

Measure title: **Integrated mobility actions for the San Martino Hospital in Genoa**

City: **Genoa**

Project: **CARAVEL**

Measure number: **11.8**

A Introduction

A1 Objectives

The general objectives of this measure are:

- To improve the accessibility of the hospital area
- To regulate all the public and private traffic generated/attracted by the hospital and by the surrounding areas in a more efficient way
- To implement sustainable mobility initiatives, addressing the behaviour of employees, but also of visitors including specific transport needs (e.g., people with reduced mobility)

The operational objective is

- To develop the home - work trip plan integrating it in a mobility scheme for the San Martino Hospital and the surrounding areas, in order to maximize the efficiency of the system for all kind of users.

A2 Description

In order to improve the accessibility to the San Martino Hospital and to regulate all the public and private traffic generated/attracted by the area in a more efficient way, a specific mobility plan for the hospital has been developed.

This plan starts from the Homework trip plan but is addressed to the mobility behaviour of visitors, in order to generate more sustainable transport habits.

The work within this measure is mainly consisted in the design, the development and the implementation of several mobility management initiatives that form the mobility plan, in addition to the more traditional dissemination and evaluation activities.

The mobility plan has been designed according to an approach that integrates several aspects of transport to reach the objective of reducing traffic flows in the hospital area. Particularly, the fields involved in the project are the following:

- The Home Work Trip Plan for the employees of the San Martino Hospital, with particular focus on the testing of the car pooling system
- Design of special connections from critical points in the city to the hospital in order to create new alternative to reach the area. This part of the project investigated two particular interventions: on one side the possibility to involve taxi drivers to realise some paths to the hospital at special fares and on the other one the development of the car sharing system;
- Extension of the public transport system inside of the hospital area, in order to facilitate people coming in the area early in the morning and late in the evening;
- The infomobility platform with installation of two kiosks inside the hospital area, allowing users to obtain real time transport information from www.mobilitypoint.it and access to the car pooling system;

- Use of electrical vehicles to move inside the hospital area where the road network is about 20 kilometres.

B Measure implementation

B1 Innovative aspects

The innovative aspects of the measure are:

- **Targeting specific user groups** – The most innovative aspect within the mobility plan of the San Martino Hospital concerns the fact it addresses not only its employees, but also outpatients, visitors and the hospital neighbours.

B2 Situation before CIVITAS

San Martino is the biggest hospital in the city of Genoa, it covers an area of 30.000 m² with an internal road network of about 20 Km. It is in an integrated structure, which includes the Hospital with about 4000 employees and the Faculty of Medicine of the University of Genoa, so it generates/attracts a remarkable mobility demand including employees, students, but also outpatients, visitors and the hospital's neighbours. Moreover, the urban area where San Martino hospital is located is a dense residential area, with the presence of many University Faculties (not only Medicine) and some medium-sized commercial structure. This area is crossed by the 17 line, which, within the CIVITAS Project will represent the backbone of the future High Mobility Corridor. At last, due to the big pressure of vehicles on the area, the problem of the lack of parking places is relevant.

At the moment the mobility of the area is served by some principal PT lines on buses; some secondary lines that serve the surroundings. Not far from this area the Brignole station is located. At the inner of the Hospital Area a circular line is available; in the last period electrical buses for this purpose have been adopted.

The hospital designed a mobility manager that was supported by the Municipality of Genoa to perform a first survey among employees in 1999.

B3 Actual implementation of the measure

The measure was implemented in the following stages:

Stage 1: Data collection: (01/02/05 - 30/04/06) – in this activity transport and mobility data (related to private and public transport), socio economic data, general information concerning the hospital area have been collected and described in a document. Particularly a survey was organised in order to obtain information about mobility habits of people directed to the area. The red area identified in the map below represents the San Martino Hospital area.

The road network inside the hospital is about 20 kilometres and they have an internal traffic regulation, but many people are allowed to enter the area, where there are approximately 1.500 parking lots.

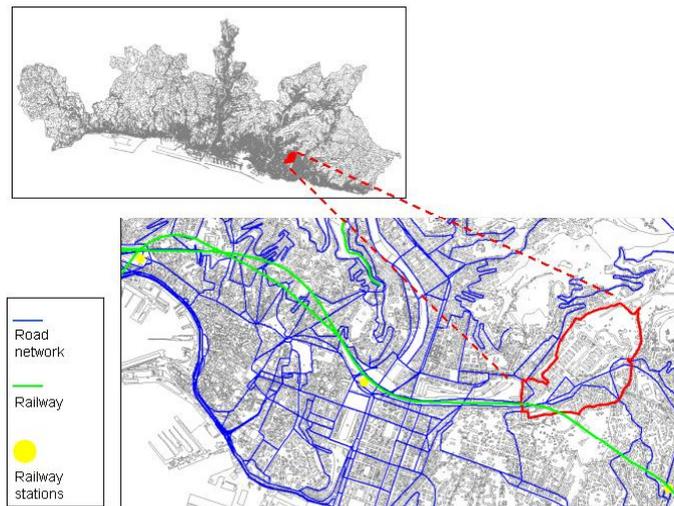


Fig. 1: the interested area

Stage 2: Integration of the data available into GIS (01/08/05- 30/04/06) – to create thematic maps, useful to support the planning activity. The procedure used to integrate data into GIS has been explained in a document: GIS allows showing several kinds of data at the same time. The image below represents different information layer, such as the population, the road network, the point of interests and the area.

