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AMIS
Acute Myocardial
Infarction
in Switzerland

SCIENTIFIC MILESTONES

Prof. Marco Roffi

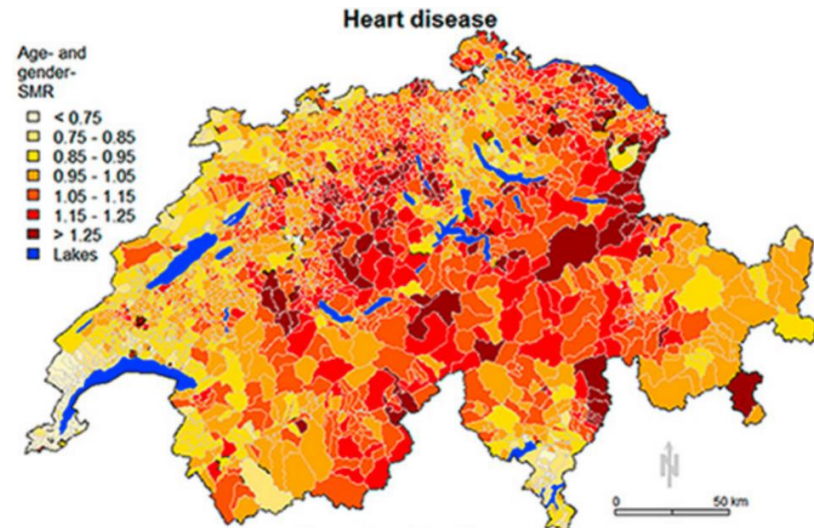
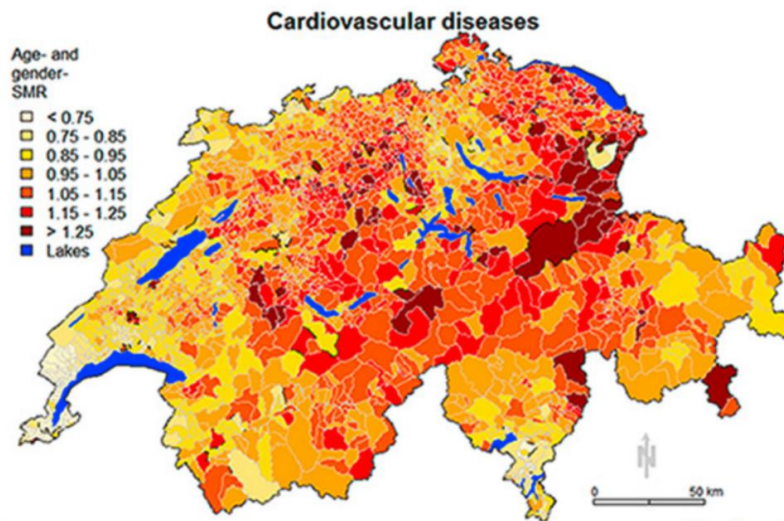
University Hospitals
Geneva

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Geographical distribution of mortality risk due to cardiovascular / heart disease in Switzerland 2008 – 2012



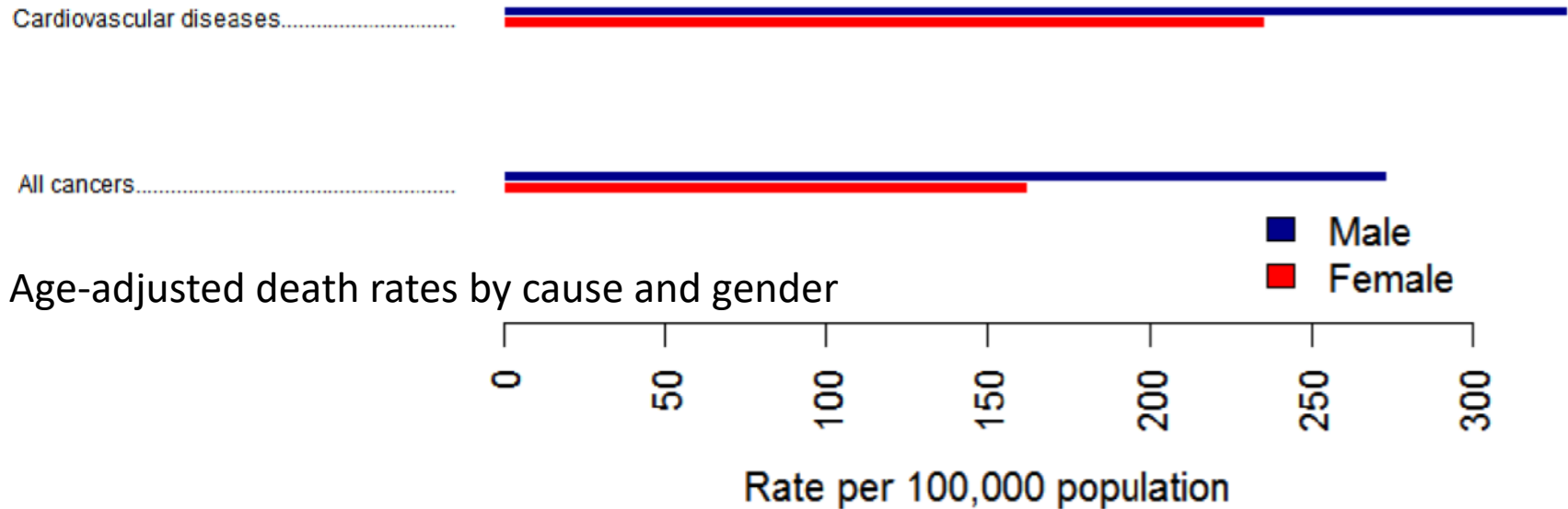
Cardiovascular diseases → 36% of deaths in Switzerland 2008–2012
→ leading cause of mortality

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Cardiovascular Mortality in Women



Cardiovascular disease → leading cause of mortality among men and women in Switzerland 2008 – 2012

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The screenshot shows the AMIS website interface. At the top, there is a dark red header bar. On the left side of the header, there is a logo consisting of a heart shape made of red dots, followed by the text "AMIS Acute Myocardial Infarction in Switzerland". In the center of the header, there is a white button labeled "TOOLS". To the right of the "TOOLS" button, there is a white ECG line graphic. Below the header, there is a navigation menu with five items: "ABOUT AMIS", "ORGANIZATION", "DOCUMENTS", "SPONSORS", and "CONTACT". Below the navigation menu, there is a light blue sidebar on the left. The sidebar has two sections: "Quick Navigation" and "Tools". The "Quick Navigation" section has three items: "Introduction", "News", and "Project". The "Tools" section has three items: "Data Entry", "Reporting System", and "Risk Calculator". The main content area is white and features a large red heart logo made of dots on the left, followed by the text "AMIS". Below the logo, there is a red heading: "AMIS Plus - National Registry of Acute Myocardial Infarction in Switzerland". In the bottom right corner of the main content area, there is a red button with a white upward-pointing arrow.

<https://amis-plus.ch/>

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Myocardial Infarction in Switzerland

The AMIS Plus national registry collects and analyzes data on patients with acute myocardial infarction in Switzerland in the pre-admission, hospital and follow-up phases. Emphasis is placed on the evaluation of risk factors, diagnostics, urgent therapy strategies and treatment. AMIS Plus data are important for quality assurance, assessing guidelines, improving compliance with guidelines in clinical practice, verifying whether results of randomized clinical trials are translatable into everyday clinical practice, investigating patient groups not extensively studied in large randomized trials and improving therapeutic strategies.

News

06.04.23 - AMIS Plus 25th Anniversary Symposium



We are thrilled to present you the **program** of our 25-year anniversary symposium! We look forward to seeing you in Berne.

06.04.23 - AMIS Plus 25th Anniversary Symposium

23.02.23 - Prognostic value of low heart rates in patients admitted with acute myocardial infarction

26.01.23 - *25th ANNIVERSARY - SAVE THE DATE*

Risk Calculator

Latest Publications

04.02.2023 - Prognostic Value Of Low Heart Rates In Patien...

