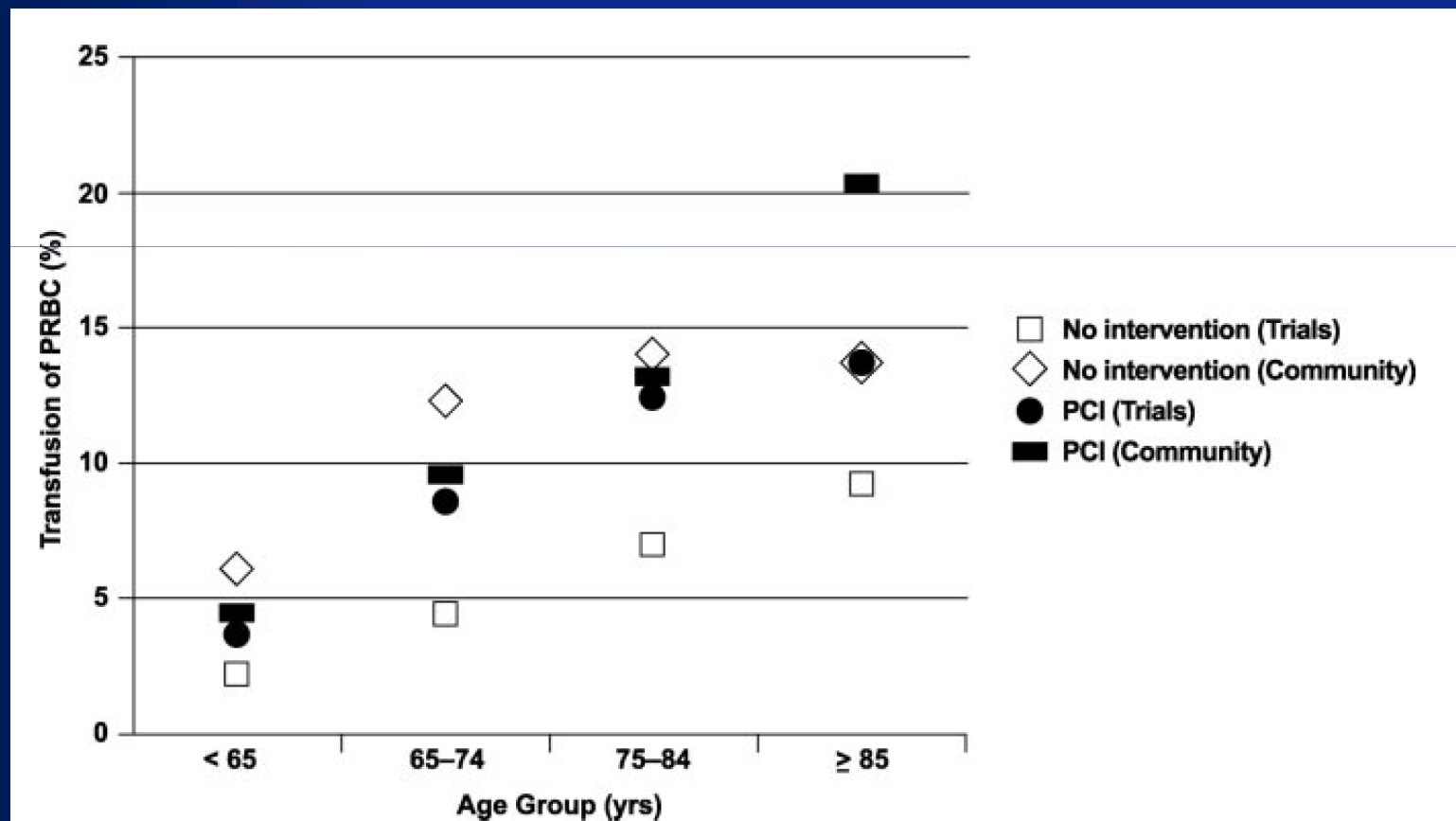
- ◆ GRACE is a large, ongoing, observational registry of patients with Acute Coronary Syndromes hospitalized in 94 hospitals in 14 countries across 4 continents (Europe, North & South America, Australia, New Zealand)
- ◆ First 10–20 consecutive cases per centre / month who present with qualifying symptoms **PLUS** evidence of CAD are included at referral centers (clustered with community hospitals)

GRACE Registry

- ◆ Random audit of all centres is taking place over a 3-year cycle, including 10% source data verification. Data are collected via e-CRF and independent data analysis is performed by the Center for Outcomes Research (COR, U Mass)
- ◆ The GRACE group has an impressive track record
 - 63 manuscripts published or in press and 109 abstracts presented
 - **GRACE Risk Score is well validated and was incorporated in 2007 ESC Guidelines for treatment of NSTEMI**

Increasing Need of Blood Transfusion With Increasing Age in ACS Patients With and Without PCI

Data from VIGOUR Trials, CRUSADE, GRACE and NRMI-2 Registry



Management and 6-month outcomes in elderly and very elderly patients with high-risk non-ST-elevation acute coronary syndromes: The Global Registry of Acute Coronary Events

Gerard Devlin^{1*}, Joel M. Gore², John Elliott³, Namal Wijesinghe¹, Kim A. Eagle⁴, Álvaro Avezum⁵, Wei Huang², and David Brieger⁶ for the GRACE Investigators

¹Department of Cardiology, Waikato Hospital, Hamilton, New Zealand; ²University of Massachusetts Medical School, Worcester, MA, USA; ³Christchurch School of Medicine, Christchurch, New Zealand; ⁴University of Michigan Medical Center, Ann Arbor, MI, USA; ⁵Dante Pazzanese Institute of Cardiology, São Paulo, Brazil; and ⁶Concord Hospital, Sydney, Australia