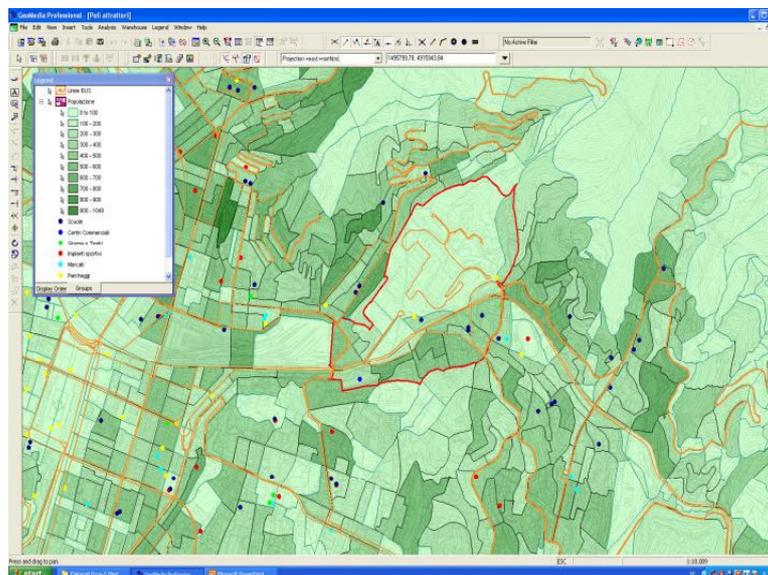


Fig. 2: example of GIS data

This possibility make easier to perform analysis, with particular respect to the accessibility of the area.

Stage 3: Development of mobility management interventions (01/02/06 - 31/07/07) – design of the measures of the mobility plan with special focus on home-work trip plan (HWTP) for the employees of the hospital.

The HWTP has been defined according to the guidelines of the ENEA that is a public agency operating in the fields of energy, the environment and new technologies to support Country's competitiveness and sustainable development. Starting from the results of the analysis, the planning phase designs the main interventions to propose to the employees. The fields of intervention concern the following issues:

- Car pooling, with the launch of a new software platform where employees can insert their data, state their preferences and look for colleagues sharing the same trip.
- Infomobility platform that will allow employees to obtain several information about traffic and mobility and to enter the car pooling system; two kiosks will be installed in two crucial locations inside the hospital
- Public transport, increasing the service of the bus connecting the several departments inside the hospital.

Stage 4: Design and development of intermodal connections (01/08/07 - 31/10/08) – analysis and design focused to the planning of special connections between the hospital and one of the main rail station or specific locations, trying to involve taxi drivers and collective transport. These planning was integrated in the mobility plan, designed according to an approach that including several aspects of the transport to reach the objective of reducing traffic flows in the hospital area. Particularly, the fields involved in the project are the following:

- The Home Work Trip Plan for the employees of the San Martino Hospital, with particular focus on the testing of the car pooling system
- Designing of special connections from critical points in the city to the hospital, in order to create new alternative to reach the area. This part of the project investigated two particular interventions: on one side the possibility to involve taxi drivers to realise some paths to the hospital at special fares and on the other one the development of the car sharing system;

The idea regarding the taxi drivers is the following: from some crucial points of the city (main rail stations, main interchanging points) a special fare could be proposed to reach the hospital and vice versa. This could increase the use of this transport mean. In the figure below are represented possible points (red ones) proposed to taxi drivers. The blu point represents the hospital.

This mechanism is available for the user from the airport to the city centre.

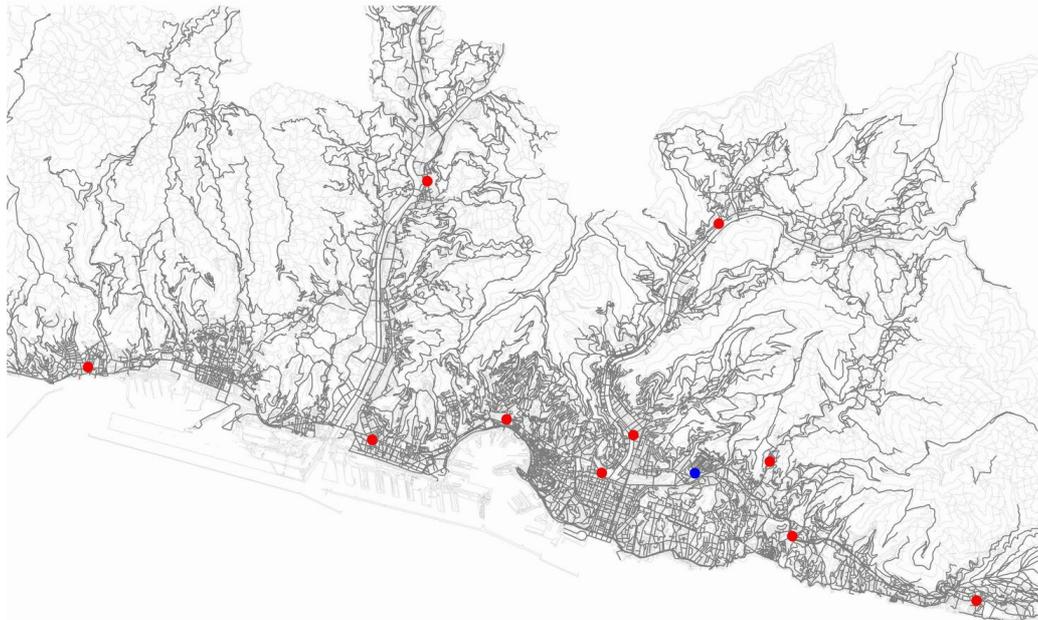


Fig. 3: locations of taxi parking areas

- Extension of the public transport system inside of the hospital area, in order to facilitate people coming in the area early in the morning and late in the evening;
- The infomobility platform with installation of two kiosks inside the hospital area, allowing obtaining real time transport information from www.mobilitypoint.it and accessing the car pooling system;
- Use of electrical vehicles to move inside the hospital area where the road network is about 20 kilometres; these vehicles are part of the hospital fleet and are used to move inside the hospital. The figure below shows one of the electrical vehicle.