Infos

Twitter

Links

Archives

News Archive

Publications Archive

Newsletters Archive

Presentations, Reports

Press Archive

91 publications, 82 peer-reviewed

<https://amis-plus.ch/>

FIRST PAPER

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AMIS
Acute Myocardial
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in Switzerland

Original article

Kardiovaskuläre Medizin 2000;3:430–40

*P. Urban^a, M. S. Bernstein^b, M. C. Costanza^b,
R. Simon^c, R. Frey^d, P. Erne^e, for the AMIS
Investigators*

^a Cardiovascular Department
La Tour Hospital, Geneva

^b Clinical Epidemiology Unit, Community
Medicine, University Hospital, Geneva

^c Department of Medicine, Kantonsspital, Altdorf

^d Department of Medicine, Kantonsspital,
Schaffhausen

^e Cardiology Division, Kantonsspital, Lucerne

An Internet-based registry of acute myocardial infarction in Switzerland¹

- Joint effort from cardiology with other disciplines
- No “Röstigraben”

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ACUTE REPERFUSION 1997- 1998

	n	%
intravenous thrombolysis	1133	36.4
immediate ("direct") PTCA within 12h following admission	237	7.6
IV thrombolysis and/or direct PTCA and/or coronary bypass surgery within 48 hours (i.e. early myocardial reperfusion therapy)	1426	47.0

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ASSESSMENT OF DRUG TREATMENTS

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HeartDrug™

Clinical Trial

Heart Drug 2003;3:134–140
DOI: 10.1159/000073838

Received: July 17, 2003
Accepted after revision: September 2, 2003

Early Drug Therapy and In-Hospital Mortality following Acute Myocardial Infarction

Paul Erne^a Dragana Radovanovic^b Philip Urban^d
Jean-Christophe Stauffer^e Osmund Bertel^c Felix Gutzwiller^b
for the AMIS Plus Investigators ¹



Table 3. Multivariate logistic regression model for predicting in-hospital mortality at admission (n = 6,306)

	OR	95.0% confidence interval for OR		p value
		lower	upper	
Age (per year)	1.064	1.05	1.08	0.000
Gender	0.85	0.69	1.05	0.13
Killip class 1	1.00			–
Killip class 2	2.13	1.68	2.69	0.000
Killip class 3	4.32	3.19	5.84	0.000
Killip class 4	13.63	8.96	20.71	0.000
Diabetes	1.34	1.07	1.67	0.011
Hypertension	1.12	0.91	1.38	0.279
Aspirin ¹	0.63	0.45	0.89	0.009
Beta-blocker ¹	0.46	0.37	0.57	0.000
Ticlopidine, clopidogrel ¹	0.49	0.35	0.70	0.000
Standard heparin ¹	1.13	0.86	1.49	0.393
ACE inhibitor ¹	0.60	0.49	0.75	0.000
Nitrate ¹	0.58	0.46	0.73	0.000
Thrombolysis	0.69	0.54	0.87	0.002
Primary PCI	0.66	0.44	0.99	0.044

¹ Medication within 48 h after chest pain began (including emergency medication).

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SMW

Established in 1871

Swiss Medical Weekly

Formerly: Schweizerische Medizinische Wochenschrift

The European Journal of Medical Sciences

Original article | Published 9 May 2012, doi:10.4414/smw.2012.13573

Cite this as: Swiss Med Wkly. 2012;142:w13573

Dramatic effect of early clopidogrel administration in reducing mortality and MACE rates in ACS patients

Data from the Swiss registry AMIS-Plus

Jean-Christophe Stauffer, Jean-Jacques Goy, Nicole Duvoisin, Dragana Radovanovic, Hans Rickli, Paul Erne on behalf of the AMIS group

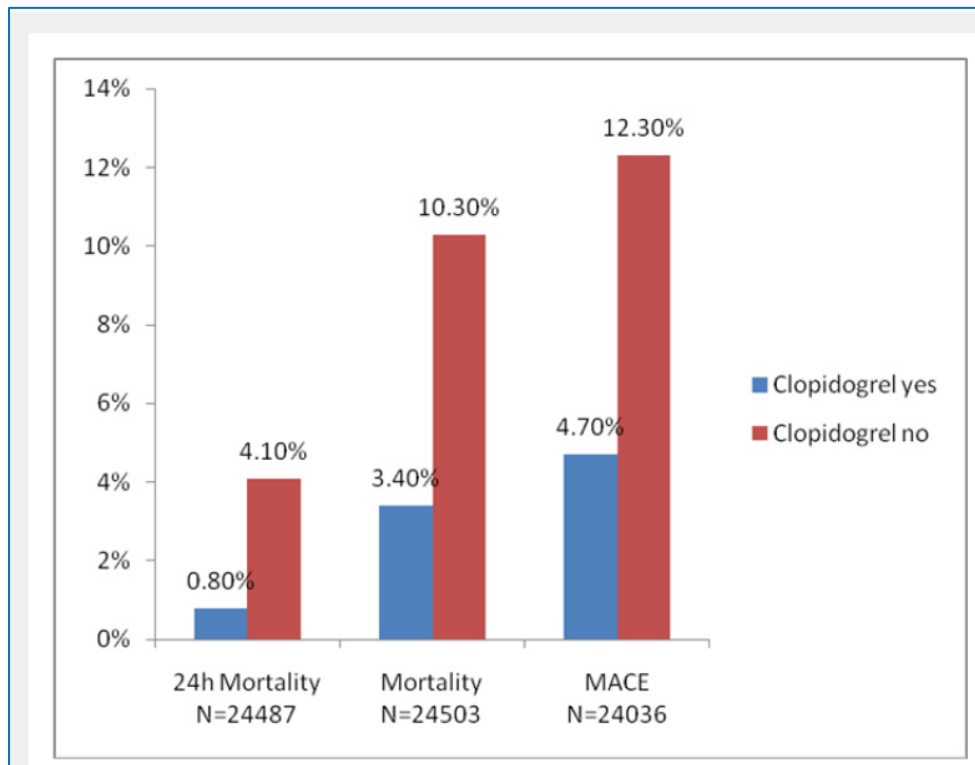


Table 4: Independent predictors for in-hospital mortality.

	OR	95% CI	<i>p</i>
Clopidogrel	0.57	0.48–0.69	<0.001

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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*



Guideline-Recommended Medical Therapies in Older Patients Compared with Younger Patients

Medical Therapy	Adjusted [‡]	
Acetylsalicylic acid [§]	0.976 (0.969–0.980)	< .001
Clopidogrel [§]	0.975 (0.973–0.979)	< .001
Acetylsalicylic acid, clopidogrel, or both [§]	0.969 (0.961–0.976)	< .001
Heparin [§]	0.999 (0.994–1.003)	.63
Beta-blocker [§]	0.985 (0.981–0.989)	< .001

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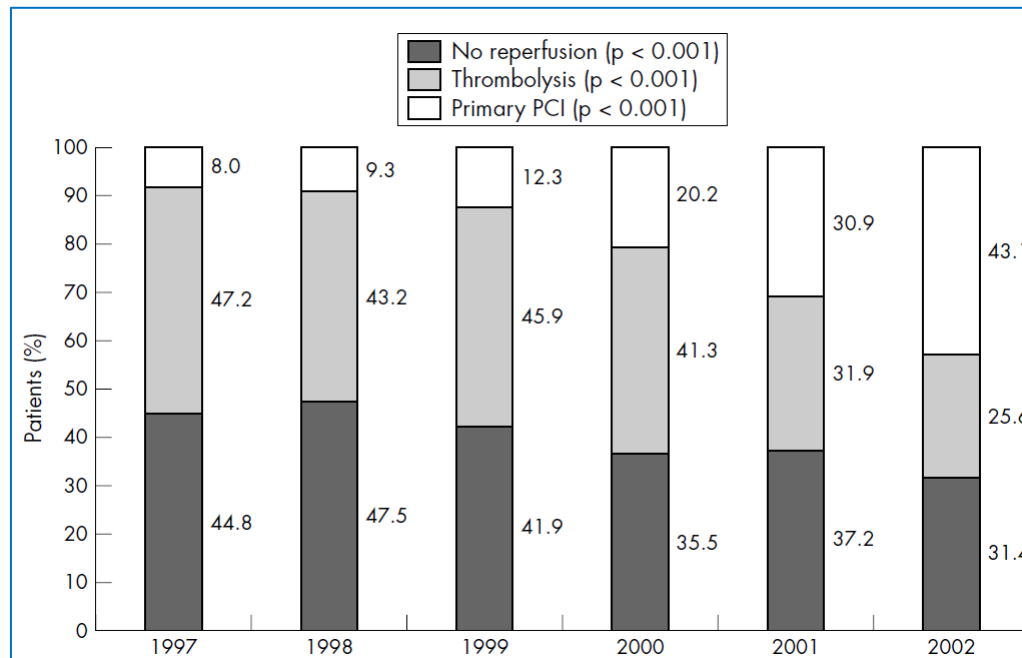
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INSIGHTS ON SWISS PRACTICE

Trends in reperfusion therapy of ST segment elevation myocardial infarction in Switzerland: six year results from a nationwide registry

A-A Fassa, P Urban, D Radovanovic, N Duvoisin, J-M Gaspoz, J-C Stauffer, P Erne and for the AMIS Plus Investigators

Heart 2005;91;882-888



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Comparison of In-Hospital Mortality for Acute Myocardial Infarction in Switzerland With Admission During Routine Duty Hours Versus Admission During Out of Hours (Insight Into the AMIS Plus Registry)

