

# Current Status of the AMIS Plus Project

Dragana Radovanovic  
Sponsors & Participants' Meeting  
5 March 2015, Berne

# Status



- Project
- AMIS Plus Steering Committee
- Data Center
- How are the data collected?
- What do hospitals gain?
- Database status
- Achievements
- Summary

# AMIS Plus



- The AMIS Project was initiated in 1997 with the aim to create a national databank to assess the diagnostic and therapeutic measures taken in Swiss myocardial infarction patients
- An open-ended, prospective, observational, approved study
- AMIS Plus has been **continuously** collecting data since 1997 on patients admitted to Swiss hospitals with acute coronary syndromes

# Steering Committee



**Paul Erne (chairman) (Lucerne)**



Osmund Bertel (Zurich)



Franz Eberli (Zurich)



Manfred Essig (Zweisimmen)



Juan F. Iglesias (Lausanne)



Raban Jeger (Basel)



Marco Maggiorini (Zurich)



Giovanni Pedrazzini (Lugano)



Milo A. Puhan (Zurich)



Dragana Radovanovic (Zurich)



Hans Rickli (St. Gallen)



Marco Roffi (Geneva)



Jean-Christophe Stauffer (Fribourg)



Philip Urban (Geneva)



Stephan Windecker (Berne)

New members elected today:

- Thomas Pilgrim (Berne) (successor of SW)
- Michael Zellweger (Basel) (quality assessment advisor)

# Data Center



- The hub for sponsors, medical societies and participating hospitals
- Located at the Epidemiology, Biostatistics and Prevention Institute (ex. Institute of Social and Preventive Medicine), University of Zurich

## The Role of the Data Center

- Data collection, cleaning, analysis and controlled dissemination of data and information
- Introduce new hospitals to the registry
- Coach participating hospitals
- Data analysis and preparation of publications
- Collaboration with other organizations
- Keep sponsors and participants informed

## Team



Dragana Radovanovic (70%)



Jenny Piket (70%)



Nina Steinemann (20%)



Fabienne Witassek (40%)