Fig. 4: electrical vehicle

Stage 5: Evaluation (01/05/06 - 31/10/08) assessment of the impact of the designed actions through a ex post survey and direct analysis via the data on public transport charges, on parking places occupancies and on traffic flows in the main streets

Stage 6: Dissemination (01/08/06 - 31/10/08) the implementation of the plan is supported by a marketing campaign consisting of leaflets, brochure, mailing. The HWTP is disseminated with the support of the San Martino Hospital through the following channels:

- A training Workshop inside the hospital
- The Infomobility Bus that was parked outside the hospital days before the workshop



Fig. 5: infomobility bus

- Advertise in the notice boards inside the several departments of the hospital
- Advertise in the intranet of the hospital

The main distribution mechanism is the e-mail and the notice boards: the last one is the most helpful to reach employees because they are used to read advertisements in the notice boards.



**MANIFESTAZIONE DI INTERESSE A FAR PARTE DEL GRUPPO
DI SPERIMENTAZIONE DEL SISTEMA CAR POOLING**

Io sottoscritt _____
_____, dipendente dell'Azienda
Ospedaliera San Martino, dichiaro il mio interesse
a far parte del gruppo che sperimenterà il sistema
di car pooling.
Genova,

Da inviare a _____

CIVITAS GENOVA	
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Fig. 6: form for interest display in car pooling system



**VUOI FAR PARTE ANCHE TU DEL CLUB DEGLI UTENTI
CAR POOLING?**

L'azienda Ospedaliera ha collaborato con il Comune di Genova nelle attività del progetto CIVITAS CARAVEL riguardanti la definizione del Piano Spostamenti Casa Lavoro (PSCL) per i dipendenti. All'interno del PSCL sono state individuate alcune proposte per migliorare la qualità dello spostamento tra l'abitazione ed il luogo di lavoro. Una di queste è il **car pooling**, secondo cui tre o più persone che abitano e lavorano nella stessa zona arrivano alla sede di lavoro insieme su un'unica vettura, utilizzando sempre lo stesso veicolo o, eventualmente, con una rotazione dell'autoveicolo utilizzato, con un abbattimento radicale dei costi di spostamento e dell'inquinamento atmosferico.

Vuoi scoprire tutti i vantaggi di questo sistema?
Vuoi essere tra i primi utilizzatori del car pooling?

Contatta l'ufficio del Mobility Manager al numero **010 5552195** o compila la scheda sulla intranet aziendale.

CIVITAS - GENOVA	
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Fig. 7: advertise in the notice boards of the hospital

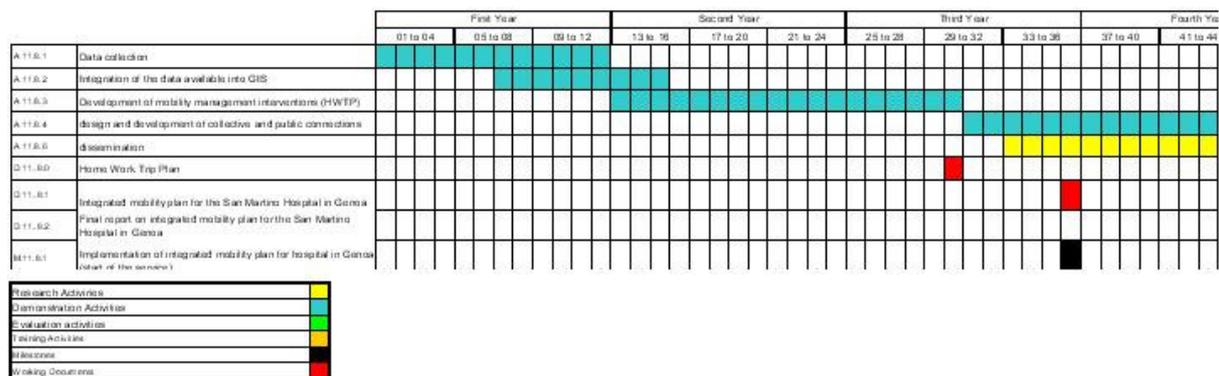


Fig. 8: Gantt

B4 Deviations from the original plan

The main deviation from the original plan concerns:

- **Interchanging issue**– According to the first version of the Inception Report description, the design and development of an inter-modal interchange point was foreseen. Indeed at city level a new rail – metro station should have been realized and become crucial for the interchanging point. Due to the fact that this station won't be realized within the CARAVEL project, this task was changed, becoming the realization of special connections between critical points and the Hospital, trying to involve taxi drivers and collective transport. This task was called “design and development of intermodal connections”.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **Measure 11.10 “Integrated mobility strategy for trade fairs in Genoa”**: the two measures are related because they concern two different aspects of the mobility management; moreover some specific activities, like the mobility survey were carried out together.

C Evaluation – methodology and results

C1 Measurement methodology

C1.1 Impacts and Indicators

Table of Indicators.

No.	Impact	Indicator
	Transport	Registration in the car pooling system
	Transport	Number of car pooling groups
26-27	Transport	Average modal split PAX-vehicles
19	Transport	Quality of PT service
14	Society	Acceptance level
15	Transport	Perception of PT accessibility
21-22	Transport	Traffic flow
5	Environment	CO levels
6	Environment	NOx levels
7	Environment	Particulate levels

Detailed description of the indicator methodologies:

- **Registration in the car pooling system** - Number of people registered in the car pooling system. The baseline is zero because the system is implemented in the CARAVEL project
- **Number of car pooling groups** - Number of groups that makes car pooling. The baseline is zero because the system is implemented in the CARAVEL project
- **Average modal split PAX-vehicles** – Data ex ante comes from the survey to people performed in October – November 2005. Another survey is foreseen for the ex post (October 2008). The interviews ere addressed both to visitors and employees
- **Quality of PT service** - Data ex ante comes from the survey to people performed d October – November 2005. Another survey is foreseen for the ex post (October 2008). The interviews ere addressed both to visitors and employees
- **Acceptance level** - The acceptance level will be assessed during the survey that will be performed in October 2008
- **Perception of PT accessibility** - Data ex ante comes from the survey to people performed d October – November 2005. Another survey is foreseen for the ex post (October 2008). The interviews ere addressed both to visitors and employees
- **Traffic flow** - Data about traffic flows is always collected by a system of about 400 detectors.
- **CO levels** - data comes from the environmental monitoring system in the city
- **NOx levels** - data comes from the environmental monitoring system in the city
 - **Particulate levels** - data comes from the environmental monitoring system in the city

C1.2 Establishing a baseline

During the project two specific surveys (ex ante and ex post) have been organised in order to interview the “user” of the hospital and surrounding zones. Through these questionnaires we obtained information about the average modal split, the quality of PT and the accessibility of the area.