Alexandre Berger, MD^{a,*}, Jean-Christophe Stauffer, MD^b, Dragana Radovanovic, MD^c, Philip Urban, MD^d, Osmund Bertel, MD^e, Paul Erne, MD^f, for the AMIS Plus Investigators

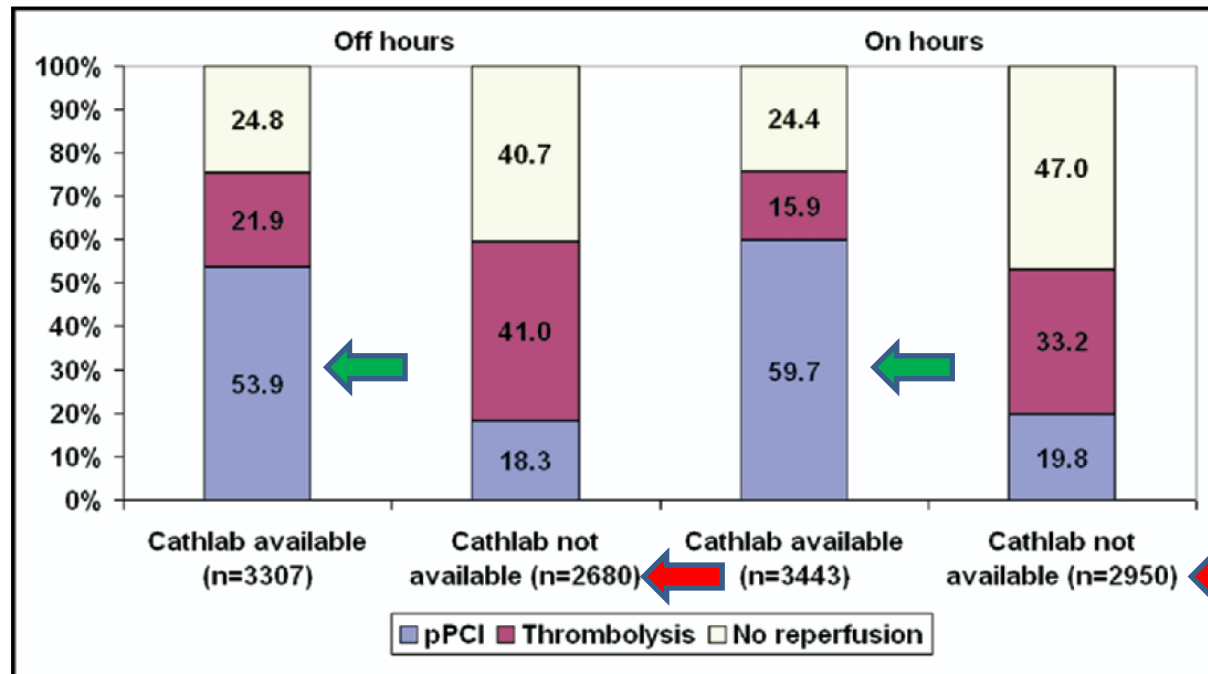


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1997-2006



Swiss interventional cardiologists committed!



Impact of cardiac rehabilitation participation on patient-reported lifestyle changes one year after myocardial infarction

Matthias Hermann^{1,2}, Fabienne Witassek³, Paul Erne³, Franz Eberli⁴, Olivier Muller⁵, Marco Roffi⁶, Marco Maggiorini⁷, Dragana Radovanovic³ and Hans Rickli⁸; on behalf of the **AMIS Plus** Investigators

European Journal of Preventive
Cardiology
0(00) 1–4
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Cardiology 2019
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DOI: 10.1177/2047487319895429
journals.sagepub.com/home/cpr


Therefore, our study demonstrates that participation in a comprehensive CR program after AMI in Switzerland results in beneficial lifestyle changes, such as increased physical activity and healthy eating, and a reduction of smoking, stress and body weight after a follow-up of one year.

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SEX(GENDER)-RELATED ISSUES

PIONEERS IN 2003!

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Akuter Herzinfarkt in der Schweiz

Werden Frauen anders behandelt als Männer?

DRAGANA RADOVANOVIC, BRIGITTE BISIG, FELIX GUTZWILLER, ZÜRICH; PAUL ERNE, LUZERN

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Open Access

Coronary artery disease

openheart Gender differences in the decrease of in-hospital mortality in patients with acute myocardial infarction during the last 20 years in Switzerland

Dragana Radovanovic,¹ Burkhardt Seifert,² Marco Roffi,³ Philip Urban,⁴
Hans Rickli,⁵ Giovanni Pedrazzini,⁶ Paul Erne^{1,7}

