Continuous Quality Improvement Program in Cardiovascular Surgery: The Latin American Perspective

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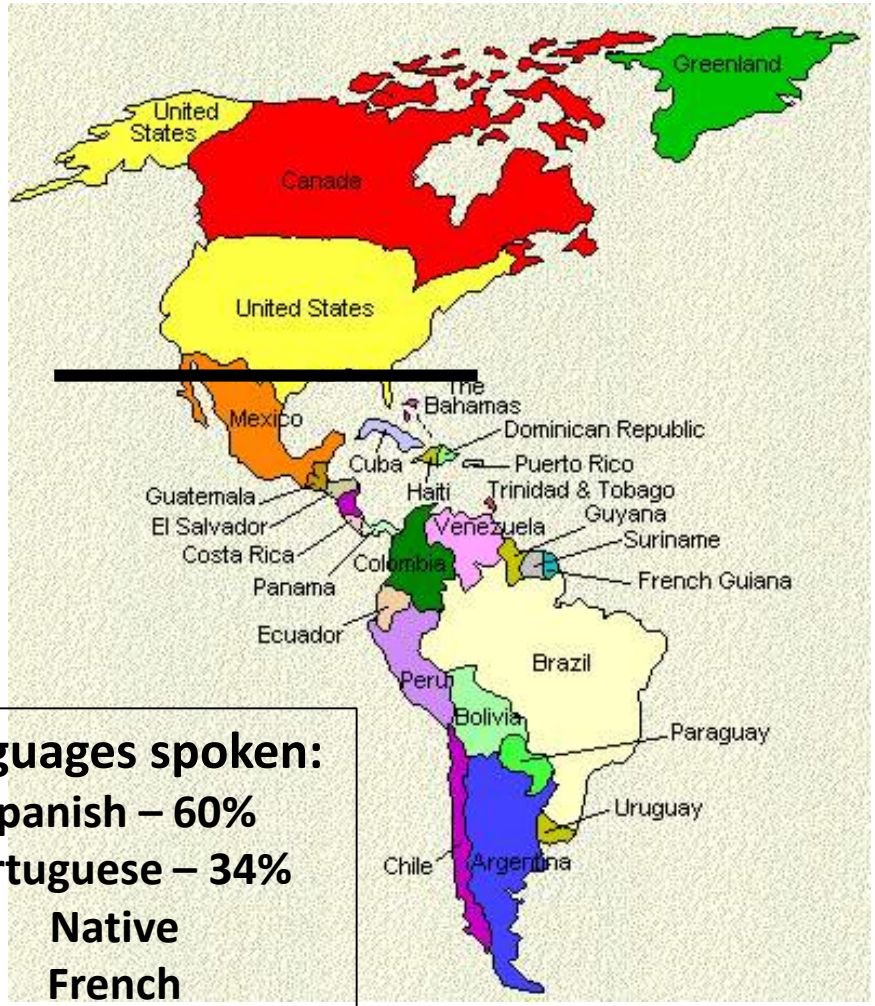
Conflict of Interest Disclosure

- None

The Americas – Latin America



Population	GDP
Canada	
35 million	1,552,000 USD
United States of America	
323 million	18,558,000 USD
Latin America	
626 million	7,531,585 USD

Languages spoken:
Spanish – 60%
Portuguese – 34%
Native
French
Dutch
English

19 sovereign states and several territories and dependencies.

Variety of ancestries, ethnic groups, and races, making the region one of the most diverse in the world.

Health Expenditure

(per capita – in USD)

Latin America - 2014

Uruguay - 1,442.28
Chile - 1,137.36
Brazil - 1,109.43
Costa Rica - 970.00
Cuba - 816.62
Mexico - 677.19
Argentina - 605.19
Ecuador 579.19
Colombia - 569.19
Paraguay - 464.09
Peru - 358.58
El Salvador - 279.65
Guatemala - 232.63
Bolivia - 208.78