## Medical students



Nadia Fehr

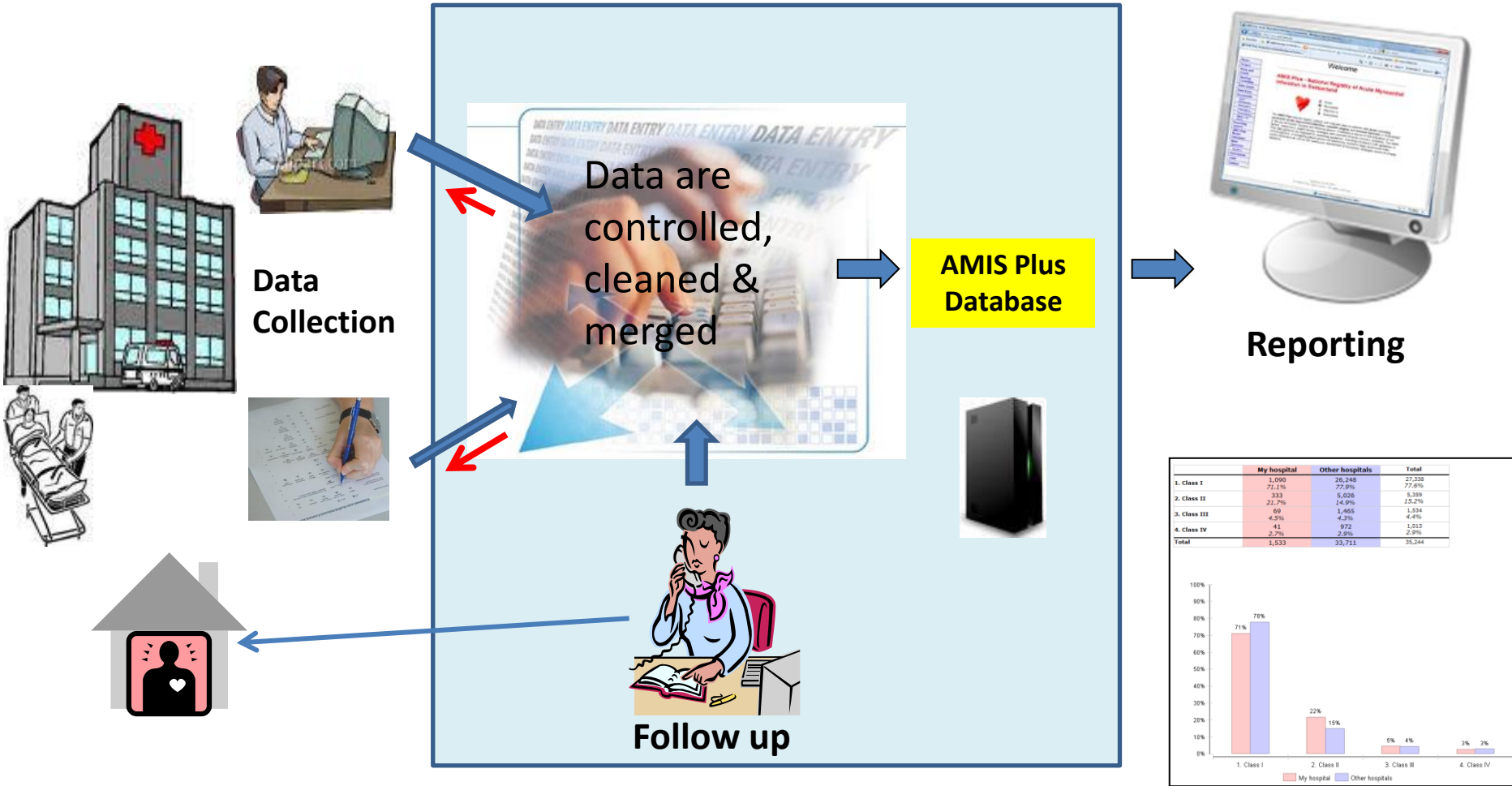


Lea Maurer

# How are the data collected?



## Data Center



# AMIS Plus Questionnaire



University of Zurich  
AMIS Plus Questionnaire  
05.2014

Please do not fill out – for internal use only

incoming mail/Check    INTL    Entry    INTL    P-Code

AMIS DATA ENTRY IDENTIFICATION	
Hospital	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Patient ID number	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Postcode	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Physician ID / Date of data entry	Date: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

PATIENT AT ADMISSION	
Date of birth	Day <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Month <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Year <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Gender	<input type="radio"/> Male <input type="radio"/> Female
Weight (eg.: 68.5 kg is rounded up to <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> kg)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> kg
Height	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> cm
Insurance coverage	<input type="radio"/> Basic <input type="radio"/> Semiprivate/ Private
Symptoms	<input type="radio"/> Typical <input type="radio"/> Atypical <input type="radio"/> Not appropriate
• Pain	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown
• Dyspnea	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown
Symptom onset date and time (Start of current heart event)	Day <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Month <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Year <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> h <input type="checkbox"/> <input type="checkbox"/> min <input type="checkbox"/> <input type="checkbox"/>
Time of first medical contact leading to hospitalization (prior to the hospital admission: Contact could be with a family/emergency doctor or another hospital)	Day <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Month <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Year <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> h <input type="checkbox"/> <input type="checkbox"/> min <input type="checkbox"/> <input type="checkbox"/>
Direct transportation with telemetric ECG transmission to PCI Center	<input type="radio"/> Yes <input type="radio"/> No
Admission date and time to this hospital	Day <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Month <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Year <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> h <input type="checkbox"/> <input type="checkbox"/> min <input type="checkbox"/> <input type="checkbox"/>
Transfer (Was the patient transferred from another hospital?)	<input type="radio"/> Yes <input type="radio"/> No IF YES → Hospital name? _____
Condition	<input type="radio"/> Class I – no clinical signs of heart failure (no rales, no S3) <input type="radio"/> Class II – rales, S3 gallop and elevated jugular venous pressure <input type="radio"/> Class III – frank pulmonary edema <input type="radio"/> Class IV – cardiogenic shock
ECG on admission (general answer possible)	<input type="radio"/> ST-segment elevations <input type="radio"/> Right bundle branch block <input type="radio"/> ST-segment depressions <input type="radio"/> No change/normal <input type="radio"/> T-wave changes <input type="radio"/> Pacemaker rhythm <input type="radio"/> Left bundle branch block <input type="radio"/> Other: _____