- 73% men, 27% women
- Mean age men 64 y and women 72 y

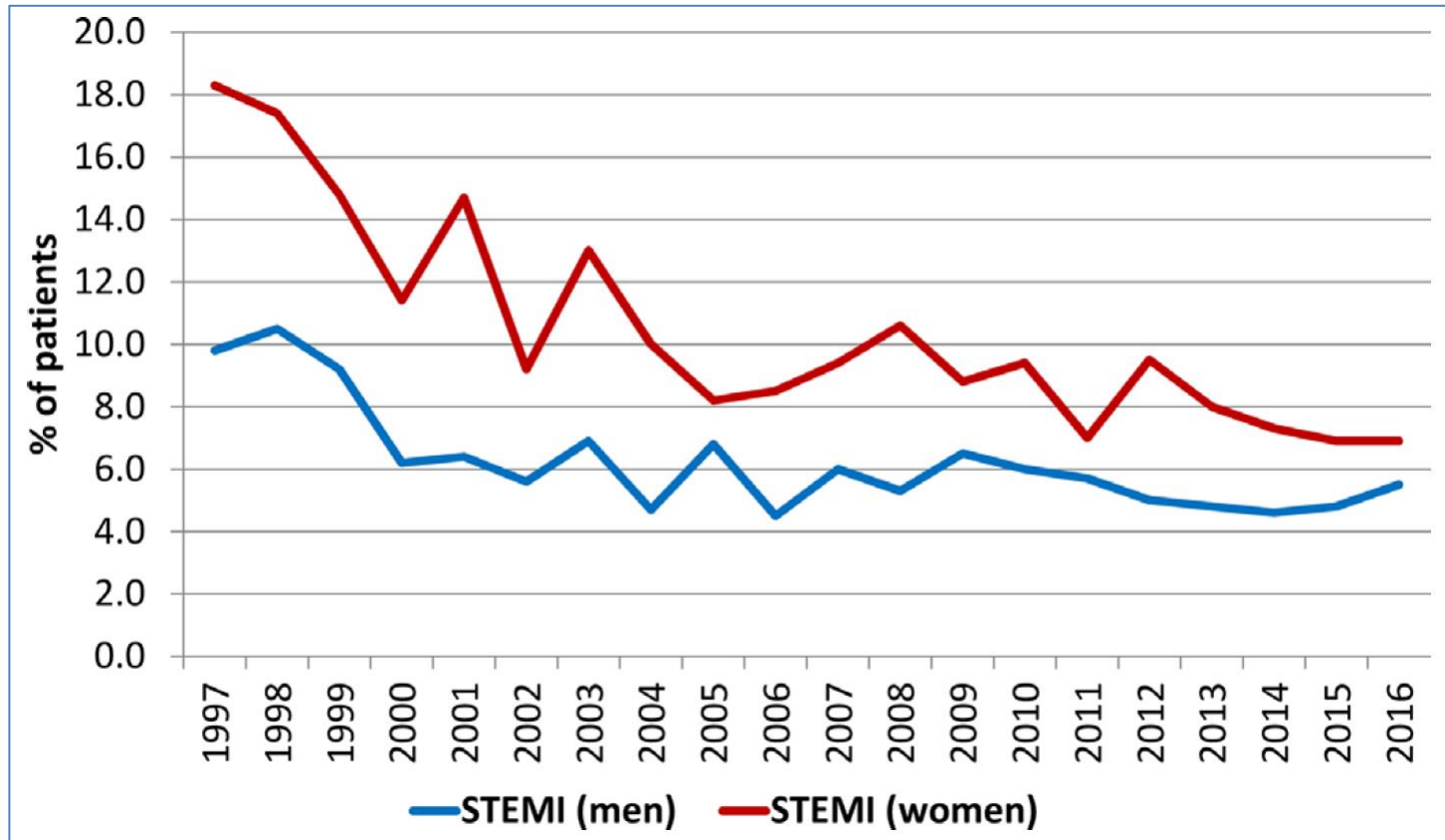
Open Heart 2017;4:e000689

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In-Hospital Mortality

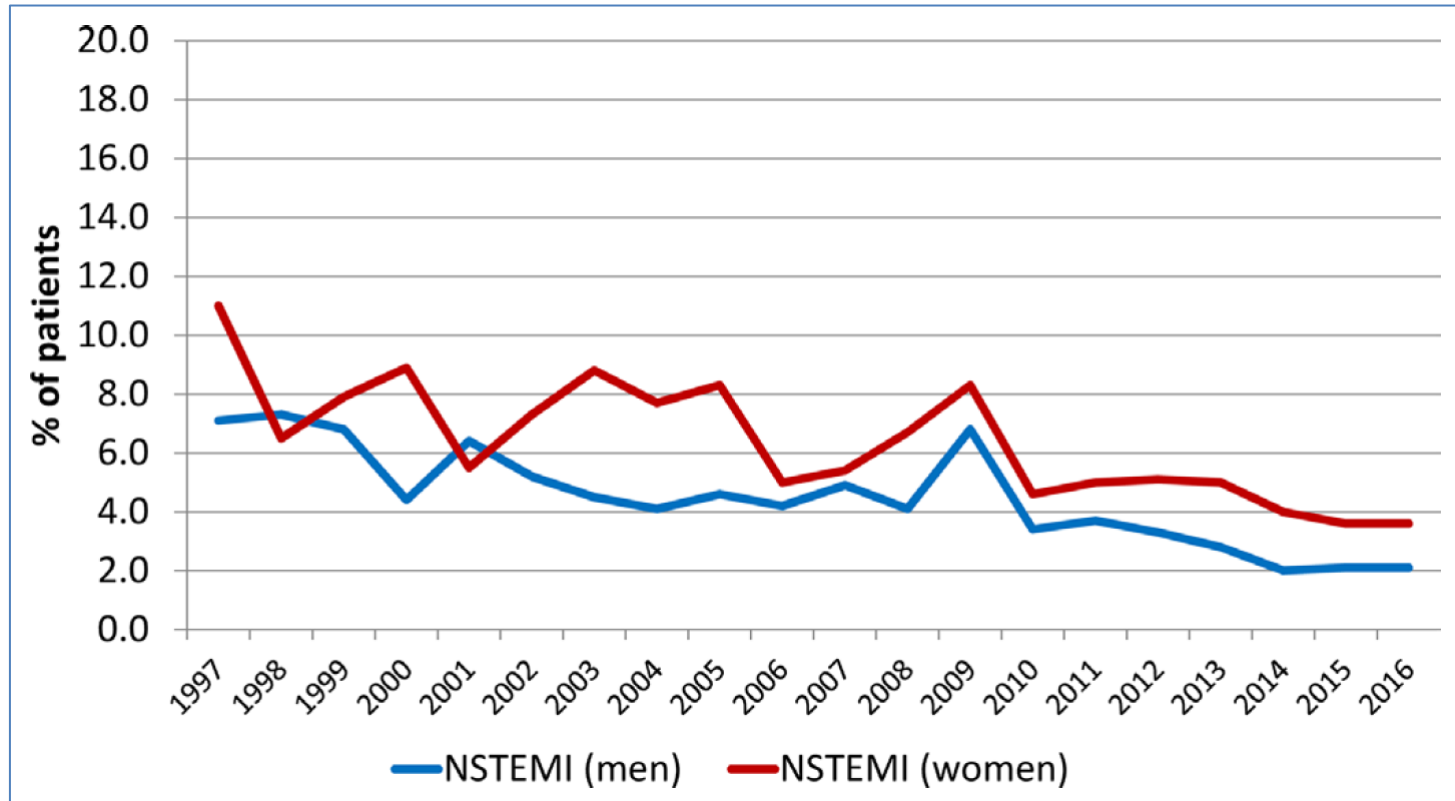


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In-Hospital Mortality

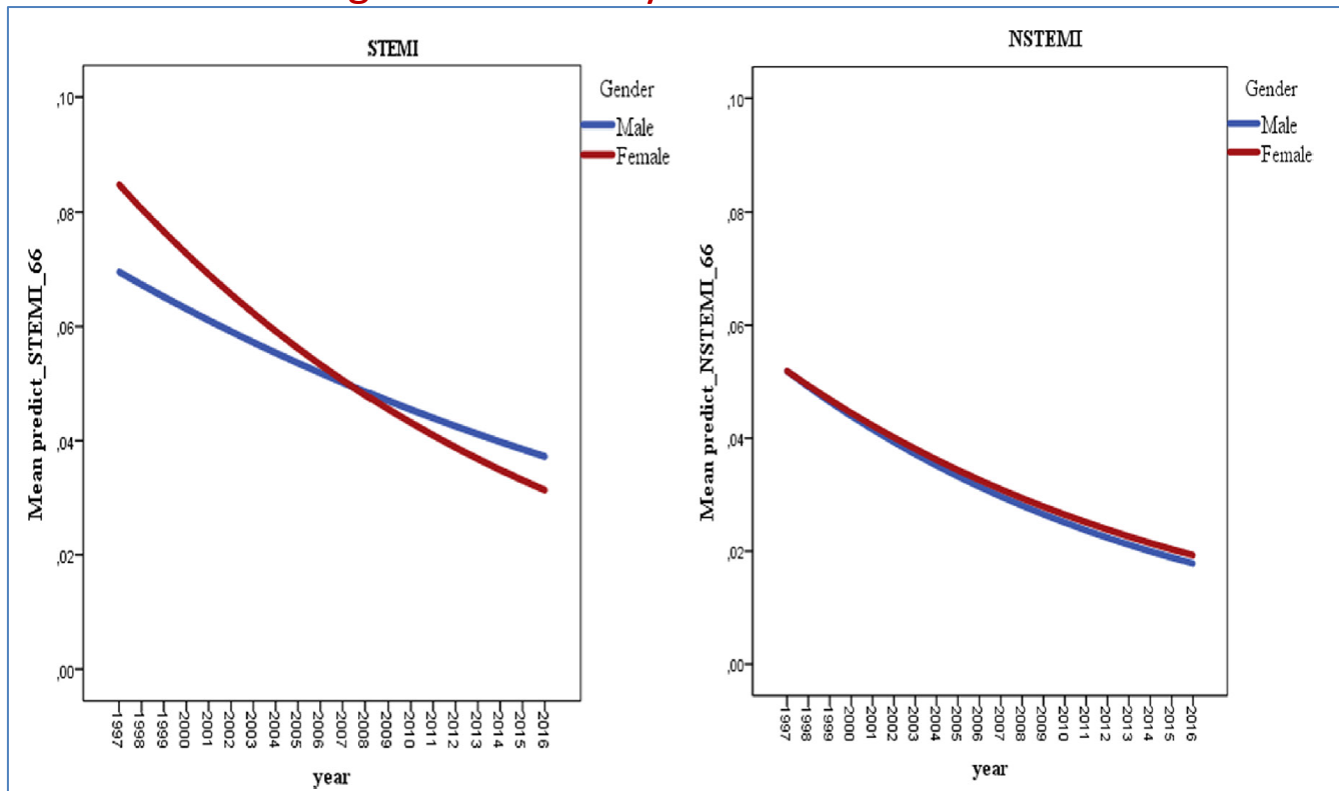


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Predicted in-hospital mortality according to logistic regression in patients with AMI aged 66 years according to admission year



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ESC

European Society
of Cardiology

European Journal of Preventive Cardiology (2023) 00, 1–7
<https://doi.org/10.1093/eurjpc/zwac294>

FULL RESEARCH PAPER

Cardiovascular disease

Reducing gap in pre-hospital delay between women and men presenting with ST-elevation myocardial infarction

**Fabienne Foster-Witassek ^{1*}, Hans Rickli², Marco Roffi ³,
Giovanni Pedrazzini ⁴, Franz Eberli ⁵, Amir Fassa ⁶, Raban Jeger ^{7,5},
Stéphane Fournier⁸, Paul Erne¹, and Dragana Radovanovic ¹, on behalf of the
AMIS Plus Investigators**

¹AMIS Plus Data Center, Epidemiology, Biostatistics and Prevention Institute, University of Zurich, Hirschengraben 84, 8001 Zurich, Switzerland; ²Department of Cardiology, Kantonsspital St. Gallen, Rorschacher Str. 95, 9000 St. Gallen, Switzerland; ³Department of Cardiology, University Hospital of Geneva, Rue Gabrielle-Perret-Gentil 4, 1205 Geneva, Switzerland; ⁴Department of Cardiology, Cardiocentro Ticino, Via Tesserete 48, 6900 Lugano, Switzerland; ⁵Department of Cardiology, Triemli Hospital, Birmensdorferstrasse 497, 8063 Zurich, Switzerland; ⁶Department of Cardiology, Hôpital de La Tour, Av. J.-D.-Maillard 3, 1217 Meyrin, Switzerland; ⁷Department of Cardiology, University Hospital Basel, University of Basel, Petersgraben 4, 4031 Basel, Switzerland; and ⁸Department of Cardiology, University Hospital of Lausanne (CHUV), Rue du Bugnon 46, 1011 Lausanne, Switzerland