North America - 2014

United States - 9,402.54

Canada - 5,291.75

Mexico - 677.19

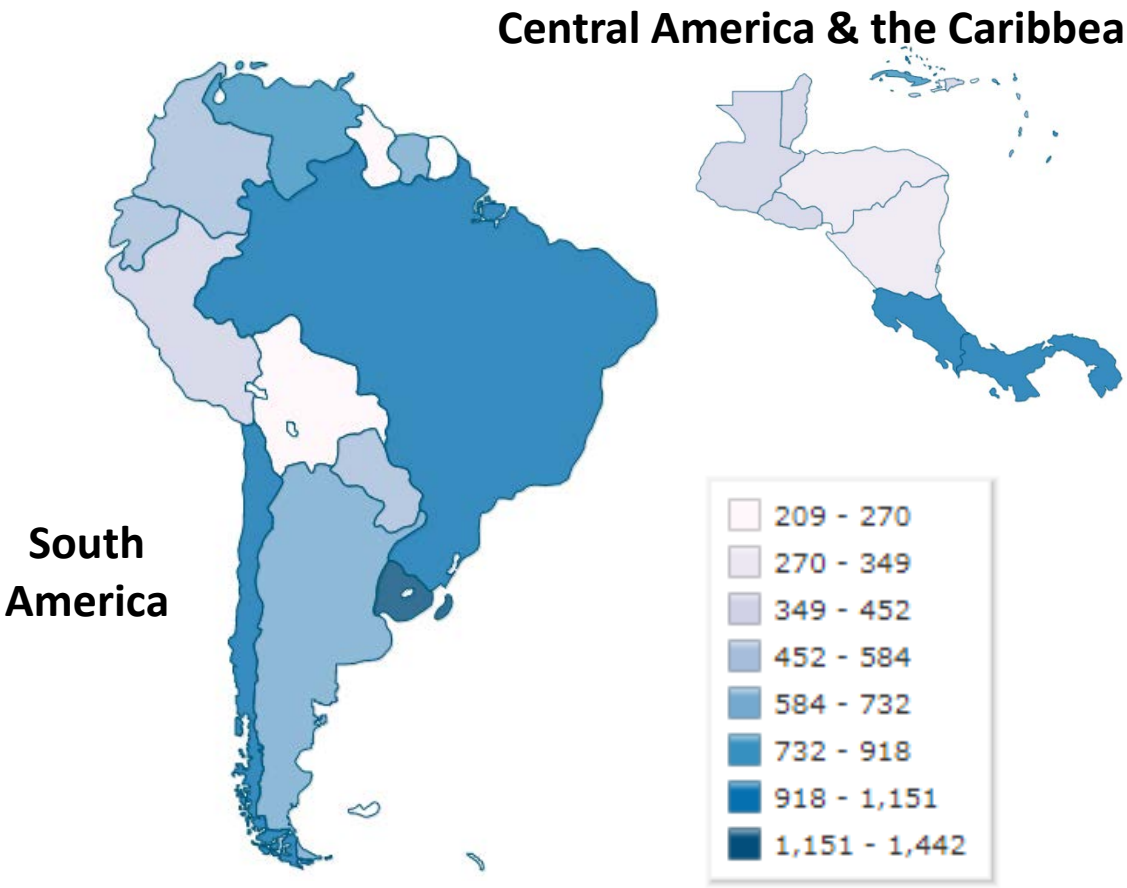
Europe - 2014

Switzerland - 9,673.52
Norway - 9,522.22
Sweden - 6,807.72
Denmark - 6,463.24
Netherlands - 5,693.86
Germany - 5,410.64
France - 4,958.99
United Kingdom - 3,934.82
Italy - 3,257.75
Spain - 2,658.27
Portugal - 2,096.82
Czech Republic - 1,378.52
Poland - 910.28

Data source: World Bank, World Development Indicators, 2016

Health Expenditure

(per capita – in USD)



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Data source: World Bank, World Development Indicators, 2016

THE BRAZILIAN CONSTITUTION PROVIDES UNIVERSAL HEALTHCARE..

SUS - UNIFIED HEALTH SYSTEM

Mixed Healthcare System – Public and Private

Unequal Distribution

Brazil = 208 million habitants

154 million (75%) - people that depend exclusively on SUS (public) and 54 million people (or 25%) having private health insurances but that can also access to SUS

Public system (underfunded) – BRL 221 bn = USD 70 bn
154 million (75%) - USD 454 per capita

Private sector – BRL 249 bn = USD 78.8 bn
54 million (25%) - USD 1,460 per capita

THE STATE OF SÃO PAULO ALONE HAS 19 MILLION PRIVATE INSURANCE BENEFICIARIES

MOST PRIVATE HEALTH PLAN BENEFICIARIES LIVE IN THE SOUTH AND SOUTH EAST

NR OF PRIVATE INSURANCE PLAN BENEFICIARIES

- More than 7 million
- Between 2 and 7 million
- Between 0,7 and 2 million
- Between 0,4 and 0,7 million
- Less than 0,4

TOP 13 STATES - NR OF PRIVATE INSURANCE BENEFICIARIES

Brazilian State	Region	Number of Beneficiaries	% Individual or Familiar	% Collective (Company)
São Paulo	Southeast	18 805 870	19%	80%
Rio de Janeiro	Southeast	6 059 970	19%	80%
Minas Gerais	Southeast	5 380 330	15%	84%
Paraná	South	2 900 763	26%	74%
Rio Grande do Sul	South	2 789 899	14%	85%
Bahia	Northeast	1 678 221	17%	83%
Santa Catarina	South	1 517 826	12%	87%
Pernambuco	Northeast	1 434 487	28%	72%
Ceará	Northeast	1 278 580	31%	68%
Espírito Santo	Southeast	1 130 645	13%	86%
Goiás	Central West	1 109 992	23%	76%
Federal District (DF)	Central West	952 797	4%	96%
Pará	North	891 646	34%	66%

MORE THAN 80% OF PRIVATELY INSURED BENEFIT FROM A HEALTH PLAN THROUGH THEIR EMPLOYMENT CONTRACT

Healthcare is about economics

Budget matching demands – everyday we strive to.

People being properly and fairly served

Our Central and the University-affiliated hospitals

Greater Sao Paulo City (Metropolitan Area)
– total population of 21,242,939 inhabitants (2016)
- If São Paulo City were to be a European country, it would be ranked the 10th most populous out of 49 countries.

Federal University of São Paulo
Active Heart Surgery Units
- Central Hospital – São Paulo Hospital
- University Affiliated Hospitals

Reimbursement

Coronary Artery Bypass Surgery – BRL 12.544,25 - USD 3,969

Valve replacement / Repair

Average hospital reimbursement – Public System

PROTESE VALVULAR BIOLOGICA
R$ 1.529,48

Heart

We sew hearts – we should amend souls

Root for heart (from the Proto-Indo-European Language) - ca. 4000 BC
(ḱered-:) ḱerd-, ḱērd-, ḱr̥d-, ḱred

Ancient Greek - kardíā
Latin - cor (from *cord), cordis
Old English - *heorte*
Gothic (Old German) - haírto, **O.H.**G. herza, O.E. heorte, O.N. hjarta
Sanskrit - **hṛd,** post-PIE **ĝhr̥d*; **hṛdaya**
Avestan (Persian) - zərəd < post-PIE **ĝhr̥d*; **zrazdā**
Slavic – sŭrdĭce, sŭrž
Baltic – OPr **siran**, **serds**, Lithuanian - **širdis**, **šerdis**
Armenian – **sirt**
Tocharian- A, kri", B **käryāñ**
Old Irish - cride n., Ir. croidhe, Welsh craidd, Corn. cre(y)s, Bret. Kreiz
Hittite - **karz**

Heart

Root for heart (from the Proto-Indo-European Language) - ca. 4000 BC
(ḱered-:) ḱerd-, ḱērd-, ḱr̥d-, ḱred

heart, soul, spirit, will, courage

In the Ancient Greek-Roman philosophy

The heart is considered the home to the soul.

