116117

Deployment Plan in Italy and AREU Lombardy - Case Study

What is the current and future implementation of the European non-emergency number 116117?

How does it work and what is the capacity for growth for this service?

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116117 DEPLOYMENT PLAN IN ITALY AND AREU LOMBARDY - CASE STUDY

Version: 1.0

Publication date: 01/02/2022

Status of the document: APPROVED

This document was written by members of EENA.

Authors:

Luca Bergonzi – Beta 80, Italy
Francesco Silanos – Beta 80, Italy

Contributors:

Cristina Lumbreras - European Emergency Number Association (EENA)

Freddie McBride - European Emergency Number Association (EENA)

EENA

European Emergency Number Association

EENA 112

Avenue de la Toison d'Or 79, Brussels, Belgium
T: +32/2.534.97.89
E-mail: info@eena.org

EXECUTIVE SUMMARY

The 116117 non-emergency number is regulated by National Regulatory Authorities with responsibilities for the administration of national numbering plans in accordance with European Commission Decision 2007/116/EC of 15 February 2007 (as amended): all 6-digit 116*xyz* numbers are reserved in national numbering plans for harmonised services of social value. 116117[1], in particular, is dedicated to non-emergency medical service.

This document aims to explore in detail the actions taken by the Italian Ministry of Health to implement what is described in the Decision 2007/116/EC, to harmonise the various non-emergency services currently existing, and to define a roadmap for the implementation of such services (and more) for the rest of the country.

The document explains how 116117 serves as a medical consultancy and connects citizens with medical doctors at any time of the day or the week.

Finally, it gives an overview of how Azienda Regionale Emergenza Urgenza (AREU), Lombardy region's 112 and ambulance service PSAP manager, has also taken the duty of setting up the 116117 service in the region.

AREU already manages three 112 call-taking PSAPs and four Ambulance dispatching PSAPs. This knowledge served to establish a functional and professional 116117 call centre.

This document outlines the situation in the Lombardy region and the rationale for implementing the service and an overlook at the statistics of the last year of service.

[1] Commission Decision of 30 November 2009 amending Decision 2007/116/EC as regards the introduction of additional reserved numbers beginning with '116' (notified under document C(2009) 9425)

1 | 116117 IN ITALY TODAY

First, it is important to have a clear picture of Italy's Non-Emergency Management infrastructure.

Italy is divided into 20 regions which are further sub-divided into 107 provinces. The responsibility of non-emergency medical services is province-based.

The State-Region agreement of 7th February 2013 indicated the responsibility of Provinces for the setup of call centre for non-urgent medical requests. In the same year, the Italian Regulatory Authority for Communications (AGCOM) assigned 116117 to such call centre.

The two initial pillars of this service were:

- Centralisation at least on the provincial level (eventually consolidating on a regional level) of the out-of-hours medical services.
- Sharing technologies with Emergency medical PSAPs and integration with the Regional IT services for data sharing and uniformity of IT procedures.

The initial role of the 116117 service was to provide citizens with a unique short number to contact medical practitioners out of hours (weekends and night shifts) with plans to extend the availability of the service to 24 hours a day, 7 days a week in accordance with the requirements of the EC Decision. From this basis, Italy started developing the 116117 service to provide complete non-emergency medical support to citizens through a network of call centres with call filtering and qualification skills and practitioners capable of satisfying any request.

Currently, the 116117 call centres are active in the Lombardy Region, in the Province of Trento. Pilot projects have been running in the regions of Piedmont and Sardinia.

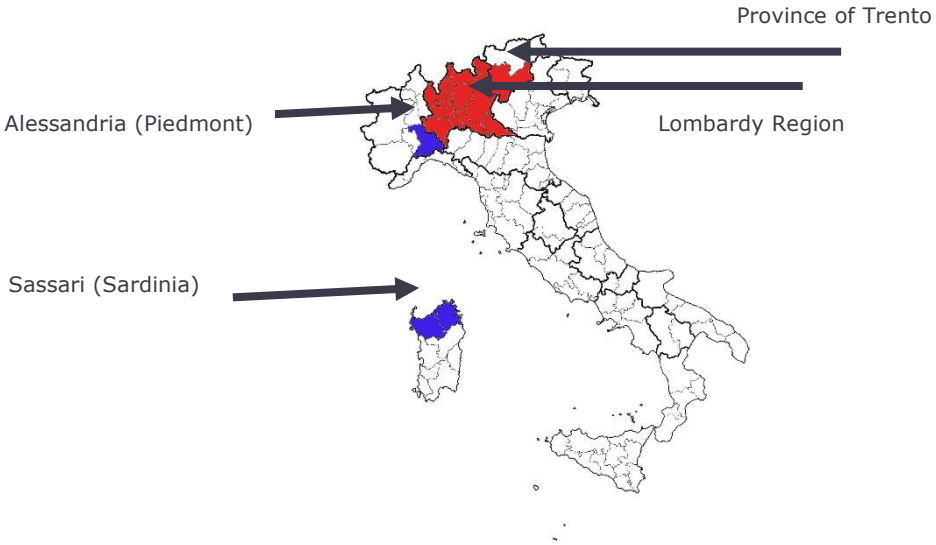


Figure 1: Areas covered by 116117 call centres, December 2021 (Red = in production; Blue = pilot projects)