AMIS Plus Data Center  
Hirschengraben 84  
CH-8001 Zurich

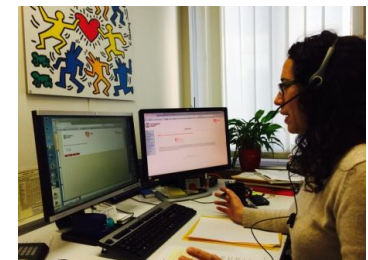
Tel: +41 (0)44 634 48 30  
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E-Mail: [amis@hirs.ch](mailto:amis@hirs.ch)  
[www.amis-plus.ch](http://www.amis-plus.ch)

## The data collected include:

- Baseline characteristics and demographics
- Risk factors, comorbidities, regular medication
- Symptoms and clinical signs at admission
- Immediate therapy - drugs and interventions
- Laboratory parameters
- Hospitalization course and procedures
- Complications and outcomes
- Discharge treatment
- Telephone follow-ups since 2005

- Updated 15 times
- Number of variables included increased from 115 to over 300
- Online data entry system changed 5 times



# AMIS Plus Follow-up



- Follow-up questionnaire was extended
- Now includes:
  - Lifestyle changes, e.g. physical activity, weight, smoking
  - Drug compliance
  - Rehabilitation
  - New diagnoses



# AMIS Plus Auditing

- Random selection of participating hospitals (3 small/B and 2 large/A)
- Random selection of patients (5 -10/12) to be audited per year
- Performed by the Clinical Trials Unit Basel

## Summary 2011-2014

- Audit Sites Visited: 15 (9 smaller and 6 large hospitals)
- Total Source Data Verification
  - 91 CRF with 1740 data items
- Total Findings
  - Critical 1 (0.05%)
  - Major 1 (0.05%)
  - Minor 39 (2.2%)
- No findings in 4 hospitals



# What's in it for hospitals?



- Stay informed on one of the most common acute admission diagnoses for quality assurance
- Newsletters providing overall and specific analyses
- Hospital-specific analyses
- Benchmarking = Reporting System