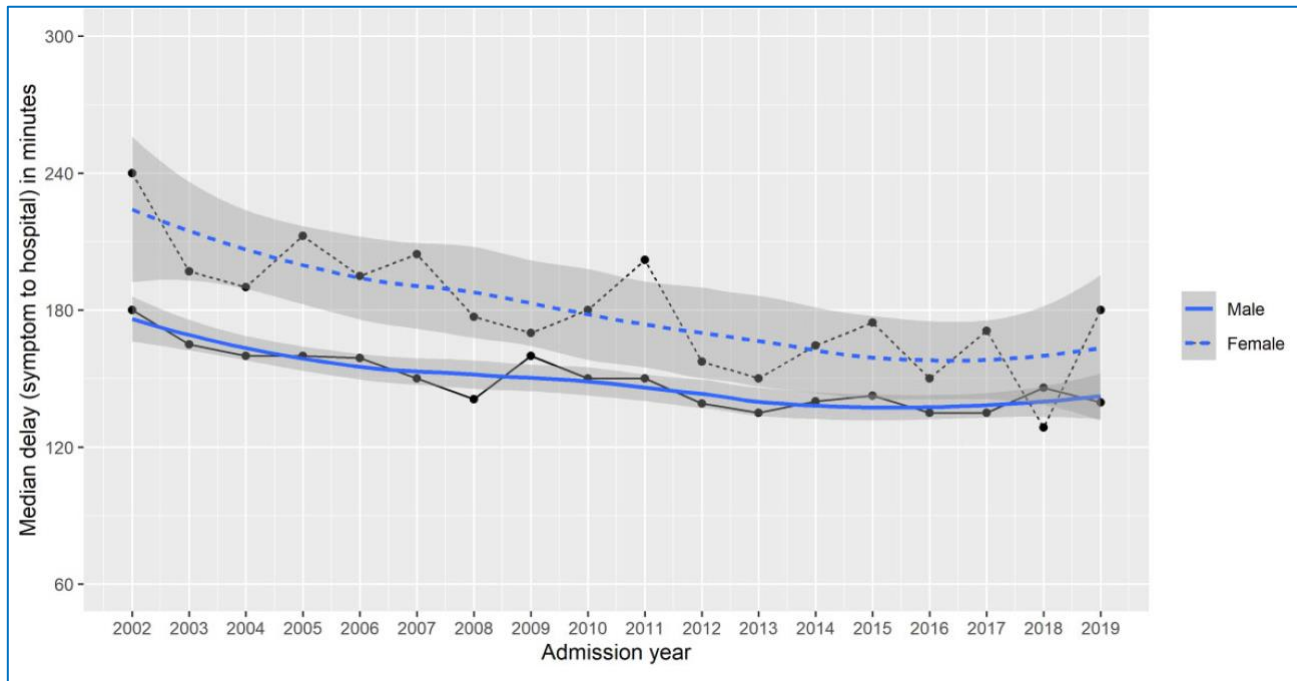
Received 12 August 2022; revised 20 October 2022; accepted 10 December 2022; online publish-ahead-of-print 13 December 2022

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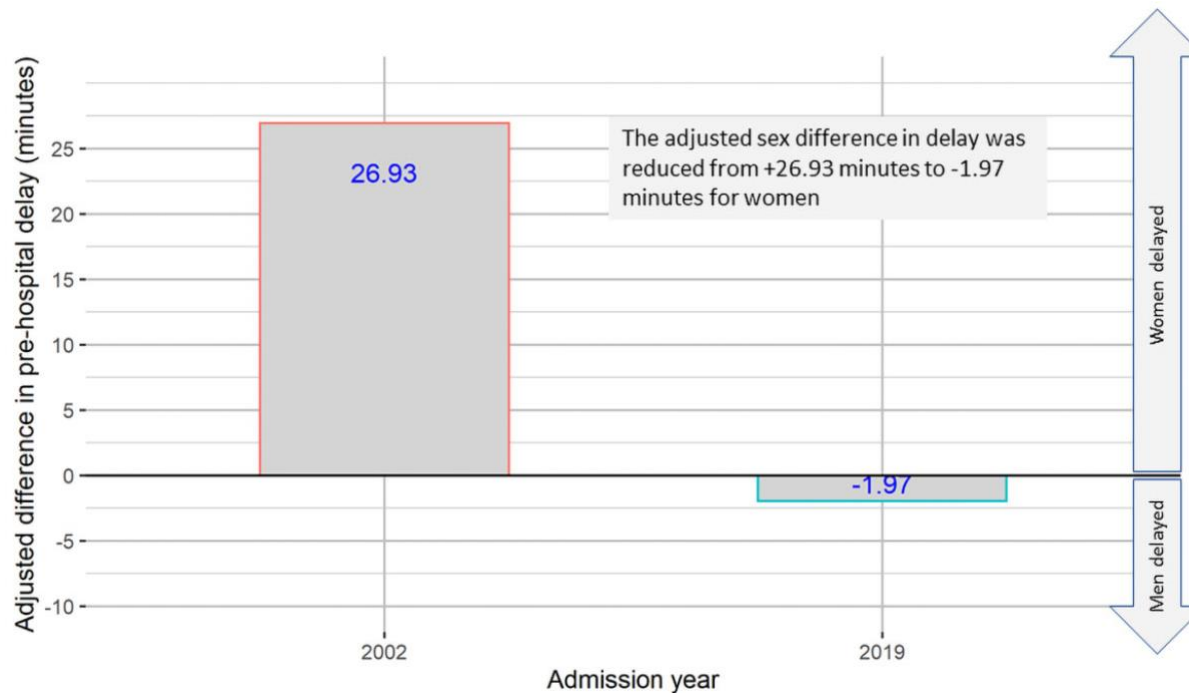
Median delay (symptoms to hospital)



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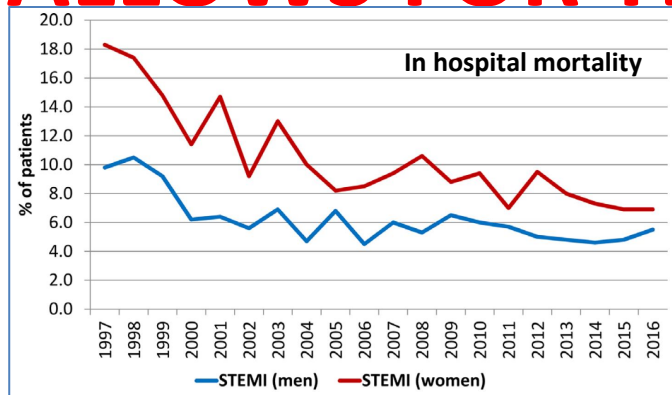


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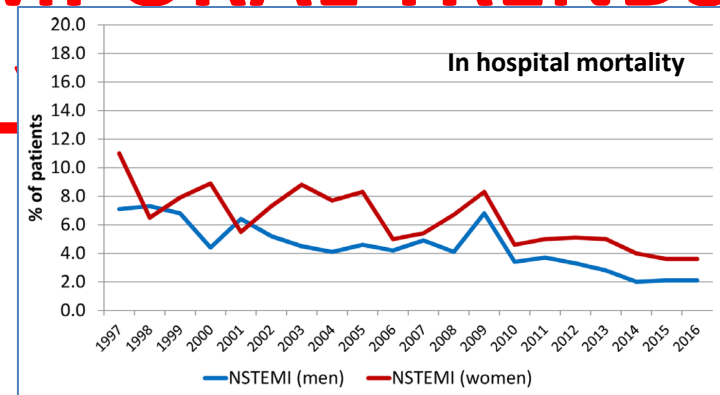
AMIS PLUS IS A LONG-TERM PROJECT

THIS IS **THE** STRENGTH OF IT

ALLOWS FOR TEMPORAL TRENDS



AL



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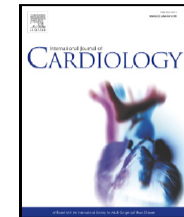


ELSEVIER

Contents lists available at [ScienceDirect](#)

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard



Temporal trends in in-hospital complications of acute coronary syndromes: Insights from the nationwide AMIS Plus registry



Barbara E. Stähli ^{a,*}, Marco Roffi ^b, Franz R. Eberli ^c, Hans Rickli ^d, Paul Erne ^e, Marco Maggiorini ^f, Giovanni Pedrazzini ^g, Dragana Radovanovic ^e, On behalf of the AMIS Plus Investigators