Indicators related to the car pooling systems can't have a baseline value due to the fact that the system has been “created” during the project.

The reference date for the transport indicator in baseline is November 2005 because they were obtained from the ex-ante survey performed during the project.

The indicator “PT accessibility” refers to the cost of Public transport, that according to the 69% the ticket is reasonable.

The indicator traffic flow refers to cars; it doesn't consider motorcycles.

C1.3 Building the business-as-usual scenario

The analysis of traffic data allows making a hypothesis about the business as usual scenario. Data about traffic flows are obtained from the system of detectors covering all the urban territory. They are related to the points used for the indicator “traffic flows”, in order to perform significant comparisons.

Data reported in the graphic below refers to east direction and to a weekly wintry day; they are about year 2003, 2004 and 2005 (red line). The black line represents the possible trend, while the blue point is the value registered in 2008.

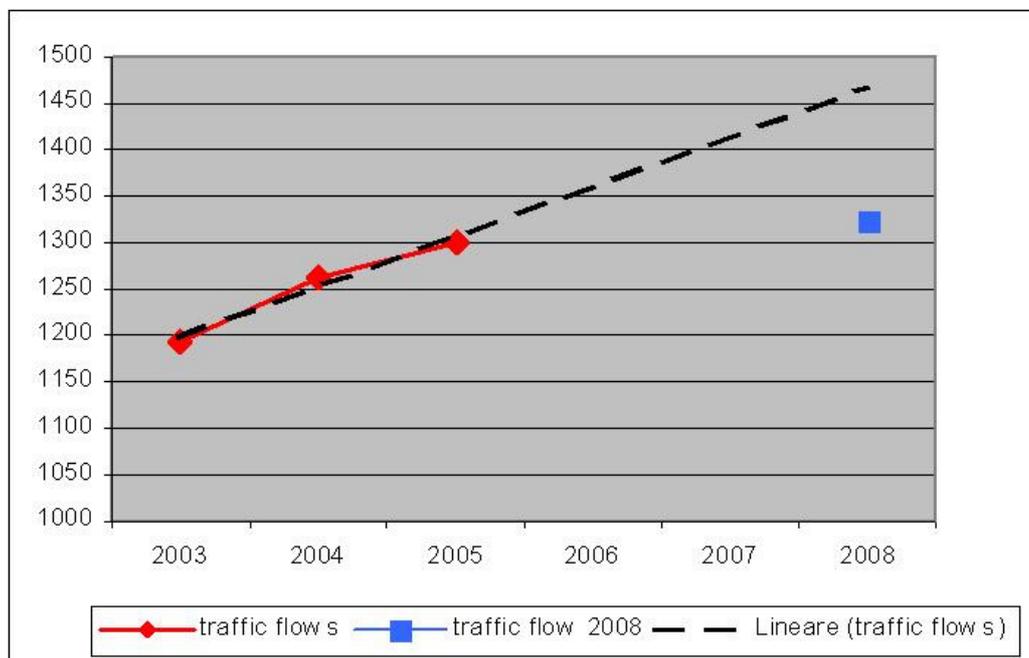


Fig. 9: trend of traffic flows in the business as usual scenario

This trend can be possible due to different causes, like for instance the following ones:

- Internal regulation allows employees enter the hospital by car; this habit will be were difficult to be changed, because they believe it is one of their rights.
- a new parking area is going to be built at the entrance of the hospital. This could encourage citizens to arrive in the area by car.
- Some little hospitals in the metropolitan area are going to be turned into doctors' offices and this situation could cause more traffic towards San Martino hospital, most of all from the eastern side of the region, where it is on going this shift.

C2 Measure results [MSOffice1]

The results are presented under sub headings corresponding to the areas used for indicators –

C2.3 Environment

Ex - ante

No	Indicator	Value	Date
5	CO levels	2.41 mg/mc	From 1/ 1/2005 to 31/12/2005
6	NOx levels	102.19 ppb	
7	Particulate levels	35.43 microg/mc	

Ex - post

No	Indicator	Value	Date
5	CO levels	1.69 mg/mc	From 1/ 1/2008 to 31/10/2008
6	NOx levels	79.95 ppb	
7	Particulate levels	37.39 microg/mc	

C2.4 Transport

The ex-post survey interviewed 1000 users of the San Martino area, with the distribution reported in the graphic below. Among the employees about 14% knows the car-pooling system and 2% of them is registered in the system.