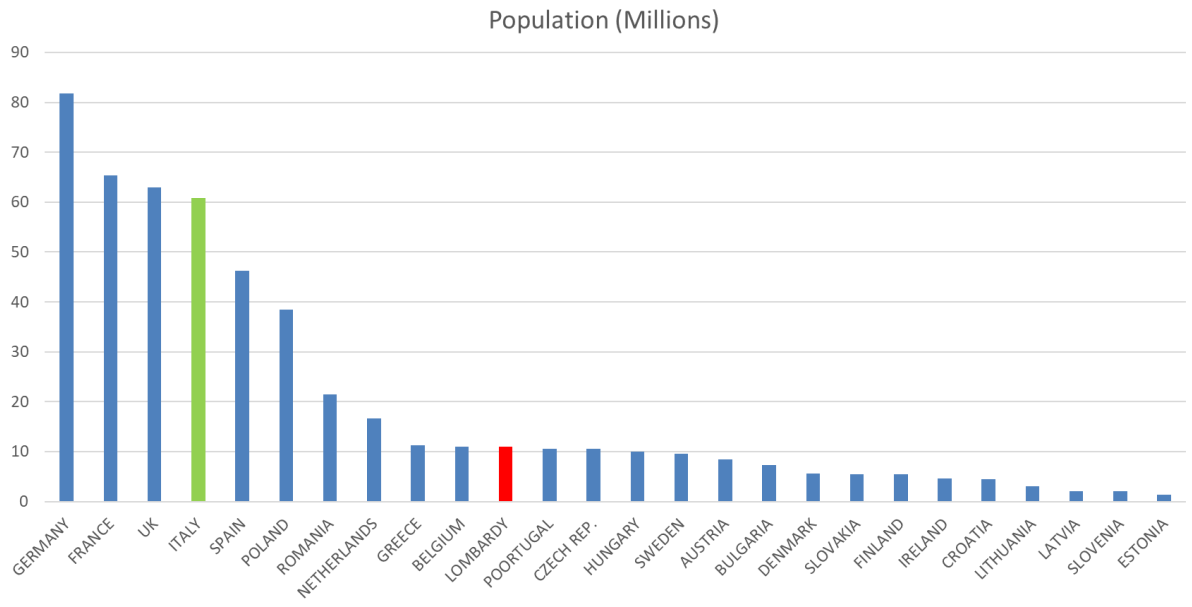


Figure 2: Population comparison between Lombardy region and other European Countries

Number	Duties of the service	Goals of the service	Advantages for citizens
116117	Unified national number for access to non-emergency medical services and other healthcare-related services. It responds to demand for low-priority medical assistance.	To put the citizens in contact with professional call-takers, capable of triaging their needs, assuring the assistance of a medical practitioner, or to provide healthcare-related assistance.	Citizens will have a unified service available throughout the territory to respond to their non-emergency medical needs.

2 | THE 116117 NATIONAL REFORM

The COVID-19 pandemic made policymakers and decision-makers understand how a modern and smart healthcare system cannot be based on hospital care alone, highlighting the need for national healthcare system reform.

The Italian national healthcare system will undergo an important reform of how non-emergency services and care is conceived, providing more "power" to regional/provincial structures outside of hospitals that will be provide diagnosis, therapies and care. These structures will also act as filters to hospital access.

Hospitals will become centres for highly specialised medical treatment, while territorial structures will absorb, as much as they can, the demand for healthcare that doesn't require hospitalisation.

This choice of moving the focus of non-emergency care into new or alternative structures will have significant implications and consequences on the allocation of resources and the organisation of service delivery to citizens. It will take a considerable amount of time to implement these changes, particularly in Italy, where the healthcare system is managed regionally where each region has a different culture and history of managing health response. Despite these challenges, the process has now been set in motion and cannot be reversed. The current national health service does not have sufficient capacity or an appropriate structure to adequately deal with stressful situations like the current pandemic or the ever-increasing demands for care.

2.1 | Primary Healthcare Model – PHM

The main element that will allow the empowerment of the territorial structures will be, naturally, technology: there is no "territory" if there is no possibility to create a network of resources and people to surpass the material limits of the current organisation.

An excellent model for this implementation was described in the publication "Governare l'assistenza primaria"[2] (Managing primary healthcare) and called **Primary Healthcare Model** (PHM).

This model defines how a healthcare system should *promote health, grant the appropriate interventions, and make them sustainable from the economic, social and environmental points of view towards citizens in need from a specific geopolitical area with determined conditions and requirements of care*.

PHM defines four types of citizens and their needs:

- **Healthy or apparently healthy citizens**, the PHM should work to propose healthcare awareness and prevention programs.
- **First-case patients**, which means those who manifest for the first time a condition that is not yet qualified in terms of pathology. *Most of the time, these patients cannot find a proper answer and, as a last resort, revert to contacting emergency services*.
- **Patients suffering from chronic or multiple-chronic conditions but who are self-sufficient.**
- **Non-self-sufficient patients and/or frail patients.**

PHM also defines the procedure to respond to these kinds of patients.

- **Accessibility** to assistance, which includes ease of access to the services for the first time, proximity of services to the citizen, 24 hours availability of personnel and waiting list management.
- **Comprehensiveness** of assistance, considering dependencies of biological, psychological and social factors on a citizen's health and/or symptoms.
- **Coordination** between the various stakeholders of the operations.
- **Continuity** of assistance throughout the day and night.
- **Accountability** of costs related to the service, evaluating, auditing and improving competencies and keeping costs under control.
- **Information** of the citizens, to provide a valuable service.

This kind of service goes beyond the classical "family doctor's office", leveraging on a network of services and people connected through technology, able to follow, step by step, the patient in their journey. As the chain of resources is linked by a decision-making process and selection of the most appropriate response, this point is in common with the more traditional 112 PSAP operation, where the classic dispatch of vehicles/resources is replaced by the selection of the "most appropriate journey for the patient". In a later chapter, we will detail the role of technology and the core position of the 116117 call centre in this scenario.

[2] Damiani, G; Silvestrini, G; Visca, M; Bellentani, M. (2016) *Manuale per Operatori di Sanità Pubblica "Governare l'Assistenza Primaria"*, Cap. 1. https://www.aprirenetwork.it/2016/11/10/che-cosa-e-la-assistenza-primaria/

Technology will have, as stated, the 116117 infrastructure at its core. Still, the high levels of investment (4 billion EUR in 2022-2026) will also include empowerment of telemedicine, home support to patients, real-time biomedical analysis instruments and an improvement of networking of health data through the entities involved.

2.2 | 116117 as unique point of access

As said, the 116117 call centre will become the core of the system reform because it will enable a variety of services, not only related to the classic out-of-hours medical services, but it will also implement several other services. A real "one-stop-shop" for the citizen for any healthcare-related topic.

