Original Investigation Reports

Early Reperfusion Project for Patients with ST-Segment Elevation Acute Coronary Syndrome in the Public Sector of the Alto Valle of Río Negro.

Science and Policy Interface: A technical offering to policy makers to achieve health results.

Sonia Costantini[1-2]; Ricardo Bernztein[3]; José Mármol[4]; José Pereyra[5-6]; Martin Cari[5-7]; Laura Moran[8]; Andrés Bogado[2-9]; Alejandro Esteban[1-2]; Juan A. Sánchez[1-2]; Ivana Muratore[1-2].

1 Argentine Federation of Cardiology . 2 Especialistas en Cardiología SRL. 3 Hospital Garrahan. 4 Technician on Health Statistics 5 Argentine College of Interventional Cardiology Angiologists (Colegio Argentino de Cardioangiólogos Intervencionistas - CACI). 6 Medical Foundation of Rio Negro and Neuquén. 7 Policlinico Modelo of Cipolletti. 8 Hospital Francisco López Lima. 9 Hospital Villa Regina.

ARTICLE INFORMATION

Received on September 15, 2024.
Accepted after review on January 22, 2025.
www.revistafac.org.ar

There are no conflicts of interest to disclose.

Keywords:
ST-Segment Elevation Acute Coronary Syndrome (STEMI),
Acute Myocardial Infarction,
Percutaneous Coronary Intervention,
Thrombolysis.

ABSTRACT

Introduction: in the Alto Valle of Rio Negro (RN) in 2017, a healthcare issue was identified where hospitals do not routinely use thrombolytics (TBL) for immediate treatment of ST-Segment Elevation Acute Coronary Syndrome (STEMI) and instead refer patients for primary percutaneous coronary intervention (PCI).

Objective: to formulate an early reperfusion project that includes pre-hospital/hospital thrombolysis and PCI under the " Infarction Code" (IC) protocol to reduce the years of potential life lost (YPLL) observed in this population and to increase patient engagement.

Materials and Methods: the project was formulated using the methodology of socio-sanitary project development from a perspective of macromanagement.

Results: prioritizing PCI as the main strategy, STEMI patients from hospitals in the Eastern Health Zone should be referred to Sanatorio Juan XXIII (Level A1) or Clínica Roca (Level A2). Patients from the Western Health Zone should be referred to Fundación Médica (Level A1) or Policlinico Modelo de Cipolletti (Level A2), with direct access to the hemodynamics room. The arrival times from Catriel and El Cuy are at the threshold for PCI within 120 minutes; therefore, these patients should receive (unless contraindicated) fibrin-specific TBL followed by referral for a pharmaco-invasive strategy.

Conclusions: the situation in the Alto Valle of RN requires immediate, collective, and coordinated actions among different stakeholders to enable network-based treatment of STEMI under the IC protocol, aiming to increase the average life years gained (LYG) and to enhance patient engagement.

INTRODUCTION

Health, particularly care for acute myocardial infarction (AMI) in the public sector of Alto Valle de Río Negro (RN), presents room for improvement; to take advantage of this, it is necessary to identify management problems, both in structure and processes: identifying them is the foundation to formulate projects to solve them. Decision making emerges from the identification of problems, the establishment of priorities, proposal of alternatives, formulation of a project and evaluation.

Planning is the continuing process of anticipating resources and services necessary to achieve specific goals according to an established order of priorities, choosing the optimal solution(s) among many alternatives, taking into consideration the context of currently known internal and external difficulties, or that can be expected in the future. A project is an interrelated set of planned activities, an instrument of change within preexisting processes constituting a scenario of interaction between different actors with diverse interests and perspectives, where information is exchanged, groups and institutions are brought together, alliances and/or conflicts are generated as part of the process. As actions develop, evaluation is constituted to provide feedback on planning and management of projects; this planning/execution/evaluation process is an indivisible whole with permanent feedback.[1,2]

According to a previous investigation in Alto Valle de RN, a sanitary problem has been detected: it is unlikely for early reperfusion treatment to be applied in patients with ST-segment elevation acute coronary syndrome (STEACS), and for the maximum number of these patients to be treated according to their incidence; hospitals do not usually use fi-

Corresponding author's address: **Dra. Sonia Costantini.** Avda. Viterbori 712. General Roca (CP: 8332) Rio Negro. Argentina. *e-mail:* sscostantini@yahoo.es

brinolytic agents for the immediate care of infarction, and these patients are referred to undergo PTCA, regardless of the time elapsed since diagnosis.[3] During the development of the study, it was observed that the time window (TW) for PTCA was prolonged with a median of 200 minutes (IQR: 120-480) or a mean of 336±290, and only 26 patients were treated in year 2017; from these, 25 with good course, and one patient died, representing 15 total years of potential life lost (YPLL); taking into account the population and incidence of AMI, 50.5 total YPLL were not recorded due to lack of treatment of patients in 2017.[3]

STEACS presents multiple barriers in the public health sector of Alto Valle, which prevent a proper treatment: causes attributable to patients, like delaying to consult, deficit in prehospital-hospital care, lack of human resources (HR) in number and quality, deficit in technological resources, lack of treatment and training of staff, and absence of coordinated regional networks that would facilitate a fast referral to complexity centers, prioritizing times to act.[3]

Large distances make delays to PTCA to be prolonged. Every 30 minutes of delay to perform PTCA entails an increase in yearly mortality of 7.5%.[4] Faced with the alternative to choose a reperfusion method before the patient, we should take into account that, if a delay exceeds 120 minutes, the best treatment will not provide the expected benefits.[5,6,7,8]

A lack of coordination becomes evident in social and health care policies, as well as system fragmentation that removes regulation power from the State. This problem is universal; so, formulating an early reperfusion project is relevant, so much so that both the WHO and the World Heart Federation (WHF) are working to achieve a 25% reduction in early mortality by chronic noncommunicable diseases (NCDs) by 2025.[9]

The hypothesis is that formulating an early reperfusion project within five years would reduce YPLL, would achieve more life years gained (LYG) and a higher number of patients with STEACS would be treated in Alto Valle de RN.

The aim of the project is reducing cardiovascular morbimortality by STEACS in the public health sector of Alto Valle de RN.

General aim: formulating an early reperfusion project with prehospital/hospital thrombolysis and PTCA for Alto Valle de RN, with Infarction Code (IC) protocol.

Specific aims:

1. Improving prehospital/hospital care of patients with STEACS by treating more patients and using prehospital/hospital fibrinolysis and/or PTCA, as it may correspond in hospitals of Alto Valle de RN.
2. Implementing a network of regional care for prehospital management of patients with STEACS to administer reperfusion therapy fast and efficiently.
3. Establishing a protocol of IC to act.

GOALS OF THE GENERAL AIM OF THE PROJECT:

- Achieving early reperfusion in STEACS within 120 minutes by PTCA as priority strategy, 5% in the first year, 10% in the second, 25% in the third, 30% in the fourth and 60% in the last year.
- Decreasing mortality by STEACS in Alto Valle of RN between 20 and 25% per year, until obtaining by the end of the project, a reduction of approximately 50% of yearly mortality.
- Achieving increasing the treatment of patients with STEACS per year, following the ratio obtained in the city of Rosario: 52%, 150%, 9%, 14% and 28% respectively.[10]

Goals of specific aim (SA) 1 of the project:

- Obtaining the HR needed for emergency services, 50% within the first 6 months, 100% within 18 months.
- Obtaining 100% of necessary equipment for a fast diagnosis of STEACS in all ERs of hospitals in Alto Valle within the first 3 months.
- Obtaining 100% of necessary supplies for a fast diagnosis of STEACS in all ERs of hospitals of Alto Valle within the first 3 months.
- Acquiring high complexity ambulances necessary to move patients, for all hospitals, two per month, until completing a fleet of twelve ambulances within 6 months.
- Achieving building adequacy of ER services, 100% within the first 6 months.
- Disseminating and communicating patients and relatives at the time of discharge, as well as to the general population, the need to consult fast when precordial pain appears or when there are symptoms compatible with AMI.[11]

Goals of SA2 of the project:

- Establishing a coordination, monitoring and feedback main office, 100% within the first 6 months, following the IC protocol.
- Categorizing centers and services according to FAC recommendations within the first 6 months.[7]
- Referring patients to private care centers for PTCA, with direct admission to the hemodynamics ward, 50% within the first 6 months, 100% within one year.
- Achieving prioritizing beds in private centers for STEACS, 50% within the first six months, 100% within one year.