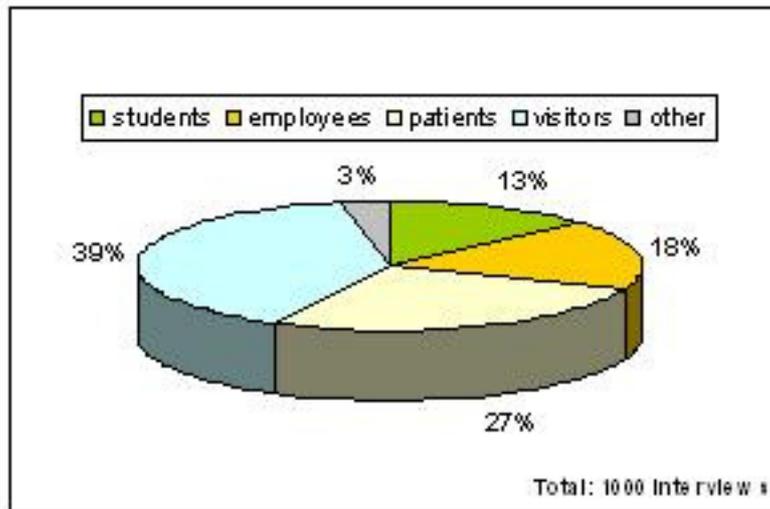


Fig. 10: distribution of people interviewed

No	Indicator	Value	Date
	Registration in the car pooling system	3	09-2008
	Number of car pooling groups	0	09-2008

The table below reports the reasons why a person that knows the system is not registered in it.

Reasons	N. users	%
Didn't find other people in the same path	4	19%
not interested	4	19%
doesn't want to share car	2	10%
leaves near the hospital	1	5%
Didn't find other people in the same hours	1	5%
has reserved parking lot	1	5%
doesn't drive	1	5%
didn't assess deeply the opportunity	1	5%
prefers to use public transport	1	5%
arrives by feet	1	5%
other	4	19%
total	21	100%

Ex-ante

No	Indicator	Value	Date
26-27	Average modal split PAX-vehicles	People to the hospital: Only PT: 50.9 % Only private vehicle: 42.3%	11-2005

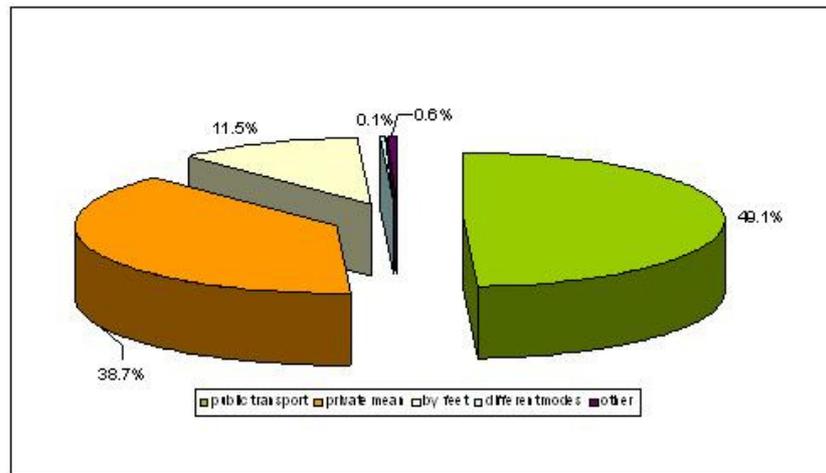


Fig. 11: modal split 2005

Ex-post

No	Indicator	Value	Date
26-27	Average modal split PAX-vehicles	People to the hospital: Only PT: 49.1 Only private vehicle: 38.7	09-2008

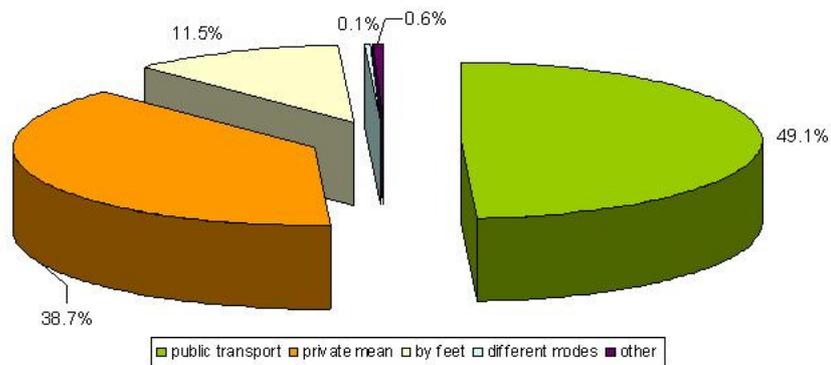


Fig. 12: modal split 2008

Comparing the modal split, it is possible to underline that both motorised trips decrease while people prefer to reach the hospital by feet.

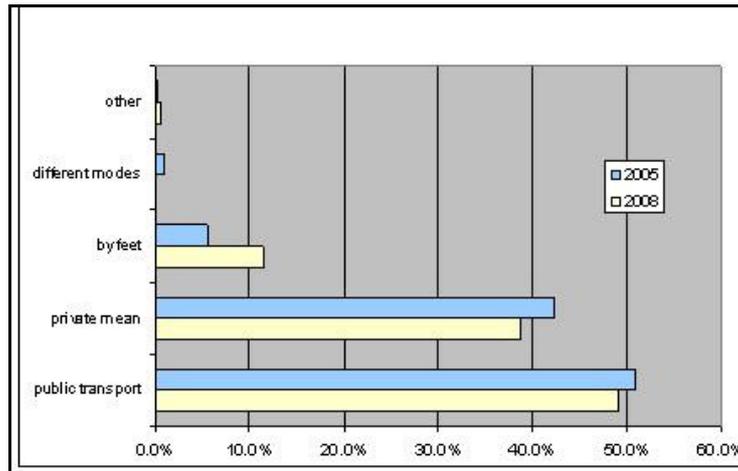


Fig. 13: modal split comparison

Ex ante

No	Indicator	Value	Date
19	Quality of PT service	People to the hospital Satisfied: 44.1%	11-2005

In order to evaluate the level of quality of PT service, we considered satisfied persons those ones detecting problems not related to public transport (306) and not detecting any problems (135).