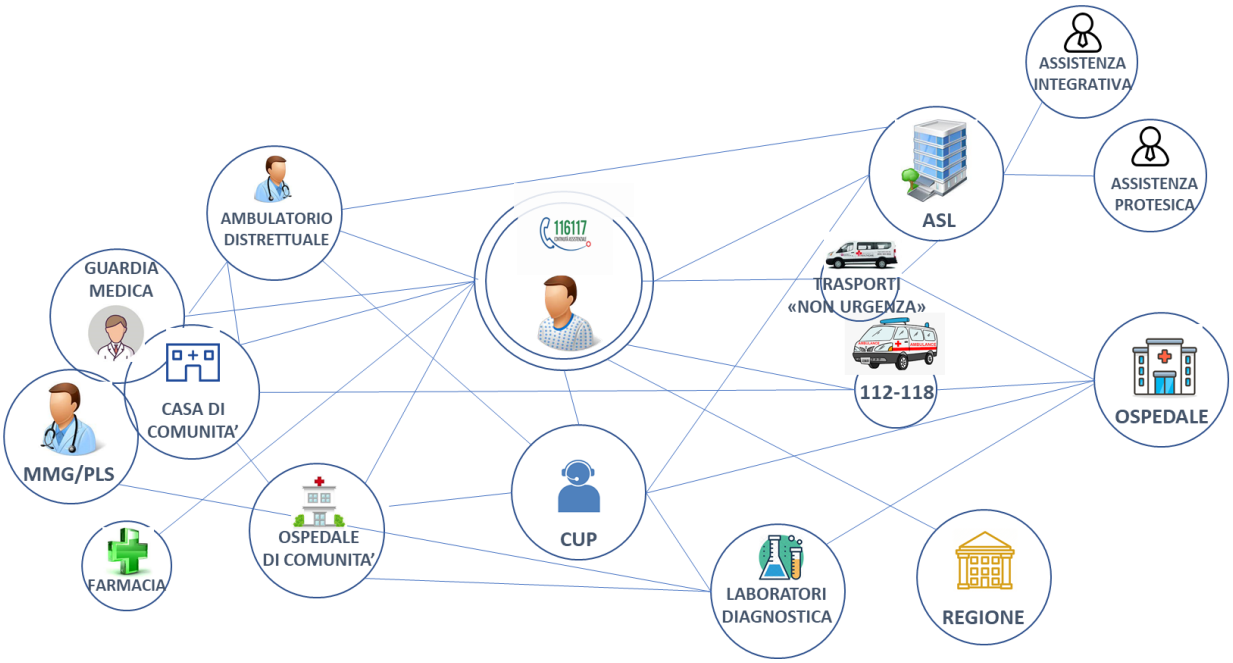


Figure 3: 116117 extended model, where the 116117 call-taker has access to a series of services for the citizens. Here in the list are family doctor reservations, out-of-hours medical services, pharmacy shifts, non-urgent ambulance transportations, contact with 112, hospital treatment reservations, etc.

The complete plan of services to be provided by 116117 is divided into two phases, summarised as follows:

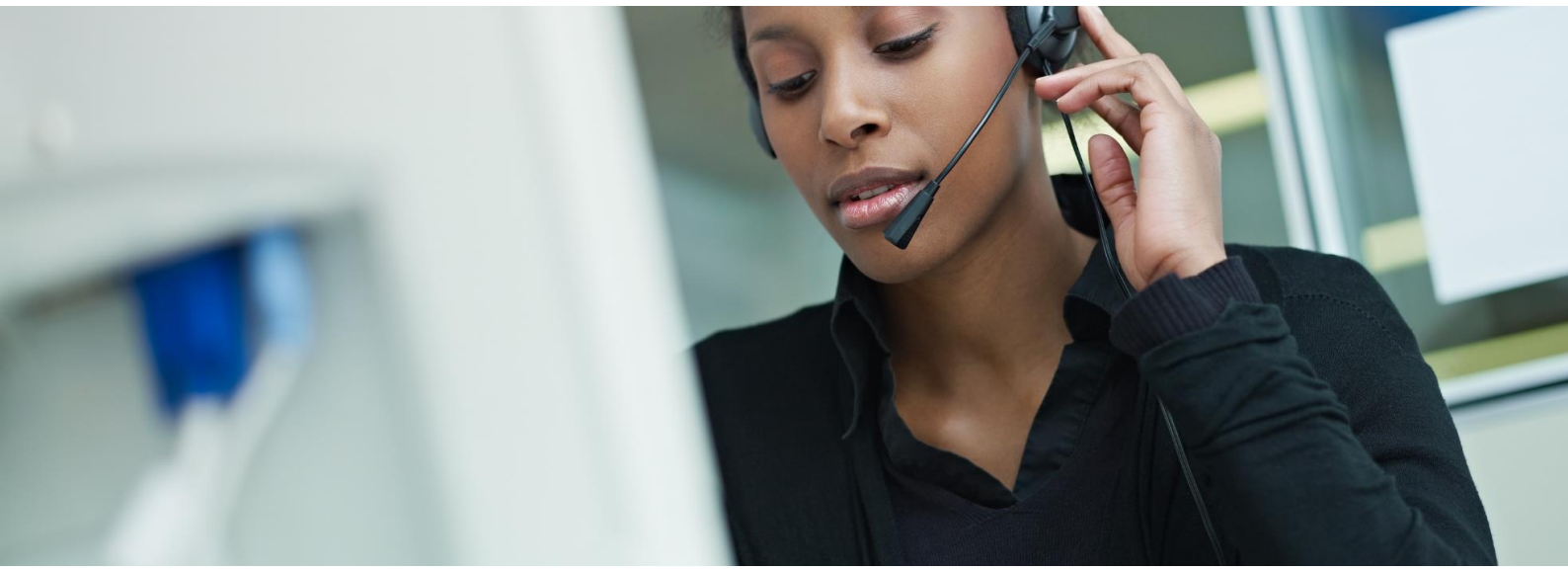
Phase 1

Non-urgent medical help/information, with the potential to route the call to a medical emergency service if necessary.
Contact/call forward to family doctors/pediatricians in case of difficulty reaching one
Medical services for tourists

Phase 2

Health assistance	1.1	Assistance for non-self-sufficient people
	1.2	Assistance for special ailments, prothesis, etc.
	1.3	Assistance for people with disabilities
	1.4	Assistance for drug dependencies, etc.
Public healthcare	2.1	Medical authorisations and verifications
	2.2	Certifications/vaccines
	2.3	Veterinary service
Categories of Service	3.1	Public healthcare subscription, healthcare card number, etc.
	3.2	Selection/change of family doctor/pediatrician
	3.3	Assistance for Italian citizens abroad, assistance for foreign people in Italy
Medical infrastrcutures	4.1	Hospitalisation process
	4.2	Post-hospitalisation documentation
Counsenling centre	5.1	Access to counselling services
Health education	6.1	Promotional and educational campaigns
Public healthcare taxation	7.1	Special exemptions
	7.2	Regional tax payment
	7.3	Special free pharmaceuticals prescriptions
Visits, exams, therapies	8.1	Bookings, access to services
Healthcare facilities	9.1	Addresses, phone numbers, etc.
Mental health	10.1	Addresses, phone numbers, etc.

Complaints	11.1	Complaints
Medical transportation	12.1	Booking of public service ambulance transportations
	12.2	Booking of private service ambulance transportations
Environment	13.1	Environmental abuse report
Fauna	14.1	Wild animal veterinary treatment
	14.2	Domestic animal veterinary treatment
Ethical matters	15.1	Transplants, donations, living will instructions



3 | 116117 SMART DISPATCH PLATFORM

The reform defined by the Ministry of Health in Italy sets the 116117 call centre as the de *facto* centre for all services. However, taking partially the idea from the most known 112 PSAP architecture, even for 116117 there will be a smart dispatch of calls received from citizens to the most appropriate recipient.