Goals of SA3 of the project:

- Recording personal and origin data of patients, history, clinical characteristics, data on infarction and procedure, etc., according to ANNEX 1, 100% within the first 3 months.
- Systematic quantification of timing, 100% within the first 3 months.
- Reaching a maximum time since first medical contact (FMC)-ECG and diagnosis ≤10 min, 50% within the first 3 months, 100% within one year.

- Reperfusing the infarction culprit artery (ICA) with PTCA before 120 minutes since FMC, 5% within the first year, 10% in the second, 25% in the third, 30% in the fourth and 60% in the last year.[12]
- Reaching a maximum time since the diagnosis of STEACS to thrombolytics (TBL) infusion in a prehospital/hospital context of 10 minutes, 50% within 6 months, 100% within one year, in the case of patients with no access to a center with PTCA before 120 minutes.[13]
- Achieving access to TCA, in the case of TBL without reperfusion criteria, hemodynamic failure, electrical instability or ischemia worsening, 50% within the first 6 months, 100% within the first year.
- Achieving pharmacoinvasive strategy within 2-24 hours after successful thrombolysis, 50% within the first 6 months, 100% within one year.[14]
- Achieving the systematic recording of processes and results, 50% within the first year, 100% within the second year.
- Writing guidelines for clinical practice and protocols to act 100% within the first 3 months.
- Achieving the training of HR 50% within the first 6 months, 50% within the second semester.
- Achieving the training of HR on IC protocol, 50% within the first 3 months, 50% within the second trimester.
- Achieving certification, 50% of the staff within the first 6 months, 50% in the second semester.
- Achieving participation in the Federal Registry of Cardiovascular Diseases (REFECV by its acronym in Spanish), 50% within the first 6 months, 50% within one year.
- Achieving the obligation to report STEACS to the National System of Epidemiological Surveillance (SINAVE by its acronym in Spanish), 50% within the first 6 months, 50% within one year.

MATERIALS AND METHODS

We applied the methodology to formulate socio-sanitary projects from a perspective of macro-management, by which decisions related to public health care policies, actions by authorities to direct a social group toward specific goals, provide a framework and condition the implementation of budgets and coverage.[15]

In this project, to be developed within 5 years, we decided to propose PTCA as a priority strategy, and in the cases of thrombolysis, we decided to use tPA (Alteplase), as it is fibrin-specific. The following were considered as indicators of outcomes: pain-to-FMC, window-time (WT), door-to-needle time (DTNT) and door-to-balloon time (DTBT).

We started by the health scenario observed in the population of Alto Valle de RN (2017), activities and actions were prepared, and the necessary resources were estimated (physical, human, financial) approaching this from macro-management.[3]

The approach of a logical framework was applied (aim, intention, components, activities), with the corresponding matrix and annexes.[16]

For the design of a health care network from a community point of view, we took into account the distances according to georeferencing, levels of complexity of the different centers, coverage 12/7 and 24/7, qualified staff available, and according to these data, we established the types of reperfusion recommended, with PTCA as priority strategy.

Interviews were carried out with all ER physicians from different centers, following a guide of questions. The answers and commentaries were useful at the time of outlining the project; for the analysis of those involved, a work breakfast was carried out with the chiefs of the corresponding areas of the Hospital General Roca (Category 6 Hospital).

DEFINITIONS

Pain-to-FMC: time elapsed since the onset of symptoms suggestive of ischemia and FMC, expressed in minutes.

- ***WT:*** time interval in minutes, from the onset of symptoms until infusion is started or until TCA is started.
- ***DTNT:*** time interval in minutes since arrival at the institution and the onset of infusion.
- ***DTBT:*** time interval in minutes since arrival at the institution until balloon insufflation.

VALUES AND DIMENSIONS TO OBSERVE

Effectiveness: benefit obtained in direct relation with need (clinical results). For the same ER service, it is possible to observe variability in clinical effectiveness according to days/providers (competences: attitude, abilities, knowledge, adherence to protocols).[17,18]

Acceptance-satisfaction: patients perceive how they are received/treated; for patients captive of the ER service of hospital of Alto Valle, it is important to know what vision they have or what credit do they give to a given institution.

Equity: same need, same offer; it is a measure of equality for the population. It would be achieved through an improvement in accessibility.

Efficacy: related to the cost of interventions with the products provided.

RESULTS

The population estimated of the province of RN is 718,646 inhabitants according with the INDEC *(National Institute of Statistics and Surveys)* data, projections prepared based on the 2010 National Population, Homes and Dwellings Survey; 49.8% live in Alto Valle, 357,230 inhabitants, 34.6% have hospital coverage. According to the investigation made in Alto Valle de RN, it was detected that it is unlikely for reperfusion to be applied early in patients with STEACS and for the maximum number of these patients to be treated according to their incidence. The TWs observed were prolonged, with a median of 200 minutes (IQR: 120-480) or a median of 336±290, and only 26 patients were treated in 2017, representing 15 total YPLL; taking into account the population and the incidence of AMI, 50.5 YPLL were not recorded due to lack of treatment of patients in 2017.[3]

TABLA 1.
Listado de efectores categorizados por Nivel según FAC

Centro	Población	Cantidad de camas	Categoría
Hospital Area Programa General Roca	87.815	140	Nivel B
Hospital Area Programa Villa Regina	36.550	60	Nivel B
Hospital Area Programa Allen	26.277	57	Nivel B
Hospital Area Programa Ingeniero Huergo	7.974	26	Nivel C
Hospital Area Programa Cervantes	4.023	2	Nivel C
Hospital Area Programa Chichinales	5.040	5	Nivel C
Hospital Area Programa El Cuy	1.627	1	Nivel C
Hospital Area Programa Cipoletti	77.713	92	Nivel B
Hospital Area Programa Cinco Saltos	24.061	41	Nivel B
Hospital Area Programa Catriel	17.600	23	Nivel B
Hospital Area Programa Fernandez Oro	6.185	0	Nivel C
Hospital Area Programa Campo Grande	4.861	7	Nivel C
Clínica Roca	87.815	65	Nivel A2
Sanatorio Juan XXIII	87.815	68	Nivel AI
Fundación Médica	77.713	70	Nivel Al
Policlínico Modelo	77.713	56	Nivel A2

Nota: datos publicados por el MSRN más recomendaciones FAC.

To achieve an improvement in this sanitary scenario, we formulated an early reperfusion project that would improve prehospital/hospital care, implementing a network under the IC protocol.

Categorization of services: public health care services were categorized in Alto Valle de RN, according to FAC recommendations *(Table 1)*.[7]

Level A center: it has intensive care unit (ICU) available, as well as heart surgery, hemodynamics and balloon counterpulsation.

Level A1 center: hemodynamics 7 days per week 7/24 h.

Level A2 center: no hemodynamics 7 days per week and/or 24 h.

Level B center: only ICU.

Level C center: ER or ward admission.

Goals, activities, actions, indicators and expected results were discussed. They are broken down according to the SA proposed and are detailed in *Table 2*.

Modality of intervention: the project would be presented before the Ministry of Health of Río Negro (MSRN by its acronym in Spanish), provincial authorities of health and directors of the Alto Valle hospitals.

All ER chiefs from hospitals and centers with access to PTCA in Alto Valle and the involved staff will be informed; they will be provided the schedule of activities to fulfill.

The direction of the project would be the responsibility of a cardiologist appointed by the MSRN, and locally, a coordinator appointed by the general director of the project.

Training and work protocols will be organized with cardiologists and chief of ER in each hospital, under the coordination of the corresponding hospital and the person in charge of the project, appointed by the MSRN.

Software system: the main hospitals have a comprehensive management system developed with the Genexus Evolution 2 tools, which allow portability, preventing a dependence on hardware, operative system, development motors and databases. The software operates in a network environment with WEB technology, so as to make access and local database stored data update possible, in a centralized, compatible and operable manner, in TCP/IP network architectures, without sacrificing the safety parameters required. Network support is the internal LAN type, in each station with an internet gateway of low/medium velocity. The CAPS will be connected to a local server.

Analyses will be generated on the information in adequate statistical systems: Epiinfo, Epidat, Epimap and SPSS, among others, and metadata will be generated for suitable indicators.

Work plan:
human, physical and financial resources.

IMPLEMENTATION OF A HEALTH CARE NETWORK

Work in networks constitutes a strategy to bring together and exchange between organizations, programs/projects and/or people associating experiences and knowledge to reach a common goal. The network is the result of this strategy and constitutes an organization and management modality adopted by its members.[19] The main challenge in a network is enhancing geographical and population scope, with support strategies for micro-management, improving nominalization, classification and monitoring processes, strengthening said strategies, consolidating changes, monitoring, evaluating and bringing together different public/private centers and different MSRN areas.

