

# Quality of Care for Acute Myocardial Infarction in Argentina. Observations from the SCAR (Acute Coronary Syndromes in Argentina) Registry

## *Calidad de atención del infarto agudo de miocardio en la Argentina. Observaciones del Registro SCAR (Síndromes Coronarios Agudos en Argentina)*

HORACIO E. FERNÁNDEZ<sup>1</sup>, JORGE A. BILBAO<sup>1</sup>, HERNÁN COHEN ARAZI<sup>MTSAC</sup>, MARÍA L. AYERDI<sup>1</sup>, JUAN M. TELAYNA<sup>MTSAC, 1</sup>, ERNESTO A. DURONTO<sup>MTSAC, 2</sup>, RICARDO VILLARREAL<sup>MTSAC, 3</sup>, PATRICIA BLANCO<sup>MTSAC, 4</sup>, CLAUDIO HIGA<sup>MTSAC, 5</sup>, IN REPRESENTATION OF THE SCAR MULTICENTER REGISTRY, SAC RESEARCH AREA AND CARDIOVASCULAR EMERGENCY COUNCIL<sup>MTSAC</sup>

### ABSTRACT

**Introduction:** Quality assessments help to quantify the gap between healthcare provision and what should be awarded. There are specific measurements on quality of medical care for myocardial infarction which standardize the quality information that every institution should determine for self-assessment and for comparison with others.

**Objective:** The aim of this study was to analyze quality of care for myocardial infarction data in our country using the SCAR (Acute Coronary Syndromes in Argentina) Multicenter Registry.

**Methods:** Quality of care data for myocardial infarction was analyzed in patients included in the database of the SCAR Multicenter Registry using definitions of the "ACC/AHA 2008 performance measures for adults with ST-elevation and non-ST-elevation myocardial infarction" document.

**Results:** The study analyzed 751 myocardial infarction cases with complete data on quality indicators. Aspirin, betablockers, statins and angiotensin antagonists were used in nearly 90% of patients. The exception was clopidogrel which was used in 72.5% of patients not receiving mechanical reperfusion. Ventricular function was assessed during hospitalization in 90.2% of cases. A reperfusion strategy was used in 90.1% of ST-segment-elevation infarctions and less than 12-hour evolution. Door-to-balloon time was < 90 minutes in 50.8% of cases, while door-to-needle time was < 40.5%.

**Conclusions:** Overall, there was high compliance to pharmacological and reperfusion treatments except in the use of clopidogrel without mechanical revascularization, and low compliance to the appropriate times of reperfusion therapy.

**Key words:** Myocardial infarction - Myocardial reperfusion - Balloon angioplasty - Thrombolytic therapy - Healthcare quality.

### RESUMEN

**Introducción:** Las mediciones de calidad ayudan a cuantificar la distancia entre la atención en salud que se brinda y la que se debería brindar. Existen mediciones específicas sobre la calidad de la atención del infarto de miocardio que permiten uniformar los datos de calidad que toda institución debería medir para autoevaluarse y compararse con otras.

**Objetivo:** Analizar los datos de calidad de la atención del infarto en nuestro país utilizando los datos del Registro Multicéntrico SCAR (Síndromes Coronarios Agudos en Argentina).

**Material y métodos:** Se analizaron los datos de calidad de atención del infarto de miocardio de los pacientes de la base de datos del Registro Multicéntrico SCAR utilizando definiciones del documento "ACC/AHA 2008 performance measures for adults with ST-elevation and non-ST-elevation myocardial infarction".

**Resultados:** Se analizaron 751 casos de infarto de miocardio con datos completos sobre indicadores de calidad. El uso de aspirina, betabloqueantes, estatinas y antagonistas de la angiotensina fue cercano al 90%. La excepción fue el uso de clopidogrel, que fue del 72,5% en quienes no recibieron reperusión mecánica. Se relevó la función ventricular durante la internación en el 90,2% de los casos. Recibieron alguna estrategia de reperusión el 90,1% de los infartos con elevación del segmento ST y menos de 12 horas de evolución. El tiempo puerta-balón fue < 90 minutos en el 50,8% de los casos, mientras que el tiempo puerta-aguja fue < 30 minutos en el 40,5%.

**Conclusiones:** Globalmente se observaron valores altos de cumplimiento en los tratamientos farmacológicos y de reperusión, excepto en el uso de clopidogrel sin revascularización mecánica. Se observó un cumplimiento bajo en los tiempos apropiados de los tratamientos de reperusión.