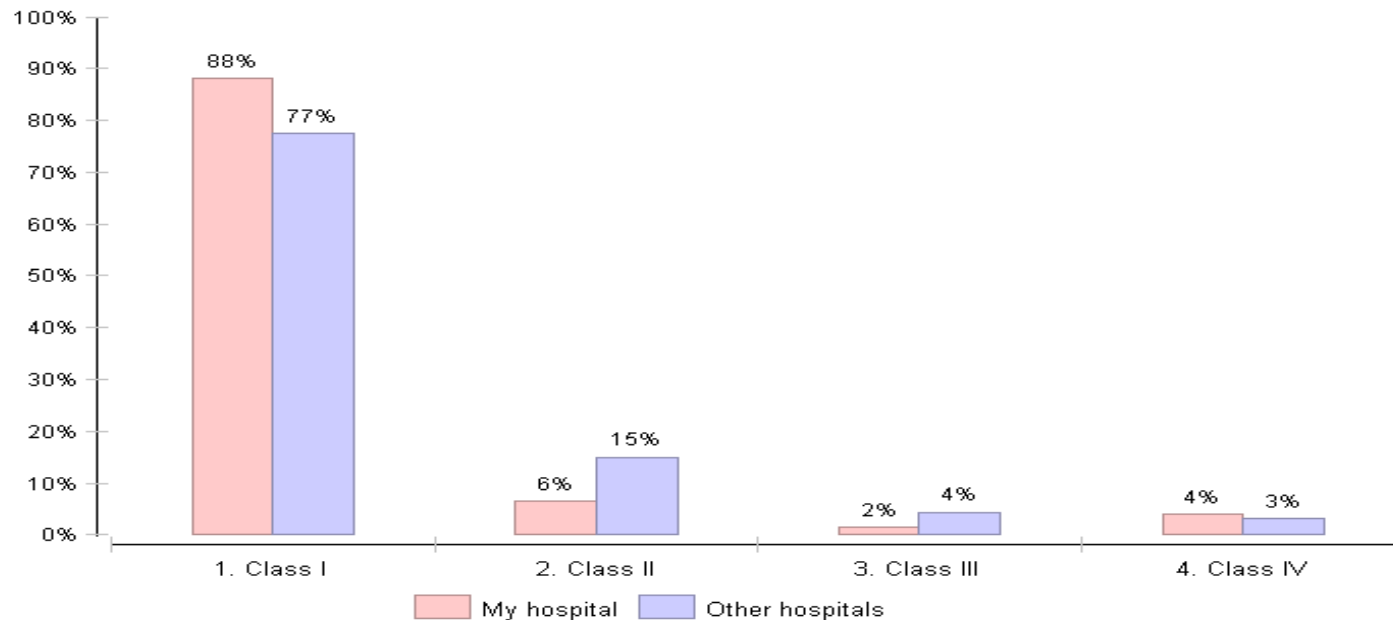
## Reports

Click on the report icon to start the analysis:  
9 reports found, displaying all reports .

Run	Report Name	Description
	Number of Patients	This report shows the number of patients
	Age Statistics	This report shows the age statistics of the patients
	Killip Classification	This report shows an overview of the patients' killip classifications
	Immediate Therapy: Thrombolysis	This report shows the number of thrombolysis done as immediate therapy
	Immediate Therapy: Percutaneous Coronary Intervention (PCI)	This report shows the number of PCI done as immediate therapy
	Immediate Therapy: Medication	This report shows the kind of medication given as immediate therapy
	Complications	This report shows a summary of complications
	Crude Mortality	This report shows the crude mortality rate
	Follow-Up	This report shows a summary of follow-up occurrences

# Killip Classification

	My hospital	Other hospitals	Total
<b>1. Class I</b>	2,977 88.0%	29,451 77.4%	32,428 78.3%
<b>2. Class II</b>	219 6.5%	5,740 15.1%	5,959 14.4%
<b>3. Class III</b>	51 1.5%	1,679 4.4%	1,730 4.2%
<b>4. Class IV</b>	136 4.0%	1,187 3.1%	1,323 3.2%
<b>Total</b>	<b>3,383</b>	<b>38,057</b>	<b>41,440</b>

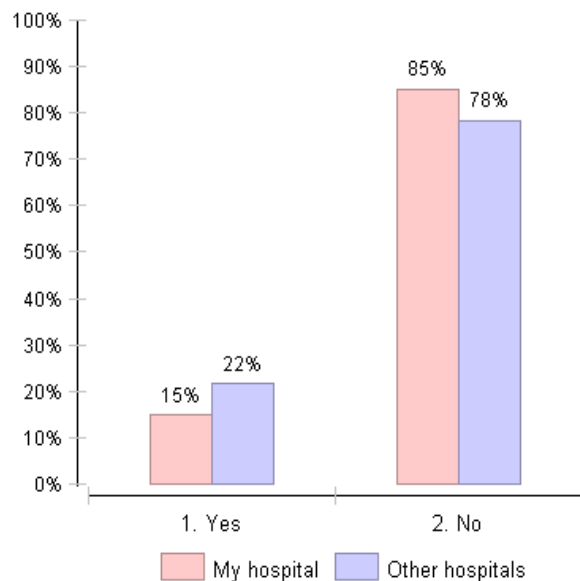


# Complications



**AMIS**  
Acute Myocardial  
Infarction  
in Switzerland

	My hospital	Other hospitals	Total
<b>1. Yes</b>	196 14.9%	8,785 21.7%	8,981 21.5%
<b>2. No</b>	1,120 85.1%	31,643 78.3%	32,763 78.5%
<b>Total</b>	<b>1,316</b>	<b>40,428</b>	<b>41,744</b>