The networks to treat AMI based their operation on two pillars: carrying diagnosis to prehospital timing, along with a coordinated work between centers of different complexity, connected by an efficient Medical Emergency System (SEM by its acronym in Spanish).[11]

Public hospitals in RN lack the necessary facilities and HR for PTCA in patients with STEACS, as the treatment is only available in a limited number of private centers; emergencies are treated by generalist physicians, and ICUs are polyvalent; fibrinolytic treatment is underused, and referral to private centers for PTCA is observed, with no appropriate control of care timing. It is necessary to redesign the health care network by decreasing total ischemic time

(TIT), limiting the extension of the myocardial lesion and increasing patient treatment.

Once the project with PTCA has been proposed as the main strategy, after diagnosis is made, patients referral should be immediate to the nearest center with hemodynamics service, not stopping by public hospitals or less complex centers, as long as there is a chance to having access to this service in less than 120 minutes since FMC, to obtain higher rates of permeability of ICA, lower rate of recurrent ischemia, reinfarction, and death.[17,18,19,20,21] ER physicians should diagnose STEACS and activate the IC immediately; 911 should establish an automatic activation system, simultaneous for each member of the team.

The SEM should avoid nearby hospitals with no high complexity, and once in the appropriate medical center, go directly to the hemodynamics laboratory, not going through the ER and/or coronary unit/ICU. If a prehospital diagnosis was not made, the SEM should wait in the ER and immediately refer patients to a center with PTCA available, to be assisted within 120 minutes. In the cases when this time is exceeded, treatment with TBL will be applied (unless contraindicated) and subsequently, patients should be referred to invasive strategy.

A periodical review by a multidisciplinary team on local data, along with immediate feedback by all the staff involved, helps to identify deficiencies in the network, and to generate initiatives for continuous improvement of care quality. The current guidelines emphasize the importance of quality control measures within regional networks. A useful tool to monitor networks is the national ACS registry, that requires obligatorily reporting to the REFECV integrated to the Argentine Integrated System of Sanitary Information (SISA by its acronym in Spanish) of the National Ministry of Health.

From all parameters that should be recorded, delays in treatment are the most straightforward quality index to audit, and it would allow comparing practices and effects in different regions of the same province and the country to identify figures outside the range. If the quality indicators that are recorded do not reach the recommended reference points, specific interventions should be designed and implemented to approach the system deficiencies.[22,23]

ESTABLISHING THE IC PROTOCOL

Organizing a sanitary system that would allow care for STEACS according to the recommended protocols constitutes a challenge for Public Health. It requires a very close joint work between health care professionals and the different strata of management, to achieve the implementation of a reperfusion treatment that would improve the course of patients, decrease mortality and readmissions.

TABLE 2.
Project for early reperfusion of STEACS: specific aims, goals, activities and actions

Specific aims	Goals	Activities	Actions	Indicators	Expected results
1. Improving prehospital/hospital care of patients with STEACS by treating more patients and using prehospital/hospital fibrinolysis and or PTCA as it corresponds in the hospitals of Alto Valle of the province of Río Negro.	• Achieving early reperfusion in STEACS before 120 minutes, 5% within one year, 10% in the second, 25% in the third, 30% in the fourth and 60% in the last year. • Decreasing mortality by STEACS in Alto Valle of the province of Rio Negro between 20% and 25% per year until obtaining a reduction of approximately 50% of yearly mortality by the end of the project. • Achieving increasing treating more patients per year following the proportion obtained in the city of Rosario (52%, 150%, 9%, 14% and 28% respectively per year of the project). • Obtaining the necessary HR for the ER services in the hospitals of Alto Valle de Rio Negro. • Obtaining 100% of the necessary equipment for a fast diagnosis of STEACS in all ERs of hospitals in Alto Valle de Rio Negro. • Obtaining 100% of supplies necessary for a fast diagnosis of STEACS in all ERs of hospitals in Alto Valle de Rio Negro within the first 3 months. • Acquiring high complexity ambulances necessary for transfer in all hospitals, two (2) per month, until completing a fleet of 12 ambulances within 6 months. • Achieving building adequacy for ERs in 100% within the first 6 months. • Disseminating and communicating patients and relatives at the time of discharge, as well as the population, about the need to consult quickly when experiencing precordial pain or symptoms compatible with AMI.	• Hiring two cardiologists every 3 months, until completing a total staff of 6, three trained on diagnostic imaging (ultrasound, stress echocardiography, TEE). • Appointing the general director of the Project. • Hiring a nurse per shift within the first 6 months, two nurses within the second semester, until completing a staff in the third semester in hospitals category 5/6. • Hiring an advanced technician in medical emergencies per shift within the first 6 months, two technicians in the second semester, until completing the staff within the third semester in hospitals category 5/6. • Training the staff of physicians, technicians, nurses, drivers, on triage, basic and advanced CPR, management of automated external defibrillators (AED) and administration of TBL. • Buying 100% of supplies and equipment needed for a fast diagnosis of STEACS in all ERs of the hospitals in Alto Valle de Rio Negro within the first 3 months. • Buying ambulances of high complexity needed for transfer, for all hospitals, two per month, until completing a fleet of 12 ambulances within 6 months. • Adjusting ERs for the care of patients with STEACS, 100% within the first 6 months.	• Calling exam for physicians specialized in cardiology, nurses, advanced technicians in medical emergencies and coordinators. • Call for tenders to buy supplies and equipment. • Making the Annual Operative Plan to be added to the budget of the subsequent year.	• Number and costs to hire cardiologists, nurses, technicians and coordinators. • Number and costs of equipment and supplies bought. • Number and costs of materials/bills/tickets, to adjust the ERs. • Cost of hiring medical staff. • Cost of hiring technicians and nurses. • Sanitary authorizations for high complexity ambulances. • Technical verifications for vehicles.	• Prehospital/hospital fibrinolysis and/or PTCA is achieved, as it may correspond.