GRACE Registry 1999-2006

35'512 patients with NSTEMI/ACS

18'466 6 months follow-up data available = study population

56% young <70 years

44% older than 70 years,

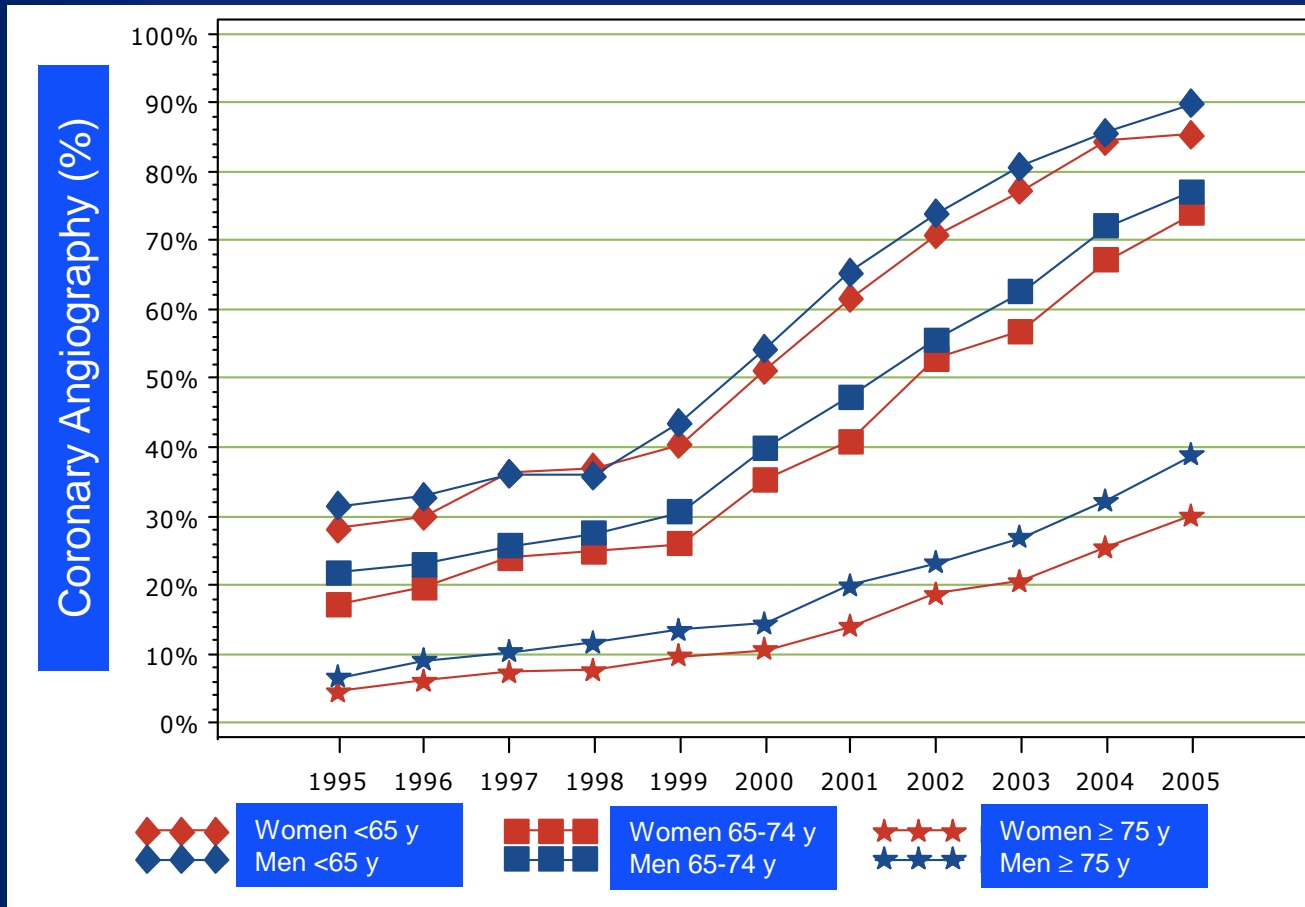
27% elderly (70-80 years), 17% very elderly (>80 years)

Lower Use of Medical and Invasive Therapy in Elderly Patients: Results from the GRACE Registry

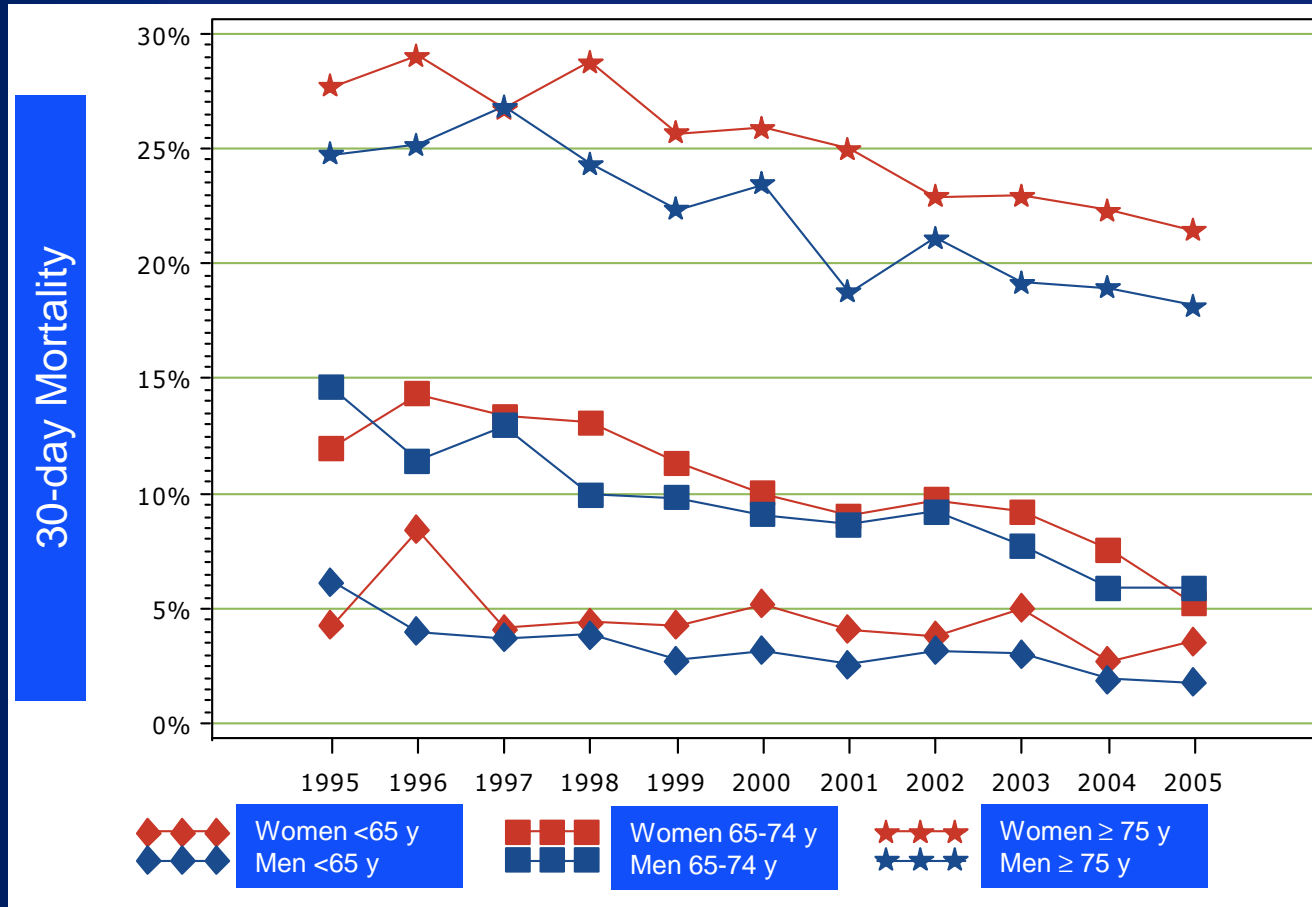
Table 2 Inhospital management for high-risk patients with NSTE-ACS