**Palabras clave:** Infarto del miocardio - Reperusión miocárdica - Angioplastia coronaria con balón - Terapia trombolítica - Calidad de atención en salud.

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Address for reprints: Dr. Horacio Fernández - Hospital Universitario Austral - Instituto de Cardiología, Unidad de Cardiología Crítica - Av. J. D. Perón 1500 - (B1629AHJ) Derqui, Pilar - Pcia. de Buenos Aires, Argentina - e-mail: hfernandez@cas.austral.edu.ar

<sup>MTSAC</sup> Full Member of the Argentine Society of Cardiology

<sup>†</sup> To apply as Full Member of the Argentine Society of Cardiology

<sup>1</sup> Hospital Universitario Austral

<sup>2</sup> Fundación Favaloro

<sup>3</sup> Sanatorio Güemes

<sup>4</sup> Hospital Naval

<sup>5</sup> Hospital Alemán

## Abbreviations

ACC	American College of Cardiology	STEMI	ST-segment elevation myocardial infarction
AHA	American Heart Association	SCAR	Acute Coronary Syndromes in Argentina
SAC	Argentine Society of Cardiology	NSTEMI	Non-ST-segment elevation myocardial infarction

## INTRODUCTION

It has been over 10 years since the United States Institute of Medicine documented its concerns on the quality of care implemented in healthcare institutions. (1) However, few healthcare institutions in our country measure and report, either internally or to the public, indicators on their quality of care. (2) Neither are there national public health initiatives to encourage such reports as in other countries. (3) Private initiatives reporting on healthcare quality indicators do not yet contemplate myocardial infarction. (4)

Quality measurements help quantify the gap between healthcare provision and what should be awarded. Identifying this gap in the field of our daily work would develop strategies to improve standards of care by comparing them with other centers (benchmarking). On the other hand, especially in the United States, public health institutions make these quality measurements spontaneously or upon request of the State or accrediting agencies such as the Joint Commission International. (5-7)

The American College of Cardiology (ACC) and the American Heart Association (AHA) have developed indicators to measure the quality of cardiovascular care in various clinical settings, including acute myocardial infarction. (8) These indicators standardize the way in which quality of care in different institutions is measured and compared. Measurement processes are based on the recommendations of the ACC/AHA Class I guidelines for the management of acute myocardial infarction, (9) simplifying the task of transferring the reported scientific evidence to the real world clinical practice.

In our setting, there have been local initiatives to measure the quality of the public health integrated system in the Autonomous City of Buenos Aires for the care of myocardial infarction. (10) Time to reperfusion in a network of public hospitals in the south of Buenos Aires province has also been reported. (11) Joining these initiatives, our goal was to evaluate the quality of care for myocardial infarction in national centers participating in the SCAR Multicenter Registry (Acute Coronary Syndromes in Argentina) conducted by the Research Area and the Cardiovascular Emergency Council of the Argentine Society of Cardiology

## METHODS

### Population and Design

Data was collected from the observational, prospective, cross-sectional consecutive registry which included patients with a diagnosis of acute coronary syndrome in 87 centers from Argentina (Appendix) between March and October 2011. Patients with myocardial infarction defined as the presence of ischemic pain of  $\geq 20$  minute duration with char-

acteristic ischemic electrocardiographic changes and biochemical marker elevation twice the upper limit of normal were included for the analysis of quality of care. ST-segment elevation myocardial infarctions (STEMI) were defined as those presenting persistent ST-segment elevation  $\geq 1$  mm in two or more contiguous leads considered to be ischemic. The rest were classified as non-ST-segment elevation myocardial infarctions (NSTEMI). Clinical, diagnostic and therapeutic interventions were recorded at each data center and sent in a specially designed file for the study via the Internet or by mail to the SAC Research Area. The study was conducted in agreement with Good Clinical Practice Guidelines and the Data Protection Law of Argentina. The protocol was approved by the SAC Bioethics Committee. Due to the observational nature of the registry, behaviors and treatments were adopted according to each investigator's criteria.