## Type of Complication

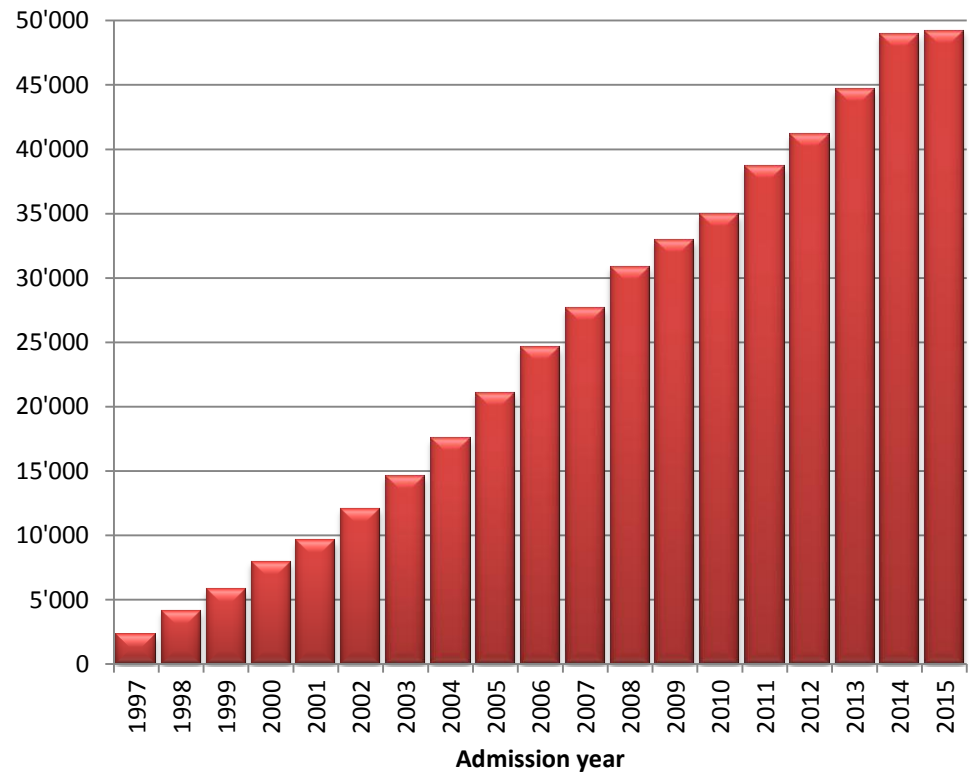
	My hospital	Other hospitals	Total
<b>01. AV block (needing pacing)</b>	17 1.3%	285 0.7%	302 0.7%
02. Cardiogenic shock (developed during hospitalization)	44 3.3%	2,386 5.9%	2,430 5.8%
03. Recurrent ischemic episodes (post-infarction angina)	9 0.7%	3,025 7.5%	3,034 7.3%
04. Infarction in patient admitted for unstable angina	1 0.1%	249 0.6%	250 0.6%
05. Re-infarction	14 1.1%	740 1.8%	754 1.8%
06. Cerebrovascular event	10 0.8%	365 0.9%	375 0.9%
07. Acute renal failure (needing treatment)	6 0.5%	283 0.7%	289 0.7%
08. Sepsis/ SIRS/ Multiorgan failure	6 0.5%	216 0.5%	222 0.5%
09. Atrial fibrillation at discharge	5 0.4%	183 0.5%	188 0.5%
10. New heart failure (Killip III-IV)	3 0.2%	335 0.8%	338 0.8%
11. Other complications	91 6.9%	2,142 5.3%	2,233 5.3%
12. No answer for complications	3 0.2%	13 0.0%	16 0.0%
<b>Total</b>	<b>1,316</b>	<b>40,428</b>	<b>41,744</b>

# AMIS Plus Database

(January 1997 – March 2015)