Specific aims	Goals	Activities	Actions	Indicators	Expected results
2. Implementing a regional health care network for the prehospital management of patients with STEACS to administer reperfusion therapy in a fast and efficient way.	• Establishing a main office for coordination, monitoring and feedback to achieve reperfusion in the least time possible in patients with diagnosis of STEACS, 100% within the first 6 months, following a strict protocol of activation of the Infarction Code. • Achieving categorizing centers and services according to the FAC recommendations within the first 6 months. • Achieving referral to private centers with PTCA available, with direct admission to the hemodynamics service, 50% within the first 6 months, 100% within one year. •Achieving the existence of priority beds in private centers for STEACS, 50% within the first 6 months, 100% within one year.	• Organizing the main office of coordination and monitoring, following the strict protocol of activation of the Infarction Code. • Designing an automatic activation system, simultaneous from the operator to the team. • Categorizing centers and services according to the FAC recommendation. • Signing agreements according to the need to georeference and times of arrival with private centers with PTCA available. •Coordinating referral to private centers for PTCA with direct admission to the hemodynamics service. • Defining, organizing and communicating the list of ER physicians from levels A1 and A2 centers to the network for 24/7 coverage. • Establishing the number of priority beds in private centers with capacity for PTCA. • Educating the population to warn the SEM early (call 911) in the case of suspecting a STEACS.	• Centralizing coordination and monitoring according to the IC protocol. • Activating the IC by calling 911 simultaneously to the team on call. • Surveying health care centers according to level of care. • Making agreements with private centers. • Referring to centers with hemodynamics service in cases of STEACS according to geographical distance and time of arrival. • Writing a schedule of ERs. • Save beds for STEACS. • Communicating by different media the significance of calling 911. • Designing leaflets and audiovisual material for the community, and communication campaigns about control of risk factors and cardiovascular prevention. •Designing and installing apps for cell phones for the community, focused on cardiovascular prevention.	• Number of protocols applied by unit of time, by number of patients assisted in the ER. • Percentage of patients admitted with diagnosis of STEACS x hospital. • Percentage of patients that received prehospital thrombolysis. •Percentage of patients that received hospital thrombolysis. • Percentage of patients transferred to other centers for PTCA. • Cost of leaflets and media to disseminate the symptoms of CAD.	•Reperfusion by PTCA is achieved before 120 minutes since FMC. •Reperfusion by prehospital/hospital TBL is achieved before 30 min in cases when it is not possible to apply PTCA in <120 min.
3. Establishing the "Infarction Code" protocol.	• Achieving a record of personal data, origin of patients, history, clinical characteristics, data on infarction and the procedure, arrival-transfer times, time and place of IC activation, times in the different procedures, etc.; 100% within the first 3 months. • Achieving the systematic quantification of times, 100% within the first 3 months. • Reaching a maximum time since FMC until ECG and diagnosis ≤ 10 min, 50% within the first 3 months, 100% within one year. • Reperfuse ICA with PTCA before 120 minutes since FMC, 5% within the first year, 10% within the second, 25% in the third, 30% in the fourth and 60% in the last year. • Reaching a maximum time since diagnosis of STEACS to infusion of thrombolysis in a prehospital/hospital scenario of 10 minutes, 50% within 6 months, 100% within one year, in the case of patients with no access to center with PTCA available before 120 minutes. • Achieving access to PTCA within 60-90 minutes, when thrombolysis did not obtain reperfusion criteria, when there is hemodynamic failure, electrical instability or ischemia worsening, 50% within the first 6 months, 100% within one year. • Achieving coronary angiography and/or subsequent TCA, when indicated, in 2-24 hours after successful thrombolysis, 50% within the first 6 months, 100% within one year. • Achieving the systematic recording of processes and results, 50% within the first year, 100% within the second year. • Achieving the distribution of guidelines and protocols, 100% within the first 3 months. • Achieving HR training, 50% within the first 6 months, 50% within the second semester. • Achieving HR training on IC protocol, 50% within the first 3 months, 50% in the subsequent trimester. • Achieving certification, 50% of the staff within the first 6 months, 50% in the second semester. • Achieving the participation in the National Registry of Cardiovascular Diseases (REFECV), 50% within the first 6 months, 50% within one year. • Achieving the obligatory report of STEACS to the SINAVE, 50% within the first 6 months, 50% within one year.	• Recording the patients' data, their origin, history, clinical characteristics, data on infarction and procedure, arrival-transfer times, time and place of IC activation. • Systematically quantifying all times since the onset of symptoms to the call to the SEM, SEM-FMC, time to ECG, time to reperfusion, DTNT, DTBT. • Coordinating the activities with the other teams in the country working under the IC protocol. • Writing guidelines and manuals about the organization and operation of the program. • Training HR on the IC protocol, basic and advanced CPR, the management of STEACS, triage, precordial pain management protocols, management of complications, transfers, management of technology, etc. • Certifications for HR after training is completed. • Processing and analyzing the information from the third month after starting the project. • Reporting results to the direction of each hospital. • Participating in work protocols and publishing results. • Participating in the National Registry of Cardiovascular Diseases (REFECV) and report STEACS to the SINAVE. • Offering care and transfer from homes to the ER. • Designing the referral and counter-referral (R/CR) system. • Evaluating performance with process and results indicators. • Establishing a control and monitoring system for patients with diagnosis of STEACS at the time of discharge. • Encouraging recording and working along with the statistics departments teams in each hospital.	• Completing worksheets with personal data and characteristics of clinical symptoms. • Recording the times since the onset of symptoms until the 911 call, since the FMC to ECG, since diagnosis to PTCA. • Recording times since diagnosis until infusion of TBL. • Recording of transfers to private centers. • Printing and distributing manuals and guidelines. • Delivering courses and training. • Provide certificates for courses and training. • Write reports for the hospital direction. • Communicating results obtained to the staff and directors. • Sending the obtained data to scientific studies protocol researchers. • Writing papers to be presented in national and international conferences. • Managing passwords for REFECV registries. • Managing statistics departments for mandatory reports. • Communicate data to Vital Statistics of the Ministry of Health of the province. • Improving morbimortality records and upload the data obtained to the software system.	• Proportion of activated IC per hospital. • Percentage of patients who are admitted with diagnosis of STEACS x hospital. • Percentage of patients who received prehospital or hospital thrombolysis. • Percentage of patients who received thrombolysis in less than 30 minutes since the onset of symptoms. • Percentage of patients transferred to to other centers for PTCA. • Percentage of patients who underwent PTCA in less than 120 minutes since the onset of symptoms. • Cost of design, printing and distribution of required guidelines, protocols and documents. • Total cost of PCs, printers, supplies, paper, etc. • Costs of fees of specialists in statistics, computer engineers, graphic designers. • In-hospital rate of mortality by STEACS. • Rate of mortality by STEACS in 30 days. • Rate of mortality by STEACS in 6 months. • Rate of mortality by STEACS in one year. • Percentage of patients who are readmitted within 30 days after discharge with similar diagnosis and/or CHF.	•Achieving in all cases a proper activation of the IC. • Treat all patients with STEACS. • Decreasing mortality by STEACS in Alto Valle de Rio Negro. • Acquiring the maximal knowledge on the management of STEACS. • Communicate to scientific societies, the results obtained with adequate treatments in the management of STEACS. • Decreasing readmissions by CHF. • Decreasing admissions due to stroke. • Decreasing readmissions due to new ischemic events.

The approach should integrate all links, from the information patients have available on CAD and warning symptoms, to training and education of health care staff and transfer of patients, the organization of ER systems, units of interventionism, including management staff and the statistics from the different centers involved; the commitment involves everyone to achieve an increase in accessibility and equity of service.[7,11,20]

The protocol should be focused on the times impacting the system, organizing them with clear georeferencing, categorizing centers, organizing the SEM and the in-hospital care process from entrance through the ER until the activation of the hemodynamics service and onset of the procedure.

SYSTEMATIZATION AND EVALUATION

The logical framework approach is a tool to facilitate the management process of projects, conceptualization, design, execution and evaluation. It allows to improve their quality and can be used from planning until the ex-post evaluation. It provides a systematized structure for the planning process, facilitates communication of information, relates goals to each other, with the problem to be solved and the activities to be developed, it clarifies functions and responsibilities, it compares the expected results against the real ones (evaluation) and promotes participation *(Figures 1 and 2).*

The methodology of a logical framework includes the analysis of everyone involved since the start of the process, it identifies the actors of the project that may be directly or indirectly related to the problem; it analyzes its dynamics and reactions faced with the project's advancement, it improves planning and the creation of agreement or alliances; it allows to investigate and interpret their needs, expectations and interests; knowing them would benefit the project and its continuity. Each stage of the project may present different dynamics between those involved; detecting them is important to generate corresponding strategies to achieve success *(Tables 3 and 4).*

HEALTH CARE NETWORK RECOMMENDED FOR THE MANAGEMENT OF STEACS IN ALTO VALLE DE RN

The hospitals of the Program Area, dependent from the MSRN are distributed in 6 sanitary zones: Western Alto Valle, Eastern Alto Valle, Mid Valle, Atlantic Zone, Andean Zone and South Zone.

This investigation focused on Alto Valle (Western and Eastern Alto Valle). The specific data on health care centers, type of complexity, number of beds, location, population, recommendations for caring for patients and recommended network are described in *Table 1*.

For the design of a care network from a community point of view, the following aspects were taken into account: georeferencing, levels of complexity of centers, coverage 12/7 and 24/7, qualified staff available and according to these data, the types of reperfusion recommended were established, with PTCA as priority strategy.

Patients with STEACS that established FMC in hospitals from the Eastern zone, with previous activation of the IC protocol, should be referred to Sanatorio Juan XXIII (level A1) or Clínica Roca (level A2). The patients the established FMC in hospitals from the Western zone should be referred to the Fundación Médica (level A1) or Policlínico Modelo of Cipolletti (level A2) to perform early revascularization. Access for the patient should be direct to the hemodynamics service.

The times of arrival both from Catriel (Western zone) and El Cuy (Eastern zone) are in the border to be able to consider PTCA since the FMC within 120 minutes. Patients from these zones should have thrombolytics (Alteplase) as priority treatment (unless contraindicated) and subsequent referral to consider a pharmacoinvasive strategy *(Table 5).*

DISCUSSION

According to the investigation made in Alto Valle de RN (2017), it was detected that it is unlikely for an early reperfusion treatment to be applied in patients with STEACS, and for the maximum amount of patients to be treated according to their incidence. The TW for PTCA was prolonged and only 26 patients were treated, a very low number in comparison to what is expected. Hospitals do not usually use fibrinolytic drugs for the immediate care of infarction, and these patients are referred to undergo PTCA, regardless of the time elapsed since diagnosis.[3]

Argentina, like other Latin American countries, has a fragmented and segmented health care system, a situation made worse by its territorial judicial organization and by retention and/or transfer process of responsibilities between jurisdictions.[24] Formulating a project of early reperfusion is a priority given the evident lack of coordination between social and sanitary policies.