### Definition of indicators

Definitions of the ACC/AHA published in their 2008 document "Performance measures for adults with ST-segment elevation and non-ST-segment elevation myocardial infarction" (Table 1) were used. (8)

### Statistical analysis

Continuous variables are presented as mean  $\pm$  standard deviation or median and interquartile range, depending on normal or non-normal distribution. Student's t test, Kruskal-Wallis test and Wilcoxon rank-sum test were used as appropriate to compare groups. A simple regression analysis was performed to obtain raw coefficients. A p value  $< 0.05$  was considered as statistically significant. Analyses were performed using the Epi Info® public domain statistical software from the Centers for Disease Control and Prevention (CDC).

## RESULTS

The Registry was active between March and October 2011, collecting data from 1330 patients with acute coronary syndrome in 87 centers from Argentina. For these analyses 751 out of 758 cases had infarctions that presented proper and complete data for the expected quality assessment. Mean age was  $61 \pm 12$  years and 23% of patients were female. STEMI patients had a higher prevalence of smoking, whereas NSTEMI ones had a higher prevalence of other risk factors. Moreover, the latter group presented a larger number of cases with history of myocardial infarction and prior revascularization. The rest of the population characteristics are shown in Table 2.

Overall and individual quality results, for STEMI and NSTEMI patients are shown in Table 3.

Nearly all patients received adequate medical therapy at admission and discharge, with utilization rates above 90%, with the exception of antiangiotensin strategies (angiotensin-converting enzyme inhibi-

**Table 1.** Definitions, inclusions and exclusions of the measured quality indicators

Variable	Numerator	Denominator	Exclusion
Aspirin at admission	Patients receiving ASA at admission or who had been receiving it	All infarctions	Deceased on the day of admission Allergy to aspirin or other contraindications
Aspirin at discharge	Patients receiving ASA at discharge	All infarctions	Referred or deceased prior to discharge Allergy or other contraindications
Betablockers at discharge	Patients receiving betablocker treatment at discharge	All infarctions	Referred or deceased prior to discharge Allergy or other contraindications
Statins at discharge	Patients receiving statin treatment at discharge	All infarctions	Referred or deceased prior to discharge LDL < 100, allergy or other contraindications
Ventricular function assessment	Patients with any method of LV function assessment	All infarctions	Referred or deceased prior to discharge
ARB in LV dysfunction	ARB at discharge in patients with moderate to severe LV dysfunction	Infarctions with moderate to severe LV dysfunction	Referred or deceased prior to discharge Allergy, aortic stenosis, angioedema, hyperkalemia, hypotension, renal artery stenosis, renal dysfunction
Door-to-needle time ≤ 30 minutes	Patients undergoing thrombolytic therapy within ≤ 30 minutes from admission to the healthcare center	STEMI receiving thrombolytics ≤ 6 hours from arrival to the healthcare center	Referred from another institution Documented contraindication
Door-to-ballon time ≤ 90 minutes	Patients undergoing angioplasty within ≤ 90 minutes from admission to the healthcare center	STEMI with direct angioplasty performed within 24 hours from admission	Referred from another institution Patients who received thrombolytics. Documented reason for no reperfusion
Reperfusion	Patients who received or were referred for some type of reperfusion	STEMI within 12 hours from initiation of symptoms	Documented reason for no reperfusion
Clopidogrel at discharge in medical treatment	Patients without mechanical revascularization procedures receiving clopidogrel or ticlopidine at discharge	All infarctions	Patients undergoing angioplasty or CABG during hospitalization or that were planned at discharge Deceased or referred. Allergy

ASA: acetylsalicylic acid (aspirin). LV: Left ventricular. ARB: Angiotensin Receptor Blocker. AIIRA: Angiotensin II receptor antagonists. STEMI: ST-segment elevation myocardial infarction. LDL: Low-density lipoprotein. CABG: Coronary artery bypass graft surgery.

tors and angiotensin receptor blockers), which were a little below that figure, as was the use of clopidogrel at discharge in those who did not receive mechanical revascularization.

A reperfusion strategy was used in 89.3% of STEMI cases. However, when the quality indicator definition is applied and patients with less than 12 hours evolution are assessed, the figure stands at 90.1%. Regarding the type of reperfusion therapy used in that temporal window, direct angioplasty was performed in 61.7% and thrombolytic treatment was used in 19.3%

of cases. The quality of reperfusion analysis showed that only half of the patients received direct angioplasty in an optimal door-to-treatment time below 90 minutes, and only 40.5% of patients received thrombolytic therapy in the recommended time interval below 30 minutes.

Ventricular function assessment during hospitalization was performed in 90.2% of patients.