	<70 years (n = 10 380)	70–80 years (n = 5057)	>80 years (n = 3029)	P-value
Aspirin, n (%)	9838 (95)	4647 (92)	2739 (91)	<0.0001
Beta-blocker, n (%)	9021 (87)	4086 (81)	2404 (80)	<0.0001
Statin, n (%)	7196 (70)	3095 (61)	1552 (52)	<0.0001
ACE-inhibitor/ARB, n (%)	6263 (61)	3284 (65)	1843 (61)	<0.0001
LMWH, n (%)	6441 (63)	3175 (63)	1721 (57)	<0.0001
Glycoprotein IIb/IIIa blocker, n (%)	3010 (29)	1102 (22)	441 (15)	<0.0001
Thienopyridine, n (%)	5525 (54)	2320 (46)	1163 (39)	<0.0001
Warfarin, n (%)	465 (4.6)	499 (10)	270 (9.1)	<0.0001
Nitrate, n (%)	8604 (83)	4274 (85)	2539 (84)	0.03
Calcium-channel blocker, n (%)	2375 (23)	1575 (32)	1005 (34)	<0.0001
Cardiac catheterization, n (%)	6926 (67)	2758 (55)	988 (33)	<0.0001
PCI, n (%)	3924 (38)	1402 (28)	535 (18)	<0.0001
CABG, n (%)	732 (7.2)	363 (7.3)	92 (3.1)	<0.0001

Swedish Registry on Cardiac Intensive Care (RiksHIA) Proportion of Patients Undergoing Coronary Angiography



Swedish Registry on Cardiac Intensive Care (RiksHIA) 30-Day Mortality in STEMI According to Age and Gender



Age-Related Differences in the Use of Guideline-Recommended Medical and Interventional Therapies for Acute Coronary Syndromes: A Cohort Study

Andreas W. Schoenenberger, MD,^{†} Dragana Radovanovic, MD,[‡] Jean-Christophe Stauffer, MD,[§] Stephan Windecker, MD,^{||} Philip Urban, MD,[#] Franz R. Eberli, MD,^{**} Andreas E. Stuck, MD,^{*†} Felix Gutzwiller, MD, DrPH,[‡] and Paul Erne, MD,^{††} for the Acute Myocardial Infarction in Switzerland Plus Investigators*