- **49,615**  
ACS patients
- **8738** with 1-year  
follow-ups



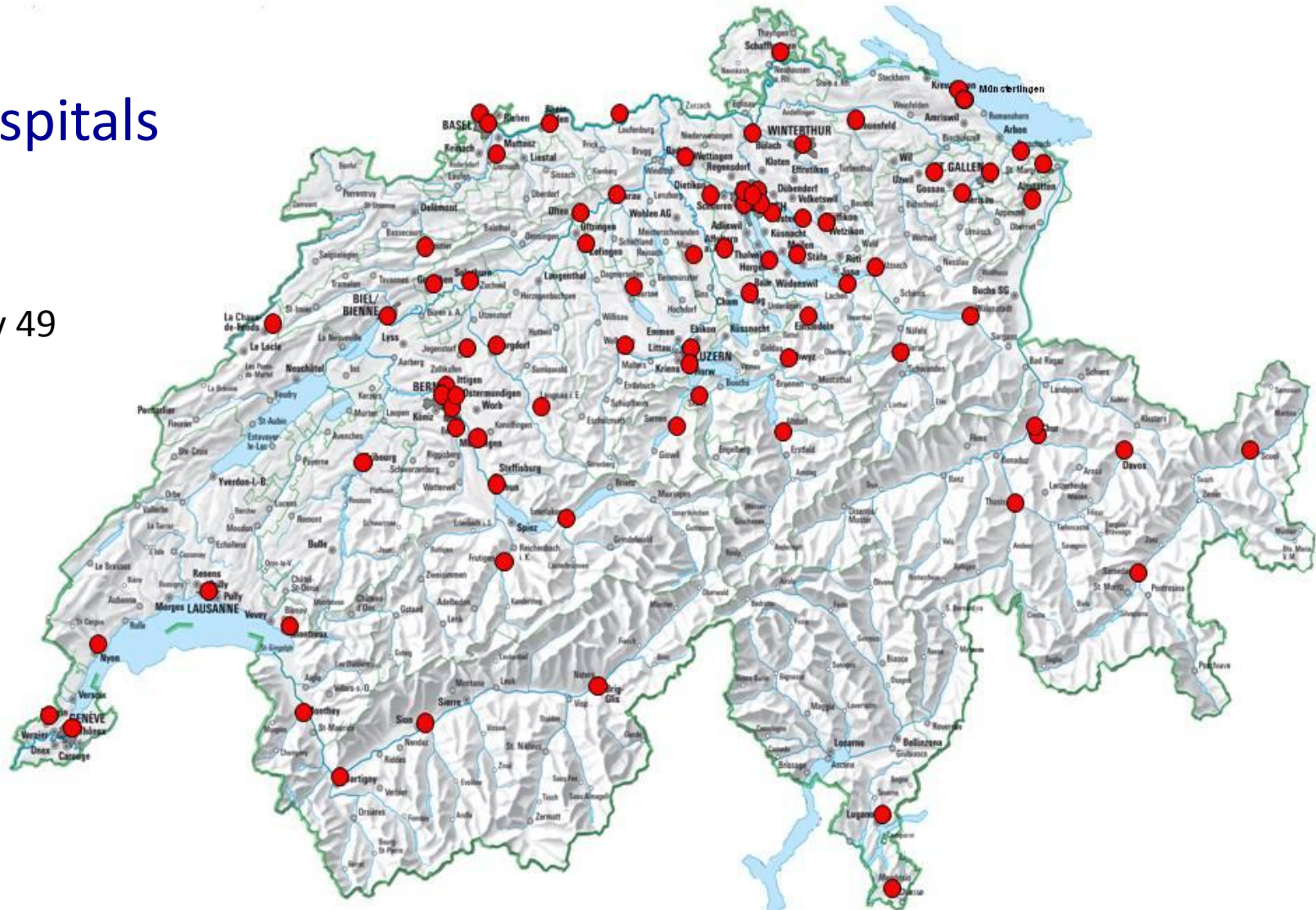
# AMIS Plus Participants (January 1997 – March 2015)



AMIS  
Acute Myocardial  
Infarction  
in Switzerland

83 hospitals

Currently 49





# AMIS Plus Achievements



- 102 presentations at congresses and meetings
- 5 dissertations
- 1 diploma
- 1 MPH thesis
- 56 publications, 41 peer-reviewed



Sponsors are acknowledged by name

## Publications

List of Papers and Abstracts ([see below](#))