	Number of problems detected	Number of problems detected in PT				
		0	1	2	3	≥ 4
Number of persons detecting the problems	135	306	196	153	146	64

Ex post

No	Indicator	Value	Date
19	Quality of PT service	People to the hospital Satisfied: 16%	10-2008

	Number of problems detected	Number of problems detected in PT				
		0	1	2	3	≥ 4
Number of persons detecting the problems	46	112	259	313	206	54

Indicator n 19, “quality of PT service”, comes from the assessment of the following topics:

- crowding of the bus
- cost of the transport
- unreliability of the service
- lack of integration

year	crowding	cost	unreliability of the service	lack of integration
2005	461	184	306	245
2008	605	453	445	156

The table reports number of persons detecting different problems: the only issue improved concerns the integration. This situation reflects the most relevant changing in the public transport management: the increasing of 20% of the fares and the revision of the in order to optimise the supply of PT. Therefore the figures feels the effects of these two global changes.

Ex ante

No	Indicator	Value	Date
15	PT accessibility	People to the hospital Satisfied: 69%	11-2005
21	Traffic flow	way to	11-2005
		daily average	
		morning peak hour	
	east	1300	1985
	west	905	1529

Data about traffic flows are obtained from the system of detectors covering all the urban territory. Particularly data reported in the table come from detectors pointed out in red in the picture below. The blue line represents the area considered in the analysis phase.

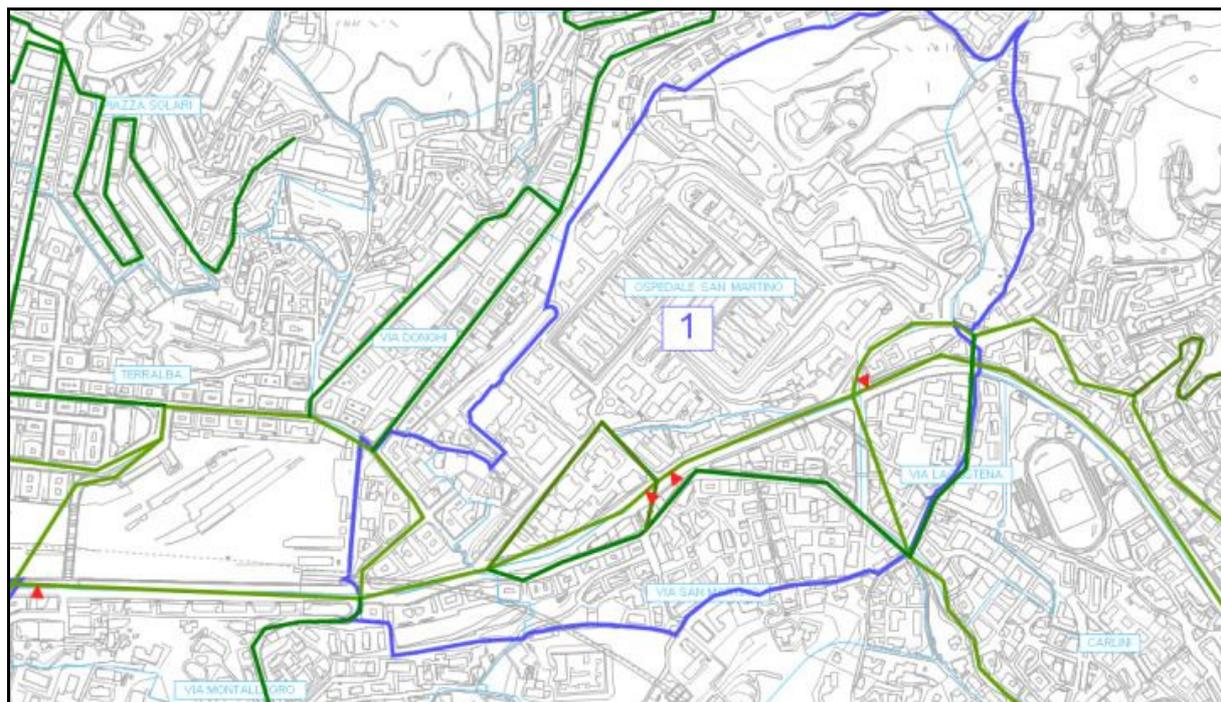


Fig. 14: traffic detectors

Ex post

No	Indicator	Value	Date
15	PT accessibility	People to the hospital Satisfied: 55%	10-2008
21	Traffic flow	way to	09-2008
		daily average	
		morning peak hour	
	east	1323	1980
	west	837	1063

way to	daily average	morning peak hour
east	2%	0%
west	-8%	-31%

C2.5 Society

The acceptance level is assessed during the survey performed in October 2008 through the following questions:

- Do you believe the accessibility to the hospital is good?
- Do you believe it improved in the last year?

58 % believes that the accessibility to the hospital is low, while the 20 % believes it improved: it is possible to say that the acceptance level is quite low.