AMIS Registry

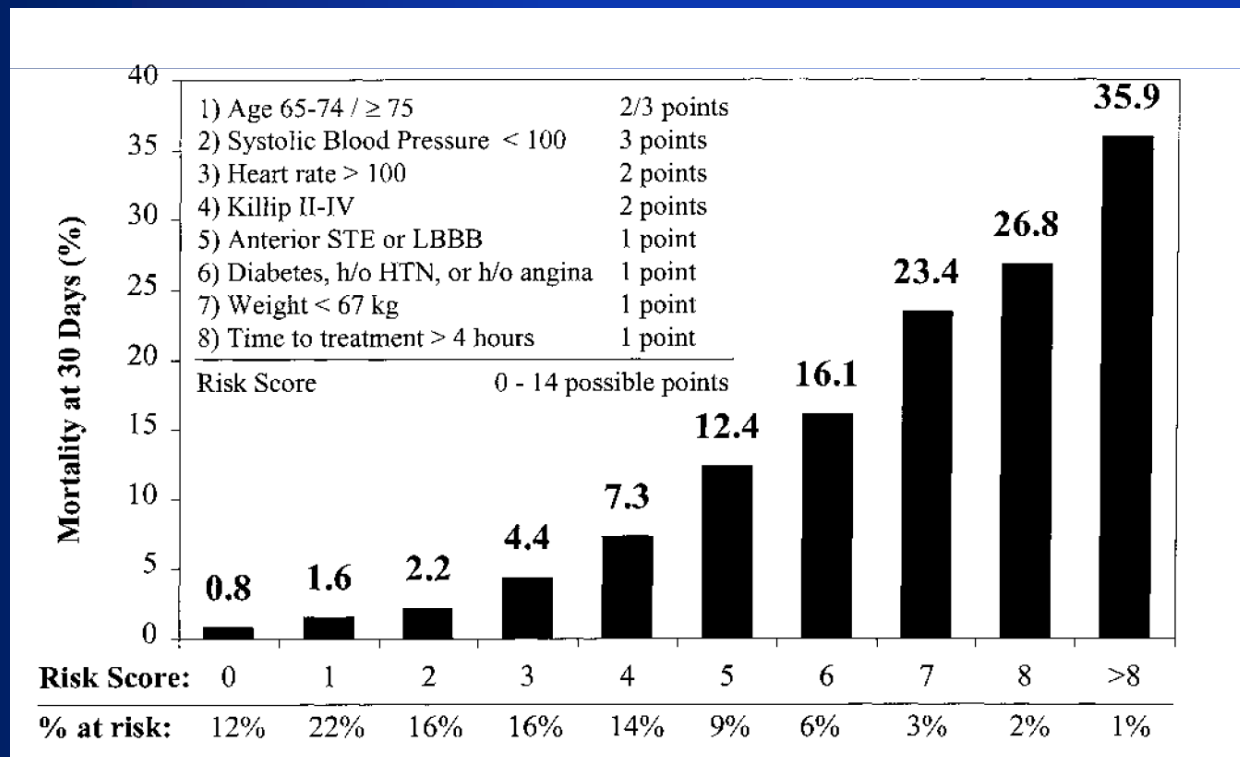
11932 patients between 2001-2006

Surveys as sources to predict risk in NSTEMI and STEMI

TIMI Risk Score für ST-Hebungsinfarkte (STEMI)

Morrow DA et al. *Circulation* 2000;102;2031-37

- Entwickelt aus der InTIME II Datenbank: RCT lanoteplase vs. alteplase
- >15'000 Patienten mit ST-Hebungsinfarkt (STEMI) randomisiert
- 30d Mortalität = 6.7%
- Punktescore, aus 10 gewichteten Parametern berechnet



TIMI Risk Score for UA / Non-STEMI

Antmann EM et al. JAMA 2000; 284: 835-842

- ◆ Basierend auf zwei RCT von UFH vs. LMWH in UA / NSTEMI (TIMI 11b und ESSENCE)
- ◆ 7-Punkte Score aus 7 Risikofaktoren:
 1. Alter ≥ 65 Jahre
 2. ≥ 3 koronare Risikofaktoren
 3. Bekannte signifikante Koronarstenose
 4. ST-Streckensenkung im Eintritts-EKG
 5. ≥ 2 Anfälle von Angina in den letzten 24 Stunden
 6. Einnahme von Aspirin in den letzten 7 Tagen
 7. Erhöhte myokardiale Marker (Troponin, CK-MB) bei Eintritt
- ◆ Output: Risiko für Mortalität / MI / dringliche Revaskularisation innert 14 Tagen

At Admission (in-hospital/to 6 months)

At Discharge (to 6 months)

Age ▾

HR ▾

SBP ▾

Creat. ▾

CHF ▾

Cardiac arrest at admission

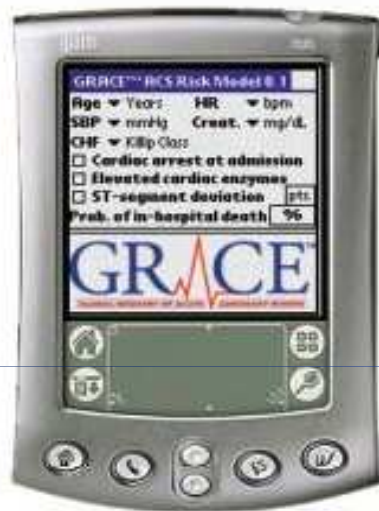
ST-segment deviation

Elevated cardiac enzymes/markers

Probability of	Death	Death or MI
In-hospital	<input type="text" value="--"/>	<input type="text" value="--"/>
To 6 months	<input type="text" value="--"/>	<input type="text" value="--"/>

GRACE™ ACS Risk Model Beta Version

Announcing the new GRACE™ Risk Model for predicting 6-month death, and death/MI due to ACS (MI)



Free Download

Download GRACE™ ACS Risk

- Features the original GRACE™ Risk Model for in-hospital death, and death/MI due to ACS (MI)
- Easy point-and-click interface
- Uses less than 60K of memory
- For educational purposes only
- Download and use free of charge

GRACE
Global Registry of Acute Coronary Events

Assessing Today's Practice Patterns to Enhance Tomorrow's Care

Quick Links

- ♥ [GRACE Interactive](#)
- ♥ [Bibliography](#)
- ♥ [Summary Slides](#)

What's new for August 20, 2003?

- ♥ [GRACE Risk Model - FDA Software](#)
- ♥ Three abstracts accepted by AHA 2002
- ♥ Six abstracts accepted by ACC 2003
- ♥ Four abstracts accepted by ESC 2003

Overview
Find out more about this physician directed registry.

Committee
Scientific advisory Committee member's contact information.

Confidentiality
Confidentiality materials, standards and procedures.

Web Links
Cardiology resources on the World Wide Web.

Members
Members enter here. PASSWORD REQUIRED.

www.outcomes.org/grace

Risk scores for risk stratification in acute coronary syndromes: useful but simpler is not necessarily better

Andrew T. Yan^{1,2}, Raymond T. Yan^{1,2}, Mary Tan^{1,2}, Amparo Casanova^{1,2}, Marino Labinaz³, Kumar Sridhar⁴, David H. Fitchett^{1,2}, Anatoly Langer^{1,2}, and Shaun G. Goodman^{1,2*}

¹Canadian Heart Research Centre, Toronto, Ontario, Canada; ²Terrence Donnelly Heart Centre, Division of Cardiology, St Michael's Hospital, University of Toronto, 30 Bond Street, Room 6-034 Queen, Toronto, Ontario, Canada, M5B 1W8;

³University of Ottawa Heart Institute, University of Ottawa, Ottawa, Ontario, Canada; and ⁴London Health Sciences Centre, London, Ontario, Canada