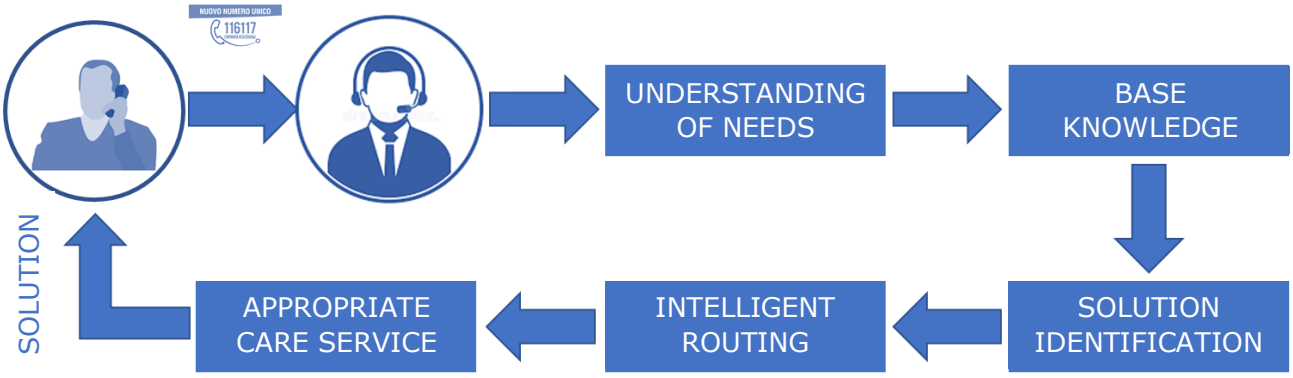


Figure 4: 116117 service chain

The service chain is very similar to call answering models 2 and 3 as described in Figure 6 below. Like these, 116117 is supposed to be served by an assortment of media and communication channels.

Figure 5: Technologies used in 116117 implementations. Phone (fixed and smart), laptop/computer, vocal assistant and chatbots.

Focus on 112 PSAP models 2 and 3

Model 2

Model 2 has only a general emergency number which people call to access all the services and there are two levels of organisation for call-handling. An independent organisation first receives the call, which filters the calls. For instance, in the UK and Ireland, the first (stage 1) operator may ask, 'Which service do you require?'. Based on the answer, the call is forwarded to the correct service. The second operator (stage 2) will find out the details of the emergency and will dispatch resources.

Model 3

Model 3 looks similar to Model 2, but the classification and data gathering is done by the first (stage 1) call-taker. The call-taker then makes a parallel dispatch to the relevant services, which send resources to the scene. This model is in place in Romania.

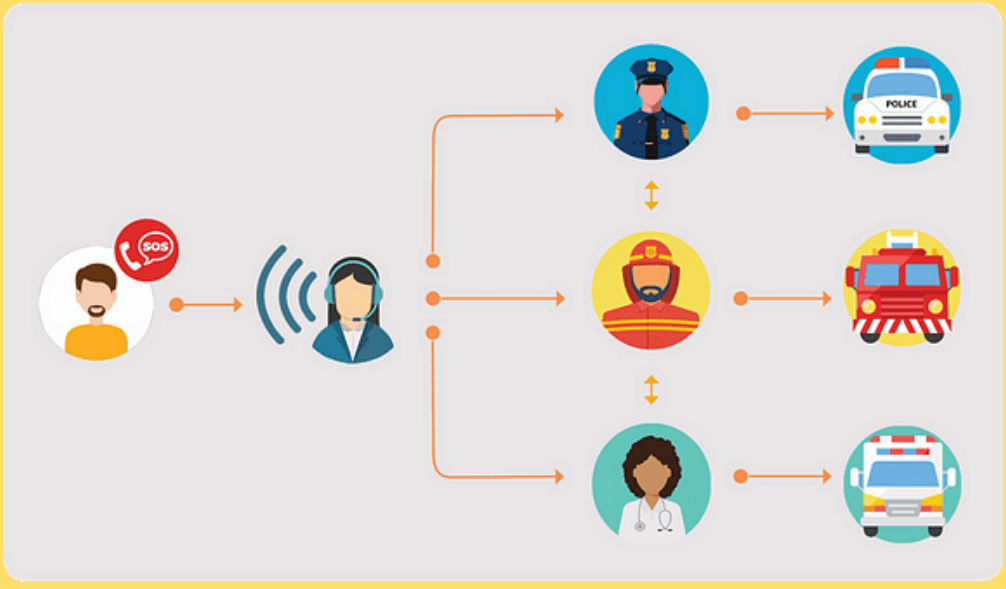


Figure 6: Emergency call handling service chain description – Models 2 and 3[3]

[3] EENA Document (2020) *Emergency Call Handling Service Chain Description V 2.0* – December 2020 *https://eena.org/wp-content/uploads/2020_12_07_ServiceChainV2.0-final.pdf*

Let's now see how technology applies to the previously mentioned phases of the reform.

Phase 1

Non-urgent medical help/information, with the potential routing of the call to a medical emergency, should it be case
Contact/call forward to family doctors/pediatricians in case of difficulty reaching one
Touristic medical services

These services are relatively simple to handle, involving a call-taker capable of providing instructions and/or advice based on Standard Operating Procedures (SOP) previously encoded by doctors and practitioners. The technology involved will then include a traditional Call Centre facility for handling the calls and a Computer Aided Dispatch software to manage the incident and define the process, equipped with the necessary SOPs (which are the most critical part of this phase: SOPs must be clear, comprehensive, and rapidly updated, for the call-taker to perform their tasks).

Phase 2

Health assistance	1.1	Assistance for non-self-sufficient people
	1.2	Assistance for special aliments, prothesis, etc.
	1.3	Assistance for people with disabilities
	1.4	Assistance for drug dependencies, etc.

The platform requires an expansion of capabilities for these services, particularly technology that allows multichannel communication, besides the regular phone call, allowing also non-self-sufficient people or people with disabilities to contact the 116117 service.

Among the services, the technological platform must include proper request forms that must be filed jointly by the call-taker and the citizen for various types of requests (e.g., wheelchair, a particular food, tax exemption/reduction for specific categories of people, etc.)