Policy is defined as the set of values and aims supported by a specific community to organize and maintain its social, economic and cultural life.[25]Formulating policies is establishing priorities, understanding the set of actions and omissions (deliberate decisions to do or not to do) manifested in actions by the State in relation to issues that are of interest for sectors or actors of civilian society. Policies can be offered or demanded; they are instruments to solve problems and reduce inequality; according to their scope, level of aggregation or disaggregation, they are called plans, programs or projects.[26]

An intervention project is the smallest unit of resource assignment by which a program is realized within a policy.[27] It is the planning and realization of a set of activities addressed to solving a problem. Projects require first, formulating a problem and designing the technically feasible alternatives to solve it. The alternatives emerge in general from the theory available or from ex-post evaluations of analogous projects.[28]

Reduction in mortality and YPLL by STEACS is a priority; to achieve it, we propose the implementation of a health care network for STEACS. A network means the development, within a geographical area, of a coordinated and coo-

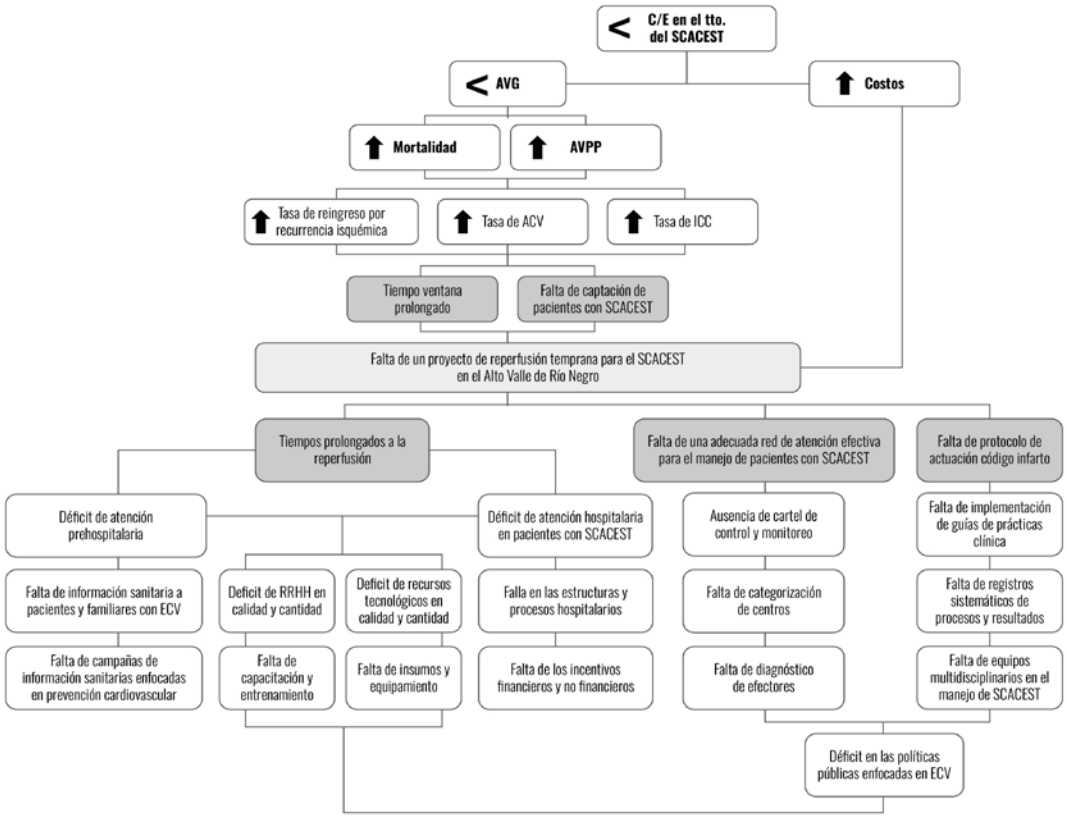


FIGURE 1.
Problem tree analysis

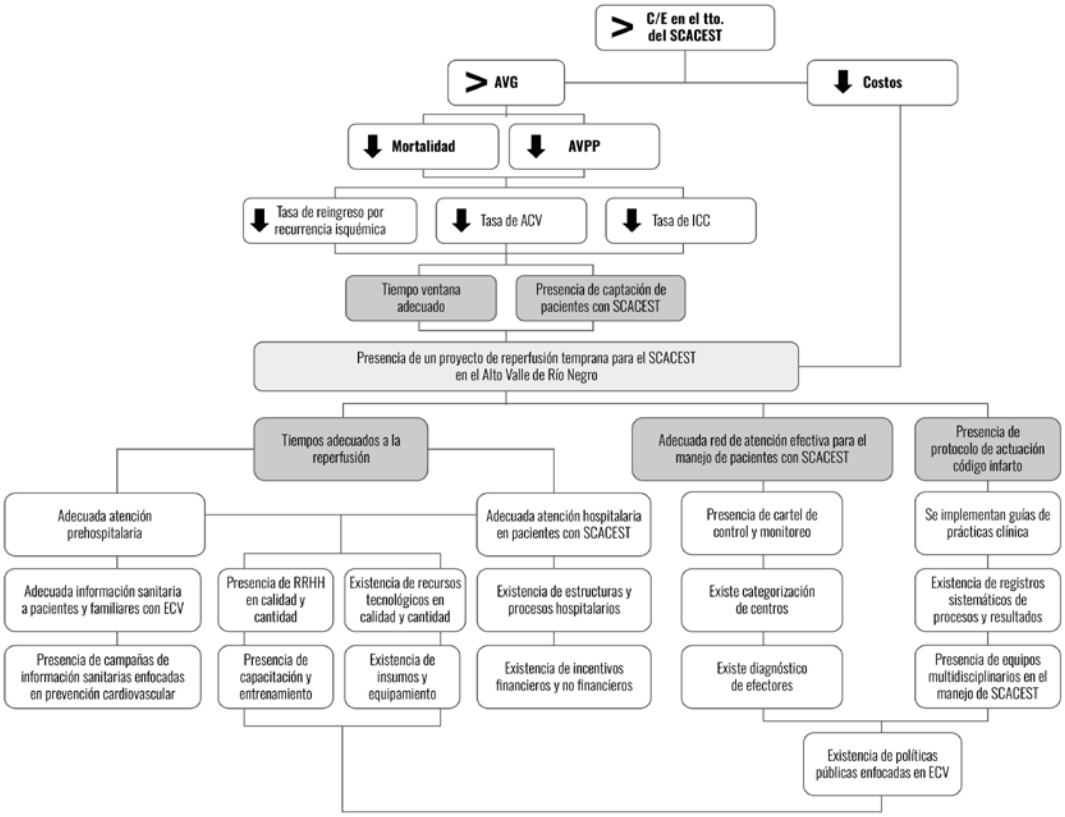


FIGURE 2.
Objective tree analysis

perative health care system by which, according to agreements between health care institutions/teams and based on the needs of the population, the aim is to treat patients with STEACS, improve quality of care, use the required technology to a maximum, and have trained and qualified staff. General success will depend on the performance of each organization, the support from the respective directions and agencies, of an organizational culture addressed to minimizing the delays of the system, along with a continuous improvement of quality.[29,30]

Using health care networks for AMI is increasing both in Europe and Latin America. In Argentina, the experience of the city of Rosario and the El Cruce Hospital Network in Buenos Aires, achieved increasing the proportion of patients that received TBL within the recommended DTNT, with a tendency to reduction in DTBT, associated to an increase in reperfusion of 28.5% and a significant reduction in times.[10,31] The centers in Argentina that participated in the SSL Initiative also showed improvements.[32]