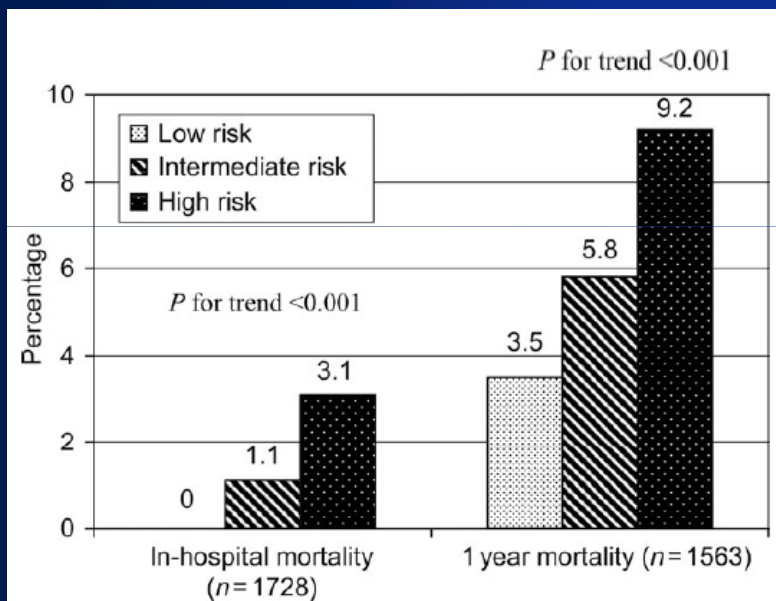


Figure 1 In-hospital and 1 year outcomes by physicians' assessment.

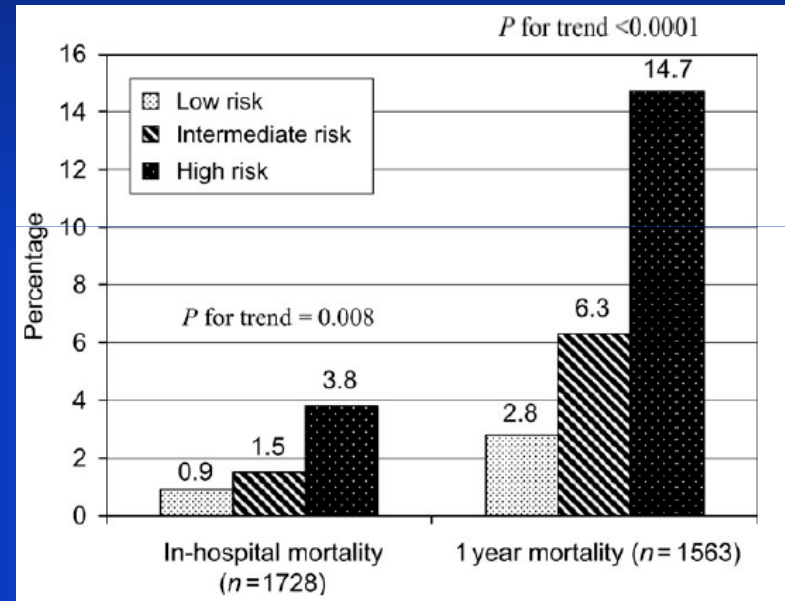


Figure 2 In-hospital and 1 year outcomes by TIMI RS (tertiles).

Treating physicians were asked to categorize their patients into low, intermediate, and high-risk groups on the basis of overall risk assessment of medical history (e.g. age), physical examination (e.g. heart failure or haemodynamic instability), and laboratory investigations (e.g. ST-segment deviation on ECG). This approach was similar to the American College of Cardiology/American Heart Association (ACC/AHA) and the European Society of Cardiology (ESC) consensus guidelines.^{1,2}

Risikostratifizierung mit dem TIMI Score: für zeitgemäss behandelte Patienten ungenügend

TIMI Risk Score for STEMI

Historical

Age 65-74	2 points
Age \geq 75	3 points
DM/HTN or angina	1 point

Exam

SBP < 100	3 points
HR > 100	2 points
Killip II-IV	2 points
Weight < 67kg	1 point

Presentation

Anterior STE or LBBB	1 point
Time to rx > 4 hrs	1 point

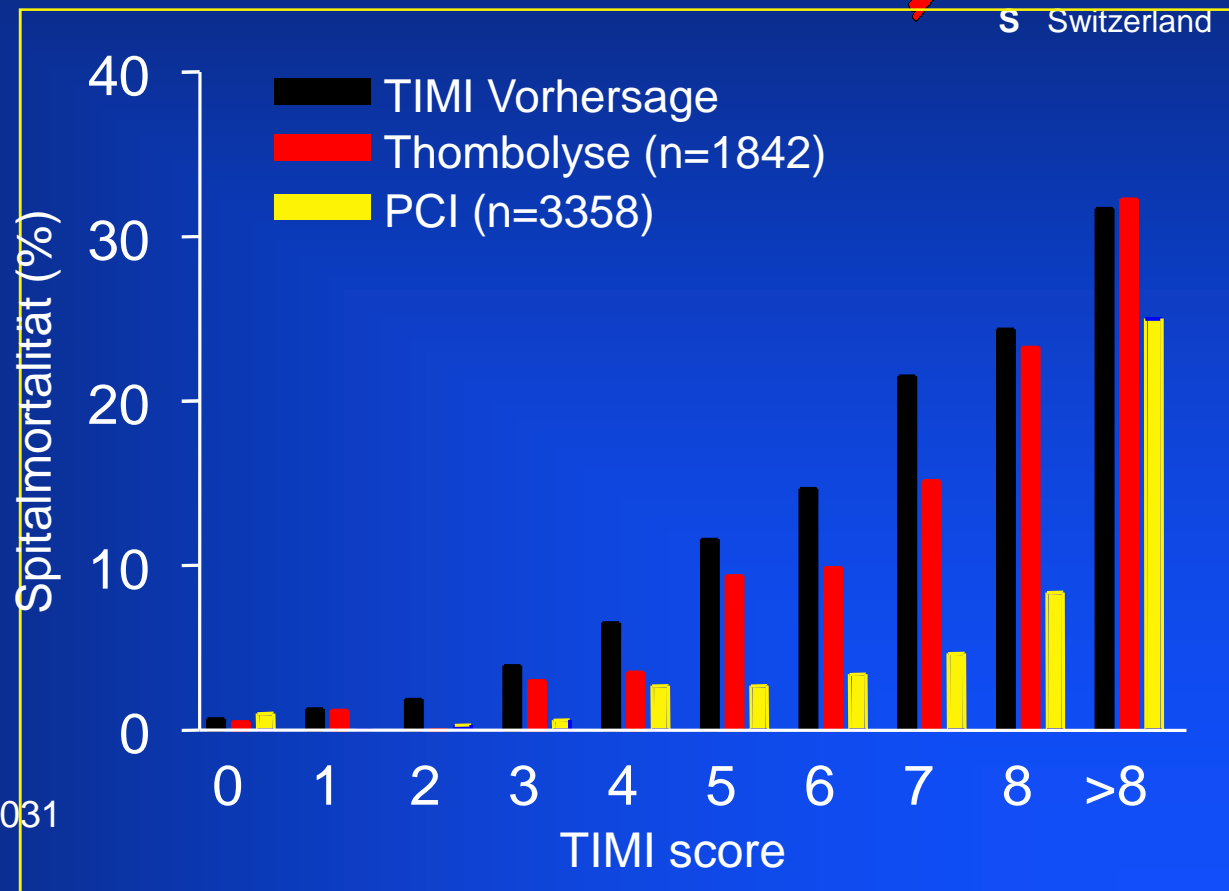
Risk Score = Total (0-14)