Categories of Service	3.1	Public healthcare subscription, healthcare card number, etc.
	3.2	Selection/change of family doctor/pediatrician
	3.3	Assistance for Italian citizens abroad, assistance for foreign people in Italy
Medical infrastractures	4.1	Hospitalisation process
	4.2	Post-hospitalisation documentation

For these kinds of services, the 116117 platform requires integration with existing IT services or other platforms to create a unified workflow of requests/responses to the citizen. It must also enable other mechanisms of contact with the citizens, which are not limited by verbal/visual communications, but also data exchange and delivery, for example through an app, website, emails and other media channels.

Medical transportation	12.1	Booking of public service ambulance transportations
	12.2	Booking of private service ambulance transportations

This type of service can be either integrated with a 116117 call centre, extending the functionalities and skills of operators or could be dispatched as one of the "most appropriate second-level services" of the 116117 range of services whenever there is already an infrastructure dedicated to booked transportation. Managing public and private instances may require a double integration with external systems.

As the platform grows also the technology associated with it will expand which will require greater integration of stakeholders on various levels (PSAP, ambulance services, hospitals, equipment providers, etc.) to make sure the full chain is working. Also, the 116117 operators' skills will increase (see the example of booked transportation) with the increased availability of second-level services to citizens through 116117. Technological integration with those platforms will become a critical element of the activity.

All this technology at the service of flexibility and simplification of the workflow: the system, in fact is supposed to collect data on the call taking side and prepare the "incident" or "citizen's request" to a level of completeness that will remove most of the burden of providing data to the specialised operators of various services (hospital, booked transportation, veterinary, family doctor, etc.).

Once again, the type of service hierarchy defined by the reform is inspired by the 112 PSAP model on two stages of operations.

4 | AREU'S EXPERIENCE WITH 116117 CALL CENTRE

Azienda Regionale Emergenza Urgenza (AREU) was founded on April 2nd, 2008, with the Deliberation no. 6994, issued by Regione Lombardia. In this Deliberation, AREU is instituted as the Regional Healthcare Agency, tasked with the governance and operational management of all the extra-hospital emergency medical activities in the region, to develop the integration of the intra and extra hospital healthcare emergency, to coordinate the organs and tissues transportation service and to coordinate the regional blood transfusion and haematic-components activities. AREU's main objective is to unify and coordinate all the emergency activities carried out by the 12 Medical PSAPs, distributed on the regional territory. This includes people, processes, organisation, technology, and knowledge coordination for all the resources used in the out-of-hospital medical emergency system. AREU has also been selected as the organisation responsible for building the first Italian stage 1 112 PSAP, devoted to managing the European emergency number based in Varese.

Today, AREU manages four consolidated ambulance PSAPs, plus three 112 stage 1 PSAPs in a region of 10 million people. Since 2019, AREU is also responsible for the regional 116117 call centre, which implements phase 1 of the national reform, connects to the services described in Chapter 1 as second-level dispatched services, plus the second-level "public service booked ambulance transportations". AREU is currently planning the migration to the rest of phase 2 services, on a step-by-step basis.

AREU's history briefly	
2008	AREU was founded, collecting the responsibility of managing 12 ambulances dispatching PSAPs
2011	AREU was given the responsibility of the first 112 PSAP in Italy
2014	AREU consolidates the 12 ambulance PSAPs into 4, with a centralised data centre, creating the first "serverless" PSAPs in Italy
2016	By this time AREU manages three 112 PSAPs and four ambulance dispatching PSAPs
2019	AREU is given the responsibility to build the 116117 call centre in Lombardy
2020	COVID outbreak: AREU is the first emergency organisation in Europe facing the COVID outbreak, that starts in a town located in Lombardy

The 116117 AREU's call centre has the following numbers currently:

- 10 million citizens served
- 38 call-taker workplaces (plus another 14 for crisis situations). Trained call-takers using a question-based triage filter during citizen interviews.
- Average 2,500-3,000 calls per day (112 in the same region handles approximately 12,000 calls per day)

AREU, with its extensive experience in PSAP management, was given the task to set up the biggest 116117 call centre in Italy and took care of the technological and procedural set up of the infrastructure.

AREU not only defined the PSAP logistics, technology, and organisation, but it also defined the call filtering procedures for the call-takers, who are employed directly by AREU. They provide the same kind of technology and network accessibility to Out of Hours (OOH) doctors who provide medical assistance services during weekends and night shifts. These doctors represent a "second-level service" receiving data and the citizen's call after gathering patient information on stage 1 call taking. They come from various local and regional healthcare structures. They are not hired directly by AREU, but are trained and work in accordance with AREU's defined workflows.

4.1 | Current 116117 procedure workflow in Lombardy

As described in the previous chapters, AREU adopted the reform model of 116117 and has organised the workflow as follows:

Call-takers receive 116117 calls and must collect data, opening an "incident" on their CAD platform, collecting all personal information from the citizen and about the citizen who is the object of the request (if different from the caller), including a general description of the symptoms (if any). They do so by following a call filter question & answer tree, defined by AREU, that requires simple answers from the citizen and no medical skill from the call-taker. These questions may include a request of a medical nature from the citizens to qualify, at a high level, the situation and pass them to the OOH doctor for a rapid analysis and potential diagnosis. Unlike the approach adopted with emergency services, these doctors, as may not be available at the time of the call. Call-takers can forward the incident on the CAD platform to the doctor who will take the incident in charge as soon as it is available. For this reason, if no immediate contact citizen-doctor is possible, high-level medical information can become useful to determine the situation. All calls are recorded as the law requires.

Any action taken by OOH doctors follows their medical procedures and is managed outside the 116117 call centre workflow. One can divide the responsibilities of AREU and the local medical organisation as follows:

- AREU is responsible for the work done by call-takers and their technological preparedness.
- Local Medical Organisations are responsible for taking in charge the citizens' requests, making sure the OOH doctors respond in the most professional way.
- Local Medical Organisations are responsible for any on-site activity (i.e., home visit) of the doctor, should the citizen's situation require it.

4.2 | Benefits of the solution

Four main pillars have been identified as benefits for the citizens and 116117 workers when adopting this model:

- **Citizen's advocacy**, as the citizen is followed in every step of his request, with secured response time and problem-solving skills.
- **Citizen's training**, as the 116117 call centre, acts as an information point for the citizen, providing any medical-related information and guidance to the citizen in what could be the next steps to be taken into consideration as the "incident" evolves.
- **Call-takers unified training**, which, regardless of the geographic location of the citizen, or the OOH doctor, allows them to act on a vast territory, resting assured that their actions are harmonised in a single SOP.
- **International support**, through a real-time translation service connected to the 116117 call-centre.

4.3 | 116117 COVID approach

During the COVID outbreak, 116117 was crucial for reducing the pressure on 112 for non-emergency calls.

Call-takers were swiftly provided with a new COVID-oriented filter to provide the necessary help to citizens requests for clarifications. The filter was also used to identify potential covid cases and redirect them to medical emergency services.