### Papers List:

2015

- **Outcome of patients admitted with acute coronary syndrome on palliative treatment: insights from the nationwide AMIS Plus Registry 1997–2014.** Erne P, Radovanovic D, Seifert B, Bertel O, Urban P, on behalf of the AMIS Plus Investigators. *BMJ Open* 2015; 5:e006218.
- **Assessing the Impact of DRGs on Patients Care and Professional Practice in Switzerland (IdoC) – a potential model for monitoring and evaluating health care reform.** Wild V, Fourie C, Frouzakis R, Clarinval C, Fässler M, Elger B, Gächter T, Leu A, Spirig R, Kleinknecht M, Radovanovic D, Mouton Dorey C, Burnand B, Vader J-P, Januel J-M, Biller-Andorno N. *Swiss Med Wkly* 2015;145:w14034
- **Increased mortality after a first myocardial infarction in human immunodeficiency virus-infected patients: a nested cohort study.** Carballo D, Delhumeau C, Carballo S, Bähler C, Radovanovic D, Hirscher B, Clerc O, Bernasconi E, Fasel D, Schmid P, Cusini A, Fehr J, Erne P, Keller P-F, Ledergerber B, Calmy A. *AIDS Research and Therapy* 2015; Feb 22;12:4. doi: 10.1186/s12981-015-0045
- **Impact of prasugrel in patients with acute coronary syndrome undergoing percutaneous coronary intervention: A propensity score-matched analysis of the AMIS Plus Registry.** Kurz D.J., Radovanovic D, Roffi M, Pedrazzini G, Windecker S, Erne P, Eberli F.R. *EJACC* 2015; DOI: 10.1177/2048872614566946

2014

- **Impact of Body Mass Index on mortality in Swiss hospital patients with ST-elevation myocardial infarction: does an obesity paradox exist?** Witassek F, Schwenkglenks M, Erne P, Radovanovic D. *Swiss Med Wkly* 2014;144:w13986 ([PDF, 493kB](#))
- **Validity of Charlson Comorbidity Index in patients hospitalised with acute coronary syndrome. Insights from the nationwide AMIS Plus registry 2002-2012.** Radovanovic D, Seifert B, Urban P, Eberli FR, Rickli H, Bertel O, Puhan MA, Erne P, on behalf of the AMIS Plus Investigators. *Heart* 2014;100:288-294 ([PDF, 535kB](#))
  - Editorial: Comorbidities in patients with acute coronary syndrome: rare and negligible in trials but common and crucial in the real world. Maeder M. *Heart* 2014; 100:268-270
- **Acute multivessel revascularization improves 1-year outcome in ST-elevation myocardial infarction. A nationwide study cohort from the AMIS Plus registry.** Jeger R, Jaguszewski M, Nallamothu BK, Lüscher TF, Urban P, Pedrazzini GB, Erne P, Radovanovic D. *Int J Cardiology* 2014; 172:76-81
- **Drug-eluting stents compared to bare-metal stents improve mortality in patients with acute myocardial infarction undergoing primary percutaneous coronary intervention - A Nationwide Prospective Analysis of AMIS.** Jaguszewski M, Radovanovic D, Nallamothu BK, Urban P, Erne P, for the AMIS Plus Investigators. *Kardiol Pol.* 2014; 4: 315-323

2013

- **Multivessel versus culprit vessel percutaneous coronary intervention in ST-elevation myocardial infarction: is more worse?** Jaguszewski M, Radovanovic D, Nallamothu BK, Lüscher TF, Urban P, Eberli FR, Bertel O, Pedrazzini GB, Windecker S, Jeger R, Erne P. *EuroIntervention.* 2013 Dec 23;9(8):909-15
- **Gender-related mortality trends among diabetic patients with ST-segment elevation myocardial infarction: insights from a nationwide registry 1997-2010.** Roffi M, Radovanovic D, Erne P, Urban P, Windecker S, Eberli FR, for the AMIS Plus Investigators. *EJACC* 2013; 2(4):342-9

- **Therapy of acute myocardial infarction in Switzerland - the AMIS Plus Registry.** Radovanovic D, Erne P. *Leading Opinions: Kardiologie & Gefässmedizin* 1/2013;56:58

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# Summary



## AMIS Plus Registry

- ✓ Contains a huge amount of reliable data
- ✓ Enables benchmarking
- ✓ Shows intervention possibilities
- ✓ Enables improvement in logistics und algorithms
- ✓ Verifies whether RCT results are translatable into everyday clinical practice
- ✓ Supports a robust quality improvement effort designed to encourage evidence-based acute cardiac care and ultimately improve patient outcome



**AMIS**  
Acute Myocardial  
Infarction  
in Switzerland



**Thank you!**