Overall stroke mortality was 7.2% with no significant difference between STEMI and NSTEMI patients.

Performance measurement	Overall (n = 751) n (%)	With STE (n = 472) n (%)	With NSTEMI (n = 279) n (%)	p
Aspirin at admission	743/747 (99.5)	466/469 (99.4)	277/278 (99.6)	ns
Aspirin at discharge	690/693 (99.6)	430/432 (99.5)	260/261 (99.6)	ns
Betablockers at discharge	635/670 (94.8)	392/417 (94.0)	243/253 (96.0)	ns
Statins at discharge	658/679 (96.9)	412/423 (97.4)	246/256 (96.1)	ns
LV function measurement	629/697 (90.2)	389/435 (89.4)	240/262 (91.6)	ns
Antiangiotensin in LV dysfunction	133/151 (88.1)	89/100 (89.0)	44/51 (86.3)	ns
Door-to-balloon < 90 min		129/254 (50.8)		
Door-to-needle < 30? min		30/74 (40.5)		
Reperfusion with < 12 hour symptoms		353/392 (90.1)		
Clopidogrel at discharge with medical treatment	87/120 (72.5)	48/59 (81.4)	39/61 (63.9)	0.033
Mortality	54/751 (7.2)	37/472 (7.8)	17/279 (6.1)	ns

STE: ST segment elevation. NSTEMI: Non-ST-segment elevation. ns: Non-significant

**Table 2.** Quality of care indicators for myocardial infarction

	Overall (n = 751) n (%)	With STE (n = 472) n (%)	With NSTEMI (n = 279) n (%)	p
Age, years	62 ± 12	61 ± 12	63 ± 12	0.022
Female gender	175 (23.3)	117 (24.8)	58 (20.8)	ns
Obesity	215 (28.6)	135 (28.6)	80 (37.4)	ns
Hypertension	498 (66.3)	299 (63.3)	198 (71.0)	0.03
Smoking	279 (37.1)	191 (40.5)	89 (31.8)	0.02
Diabetes	166 (22.1)	90 (19.1)	76 (27.2)	0.01
Dyslipidemia	398 (53.0)	233 (49.4)	165 (59.1)	0.01
Family history	126 (16.8)	87 (18.4)	39(14.0)	ns
Previous infarction	133 (17.7)	60 (12.7)	73 (26.2)	< 0.001
Previous revascularization	123 (16.4)	56 (11.9)	67 (24.0)	< 0.001
Direct angioplasty		291 (61.7)		
Thrombolytic therapy		91 (19.3)		

STE: ST-segment elevation. NSTEMI: Non-ST-segment elevation. ns: Non-significant.

**Table 3.** Population characteristics

**DISCUSSION**

The reduction in mortality achieved through the years in the treatment of myocardial infarction is due to pharmacological and mechanical interventions aimed at limiting thrombosis, infarct size, arrhythmias and subsequent myocardial remodeling. (12, 13) In contrast, delayed reperfusion increases mortality of patients who have lost this benefit. (14) This is evidenced in a recently published registry of 515 hospitals participating of the CathPCIRegistri showing that mortality of patients with direct angioplasty in less than 90 minutes was 3.7%, whereas in those exceeding that time mortality was 7.3%, similar to that of our study. (15)

Quality indicators allow assessing the implementation of guideline recommendations in everyday clinical practice to see how far our setting is from the best quality of care. In that sense, our results show a proper use of initial and at discharge patient treatment. Regarding the use of aspirin, beta blockers and statins, our figures match those of Piombo et al. (10)

that showed 97.8%, 92.6% and 95.6% utilization, respectively. Similarly, the same study shows less use of strategies that block the effect of angiotensin in patients with ventricular dysfunction, reporting 88.2% utilization. Clopidogrel administration in patients not receiving mechanical reperfusion was also lower in our study, especially in NSTEMI patients. This indicates lack of knowledge or adherence to guideline recommendations based on studies of clopidogrel in myocardial infarction. (16-18) It is possible to improve these values with medical education and information dissemination.