Alongside regular 116117, another toll-free number, dedicated to COVID-related information was created.

The new COVID procedure allowed call-takers to define new kinds of second-level services to address the potential situation, directing the call to specialised emergency medical COVID PSAPs. The global situation of services managed by AREU is illustrated in Figure 7 below (schema including 112 emergency calls and toll-free information number services).

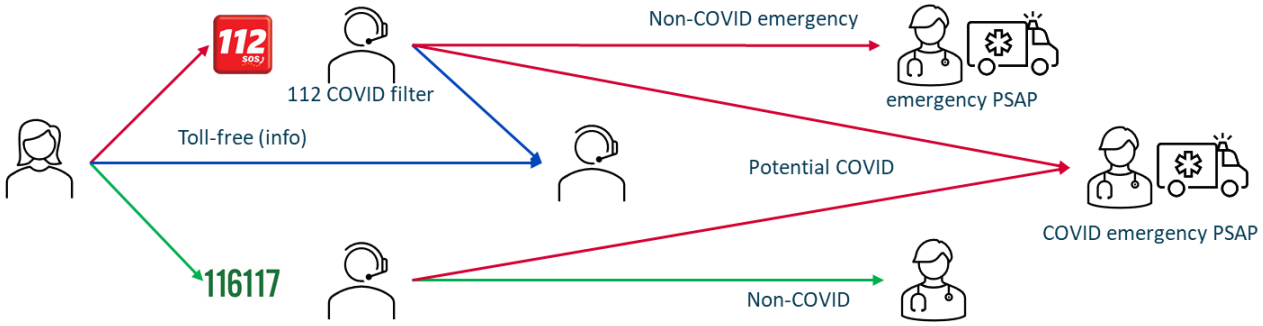


Figure 7: Global situation of services managed by AREU

Citizens have three choices: calling 112, calling 116117 and calling the toll-free information number.

The latter is the only one with no further consequences, as it is supposed to work on information-related cases only.

112 emergency PSAP worked, as usual, managing emergencies and using their own dedicated COVID triage filter to identify COVID-related emergencies.

116117 call centres were updated with a similar triage procedure that was defined to identify the same results as 112, determining the dispatch of the call to the same destination as 112: the COVID-dedicated ambulance service dispatch PSAP.

> “116117 has brought a “revolution” in the way non-emergency calls are managed: not only are calls managed in a uniform way throughout the territory, without distinctions, but the call management workflow is now more rapid and more transparent for the citizen. The outcome is a precise response to the citizen that does not feel lost anymore, and who is addressed always to the most appropriate service.”
>
> *Alberto Zoli, General Director of AREU*

4.4 | Lombardy's 116117 reports and numbers (2021)

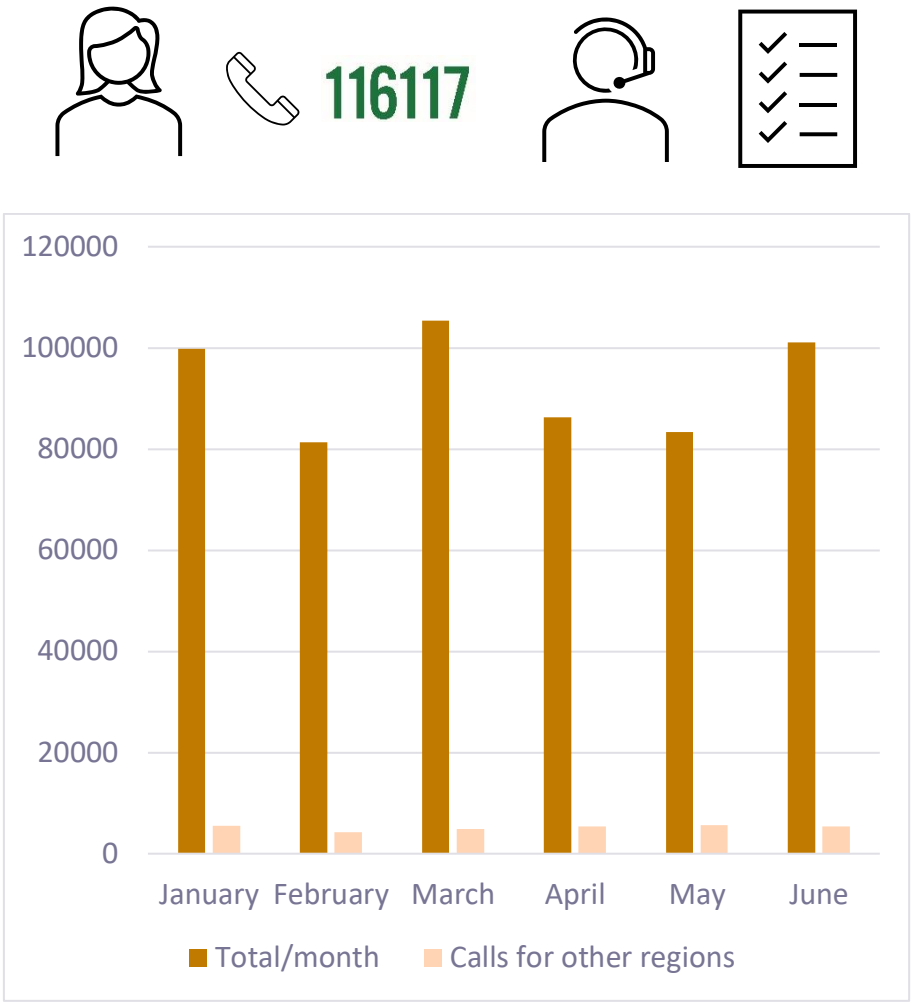


Figure 8: No. of calls per month (H1, 2021)

AREU received an average of 100,000 calls per month in the first six months of 2021, including a small percentage of calls from neighbouring regions. These calls are answered under the inter-regional agreements, especially where a local 116117 service is not established yet.