THE ANNALS OF THORACIC SURGERY

Coronary Artery Bypass Grafting Without Cardiopulmonary Bypass

Enio Buffolo, MD, José Carlos Silva de Andrade, MD, João Nelson Rodrigues Branco, MD, Carlos Alberto Teles, MD, Luciano Figueiredo Aguiar, MD, and Walter José Gomes, MD

Escola Paulista de Medicina, Hospital São Paulo, Disciplina de Cirurgia Cardiovascular, São Paulo, SP, Brazil

Background. Coronary artery bypass grafting without cardiopulmonary bypass is now an accepted technique of myocardial revascularization. We herein report our total experience with this procedure.

Methods. In a consecutive series of 8,751 patients operated on in our institution for coronary artery disease from 1981 to 1994, 1,274 patients received coronary artery bypass grafting without cardiopulmonary bypass.

Results. Results indicate that the operation can be performed with an acceptable mortality (2.5%), and that all types of arterial conduits can be used. Most commonly the left anterior descending and right coronary arteries were bypassed. The incidence of arrhythmias and of pulmonary and neurologic complications were significantly lower in this group of patients compared with patients receiving coronary artery bypass grafting with cardiopulmonary bypass. Most importantly, there was decreased cost when the procedure was used because no extracorporeal circulation, cardioplegia sets, or other cannulas were used.

Conclusions. We conclude that the continuing use of coronary artery bypass grafting without cardiopulmonary bypass is justified and that, with proper selection of patients, the procedure is safe and cost-effective.

(Ann Thorac Surg 1996;61:63–6)

Paper ranked 44th in the 100 most cited publications in cardiac surgery.