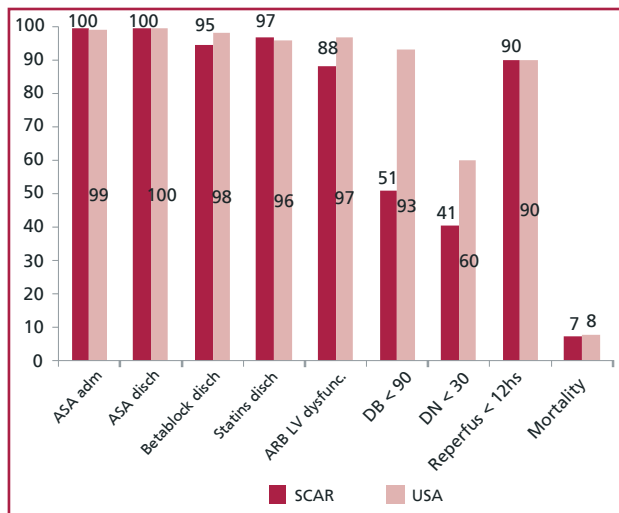
In selected centers participating in the SCAR Registry, the use of any type of reperfusion strategy achieved very acceptable values (90.1%), better than previously reported results in myocardial infarction surveys in Argentina showing prevalence of 74 % and 55% in 2003 and 2005. (19) These results had already shown improvements in the Piombo et al. study (10) reporting 95.2% use of reperfusion and the Mariani et al. study, (11) with 63.6% utilization. It seems that

there is an opportunity for improvement for 5-10% of patients who are still not receiving any reperfusion strategy, considering that this value could be higher if all health centers in the country were taken into account.

Myocardial infarction in our registry, especially STEMI, was lower than in previous registries, 7.8% vs. 10% in the 2005 SAC survey, although substantially higher than the 3% prevalence indicated by the city of Buenos Aires hospital study and the 4.6% in the south of Buenos Aires province hospital study.

The most upsetting aspect of our results in terms of reperfusion quality lies in the delay to perform it. Only about half of patients are reperfused in the ideal times indicated by guidelines. Similar difficulties were found in the already mentioned hospital study in the city of Buenos Aires, showing that only 1 out of every 3 patients undergo reperfusion treatment in the ideal time. Thus, projects of quality improvement should be focused here, encouraging strategies to improve early diagnosis (electrocardiogram within 10 minutes) and quick access to thrombolytic therapy in the emergency room, or prompt assistance of the hemodynamics team and transfer of the patient to the ward, perfecting communications, and promoting the use of thrombolytics when it is known that angioplasty will not be achieved in less than 90 minutes, either by inherent center problems or because transfer to try direct angioplasty is intended. These are the elements that will allow infarct mortality rate to continue decreasing.

In the United States, most of the institutions are required to make public their data on quality of care. They are published on the Internet and are useful to compare among different institutions or one institution with the national standard. Figure 1 shows data of our registry compared with the national average of the United States during the same period. (20) It can



**Fig. 1.** Comparison between the Multicenter SCAR Registry results and the USA national mean. ASA: Acetylsalicylic acid (aspirin). Bblock: Betablockers. DB: Door-to-balloon time. DN: Door-to-needle time. ARB: Angiotensin Receptor Blockers.

be noticed that the results of the United States are similar to those of our registry, except for the times to reperfusion which are clearly better in the North American country.

**Study limitations**

As this was a survey study, the data obtained were dependent on the commitment of each center (for logistical reasons there was no available audit of the 87 centers). The methodology for door-to-balloon and door-to-needle data collection was not standardized. There may be a bias towards approximation and rounding of those times. Participating centers are associated to SAC; half of them have cardiology residency and 75% have 24-hour hemodynamics capacity, so that the data arising from this registry may not reflect the country's reality.

**CONCLUSIONS**

The impact of scientific evidence and guidelines of cardiological societies reflects positively on the high rate of appropriate pharmacological treatments and reperfusion use in this sample of coronary care units in Argentina. However, low compliance of appropriate and timely use of some form of reperfusion therapy opens a great opportunity of improvement that should be prioritized in the coming years.

**Conflicts of interest**

None declared.