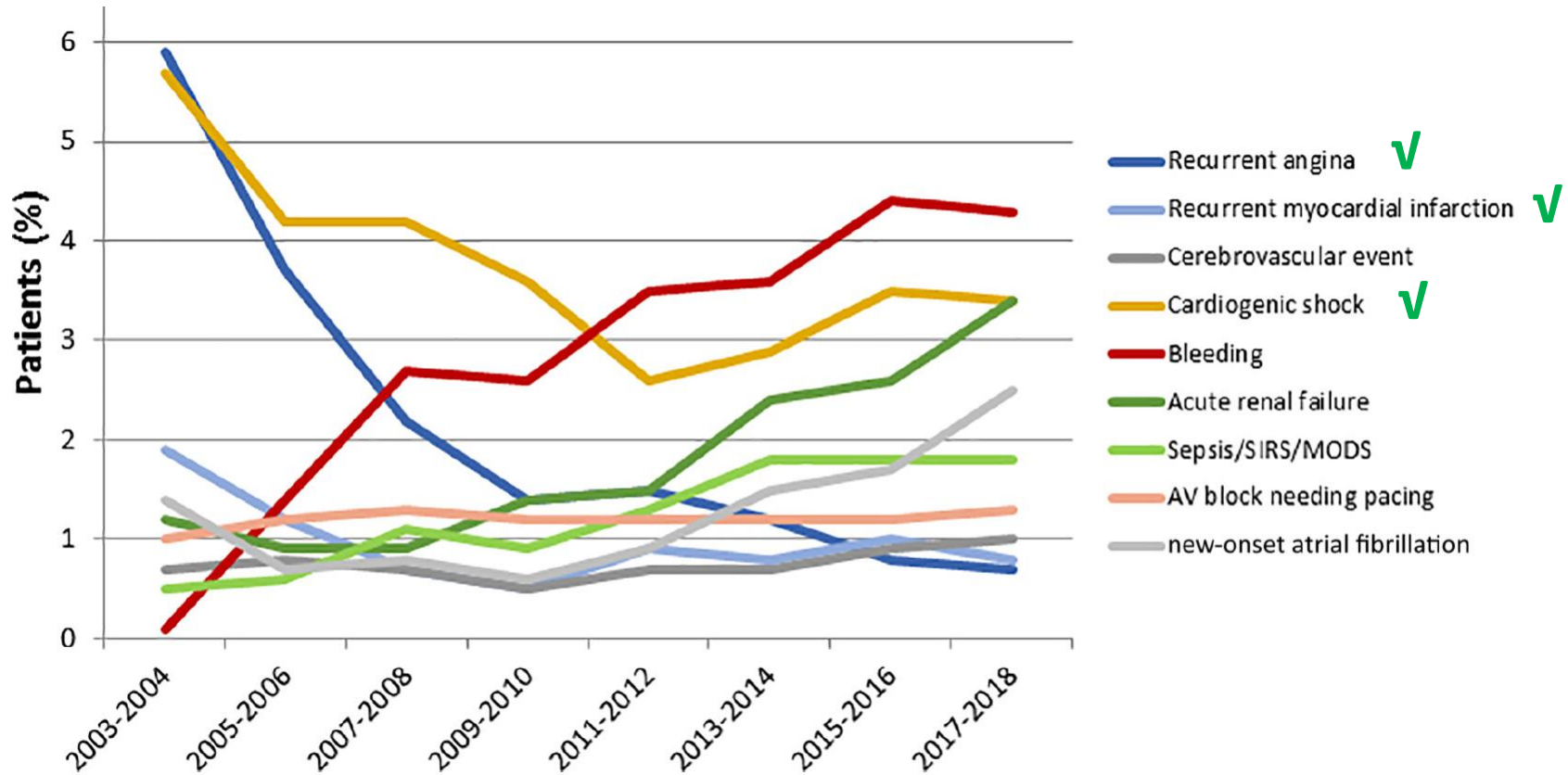
International Journal of Cardiology 2020;313:16–24

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In-hospital ischemic complications ↓

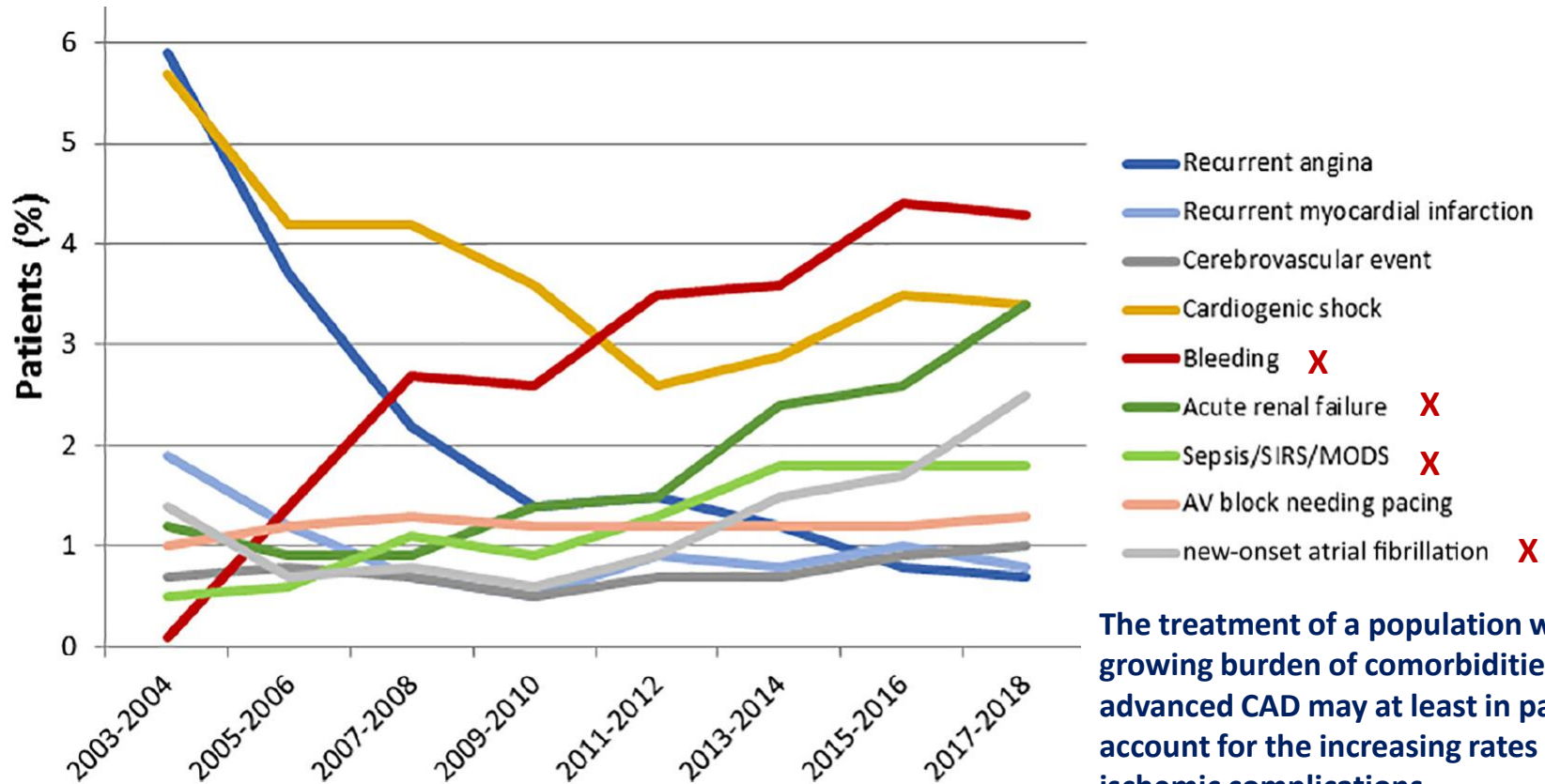


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In-hospital non-ischemic complications ↑



The treatment of a population with a growing burden of comorbidities and advanced CAD may at least in part account for the increasing rates of non-ischemic complications.

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ORIGINAL ARTICLE

Twenty-Year Trends in the Incidence and Outcome of Cardiogenic Shock in AMIS Plus Registry

BACKGROUND: Long-term trends of the incidence and outcome of cardiogenic shock (CS) patients are scarce. We analyze for the first time trends in the incidence and outcome of CS during a 20-year period in Switzerland.