Ir J Med Sci. 2015;184:91–99

Ir J Med Sci (2015) 184:91–99
DOI 10.1007/s11845-014-1193-1

REVIEW ARTICLE

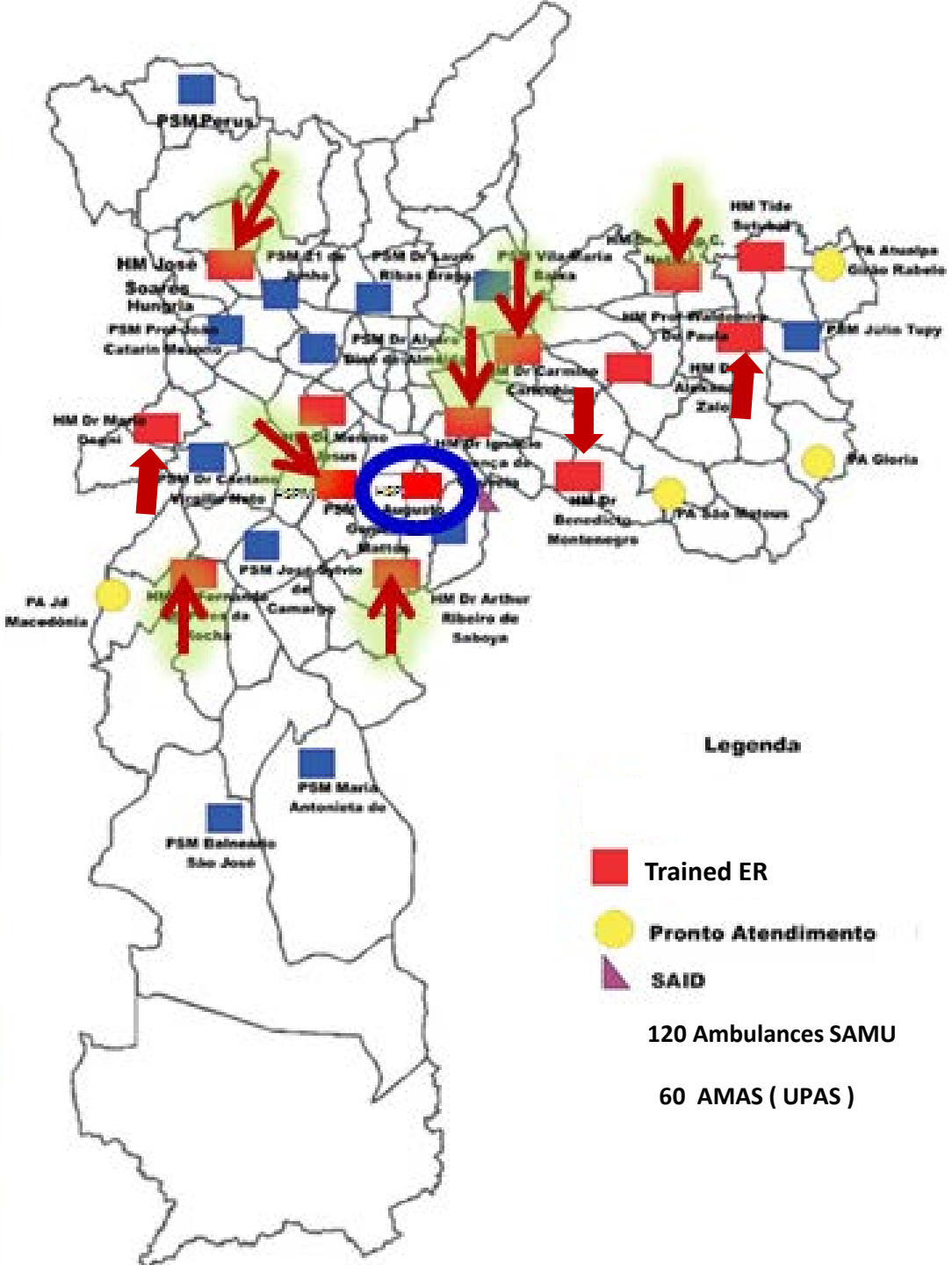
Ir J Med Sci. 2015;184:91–99

The 100 most cited publications in cardiac surgery: a bibliometric analysis

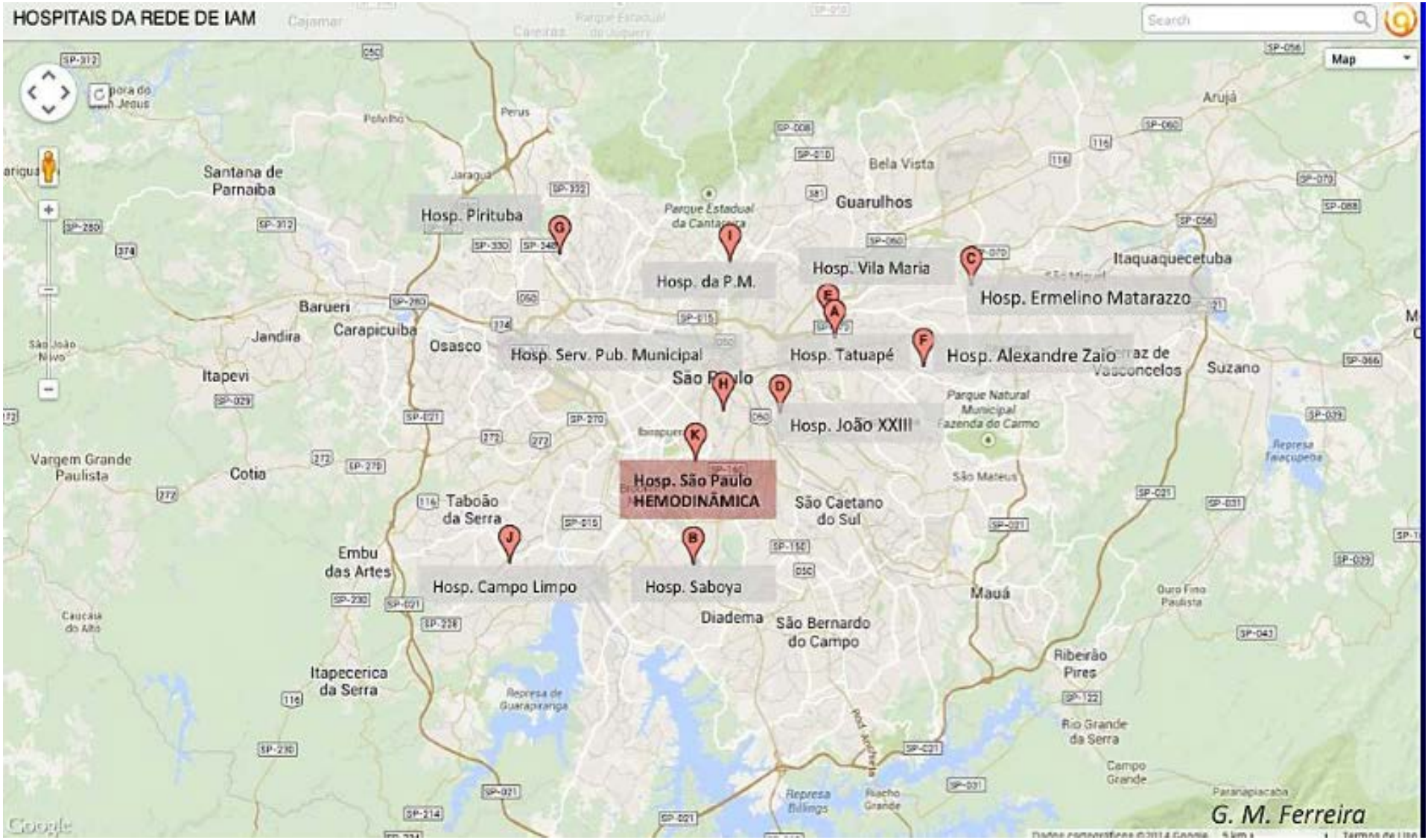
K. E. O'Sullivan · J. C. Kelly · J. P. Hurley

Table 3 The top 100 citations in cardiac surgery

Rank	First author	Citations	Rank	First author	Citations	Rank	First author	Citations
1	Nashef [10]	1252	34	Rahimtoola [46]	448	67	van de Watering [47]	321
2	Roach [48]	1035	35	McFalls [49]	447	68	Thomas [50]	320
3	Yusuf [51]	1023	36	Ross [52]	436	69	Cox [25]	319
4	Leon [13]	1013	37	Debakey [53]	435	70	Angelini [50]	316
5	Serruys [54]	999	38	Ross [55]	431	71	Hannan [56]	315
6	Kirklin [35]	942	39	Furnary [57]	428	72	Buckberg [58]	312
7	Chenoweth [59]	921	40	Acar [60]	427	73	Gardner [61]	312
8	Carpentier [22]	898	41	Cox [26]	413	74	Tamburino [16]	311
9	Alderman [19]	878	42	Lytle [33]	411	75	Guiraudon [62]	311
10	Newman [63]	845	43	Bidstrup [36]	410	76	Ferguson [64]	309
11	Mishra [65]	770	44	Buffolo [66]	409	77	Griepp [67]	304
12	Inoue [68]	750	45	Carpentier [23]	407	78	Lichtenstein [17]	303
13	Smith [69]	701	46	Loop [31]	395	79	Khan [70]	302