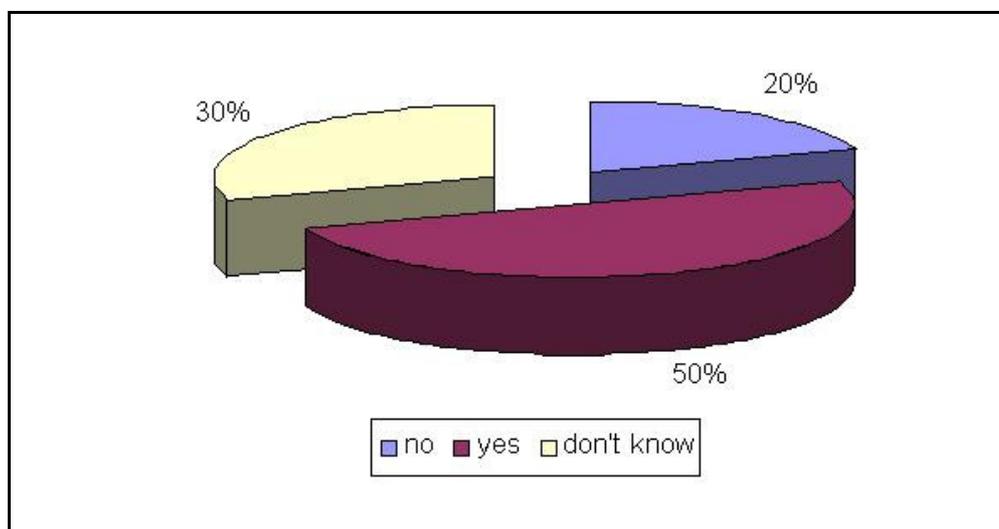


Fig. 15: acceptance level

C3 Achievement of quantifiable targets

No.	Target	Rating
1	Increase in use of public and collective transport to travel to the hospital and related decrease in use of private cars	**
NA = Not Assessed * = Not achieved ** = Achieved in full *** = Exceeded		

C4 Up-scaling of results

Several hospitals are located in the urban territory of Genoa. Those ones with significant high density of trips are three, Ospedale Galliera, Ospedale Gaslini and Villa Scassi, besides San Martino. They are represented in blue in the figure below; the red one is San Martino, and the green are the other ones in the urban territory.

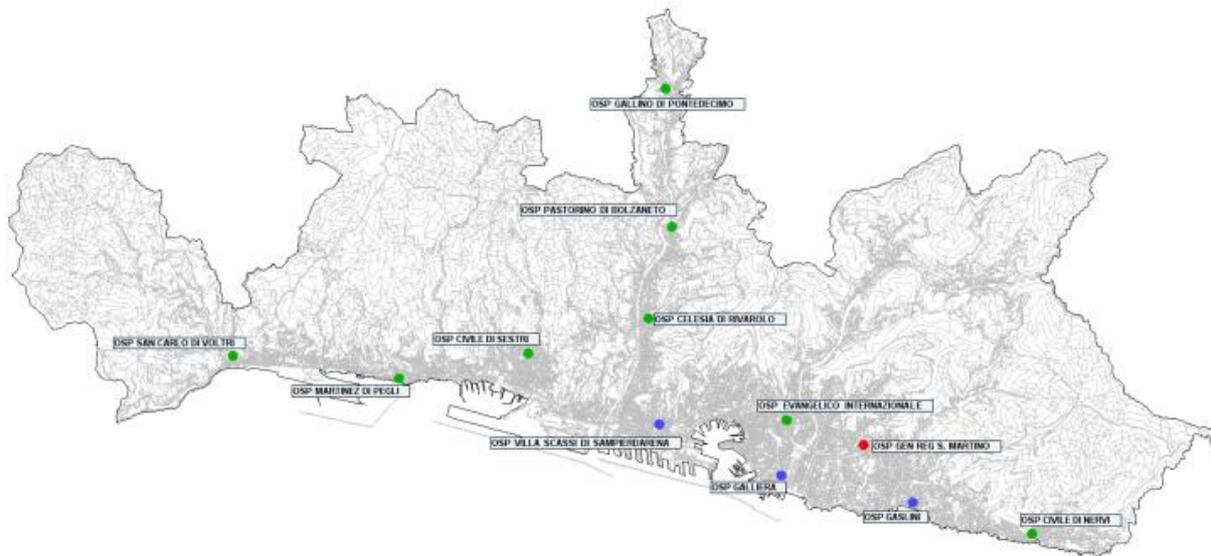


Fig. 16: location of other hospital in Genoa

Two of them, Ospedale Galliera and Ospedale Gaslini have already different efficacious traffic regulations: the first one is in the city center where several restrictions are applied, while the second one has an internal regulation that improved the situation both inside and outside the hospital.

The methodology followed in this measure could be applied for Villa Scassi. Moreover, it could be used for other similar points of interest, not only for hospital, but also for business centre or large shopping centre.

The figure below shows Villa Scassi hospital and other possible points, where this approach could be followed. They are:

- San Benigno, where the WTC is located and where about 12.000 people works;
- Fiumara, the most important shopping center in the western side of the city, where many services are located, besides shops.