**REFERENCES**

1. Institute of Medicine, Committee on Quality of Health Care in America. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: Institute of Medicine; 2001.
2. <http://www.picam.org.ar/>. Adhesión al programa de hospitales públicos e instituciones privadas.
3. "Health Policy Brief: Public Reporting on Quality and Costs", Health Affairs, March 8, 2012.
4. Programa de Indicadores de Calidad en la Atención Médica de SACAS (Sociedad Argentina de Calidad en Atención de la Salud) / ITAES (Instituto Técnico para la Acreditación de Establecimientos de Salud). <http://www.calidadensalud.org.ar/>
5. <http://www.medicare.gov/hospitalcompare>
6. [http://www.jointcommission.org/core\\_measure\\_sets.aspx](http://www.jointcommission.org/core_measure_sets.aspx)
7. QualityNet. Specifications manual for national hospital-ity quality measures. Version 4.2 (<http://www.qualitynet.org/dcs/contentServer?pagename=QnetPublic%2FPage%2FQnetTier2&c id=1141662756099>).
8. ACC/AHA 2008 Performance Measures for Adults With ST-Elevation and Non-ST Elevation Myocardial Infarction. *Circulation* 2008;118:2596-648.
9. ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction. *Circulation* 2004;110:e82-e292.
10. Piombo A, Rolandi M, Fitz Maurice M, Salzberg S, Zylberstein H, Rubio E y colset al. Registry of Quality of Medical Care for Acute Myocardial Infarction at Buenos Aires Public Hospitals/Registro de calidad de atención del infarto agudo de miocardio en los hospitales públicos de la ciudad de Buenos Aires. *Rev Argent Cardiol* 2011;79:132-8.
11. Mariani J, De Abreu M, Tajer C, en representación de los investigadores de la Red para la Atención de los Síndromes Coronarios Agudos. Time to and Use of Reperfusion Therapy in a Health Care Network/Tiempos y utilización de terapia de reperfusion en un sistema de atención en red. *Rev Argent Cardiol* 2013;81:233-9. <http://doi.org/s2r>

12. McManus DD, Gore J, Yarzebski J, Spencer F, Lessard D, Goldberg RJ. Recent trends in the incidence, treatment, and outcomes of patients with STEMI and NSTEMI. *Am J Med* 2011;124:40-7. <http://doi.org/dhgcz2>
13. Jernberg T, Johanson P, Held C, Svennblad B, Lindback J, Walentin L. Association between adoption of evidence-based treatment and survival for patients with ST-elevation myocardial infarction. *J Am Med Assoc* 2011;305:1677-84. <http://doi.org/fkn5jk>
14. Terkelsen CJ, Sørensen JT, Maeng M, Jensen LO, Tilsted HH, Trautner S, et al. System delay and mortality among patients with STEMI treated with primary percutaneous coronary intervention. *JAMA* 2010;18;304:763-71.
15. Menees D, Peterson ED, Wang Y, Curtis JP, Messenger JC, Rumsfeld JS, et al. Door-to-balloon time and mortality among patients undergoing primary PCI. *N Engl J Med* 2013;369:901-9. <http://doi.org/dkdfgd>
16. The clopidogrel in unstable angina to prevent recurrent events trial investigators. Effects of clopidogrel in addition to aspirin in patients with acute coronary syndromes without ST-segment elevation. *N Engl J Med* 2001;345:494-502.
17. Chen ZM, Jiang LX, Chen YP, Xie JX, Pan HC, Peto R, et al. Addition of clopidogrel to aspirin in 45,852 patients with acute myocardial infarction: randomized placebo-controlled trial. *Lancet* 2005;366:1607-21.
18. Sabatine MS, Cannon CP, Gibson CM, Lopez-Sendon JL, Montalescot G, Theroux P, et al. Addition of clopidogrel to aspirin and fibrinolytic therapy for myocardial infarction with ST-segment elevation. *N Engl J Med* 2005;352:1179-89. <http://doi.org/cfvngk>
19. Gagliardi J, Charask A, Higa C, Blanco P, Dini A, Tajer C y colset al. Acute Myocardial Infarction. Results from the SAC 2005 Survey in the Argentine. *Infarto agudo de miocardio en la República Argentina. Análisis comparativo en los últimos 18 años. Resultados de las Encuestas SAC. Rev Argent Cardiol* 2007;75:171-8.
20. <http://www.medicare.gov/hospitalcompare>