The results of health care networks in Mexico enabled

TABLE 3.
Analysis of the parties involved

Groups	Interests	Perceived problems	Potentials	Relationships
1. Health care authorities	• Decreasing preventable mortality by one of the main health care problems at a known cost. • Leaving an original health care project established (as the legacy of management). • Strengthening the capacity to lead of the Ministry of Health.	• Lack of systematic prioritization. • Lack of public policies focused on CAD. • Poor sanitary results. • Lack of adequate health care recordings.	• Capacity to lead. • Management. • Financial resources.	• Lack of budget. • Regulation of the Area. • Outdated program. • System fragmentation and segmentation.
2. Cardiologists	• Decreasing preventable mortality by ACS. • Obtaining in-hospital mortality records within 6 months and one year. • Improving diagnoses, control and monitoring of coronary patients. • Leading an original and relevant project. • Obtaining provable achievements (prestige).	• Lack of cardiologists or related specialists. • Lack of adequate protocols and training. • Lack of financial/non-financial incentives.	• Support and goodwill to participate and improve. • Specific knowledge on the topic.	• Outdated regulations of the program for the Area. • Lack of knowledge on financial and economic topics. • Lack of motivation. • Conflicts with other areas. • System fragmentation and segmentation.
3. Nurses	• Improving quality of care in the FMC. • Improving training, communication and organization between the different services. • Improving ACS recordings. • Obtaining provable achievements (prestige).	• Lack of protocols and training. • Absence of coordination and internal communication. • Lack of financial/non-financial incentives.	• Support and goodwill to participate and improve. • Capacity to generate and participate in registries. • Qualified HR.	• Law regulating nursing that does not include the presence of Advanced Emergency Degree. • Outdated regulation for the program for the Area. • Conflicts with Advanced Emergency Technicians. • Non-financial resources, political pressures. • Union conflicts.
4. Intensive care units	• Decreasing preventable mortality by ACS. • Obtaining records of in-hospital mortality and morbidity. • Participating in an original and relevant project. • Improving coordination with different services. • Obtaining provable achievements (prestige).	• Lack of coordination with the different services. • Absence of management control. • Lack of financial/non-financial incentives.	• Support and goodwill to participate and improve. • Qualified HR.	• Outdated regulations for the program of the Area. • Conflict with other areas or specialties. • Lack of motivation. • System fragmentation and segmentation.
5. Physicians on call	• Improving quality of care in FMC. • Improving training, communication and organization between the different services. • Participating as the main link in the Infarction Code protocol. • Improving ACS records. • Obtaining provable achievements (prestige). • Training in R/CR.	• Absence of coordination and internal communication. • Refusal to use TBL. • Lack of protocols and training. • Lack of financial/non-financial incentives.	• Support and goodwill to participate and improve. • Qualified HR.	• Outdated regulations for the program of the Area. • Conflict with other areas or specialties. • Lack of motivation. • Non-financial resources, political pressure.
6. Drivers	• Increasing financial income x on call shift and transfers. • Participating in an original and relevant protocol. • Prestige.	•Refusal to accept emergency medicine technicians (EMT). • Lack of adequate protocols and training. • Lack of financial/non-financial incentives. • Poorly maintained vehicles	• HR present in all centers. • Support and goodwill to participate and improve. • Workforce.	• Conflict due to Law on nursing/EMT Law. • Lack of motivation. • Non-financial resources. • Union conflicts.
7. Private centers	• Increasing the number of services. • Greater use and chance to improve the established capacity (complexity). • Breaking current commercial biases. • Participating in an original and relevant project. • Obtaining provable achievements (prestige).	• Lack of adequate agreements for high complexity services. • Lack of coordination between centers. • Lack of adequate protocols and training. • Lack of qualified HR for 24/7 coverage. • Lack of stents bank.	• Financial resources • Influences. • Presence of high complexity. • HR qualified in high complexity.	• Single service agreement, resistance to breaking exclusivity agreements. • Competition between A1 and A2 centers. • Conflict with level B or C centers that assume an impediment for their future growth or development. • System fragmentation and segmentation. • Political pressure.

TABLE 4.
Logical framework

	Objectives	Indicators	Means of verification	Assumptions
1. Aim	• Contributing to improving cardiovascular morbimortality by STEACS in Alto Valle de Rio Negro.	• Mortality rate • LYG	• Registry of Vital Statistics of the Ministry of Health of the province of Rio Negro.	• Updated records of the Ministry of Health of Rio Negro. • Support for the hospitals of Alto Valle de Rio Negro.
2. Purpose	• Implementing early reperfusion treatment in patients with ST-segment elevation acute coronary syndrome (STEACS) in the public field of Alto Valle de Río Negro.	• Rate of in-hospital mortality by STEACS. • Mortality within 30 days by STEACS. • Mortality within 6 months by STEACS. • Mortality within one year by STEACS. • Percentage of patients readmitted within 30 days after discharge with similar diagnosis and/or CHF	• Registry of Vital Statistics of the Ministry of Health of Rio Negro. • Records in ER log books. • Records in clinical histories. • REFECV registry.	• Good will to collaborate by the staff of hospitals in Alto Valle de Rio Negro. • Mystique and motivation in the health care teams of ER areas of the hospitals in Alto Valle de Rio Negro. • Organizational culture that would foster and maintain the emphasis to minimize delays in the system.
3. Components	• C.1: Improving prehospital/hospital care for patients with STEACS by use of prehospital/hospital fibrinolysis and/or PTCA, as it corresponds to hospitals of Alto Valle de Río Negro. • C.2: implementing a regional health care network for the prehospital management of patients with STEACS to administer reperfusion therapy rapidly and efficiently. • C.3: establishing the "Infarction Code" protocol.	• C.1: number of selected cardiologists, nurses, technicians and coordinators. • Number of human resources trained in basic and advanced CPR, triage, handling of AED, management of STEACS and administration of TBL. • Number and costs of equipment and supplies bought. • Number and costs of materials to make ERs suitable. • C.2: number of protocols applied by unit of time, by number of patients assisted in the ER. • Percentage of patients who are admitted with diagnosis of STEACS x hospital. • Percentage of patients who received prehospital thrombolysis. • Percentage of patients transferred for PTCA. • Number of categorized centers. • C.3: proportion of IC activated per hospital. • Number of distributed printed and digital guidelines for the management of the IC. • Percentages of patients added to the REFECV and reported to the SINAVE	• C.1: number of contracts of cardiologists, nurses and EMTs. • List of attendees in training courses. • List of participating professionals and interconsultants. • Billing and tickets for supplies, equipment and upgrade of ERs. • Technical verifications for vehicles. • C.2: reports of Project monitoring. • List of transfers. • Information uploaded to the computer system. • C.3: records of activated IC. • Information uploaded to the computer system. • Guidelines and protocols documented and delivered.	• Health care staff learns about transmitted contents. • The Management Unit is created to allow reaching the indicators successfully, managing the human, material and financial resources of the project. • The actors commit with the activities stated in the project. • There is a budget to add medical, technical and nursing staff. • There is a budget to buy adequate supplies and technology. • There is a budget and an agreement to establish incentives. • The proposal is accepted in the community.
4. Activities	• C.1: 1.a. /1. b./1. c. hiring specialists in cardiology, nursing, EMT. • 2. 3. Performing training activities for HR on the management of cardiovascular emergency/IC management and protocol for STEACS in patients who consult to the ER. • 4.Performing training activities for HR on the handling of equipment for ECG transmission for an early diagnosis. • 5. 6. 7. Performing training activities for HR on triage, basic and advanced CPR, handling of AED and administration of TBL. • 8 a. Buying equipment and supplies for the management of STEACS in the ER: ECG devices, defibrillators, oximeter, vital signs monitors, automated analyzers, etc. • 8.b. Buying the required high complexity ambulances. • C.2: 9-Establishing a main office for coordination, monitoring and feedback for a rapid access to reperfusion along with the telephone exchange service of the province (911- infarction code). • 9 a. Appointing a coordinator for the IC in Alto Valle and relevant substitutes. • 9 b. Establishing a single phone number in every hospital for the activation of the IC. • 9 c. Categorizing private centers and services. • 9 d. Design of the R/CR system. • 9 e. Making posters with flowcharts about R/CR. • 9 f. Design of the circuit the R/CR records should follow. • 9 g. Accessing the network of private services under a new agreement modality for PTCA. • 9 h. Establishing the number of priority beds in private centers with PTCA available. • 9 i. Educating the population to call the SEM early (call 911). • C.3: 10. Record personal data, origin, history, clinical data, type of AMI, procedures. • 11. Quantifying systematically all times since the onset of symptoms. • 12. Coordinating activities with the rest of the teams of the country working with IC protocol. • 13. Write and distribute clinical practice guidelines manuals and IC procedures. • 14. Carrying out training activities for HR for a rapid external and internal transfer of these patients.	• C.1: number of selected cardiologists, nurses, technicians and coordinators. • Number and cost of training activities for HR. • List of materials and supplies bought (sphygmomanometers, oximeters, photography paper, ECG paper, reports printed, envelopes, phones, etc.). • Number and costs of ECGs, X-rays, ultrasounds and cardiac enzymes tests made. • Number of health care authorizations for high complexity ambulances. • Number of technical verifications for vehicles. • C.2: Agreements with coordinators. • Number and costs of PCs, printers, supplies, paper, etc. • List of categorized centers. • C.3: number and cost of design, printing and distribution of required guidelines, protocols and documents. • Number and costs of training activities. • Number and costs of leaflets and media to disseminate CAD symptoms. • Number and costs of hiring specialists in statistics, computer engineers, graphic designers. • Cost of incentives. • Number of reports to SINAVE. • Number of patients admitted to the REFECV.	• C.1: list of hired staff. • Worksheets with salaries. • List of attendees to the different training activities. • Bills and delivery notes. • Record of cardiological, radiological and laboratory tests made. • Records of ER logbooks and clinical histories. • Registry of lists of R/CR. • Meeting minutes. • Accounting records. • C.2: list of hired staff. • Worksheets of salaries. • Bills and delivery notes. • C.3: bills and delivery notes. • List of attendees to the different training activities. • Quality controls with indicators of process and results. • Bills and delivery notes. • List of distributed guidelines and manuals. • List of hired staff. • Worksheets of salaries. • Records for SINAVE and REFECV.	• Enough consensus is reached on procedures. • There is financing to hire medical, technical and nursing staff, statistics staff, computer engineers, graph designers. • There is financing for the necessary equipment and materials for training. • There is consensus and financing to buy equipment and supplies for the ER. • There are resources for the design of the R/CR system. • There are resources to comply with agreed incentives according to results. • There are resources for the design of dissemination campaigns on the importance of consulting early. • Local media guarantees wide dissemination of proposals. • All activities have financing and political support. • The statistics departments take on the commitment to improve records. • Scientific organizations actively participate in the dissemination of proposals.