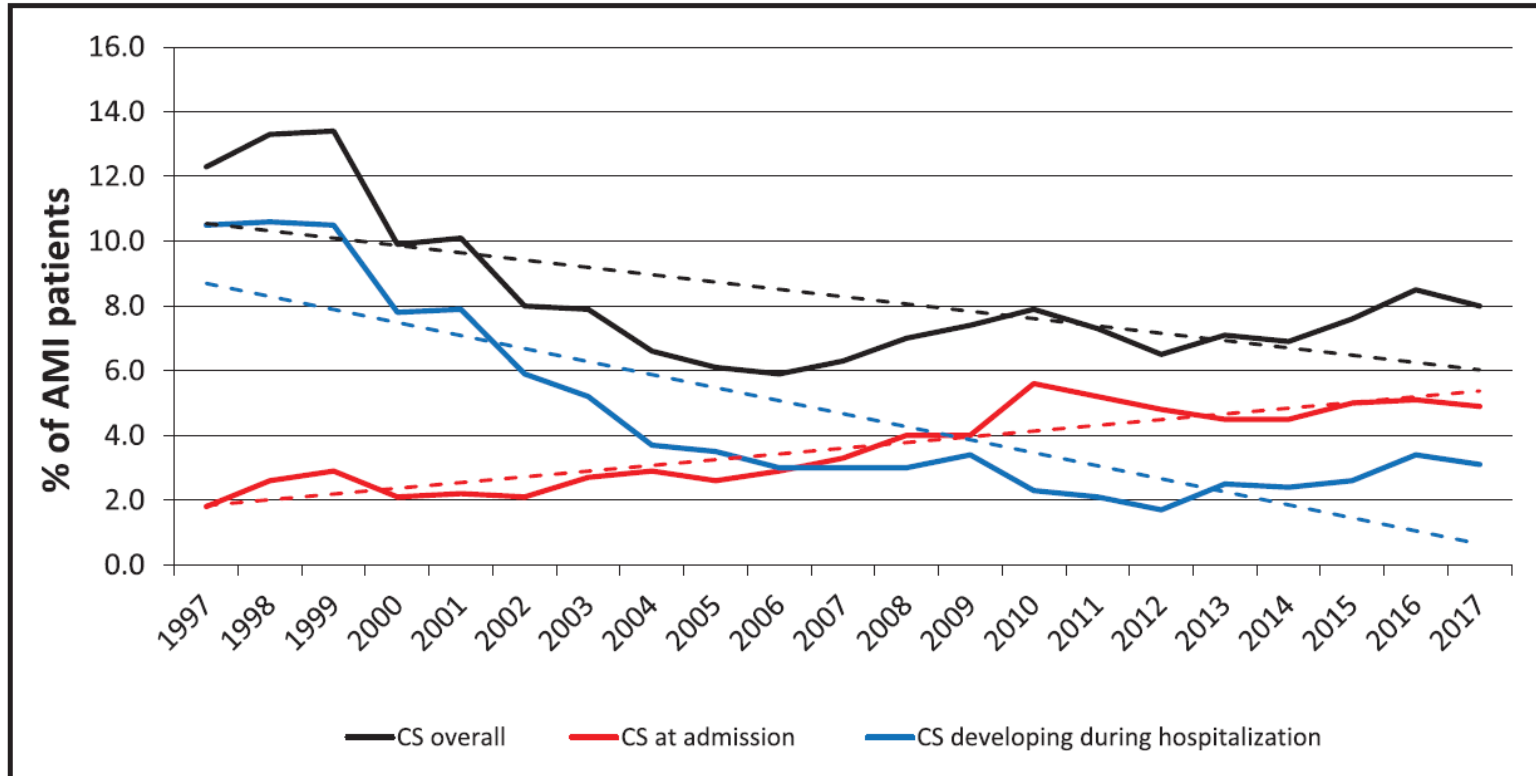
METHODS AND RESULTS: The AMIS (Acute Myocardial Infarction in Switzerland) Plus Registry enrolls patients with acute myocardial infarction from 83 hospitals in Switzerland. We analyzed trends in the incidence, treatment, and in-hospital mortality of patients with CS enrolled between 1997 and 2017. The impact of revascularization strategy on outcome was assessed for the time period 2005 to 2017. Among 52 808 patients

Lukas Hunziker, MD
Dragana Radovanovic, MD
Raban Jeger, MD
Giovanni Pedrazzini, MD
Florim Cuculi, MD
Philip Urban, MD
Paul Erne, MD
Hans Rickli, MD
Thomas Pilgrim, MD
the AMIS Plus Registry
Investigators*

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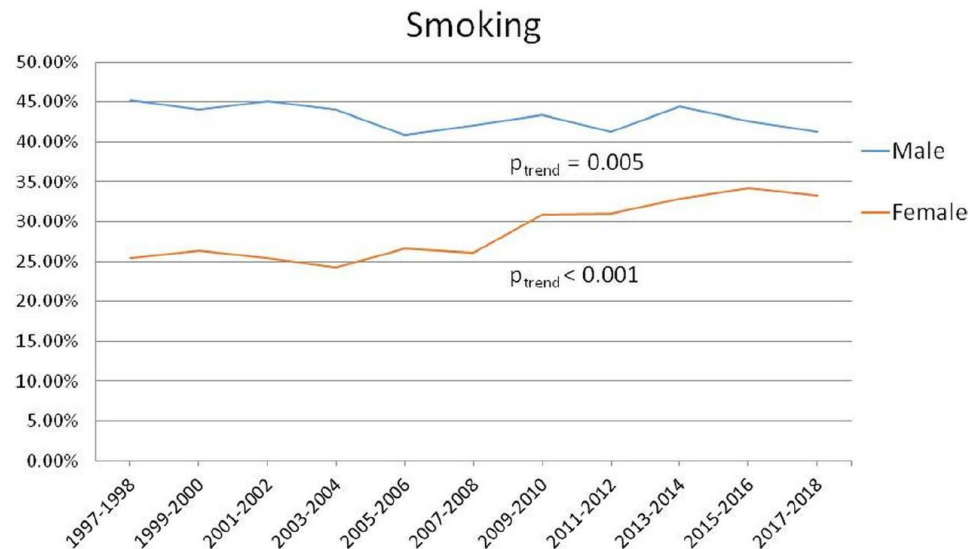


1997-2017 N = 51 842



Temporal trends in cardiovascular risk factors' prevalence in patients with myocardial infarction

Murat Cimci¹ | Fabienne Witassek² | Dragana Radovanovic² | Hans Rickli³ |
Giovanni B. Pedrazzini⁴ | Paul Erne^{2,5} | Olivier Müller⁶ | Franz R. Eberli⁷ |
Marco Roffi¹ 

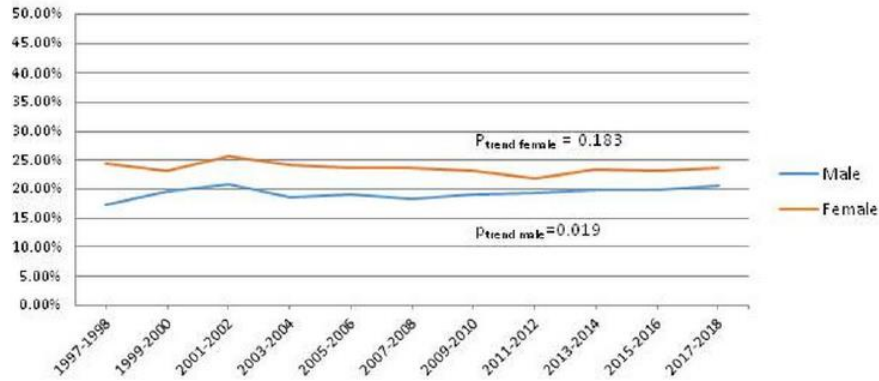


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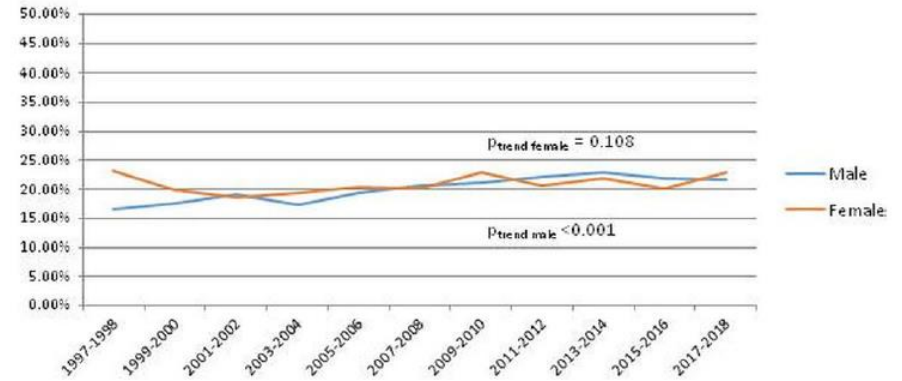


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Diabetes



Obesity



Against some common beliefs...though not representative of the general population

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Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