14	Roques [71]	672	47	Hamm [72]	394	80	Kolessov [45]	299
15	Lytle [28]	661	48	Calafiore [73]	386	81	Puskas [40]	298
16	Steingart [74]	652	49	Parsonnet [75]	384	82	Shroyer [76]	296
17	Alderman [20]	581	50	Kennedy [77]	381	83	Vanoeveren [78]	294
18	Takaro [79]	572	51	Fergusson [80]	378	84	Hampton [38]	293
19	Serruys [81]	557	52	Peterson [82]	377	85	Mangano [83]	292
20	Mangano [84]	554	53	Pocock [85]	371	86	Webb [18]	292
21	Nussmeier [86]	551	54	Bruins [87]	369	87	Cremer [88]	288
22	Cox [27]	546	55	Bolling [89]	359	88	Cosgrove [32]	286
23	Butler [90]	539	56	Lie [91]	346	89	Dake [92]	285
24	Webb [14]	537	57	Waldo [93]	345	90	Daoud [94]	282
25	Bigger [95]	536	58	Zerr [96]	345	91	Almassi [97]	280
26	King [98]	530	59	Svennson [99]	343	92	Chamberlain [100]	280
27	Bigelow [34]	523	60	Alderman [21]	340	93	Hammer Schmidt [101]	280
28	Motwani [29]	522	61	Fisher [102]	340	94	Carpentier [24]	280
29	Aranki [103]	520	62	Alderman [104]	339	95	Paperella [105]	279
30	Koch [30]	515	63	Salzman [106]	334	96	Hennein [107]	277
31	Furnary [37]	507	64	van Dijk [108]	329	97	Frazier [109]	277
32	Shake [110]	465	65	Bigelow [12]	328	98	Kennedy [111]	275
33	David [39]	449	66	Murphy [112]	325	99	Shlafer [113]	273
						100	Kodali 11]	271