an increase in reperfusion of STEACS from 34.9% to 71.4%. The group without reperfusion decreased from 65.2% to 28.6%, thanks to an increase in TBL use (25.5% vs 40.1%), and PTCA increased from 9.4% to 31.3%.[3] In-hospital mortality decreased from 21.1% to 9.4%. Similar results were obtained in Chile and in Brazil.[34,35]

Europe had significant results with regional networks for the treatment of AMI, increasing the number of procedures per million inhabitants, and decreasing mortality.[36,37]

An efficient organization shortens the times of transfer and yields better results in morbimortality, as proven in the AIR-AMI, DANAMI and PRAGUE trials.[38,39,40,41]

From the investigation made, the need to establish a health care network emerges, integrating the public and private subsectors, and the services to improve prehospital/hospital management of patients with STEACS in Alto Valle de RN.

CONCLUSIONS

A critical socio-sanitary problem has been detected: in the public sector of Alto Valle de RN, there is no early reperfusion made in patients with STEACS, which leads to a high preventable morbimortality. This requires immediate, collective actions, brought together by the different actors to achieve the treatment of STEACS.

In this study, we formulated a project for early reperfusion with prehospital/hospital thrombolysis and PTCA for Alto Valle, with IC protocol. The project would allow achieving LYG and increase the number of patients treated, achieving more accessibility and equity.

This study attempts to prove that, from a scientific and technical point of view, it is possible to contribute with political leaders to achieve results in health care.

The implementation of a project of these characteristics requires a joint effort between health care professionals from different specialties, health care management with competences in health care organization, and essentially, political support. Without this joint collaboration, the creation, operation, maintenance and evaluation of the project is not possible.

LOCATIONS WHERE THE STUDY TOOK PLACE:

Public hospitals of Alto Valle de Río Negro:

Eastern zone:

1. Hospital General Roca
2. Hospital Ingeniero Huergo
3. Hospital Allen
4. Hospital Villa Regina
5. Hospital El Cuy
6. Hospital Cervantes
7. Hospital Chichinales

Western zone:

8. Hospital Cipolletti
9. Hospital Cinco Saltos
10. Hospital Campo Grande
11. Hospital Catriel
12. Hospital Fernández Oro

Private institutions:

1. Clínica Roca
2. Sanatorio Juan XXIII
3. Policlínico Modelo de Cipolletti

Fundación Médica de Río Negro y Neuquén.

BIBLIOGRAPHY

1. Arriagada I, Catenazzi A, Chiara M, et al. Gestión en la política Social. Conceptos y herramientas. 1a Ed. - Los Polvorines: Universidad Nacional de General Sarmiento, **2017**. 408 p. ISBN 978-987-630-266-1. Disponible en https://www.ungs.edu.ar/wp-content/uploads/pdfs_ediciones/Gesti%C3%B3n_de_la_pol%C3%ADtica_social-completo.pdf Acceso 27 de Noviembre de 2025.
2. Nirenberg, O. Participación de adolescentes en proyectos sociales: aportes conceptuales y para su evaluación. **2006**. Colección Tramas Sociales, volumen 39. Ed. Paidós. Buenos Aires. Disponible en https://bibliotecas.ucasal.edu.ar/opac_css/index.php?lvl=notice_display&id=26674 Acceso 27 de Noviembre de 2025.
3. Costantini S. Costo-Efectividad de un Proyecto de Tratamiento Temprano de Reperfusión en Pacientes Mayores de 18 Años con Síndrome Coronario Agudo con Elevación del ST (SCACEST) en el Sector Público del Alto Valle de la Provincia de Río Negro. (Tesis de Magister en Economía y Gestión en Salud, No publicada) Universidad ISalud, Buenos Aires, Argentina **2020**.
4. Melchor OL, Ortigosa Aso J. Estrategias de reperfusión en el infarto agudo. Rev Esp Cardiol **2008**; 61: 6 - 9.

TABLE 5.
Coverage area according to networks

Zona Sanitaria	Hospital Derivador	Latitud	Longitud	distancia (km) a receptor Fundación Médica / Policlínico Modelo	Latitud	Longitud	Tiempo Estimado (en minutos)	distancia (km) a receptor Sanatorio Juan XXIII / Clínica Roca	Latitud	Longitud	Tiempo Estimado (en minutos)
1era Zona Sanitaria Este	Chichinales	39°06'51.62" S	66°56'28.71" O	99	-38.937389°	-68.001254°	97	58,6	-39.029876°	-67.570344°	56
	Regina	39° 6'7.22"S	67° 5'3.71"O	86	-38.937389°	-68.001254°	88	47	-39.029876°	-67.570344°	47
	Huergo	39° 4'32.54"S	67°14'32.46"O	70,6	-38.937389°	-68.001254°	72	32	-39.029876°	-67.570344°	32
	Cervantes	39° 3'6.72"S	67°23'33.40"O	58	-38.937389°	-68.001254°	62	19	-39.029876°	-67.570344°	26
	G. Roca	-39.021591°	-67.572917°	45,1	-38.937389°	-68.001254°	30	1,6	-39.029876°	-67.570344°	6
	El Cuy	39°55'37.89" S	68°20'28.45" O	162	-38.937389°	-68.001254°	140	130	-39.029876°	-67.570344°	103
	Allen	38°58'53.71"S	67°49'6.97"O	17,7	-38.937389°	-68.001254°	30	27,6	-39.029876°	-67.570344°	30
1era Zona Sanitaria Oeste	Cipolletti	38°55'30.32"S	67°58'42.21"O	3,1	-38.937389°	-68.001254°	9	43	-39.029876°	-67.570344°	53
	Cinco Saltos	38°49'35.54"S	68° 4'1.92"O	15	-38.937389°	-68.001254°	18	60	-39.029876°	-67.570344°	80
	Catriel	37°52'39.00"S	67°47'38.74"O	133	-38.937389°	-68.001254°	102	178	-39.029876°	-67.570344°	274
	Fernandez Oro	38°57'00.00" S	67°55'00.02" O	9.4	-38.937389°	-68.001254°	19	37.2	-39.029876°	-67.570344°	40
	Campo Grande	[-38.682483°]	-68.212006°	36.5	-38.937389°	-68.001254°	36	84,5	-39.029876°	-67.570344°	88