## APPENDIX

### Participating centers and responsible investigators of the SCAR Registry

1. Asociación Española de Socorros Mutuos (Comodoro Rivadavia): Dr. Celia, José Carlos | Dr. Freile, Oscar
2. CEMEP Río Grande (Tierra del Fuego): Dr. Grane, Ignacio | Dra. Di Nunzio, Mariela
3. CEMIC: Dr. Fuselli, Juan | Dr. Guetta, Javier
4. Centro Cardiológico del Norte: Dr. Cravzov, Ricardo | Dra. Mereles, Laura
5. Centro Gallego: Dr. Varini, Sergio | Dra. Surc, Patricia
6. Clínica Bazterrica: Dr. Barrero, Carlos | Dra. Granada, Carolina
7. Clínica Coronel Suárez: Dr. Caccavo, Alberto | Dr. Sein, Mariano
8. Clínica Comahue: Dr. López, Enrique
9. Clínica del Sol: Dr. Gagliardi, Juan
10. Clínica del Valle (Comodoro Rivadavia): Dra. Seleme, María | Dr. Gil Daroni, Juan
11. Clínica Independencia: Dr. Pomés Iparraguirre, Horacio | Dr. de Dominicis, Francisco
12. Clínica La Sagrada Familia: Dr. Ingino, Carlos
13. Clínica Modelo Morón: Dra. Salvati, Ana María | Dra. Gentile, Silvia
14. Clínica Olivos: Dr. Nani, Sebastián | Dr. Guardiani, Fernando
15. Clínica Privada ERI: Dr. Campos, Carlos | Dra. Panetta, Analía
16. Clínica San Camilo: Dr. David, José María | Dr. Mera, Mario
17. Clínica San Jorge: Dr. Berenstein, César | Dr. Milito, Lucas
18. Clínica Santa Isabel: Dr. Mauro, Víctor | Dr. Fairman, Enrique
19. Clínica y Maternidad Suizo Argentina: Dr. Medrano, Juan | Dra. Bruno, Claudia
20. Clínica Yunes: Dr. Manfredi, Carlos Eduardo | Dra. Pereda, Agustina
21. Corporación San Martín: Dr. Ahuad Guerrero, Rodolfo
22. FLENI: Dr. Cohen Arazi, Hernán | Dr. Caturla, Nicolás
23. Fundación Favaloro: Dr. Duronto, Ernesto
24. HIGA Presidente Perón de Avellaneda: Dr. Gadaleta, Francisco | Dr. Chianelli, Oscar
25. Hospital Alemán: Dr. Comignani, Pablo | Dr. Fedor, Novo
26. Hospital Álvarez: Dr. Mitelman, Jorge
27. Hospital Argerich: Dr. Piombo, Alfredo | Dr. Cozzarín, Alberto
28. Hospital Austral: Dr. Fernández, Horacio
29. Hospital Británico: Dr. Pérez, Marcelo
30. Hospital Central de San Isidro "Dr. Melchor A. Posse": Dr. Lang, Walter | Dr. Romero, Diego
31. Hospital César Milstein: Dr. Dizeo, Claudio
32. Hospital Churruca: Dr. Pasinato, Carlos
33. Hospital de Clínicas: Dr. Sampó Eduardo Alberto | Dra. Swieszkowski, Sandra
34. Hospital Durand: Dr. Rubio, Edgardo | Dr. Beck, Edgardo
35. Hospital Enrique Vera Barros: Dr. Cejas, Ariel | Dra. Brandan, Patricia
36. Hospital Español de Bs. As.: Dra. Nicolosi, Liliana | Dr. Fuentes, Richard
37. Hospital Evita de Lanús: Dra. Fernández, Susana | Dr. Lo Carmine, Héctor
38. Hospital Fernández: Dra. Gitelman, Patricia | Dra. Mahia, Mariana
39. Hospital Italiano de Bs. As.: Dr. Navarro Estrada, José | Dra. Carrero, María
40. Hospital Italiano de Mendoza: Dr. Achilli, Federico | Dra. Rodríguez, Liliana
41. Hospital Julio C. Perrando: Dra. González, Marina | Dra. Goujon, Noelí
42. Hospital Luis Lagomaggiore: Dr. Piasentin, Jorge | Dra. Malfa, Alejandra
43. Hospital Municipal de Chivilcoy: Dr. Iralde, Gustavo | Dr. Matias, Cristian
44. Hospital Municipal Pigüé: Dr. Vergnes, Alberto | Dr. Sequeira, Mariano
45. Hospital Nacional Dr. Bladomiro Sommer: Dr. Caissón, Alejandro | Dr. García, Pablo
46. Hospital Naval: Dr. Nobilia, Nicolás | Dra. Blanco, Patricia
47. Hospital Pablo Soria: Dr. Rivero Paz, Franz
48. Hospital para la Comunidad de Arias (Córdoba): Dr. Sangiorgi, Joaquín | Dr. Schmidt, Carlos
49. Hospital Paroissien: Dr. Spolidoro, José Antonio | Dr. Marani, Alberto
50. Hospital Pirovano: Dr. Adamowicz, Gustavo | Dr. Zylbersztejn, Horacio
51. Hospital Privado de Córdoba: Dr. Contreras, Alejandro
52. Hospital Regional de Comodoro Rivadavia: Dr. García, Eloy | Dr. Ortega, Javier