International Journal of Cardiology

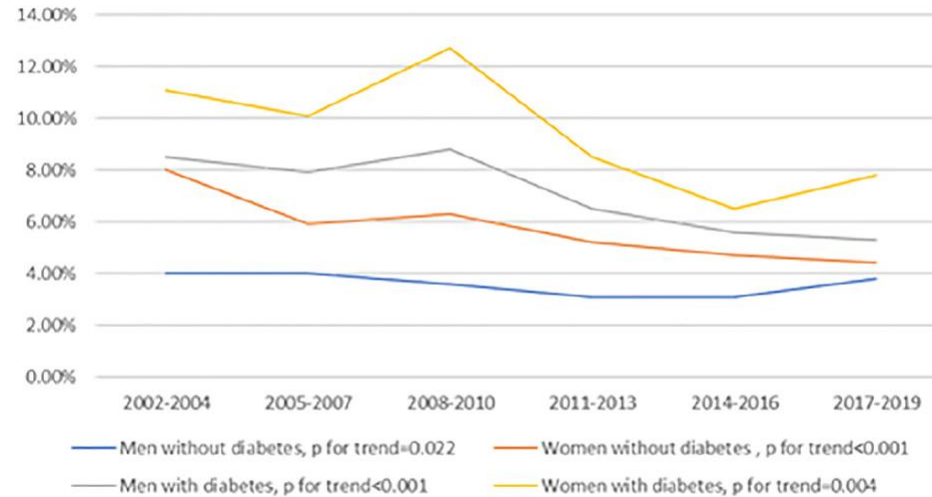
journal homepage: www.elsevier.com/locate/ijcard



Trends in treatment and outcomes of patients with diabetes and acute myocardial infarction: Insights from the nationwide AMIS plus registry

Barbara E. Stähli^{a,*}, Fabienne Foster Witassek^{b,1}, Marco Roffi^{c,1}, Franz R. Eberli^{d,1},
Hans Rickli^{e,1}, Paul Erne^{b,1}, Marco Maggiorini^{b,1}, Giovanni Pedrazzini^{f,1},
Dragana Radovanovic^{b,1}, On behalf of the AMIS Plus Investigators

B. Mortality



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**THE SIZE OF THE STUDIED
COHORT ALLOWS FOR
MEANINGFUL
SUBGROUP ANALYSES**

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LAST PAPER

G Model
REC-102054; No. of Pages 9

ARTICLE IN PRESS

Rev Esp Cardiol. 2023;xx(x):xxx-xxx

Original article

Prognostic value of low heart rates in patients admitted with acute myocardial infarction

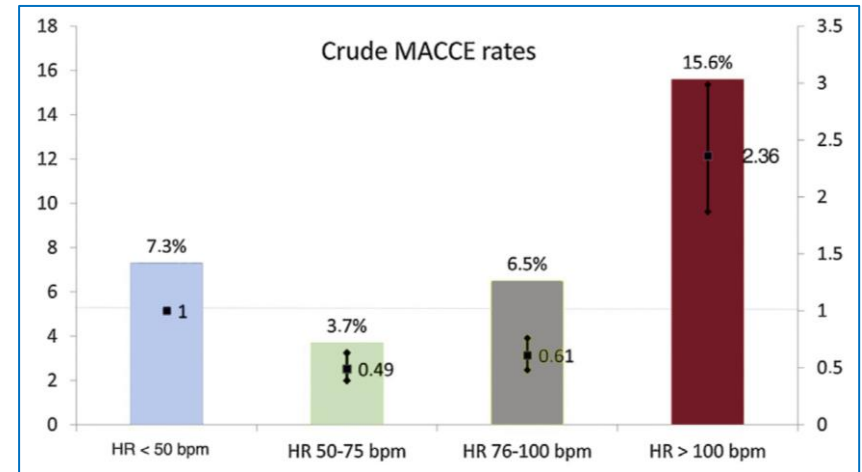
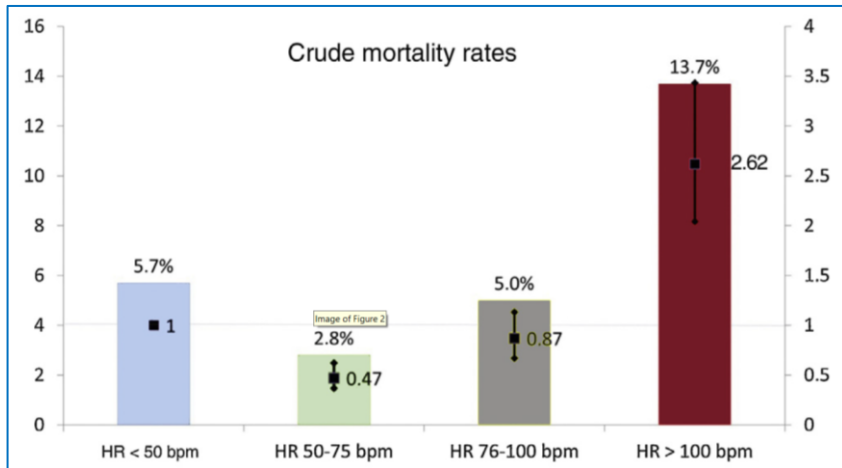
Luigi Biasco,^a Fabienne Foster-Witassek,^b Dragana Radovanovic,^b Philip Dittli,^a Gregorio Tersalvi,^{c,d} Hans Rickli,^e Marco Roffi,^f Franz Eberli,^g Raban Jeger,^g Paul Erne,^b and Giovanni Pedrazzini^{a,c,*}

Rev Esp Cardiol 2023

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INTERNATIONAL COLLABORATIONS

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European Heart Journal (2010) 31, 943–957
doi:10.1093/eurheartj/ehp492



CLINICAL RESEARCH

Coronary heart disease

Reperfusion therapy for ST elevation acute myocardial infarction in Europe: description of the current situation in 30 countries

Petr Widimsky*, William Wijns, Jean Fajadet, Mark de Belder, Jiri Knot, Lars Aaberge, George Andrikopoulos, Jose Antonio Baz, Amadeo Betriu, Marc Claeys, Nicholas Danchin, Slaveyko Djambazov, Paul Erne, Juha Hartikainen, Kurt Huber, Petr Kala, Milka Klinčeva, Steen Dalby Kristensen, Peter Ludman, Josephina Mauri Ferre, Bela Merkely, Davor Miličić, Joao Morais, Marko Noč, Grzegorz Opolski, Miodrag Ostojić, Dragana Radovanović, Stefano De Servi, Ulf Stenestrand, Martin Studenčan, Marco Tubaro, Zorana Vasiljević, Franz Weidinger, Adam Witkowski, and Uwe Zeymer on behalf of the European Association for Percutaneous Cardiovascular Interventions[†]

Circulation

JOURNAL OF THE AMERICAN HEART ASSOCIATION

European Perspectives in Cardiology



Cardiology in Practice in Europe 2011: Acute ST Elevation Myocardial Infarction



A Snapshot View of the Current Management of Acute ST Elevation Myocardial Infarction and Future Plans and Challenges in 25 European Countries

Leading European cardiologists describe the current and planned future management for acute ST elevation myocardial infarction in their hospitals and countries in 80 to 100 words.

Circulation: European Perspectives

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Switzerland

(population \approx 8 million, area \approx 41,000km²)

**Dragana Radovanovic, MD, head,
AMIS Plus Data Centre, Institute of
Social and Preventive Medicine, Uni-
versity of Zurich, Zurich, Switzerland**



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European Heart Journal – Cardiovascular Pharmacotherapy (2015) 1, 232–244
doi:10.1093/ehjcvp/pvv024

ORIGINAL ARTICLE

Acute coronary syndromes

Contemporary registries on P2Y12 inhibitors in patients with acute coronary syndromes in Europe: overview and methodological considerations

J. Wouter Jukema^{1*}, Maddalena Lettino², Petr Widimský³, Nicolas Danchin⁴,
Alfredo Bardaji⁵, Jose A. Barrabes⁶, Angel Cequier⁷, Marc J. Claeys⁸,
Leonardo De Luca⁹, Jakob Dörler¹⁰, David Erlinge¹¹, Paul Erne¹², Patrick Goldstein¹³,
Sasha M. Koul¹¹, Gilles Lemesle¹⁴, Thomas F. Lüscher¹⁵, Christian M. Matter¹⁶,
Gilles Montalescot¹⁷, Dragana Radovanovic¹⁸, Jose Lopez-Sendón¹⁹, Petr Tousek³,
Franz Weidinger²⁰, Clive F.M. Weston²¹, Azfar Zaman²², and Uwe Zeymer²³, on
behalf of the PIRAEUS group

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CONCLUSIONS: SCIENTIFIC MILESTONES

- Medical / scientific need (CVD no 1 killer in CH)
- The scale of the population enrolled and the timespan of the study are major strengths of AMIS PLUS allowing for
 - temporal trends analyses
 - meaningful subgroup analyses
- The limitations are those inherent registries (in particular patient selection)
- The nationwide nature of the study allows for an adequate assessment of the management of AMI patients in CH as snapshot and over time
- The scientific output over the last 25 years has been excellent both in terms of quality and quantity of the scientific publications
- New projects/collaborations of high scientific value have been implemented and more is to come (Florian Wenzl)