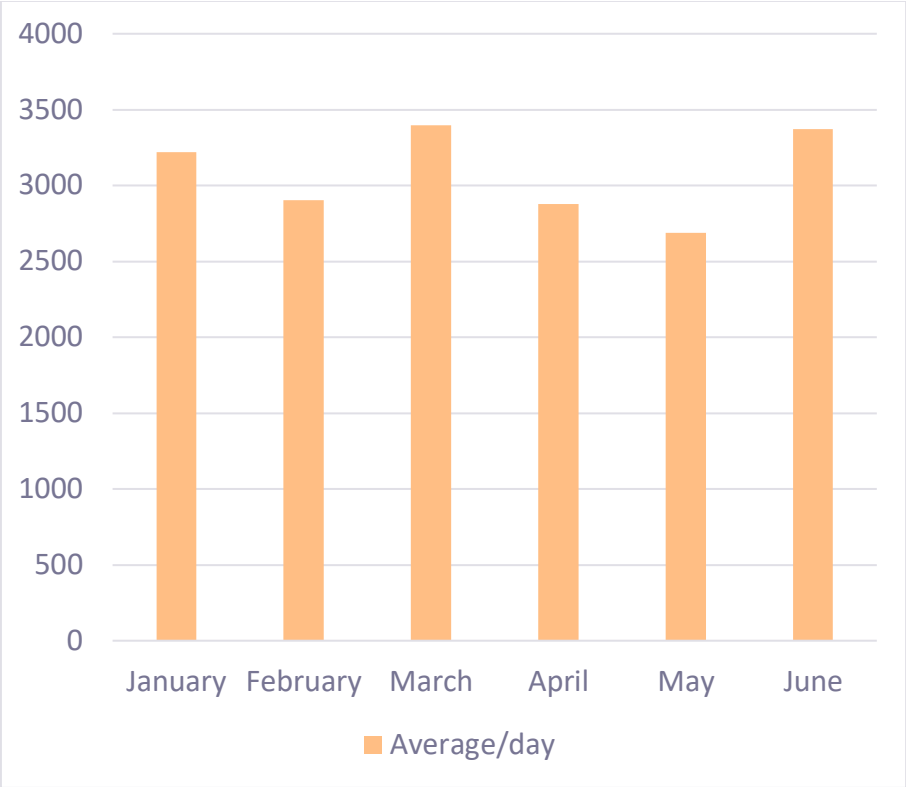


Figure 9: Average daily call distribution (H1, 2021)

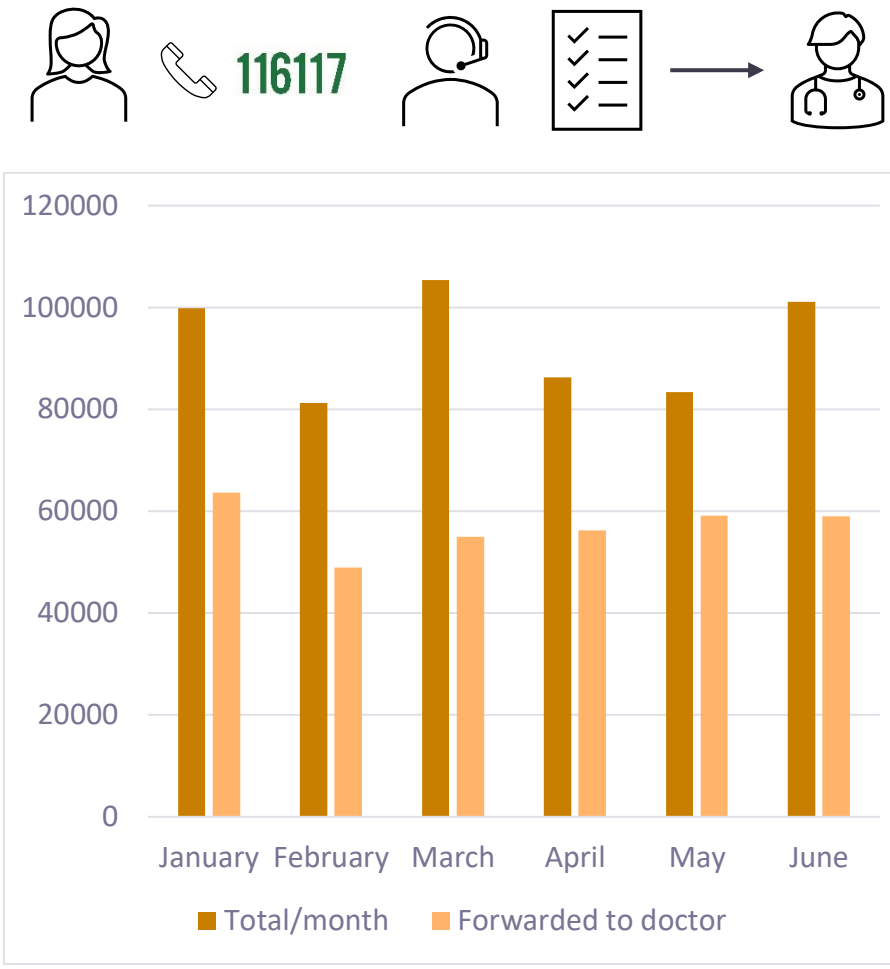


Figure 10: Total calls/calls requiring assistance of OOH doctor.

Of the calls received by the 116117 call-takers, about 60% require the assistance of an OOH doctor, while the rest are managed directly and only by the call-taker. These calls concern questions from the citizens, with or without medical background (pharmacies time shifts, contact details of a particular hospital or clinical structure, etc.)