5. Tajer C, Charask A, Castillo Costa Y et al. Consenso de Infarto Agudo de Miocardio. Rev Argent Cardiol **2015**; 83: 456 - 465.
6. Ferrante D, Spolidoro J, Caruso O, et al. Mejora en la reperfusión del infarto de miocardio en Argentina. Rev Argent Salud Pública **2013**; 4: 31 - 38.
7. Bono J, Zapata G, Amoroso A, et al. Guías de manejo de los síndromes coronarios agudos con elevación del segmento ST. Comité de Cardiopatía Isquémica de la Federación Argentina de Cardiología. Rev Fed Arg Cardiol **2012**; 41: 218.
8. Mele E. Avances en la reperfusión del infarto agudo de miocardio: realidad en Latinoamérica. Rev Esp Cardiol **2010**; 63 (Supl 2): 12 - 19.
9. OMS. Plan de acción para la prevención y el control de las enfermedades no transmisibles en las Américas 2013-2019. Washington, D.C.: Organización Panamericana de la Salud; **2014**. ISBN 978-92-75-31844-7. Disponible en https://www.paho.org/es/documentos/plan-accion-para-prevencion-control-enfermedades-no-transmisibles-americas-2013-2019 Acceso 27 de Noviembre de 2025.
10. Calenta C, Manavella B, Mas L, et al. Código Infarto Rosario. Impacto de un modelo en red integrada en salud. Rev Fed Arg Cardiol **2016**; 4: 174 - 178.
11. Zapata G. Código Infarto de la Federación Argentina de Cardiología - CI FAC Programa Nacional sobre educación y prevención, manejo e investigación del ataque agudo al corazón de la Federación Argentina de Cardiología. Rev Fed Arg Cardiol **2023**; 52: 65 – 67.
12. Castillo Costa Y, Delfino V, Mauro V, et al. SCA con elevación del ST: impacto del tiempo al diagnóstico en el tiempo puerta-balón en el mundo real. Datos del registro ARGEN-IAM-ST. Rev Argent Cardiol **2020**; 88: 530 - 537.
13. Huber K, De Caterina R, Kristensen S, et al. Pre-hospital reperfusion therapy: a strategy to improve therapeutic outcome in patients with ST-elevation myocardial infarction. Eur Heart J **2005**; 26: 2063 – 2074.
14. Rossi Prat M, Gagliardi J, Estrella ML, et al. Utilización de la estrategia farmacoinvasiva en Argentina. Análisis del registro ARGEN-IAM ST. Rev Argent Cardiol **2023**; 91: 184 - 189.
15. Ortún V. Gestión clínica y sanitaria. De la práctica diaria a la academia, ida y vuelta Barcelona: Masson, **2003** Departamento de Economía y Empresa- Centro de Investigación en Economía y Salud Universidad Pompeu Fabra, Barcelona. Disponible en https://www.semg.info/cursos/directores/doc/chapclaves.pdf Acceso 27 de Noviembre de 2025.
16. Ortegón E, Pachejo JF, Prieto A. Metodología del marco lógico para la planificación, el seguimiento y la evaluación de proyectos y programas. Santiago de Chile: UN, CEPAL **2015**. Acceso en: https://www.cepal.org/es/publicaciones/5607-metodologia-marco-logico-la-planificacion-seguimiento-la-evaluacion-proyectos Acceso 27 de Noviembre de 2025.
17. Bernztein R, et al. Análisis de las variaciones de los diagnósticos médicos y prescripción de medicamentos en el Programa Remediar, implicancias sobre la equidad. Diseño ecológico analítico. Comisión Nacional Salud Investiga. Ministerio de Salud de la Nación **2010**.
18. Wennberg JE. Dealing with medical practice variations: a proposal for action. Health Aff (Millwood) **1984**; 3: 6 - 32.
19. Artaza Barrios O. Organización Panamericana de la Salud - OPS Transformando los servicios de salud hacia redes integradas: elementos esenciales para fortalecer un modelo de atención hacia el acceso universal a servicios de calidad en la Argentina; 1a ed. Buenos Aires **2017**. 90 p.; 22 x 15 cm. - (Publicaciones de la representación OPS-OMS en Argentina; 71) ISBN 978-950-710-128-1. Disponible en https://iris.paho.org/handle/10665.2/34027 Acceso 27 de Noviembre de 2025.
20. Byrne R, Rossello X, Coughlan JJ, et al. Guidelines for the management of acute coronary syndromes. Eur Heart J **2023**; 44: 3720 - 3826.
21. Ranasinghe I, Turnbull F, Tonkin A, et al. Comparative Effectiveness of Population Interventions to Improve Access to Reperfusion for ST-Segment–Elevation Myocardial Infarction in Australia. Circ Cardiovasc Qual Outcomes **2012**; 5: 429 - 436.
22. Fernández H, Bilbao J, Cohen Arazi H, et al. Calidad de atención del infarto agudo de miocardio en la Argentina. Observaciones del Registro SCAR (Síndromes Coronarios Agudos en Argentina). Rev Argent Cardiol **2014**; 82: 373 - 380.
23. Schiele F, Gale C, Bonnefoy E, et al. Quality indicators for acute myocardial infarction: A position paper of the Acute Cardiovascular Care Association. Eur Heart J: Acute Cardiov Care **2016**; 6: 34 – 59.
24. Torres R. Política sanitaria en el país de los argentinos. 2ª ed. Buenos Aires: ISalud; **2015**. 280 p. ISBN 978-987-9413-65-4. Disponible en https://biblioteca.sociales.uba.ar/politica-sanitaria-en-el-pais-de-los-argentinos/ Acceso 27 de Noviembre de 2025.
25. Easton D. Enfoques de teoría política. Buenos Aires: Ed Amorrortu **1967**. Disponible en https://www.amorrortueditores.com/Papel/9789505180271/Enfoques+sobre+teor%C3%ADa+pol%C3%ADtica Acceso 27 de Noviembre de 2025.
26. Tobar F. Políticas de Salud: modalidades y tendencias. Buenos Aires: ISALUD; **2002**. Disponible en https://www.studocu.com/latam/document/universidad-autonoma-de-santo-domingo/fisiologia-humana-ii/httpsaulavirtualuasdedudopluginfile/104725818 Acceso 27 de Noviembre de 2025.
27. Spadafora S. Formulación y Evaluación de Proyectos: Perfil de un Proyecto de Intervención. Curso: Planificación en Salud, Estrategias y Proyectos. Modulo I. Clase 2. Universidad I Salud. Bs As p:1-79. **2018**.
28. Cohen E. Programa Conjunto sobre políticas públicas para América Latina (PROPOSAL) Manual de Formulación y Evaluación de Proyectos Sociales. CEPAL/OEA **1995**. Disponible en https://dds.cepal.org/redesoc/publicacion?id=242 Acceso 27 de Noviembre de 2025,
29. Costantini C, Togni S. Impact of Operators Skill on Direct PTCA Outcomes in Acute Myocardial Infarction. A View of the SOLACI Registry. J Am Coll Cardiol **2001**; 1001-209.
30. Bahiru E, Ayele A. Hospital-Based Quality Improvement Interventions for Patients with Acute Coronary Syndrome a Systematic Review. Circ Cardiovasc Qual Outcomes **2019**; 12: e005513.
31. Silberstein A, De Abreu M, Mariani J, et al. Programa en red para la reperfusión del infarto con telemedicina. Rev Argent Cardiol **2015**; 83: 187 - 193.
32. Candiello A, Cohen F, Lasave L, et al. Impacto de un sistema de evaluación de tiempos a la reperfusión en infarto agudo de miocardio con elevación del ST. Rev Argent Cardiol **2020**; 88: 34 - 40.
33. Borrayo-Sanchez G, Rosas-Peralta M, Ramirez-Arias E, et al. STEMI and NSTEMI: Real- world Study in Mexico (RENASCA). Arch Med Res **2019**; 49: 609 - 619.
34. Nazzal C, Campos P, Corbalan R, et al. Impacto del plan AUGE en el tratamiento de pacientes con infarto agudo al miocardio con supradesnivel ST en hospitales chilenos. Rev Méd Chile **2008**; 136: 1231 - 1239.
35. Campos Abreu Marino B, Pinho Ribeiro A, Alkmim MB, et al. Coordinated regional care of myocardial infarction in a rural area in Brazil: Minas Telecardio Project 2. Eur Heart J Quality of Care and Clinical Outcomes **2016;** 2: 215 - 224.
36. Kristensen S, Fajadet J, Di Mario C, et al. Implementation of primary angioplasty in Europe: Stent for Life initiative progress report. Euro Intervention **2012**; 8: 35 - 42.
37. Kristensen S, Laut K, Fajadet J, et al. Reperfusion therapy for ST elevation acute myocardial infarction 2010/2011: current status in 37 ESC countries. Eur Heart J **2014**; 35: 1957 - 1970.
38. Grines C, Westerhausen D, Grines L, et al. A Randomized Trial of Transfer for Primary Angioplasty Versus On-Site Thrombolysis in Patients with High-Risk Myocardial Infarction. The Air Primary Angioplasty in Myocardial Infarction Study. J Am Coll Cardiol **2002**; 39: 1713 - 1719.
39. Widimsky P, Budesinsky T, Vorac D, et al. Long distance transport for primary angioplasty vs immediate thrombolysis in acute myocardial infarction. Final results of the randomized national multicentre trial—PRAGUE-2. Eur Heart J **2003**; 24: 94 - 104.
40. Andersen H, Nielsen T, Rasmussen K, et al. for the DANAMI-2 Investigators. A comparison of coronary angioplasty with fibrinolytic therapy in acute myocardial infarction. N Engl J Med **2003**; 349: 733 - 742.
41. Thrane P, Kristensen S, Olesen K, et al. 16-year follow-up of the Danish Acute Myocardial Infarction 2 (DANAMI-2) trial: primary percutaneous coronary intervention vs. fibrinolysis in ST-segment elevation myocardial infarction. Eur Heart J **2020**; 41: 847 - 854.