PSM Perus
HM José Soares Hungria
HM Tide Setúbal
PA Anuaipe
Cidão Rabelo
PSM Julio Tupy
HM Dr Mario Degni
PA Gloria
PA São Mateus
HM Dr Benedicto Montenegro
PA Jd Macedônia
HM Dr Arthur Ribeiro de Saboya
PSM Maria Antonieta de
PSM Balneário São José
Legenda
Trained ER
Pronto Atendimento
SAID
120 Ambulances SAMU
60 AMAS (UPAS)

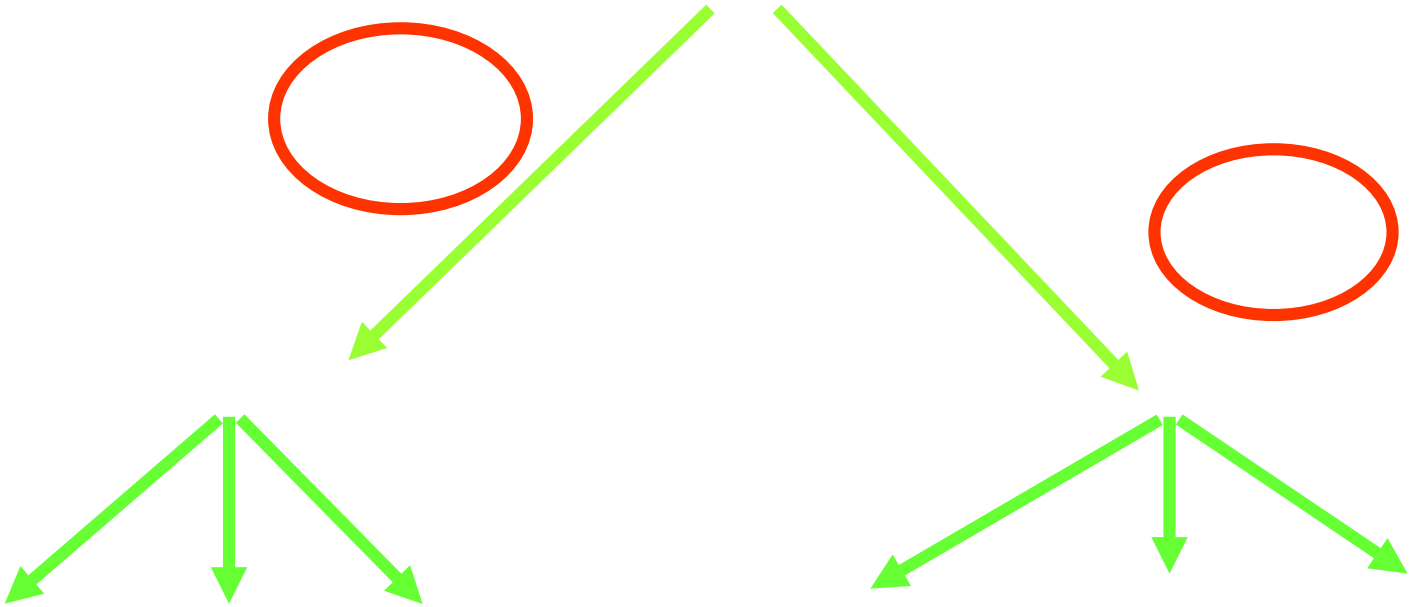
HOSPITAL DISTRIBUTION SP STEMI NETWORK



SP STEMI NETWORK
ORIGIN AND SEQUENCE OF TREATMENT

SAMU 88 **ER's and Light ER's 1484**

N = 2353 até 31/05/2017



No case had request for transfer denied in this series

SP STEMI NETWORK
ORIGIN AND SEQUENCE OF TREATMENT

SAMU 88 ER's and Light ER's 1484

N = 2353 até 31/05/2017

150 6,5 %

2200 TNK +25 TPA-28 SK= 159

93,5 %

21 TNK at ambulances

PPCI

SAMU 67
AMAS 18
PS's 25

83 true PPCI

24 angio w/o Interv

3 w/o angio

478 Rescue 30,5 %

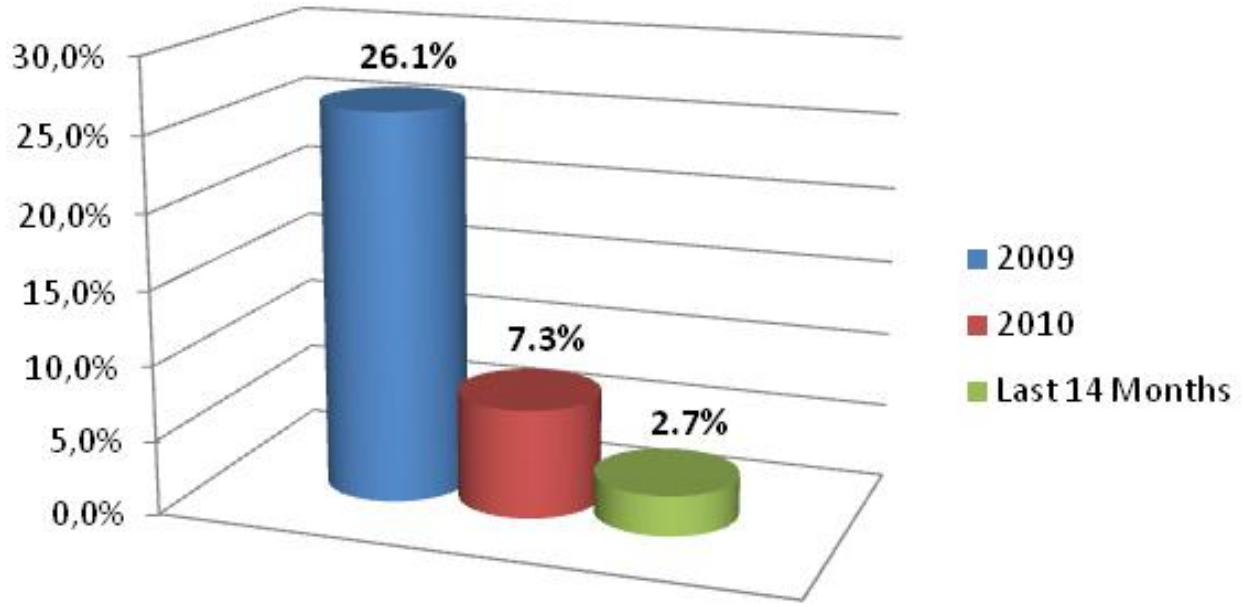
1042 6-24 hs PI 64,8 %

75 w/o angio 4,7 %

No case had request for transfer denied in this series

128 hosp deaths : 5,4 %

Results



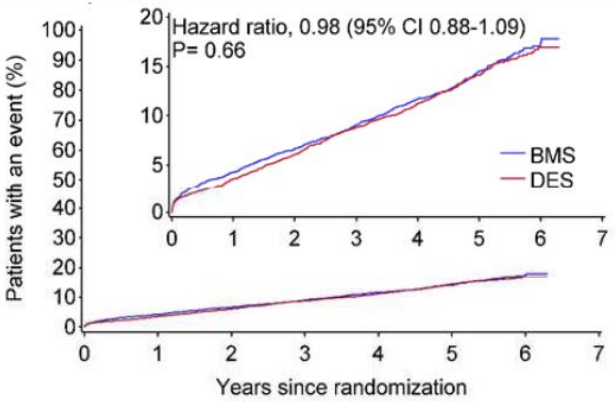
Mortality due to MI at the Hospital Municipal Prof Dr Alipio Correa Neto - Ermelino Matarazzo, before (2009), just after establishing the STEMI network (2010), and in the last 14 months. $X^2 = 15.2$; $P < 0.0001$

NORSTENT study design

- Randomized multicenter trial in Norway
- 9013 patients – largest stent trial ever
- Investigator initiated
- Funded by not-for-profit organizations
- Conducted in a real-world patient care setting
- Inclusion period 2008-2011
- 5 years follow-up (median)
- 95 % of patients in the DES arm received newer generation DES

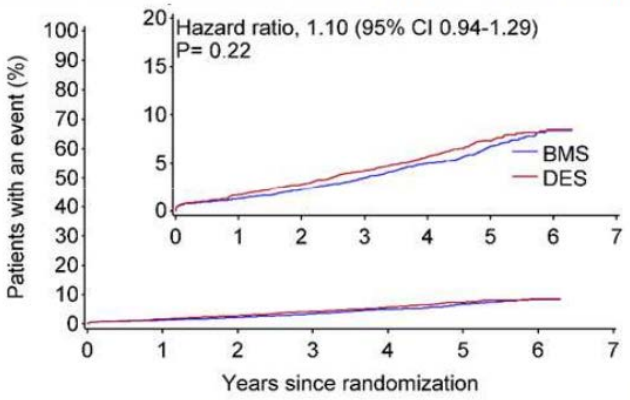
All-comers

Primary EP – death and nonfatal spontaneous MI



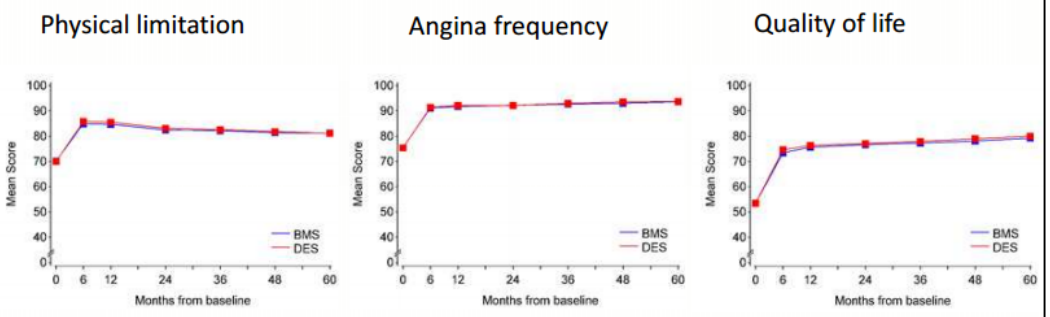
HR 0.98 P=0.66

All cause mortality



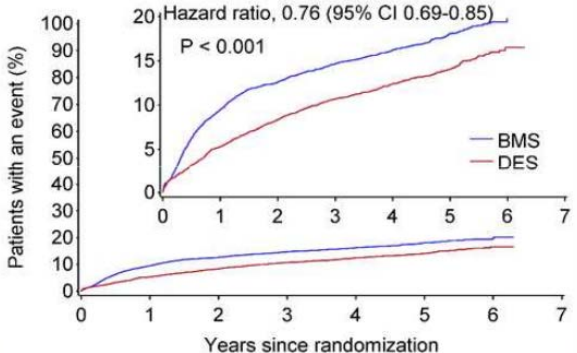
HR 1.10 P=0.22

Quality of life – Seattle Angina Questionnaire (SAQ)



No difference in quality of life with DES vs BMS as measured with SAQ

Any revascularization



HR 0.76 P<0.001

6 year rates:
DES 16.5 %
BMS 19.8 %

Number needed to treat = 30

- 3,3 % !!