Morrow et al. *Circulation* 2000;102:2031

ST-Hebungsinfarkte im AMIS Register 1997-2004



A Acute
M Myocardial
I Infarction in
S Switzerland



Kurz et al. *Eur Heart J* 2006;27:10 (abstract)

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Validated risk prediction scores for ACS mortality:

AMIS model, GRACE score, TIMI risk score

AMIS Model	GRACE score	TIMI Risk Score
<ol style="list-style-type: none"> 1. age 2. Killip class 3. systolic BP 4. heart rate 5. prehospital CPR 6. history of heart failure 7. history of stroke / cerebrovascular disease 	<ol style="list-style-type: none"> 1. age 2. Killip class 3. systolic BP 4. heart rate 5. prehospital CPR 6. Serum creatinine 7. ST-segment deviation 8. Elevated myocardial markers 	<ol style="list-style-type: none"> 1. age 2. Killip class 3. systolic BP 4. heart rate 5. Weight <67kg 6. diabetes 7. hypertension 8. history of angina 9. LBBB or anterior MI 10. time to treatment

Model-Output: Risk of hospital death (%)

FRE



University of Zurich
Institute of Social and
Preventive Medicine



AMIS Plus

- Home
- Project
- News and Events
- Steering Committee
- Data Center
- Data Entry
- Documents
 - AMIS Documents
 - Newsletters
 - Publications
- Online Analysis
- AMIS Risk Model Calculator
- Sponsors and Donators
- Participants
- Links
- Contact

AMIS Plus - National



The AMIS Plus national registry co... (acute myocardial infarction, unsta... admission, hospital and follow-up p... diagnostics, urgent therapy strateg... data gathered are important for ass... practice, investigating patient group... assurance as well as the continuo... database.

AMIS Model

Age

Systolic Blood Pressure

Heart Rate

Killip Classification

Pre-hospital cardio-pulmonary resuscitation*

History of heart failure*

History of cerebrovascular disease / stroke*

*Fill in 0 for no, 1 for yes

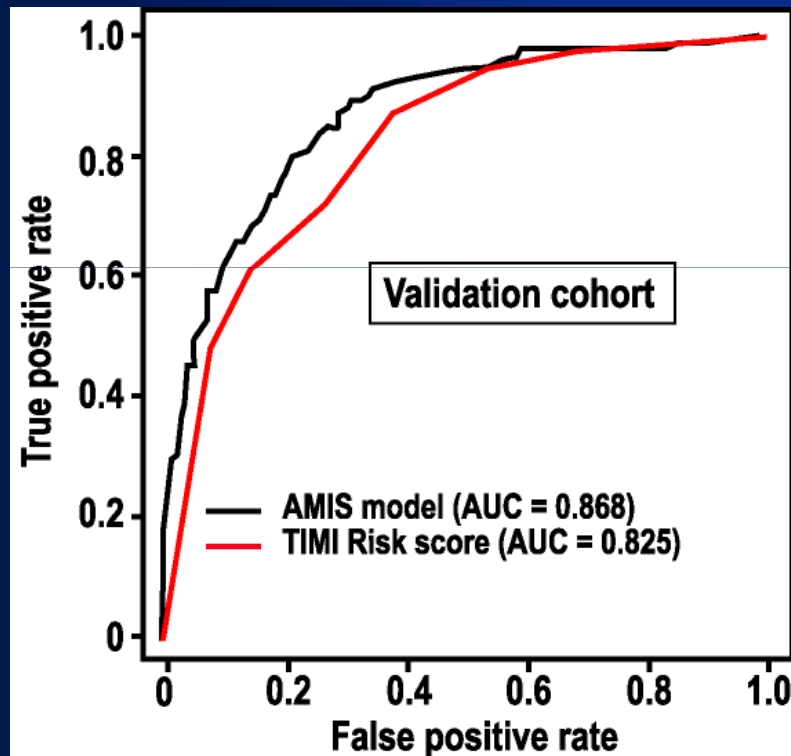
Prediction Result

Predicted Mortality Risk:

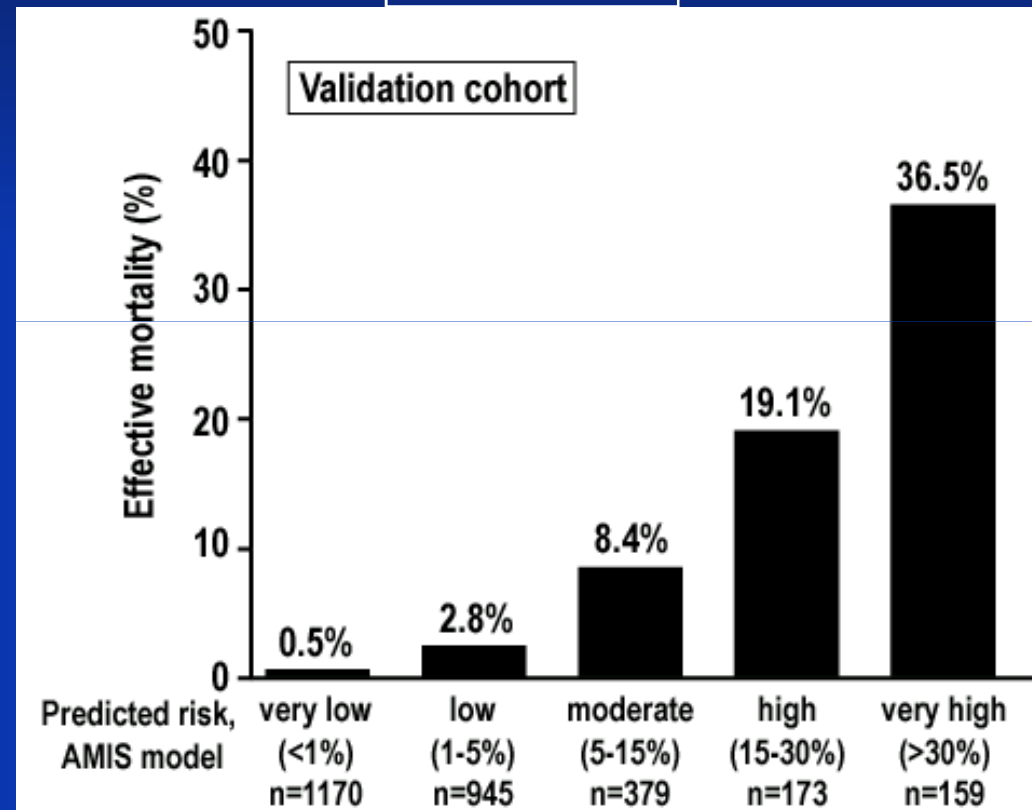
Java Applet Window

Validierung des AMIS Modells

Diskrimination: ROC Kurve

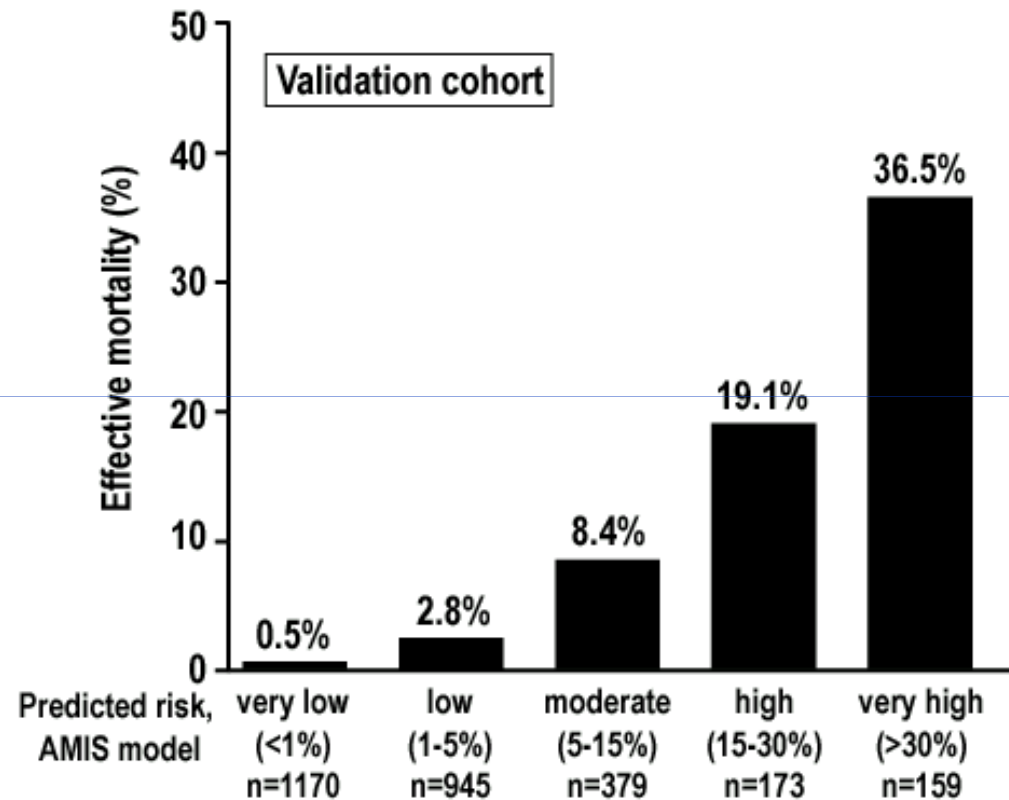
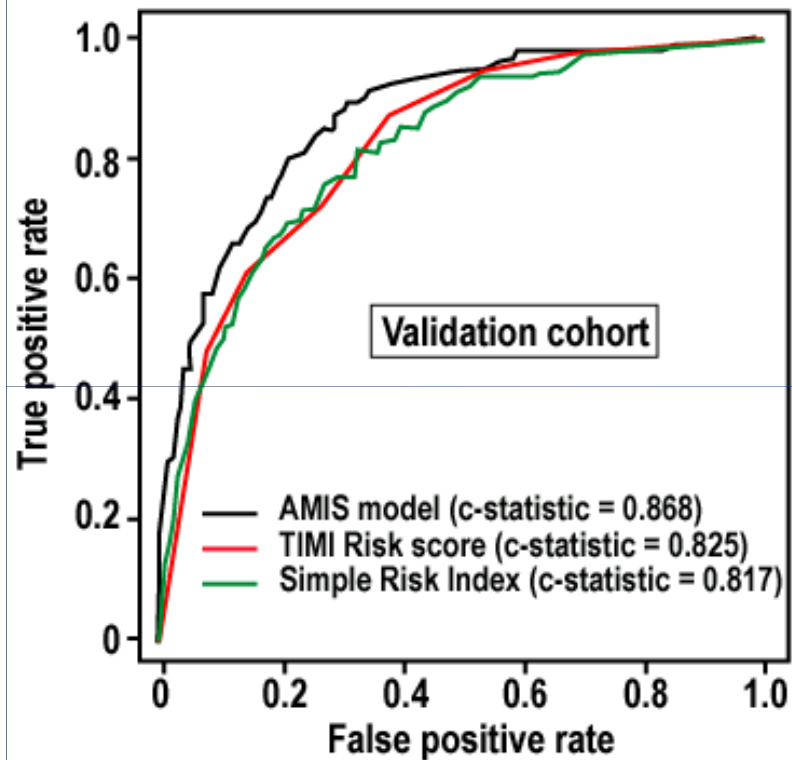