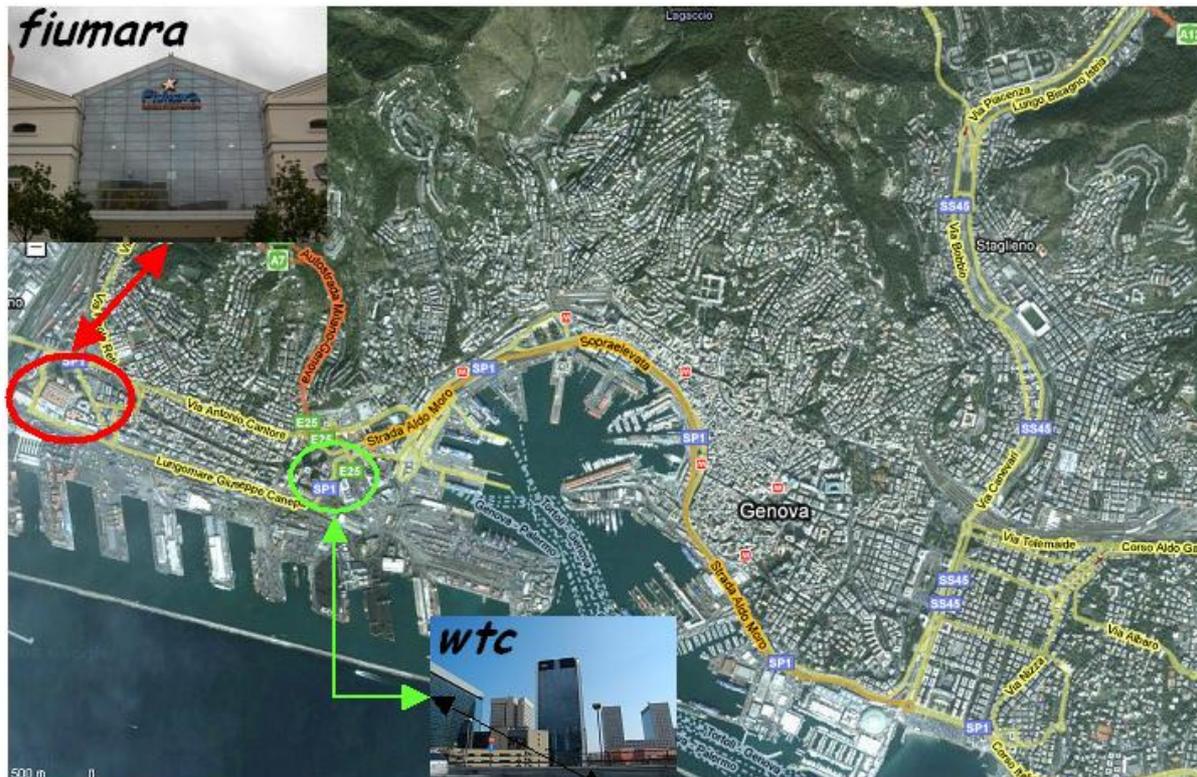


Fig. 17: location of other possible centre for upscaling

These two sites could be a good choice to perform the upscaling of the measure because the characteristics of people working there are similar to those ones of people to San Martino. Concerning the WTC, employees form the largest percentage, while visitors are the most relevant part in Fiumara. In the first case the systematic trips prevailed over the random ones, and vice versa in the second case. These components are both significant in the San Martino Hospital.

The main steps to follow should be:

- Data collection, in this activity transport and mobility data (related to private and public transport), socio economic data, and general information concerning the area has to be collected. The
- Analysis of data, in order to identify the main problem and possible solutions
- Development of mobility management interventions, not only the Home work Trip Plan for the employees, but also different interventions addressed to users of the area
- Dissemination, in order to involve the stakeholders and increase the success of the interventions,
- Testing phase, to test the interventions and their acceptance from the users
- Monitoring of the system, to allow improvements in the interventions and to satisfy better the needs of the users.

C5 Appraisal of evaluation approach

The evaluation approach used in is suitable for a project composed by different measures as CARAVEL is. To have a common template to describe the evaluation activity allows better comparisons among cities.

Concerning measure 11.8, one of the main problem could be represented by the difficulty to understand the feeling of the persons: for instance in the case of the accessibility to public transport, it could be difficult for people interviewed, to split effects from interventions in the San Martino area and somewhere else in the city, even if the question is related only to the Hospital.

C6 Summary of evaluation results

The key results are as follows:

- **Traffic flows:** concerning the traffic flows it is important to underline that they decreased, as recorded from traffic detectors in the main street in the area. Table below reports the main difference.

way to	daily average	morning peak hour
east	2%	0%
west	-8%	-31%

Reduction is very significant in the west direction, that is the way to the city centre, particularly in the morning peak hour.

- **Modal split** – it is significant the increase in the share of people reaching the hospital by feet, and the simultaneous decreasing of motorised means

	2008	2005
public transport	49.1%	50.9%
private mean	38.7%	42.3%
by feet	11.5%	5.5%
different modes	0.1%	1.0%
other	0.6%	0.3%
total	100.0%	100.0%

- **Perception of public transport** – from the interviews people satisfied decrease from 44% to 16 %; they are people that don't detect any problems in public transport.

D Lessons learned

D1 Barriers and drivers

D1.1 Barriers

- **Technical barrier** – currently, the entry by car in the San Martino hospital area is regulated by the hospital itself and the municipality can't force this procedure. For instance employees that lives at more than 20 minutes by PT from the hospital can enter by car.
- **Technical barrier** – new parking lots are going to be built at the entrance of the hospital. This could encourage citizens to arrive in the area by car.
- **Acceptance barrier** – the right of the employees to enter the hospital area by car is very rooted.

These barriers can be mainly faced with a revision of the internal traffic regulation, for example through more restrictions for people coming to the hospital, through the creation of paying car park inside the hospital.

D1.2 Drivers

- **Driver 1** – San Martino is one of the biggest hospital in the region and therefore there is a general interest in increasing the accessibility and information to users.
- **Driver 2** – San Martino hospital had already the mobility manager and she was the main interface with municipality and with the CARAVEL Project.

D2 Participation of stakeholders

The main stakeholders involved in this measure were:

- **AZIENDA OSPEDALIERA SAN MARTINO**, the main company interested in the project; the mobility manager of the company supported the team project in supplying data, disseminating the project to employees and becoming the main interface between the CARAVEL Project and the employees and the company
- **AMI**, partner of the project, the company particularly follows the info mobility platform and the car pooling system installation
- **AMT**, partner for several measure of the project, the company supports the specific measure in choosing related to public transport; particularly they supported the measure to understand the feasibility of the extension of public transport.
- **The University of Genoa**, because the faculty of medicine is located in the area
- **Citizens**, represented by the delegates of the area districts

At the beginning of the project they were informed with specific meetings; then they cooperated in the mobility plan, according to their specific roles.

D3 Recommendations

This kind of measure can be replicated easily. The main recommendation from this experience is the relevance of stakeholders, with particular respect to the hospital or companies involved. Indeed their support is very significant during the communication campaign and influence also the design of the mobility plan.

D4 Future activities relating to the measure

The activities developed during the CARAVEL Project could be carried on from the involved stakeholders, particularly from the hospital; the mobility manager's staff of the Municipality could support the hospital team. The impacts of the planned interventions should be verified and assessed in order to evaluate possible improvements in the Mobility Plan.

The car pooling system could be supported with new benefits for carpoolers, particularly with new parking policies.

At last, the lack of specific funding could represent the main problem to proceed with the activities.