N Engl J Med. 2016;375:1242-52

2014

European Heart Journal Advance Access published August 29, 2014

European Heart Journal
doi:10.1093/eurheartj/ehu278

ESC/EACTS GUIDELINES

2014 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association of Percutaneous Cardiovascular Interventions (EAPCI)

Authors/Task Force members: Stephan Windecker* (ESC Chairperson) (Switzerland), Philippe Kolh* (EACTS Chairperson) (Belgium), Fernando Alfonso (Spain), Jean-Philippe Collet (France), Jochen Cremer (Germany), Volkmar Falk (Switzerland), Gerasimos Filippatos (Greece), Christian Hamm (Germany), Stuart J. Head (The Netherlands), Peter Jüni (Switzerland), A. Pieter Kappetein (The Netherlands), Adnan Kastrati (Germany), Juhani Knuuti (Finland), Ulf Landmesser (Switzerland), Günther Laufer (Austria), Franz-Josef Neumann (Germany), Dimitrios J. Richter (Greece), Patrick Schauerte (Germany), Miguel Sousa Uva (Portugal), Giulio G. Stefanini (Switzerland), David Paul Taggart (UK), Lucia Torracca (Italy), Marco Valgimigli (Italy), William Wijns (Belgium), and Adam Witkowski (Poland).

Page 17:

«Compared with bare metal stents and early-generation DES, new-generation DES have also improved safety outcomes including death, myocardial infarction and stent thrombosis»

128. Stefanini GG, Byrne RA, Serruys PW, de Waha A, Meier B, Massberg S, Juni P, Schomig A, Windecker S, Kastrati A. Biodegradable polymer drug-eluting stents reduce the risk of stent thrombosis at 4 years in patients undergoing percutaneous coronary intervention: a pooled analysis of individual patient data from the ISAR-TEST 3, ISAR-TEST 4, and LEADERS randomized trials. *Eur Heart J* 2012; **33**(10):1214–1222.

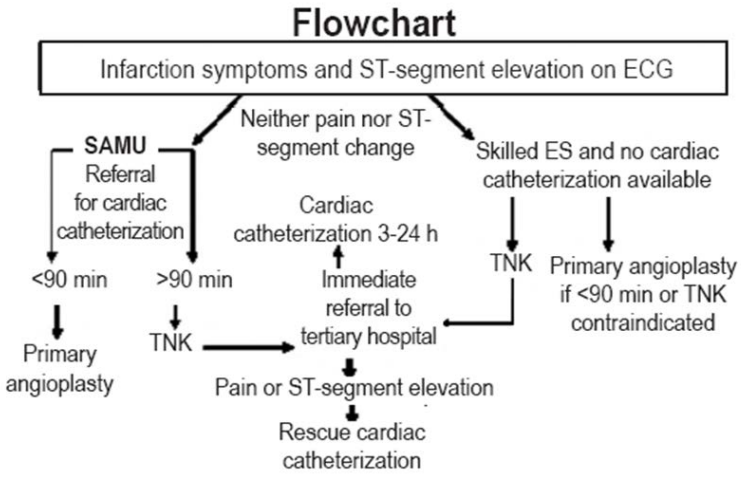
129. Stefanini GG, Baber U, Windecker S, Morice MC, Sartori S, Leon MB, Stone GW, Serruys PW, Wijns W, Weisz G, Camenzind E, Steg PG, Smits PC, Kandzari D, Von Birgelen C, Galatius S, Jeger RV, Kimura T, Mikhail G, Itchhaporia D, Mehta L, Ortega R, Kim HS, Valgimigli M, Kastrati A, Chieffo A, Mehran R. Safety and efficacy of drug-eluting stents in women: a patient-level pooled analysis of randomised trials. *Lancet* 2013;**382**(9908):1879–1888.

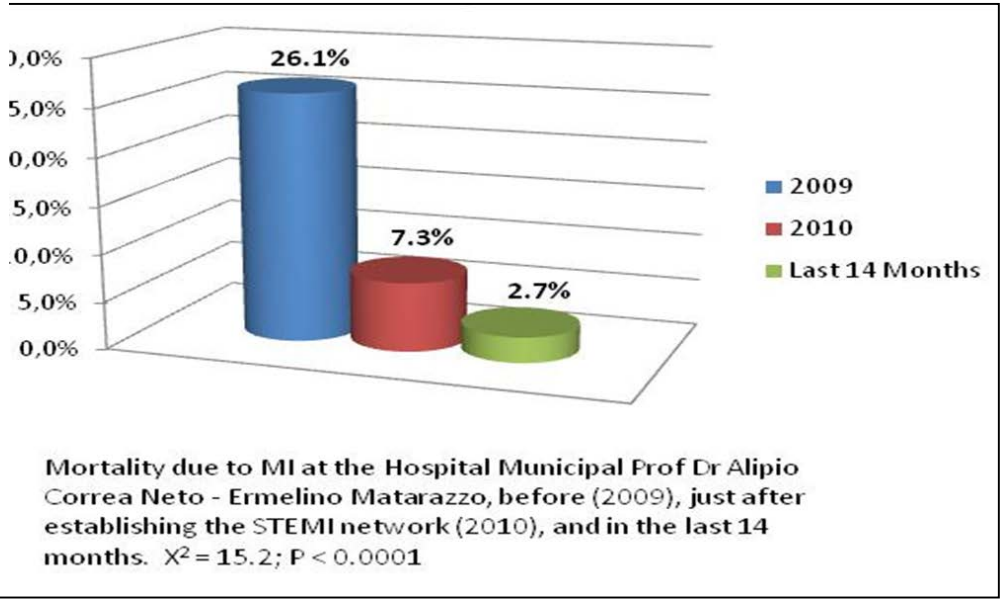
130. Stefanini GG, Kalesan B, Serruys PW, Heg D, Buszman P, Linke A, Ischinger T, Klauss V, Eberli F, Wijns W, Morice MC, Di Mario C, Corti R, Antoni D, Sohn HY, Eerdmans P, van Es GA, Meier B, Windecker S, Juni P. Long-term clinical outcomes of biodegradable polymer biolimus-eluting stents vs. durable polymer sirolimus-eluting stents in patients with coronary artery disease (LEADERS): 4 year follow-up of a randomised non-inferiority trial. *Lancet* 2011;**378**(9807): 1940–1948.