Kalibrierung



- Alle Patienten im AMIS Register Juni 2005 - Juli 2006 (n = 2854)
- AUC = 0.868

Präzision der Vorhersage mit verschiedenen Scores



alle ACS Patienten im AMIS-Plus Register Juni 2005 - Juli 2006

n = 2854

Spitalmortalität 5.5%



The Krakow (Malopolska) ACS Cohort

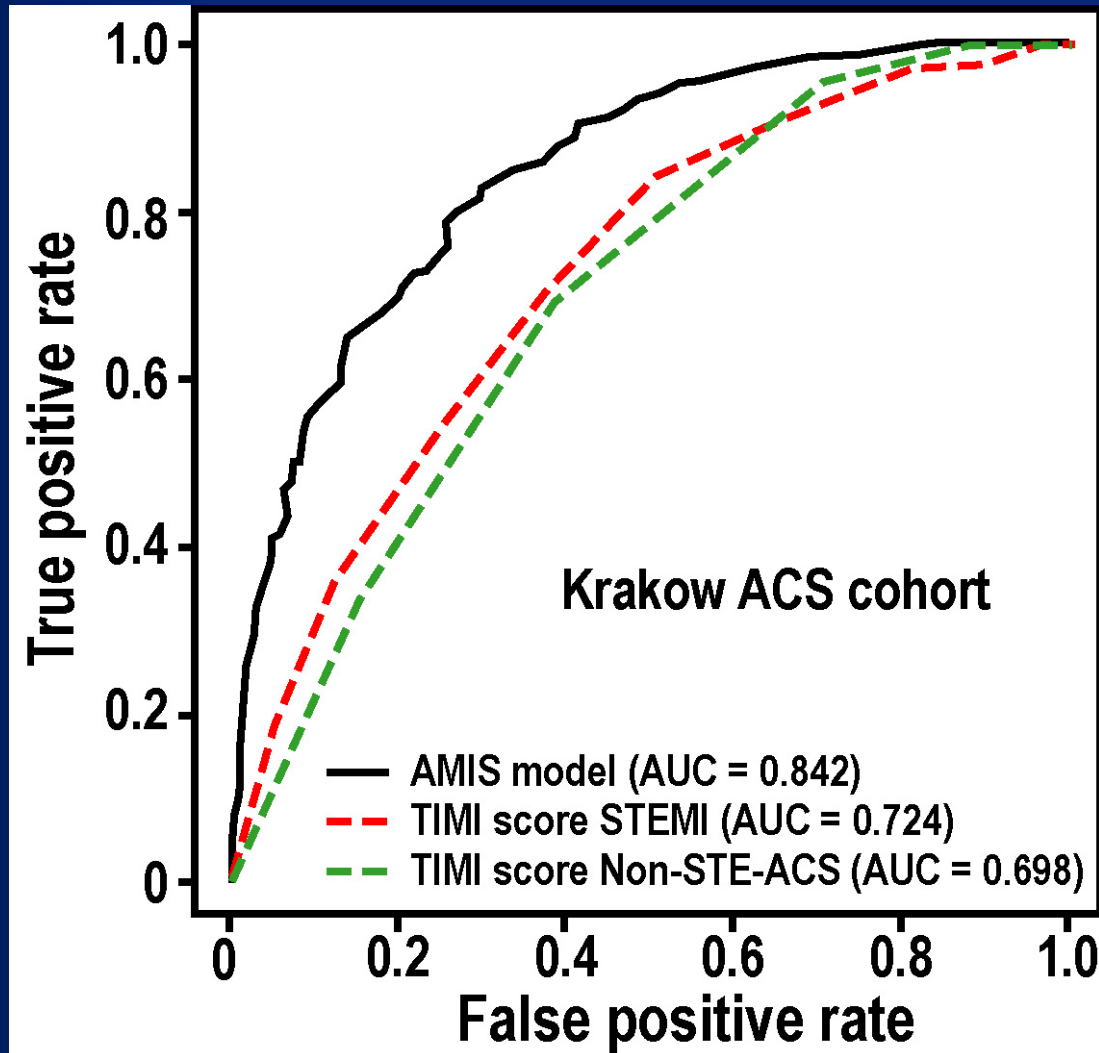
- ◆ Selectively included patients treated with a **non-invasive strategy** in 29 hospitals in the greater Krakow area (Poland)
- ◆ Inclusion time frame: 2002 - 2006
- ◆ 2635 patients
- ◆ Hospital mortality 7.6%
- ◆ Due to the ability of the AMIS model to cope with missing data: analysis of the complete cohort without exclusions



Malopolska Region
Poland



Performance of the AMIS Model in the Krakow ACS Cohort



**AMIS model:
AUC = 0.842**

**TIMI STEMI:
AUC = 0.724**

**TIMI Non-STE-ACS:
AUC = 0.698**

Summary I

◆ AMIS Data Collection:

- Prospective inclusion of all patients with ACS in participating hospitals
- Comparable to other large national registries eg. RIKS-HIA
- Different to point in time observance of European Heart Survey, CRUSADE etc.
- Different to selective inclusion in GRACE registry

Summary II

- ◆ AMIS Datas Set (>180 Variables)
 - Comparable to leading registries eg. GRACE
 - Allows reliable and comparative analysis of specific variables e.g. age, gender, diabetes
 - Allows establishment of very robust risk score

- ◆ AMIS Follow-up
 - Different to national registries (usually no follow-up)
 - Comparable to GRACE