53. Hospital Rivadavia: Dr. Hirschson Prado, Alfredo | Dr. Domine, Enrique
54. Hospital Santojanni: Dr. Kevorkian, Rubén | Dra. González, María
55. Hospital Vélez Sarsfield: Dr. Linenberg, Adrián | Dr. Saez, Leandro
56. Hospital Vicente López: Dr. Paves Palacios, Héctor | Dr. Cepik, Julio
57. Hospital Zonal de Esquel: Dr. Serebrinsky, Damián | Dra. Torres, Adriana
58. Instituto Cardiovascular de Bs. As.: Dr. Benzádon Mariano | Dr. Campos, Roberto
59. ICCV - Sacre Coeur: Dr. Tuda, Ricardo | Dr. Herrera Paz, Juan José
60. INCOR La Rioja: Dr. Geronazzo, Ricardo José
61. Instituto Argentino de Diagnóstico y Tratamiento: Dr. Roura, Pablo | Dr. Fiorucci, Martín
62. Instituto de Cardiología Juana Cabral: Dra. Macín, Stella Maris | Dr. Zoni, Rodrigo
63. Instituto Cardiovascular de Rosario: Dr. Zapata Gerardo | Dr. Jorge, Raúl
64. Instituto Cardiovascular del Oeste: Dr. Rosales, Armando | Dr. Peñafort, Gonzalo
65. Instituto Cardiovascular Las Lomas de San Isidro: Dr. Stutzbach, Pablo | Dr. Duarte, Daniel
66. Instituto Cardiovascular San Luis : Dr. Albisu, Juan Pablo | Dr. Albisu, José
67. Instituto Cordis (Chaco): Dr. Soriano, Lisandro | Dr. Meneses, Rafael
68. Instituto de Cardiología del Sanatorio Juan XXIII (Río Negro): Dr. Bernardini, Roberto | Dr. Menichini, Nicolás
69. Instituto Médico Central Ituzaingó: Dr. Ferrer, Mariano | Dr. Haefeli, Mariano
70. Instituto Médico Privado: Dra. Porcasi Gómez, Soledad | Dr. González Oré, Bladimir
71. Policlínico Neuquén: Dr. Lacalle, Daniel | Dr. Rueda Rivas, Juan
72. Sanatorio Anchorena: Dr. González, Miguel | Dr. Rodríguez, Leandro
73. Sanatorio Esperanza: Dr. Allin, Jorge | Dr. Ávila, Rafael
74. Sanatorio Franchín: Dr. Calderón, Gustavo | Dr. Dizeo, Claudio
75. Sanatorio Garat: Dr. Forte, Ezequiel
76. Sanatorio Güemes: Dr. Villarreal, Ricardo | Dr. Cestari, Germán
77. Sanatorio Modelo de Quilmes: Dr. Hrabar, Adrián | Dr. Fernández, Alberto
78. Sanatorio Municipal Dr. Julio Méndez: Dr. Zivano, Daniel | Dra. Scattini, Florencia
79. Sanatorio Nosti: Dra. Ricotti, Carola | Dra. Reyes, Pamela
80. Sanatorio Otamendi: Dr. Manente, Diego | Dr. Guerrico, Fernando
81. Sanatorio Pasteur: Dra. Marturano, María Pía | Dra. Villagra, Lorena
82. Sanatorio Prof. Itoiz: Dr. Rapallo, Carlos | Dr. Gómez Santa María, Héctor
83. Sanatorio San Lucas: Dr. Almirón, Norberto
84. Sanatorio San Roque: Dr. Marconetto, Fernando | Dr. Toldo, Cristian
85. Sanatorio Trinidad Mitre: Dr. Iglesias, Ricardo | Dr. Pellegrini, Carlos
86. Sanatorio Trinidad Palermo: Dr. Romeo, Esteban | Dr. Lezcano, Adrián
87. Sanatorio Trinidad Quilmes: Dr. Musante, Christian | Dr. Dumm, Jorge