131. Palmerini T, Biondi-Zoccai G, Della Riva D, Stettler C, Sangiorgi D, D'Ascenzo F, Kimura T, Briguori C, Sabate M, Kim HS, De Waha A, Kedhi E, Smits PC, Kaiser C, Sardella G, Marullo A, Kirtane AJ, Leon MB, Stone GW. Stent thrombosis with drug-eluting and bare-metal stents: evidence from a comprehensive network meta-analysis. *Lancet* 2012;**379**(9824):1393–1402.

Eur Heart J 2014:35(37):2541-619

STEMI Management in Developing Countries





Mortality due to MI at the Hospital Municipal Prof Dr Alipio Correa Neto - Ermelino Matarazzo, before (2009), just after establishing the STEMI network (2010), and in the last 14 months. $X^2 = 15.2$; $P < 0.0001$

STEMI Management in Developing Countries

STREAM trial

Prehospital fibrinolysis with timely coronary angiography resulted in effective reperfusion in patients with early STEMI, providing clinical outcome similar to that with primary PCI.

CABG was performed in more patients in the fibrinolysis group (4.7% vs 2.1%) and accounted for end-point reduction in the pharmacoinvasive group, driven largely by heart failure and shock.

Furthermore, suggested that complete surgical coronary revascularization among the patients undergoing fibrinolysis might have an favorable effect on long-term mortality.

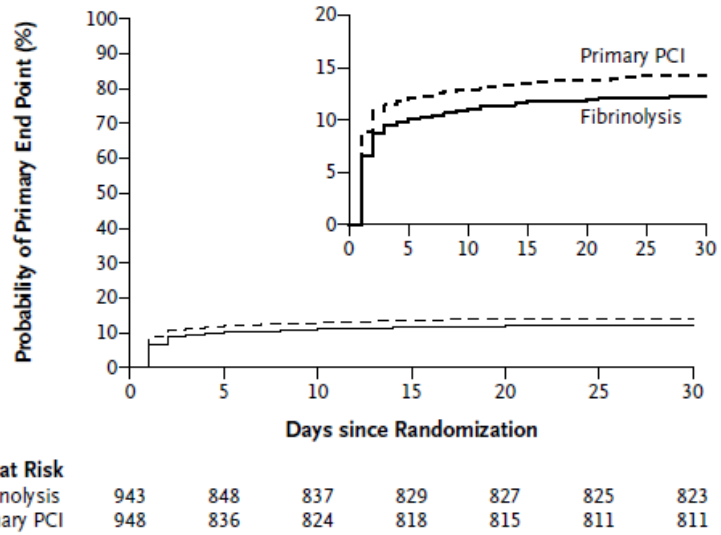


Figure 1. Kaplan–Meier Curves for the Primary End Point.

The primary end point was a composite of death from any cause, shock, congestive heart failure, or reinfarction within 30 days (P=0.21 by the log-rank test). PCI denotes percutaneous coronary intervention. The inset shows the same data on an enlarged y axis.

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 11, 2013 VOL. 368 NO. 15

Fibrinolysis or Primary PCI in ST-Segment Elevation Myocardial Infarction

Paul W. Armstrong, M.D., Anthony H. Gershlick, M.D., Patrick Goldstein, M.D., Robert Wilcox, M.D., Thierry Danays, M.D., Yves Lambert, M.D., Vitaly Sulimov, M.D., Ph.D., Fernando Rosell Ortiz, M.D., Ph.D., Miodrag Ostojic, M.D., Ph.D., Robert C. Welsh, M.D., Antonio C. Carvalho, M.D., Ph.D., John Nanas, M.D., Ph.D., Hans-Richard Arntz, M.D., Ph.D., Sigrun Halvorsen, M.D., Ph.D., Kurt Huber, M.D., Stefan Grajek, M.D., Ph.D., Claudio Fresco, M.D., Erich Bluhmki, M.D., Ph.D., Anne Regelin, Ph.D., Katleen Vandenberghe, Ph.D., Kris Bogaerts, Ph.D., and Frans Van de Werf, M.D., Ph.D., for the STREAM Investigative Team*

Procedure			
Urgent coronary angiography	331/911 (36.3)	NA	
PCI	736/915 (80.4)	838/933 (89.8)	<0.001
Coronary-artery bypass grafting after study angiography or PCI	44/943 (4.7)	20/947 (2.1)	0.002
Stent placement	704/736 (95.7)	801/838 (95.6)	0.95

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"Drug therapy before transfer is at least as effective as PCI, and an urgent catheterization was avoided in two-thirds of patients. This gives clinicians time to consider other options, such as CABG and medical therapy.“

it enables more patients to get bypass surgery, we might see an effect on long-term mortality."

My final message

As utopic as it may sound, but we should brace to make possible and affordable to extend these new technologies to every patient in need.

We doctors have the sacred carry the burden of take care

The health care of caring for our peers, whoever and wherever they are.

And we all to have to share this mission

I am grateful for the opportunity, thank you all for the goodwill to listen to my words, believe it comes from the very bottom of my heart.

Thank you
Obrigado
Gracias
Merci

Walter J. Gomes

São Paulo Hospital
Escola Paulista de Medicina
Federal University of São Paulo
São Paulo - Brazil