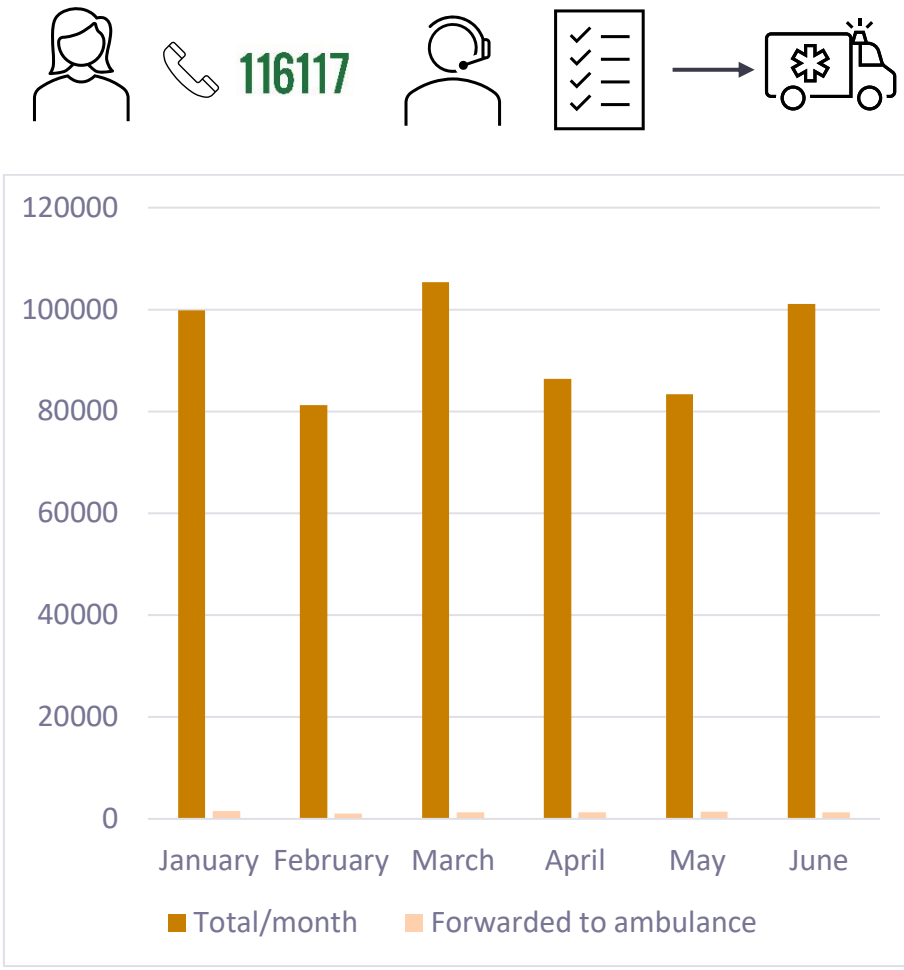


Figure 11: Total calls/calls forwarded to ambulance service

A very small number of calls are forwarded to ambulance services, as the call-filtering procedures available to the call-takers define a potential emergency situation instead of an average case of medical consultation or visit. This implies already a good "education" of citizens, concerning the unified numbers to use in case of emergency or non-emergency.

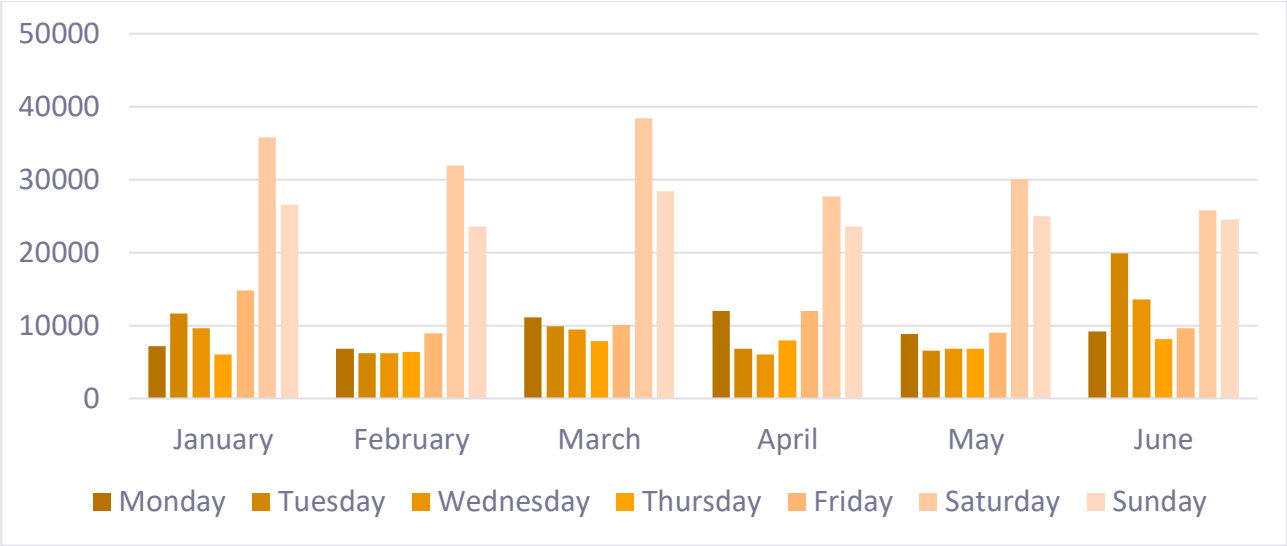


Figure 12: Concentration of calls - Days of week

As the service follows phase 1 of the reform, with 116117 call-taking centres and OOH doctors providing second-stage services, most of the calls are concentrated on weekends, as the services are available on the night shift only, during weekdays.

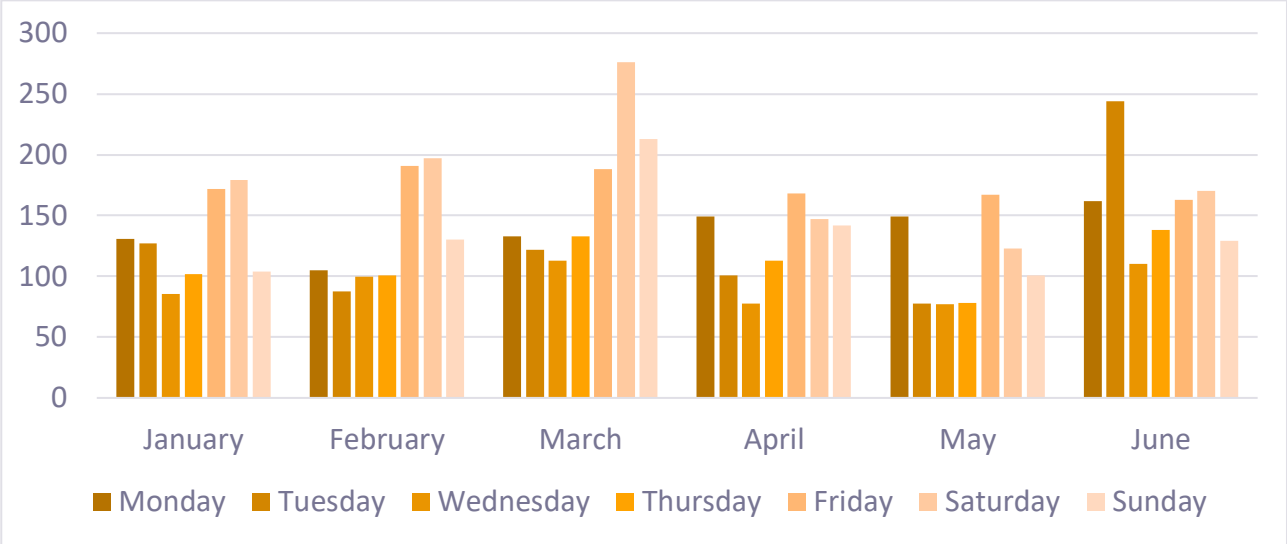


Figure 13: Average Response Time (in seconds)

The response time KPI is a very important element of distinction between emergency and non-emergency services. For example, 116117 has a relatively slow response time (which may easily reach 50-60 seconds of waiting time) when compared to an emergency. But since the nature of the two services is entirely different, any comparison may be unjustified.

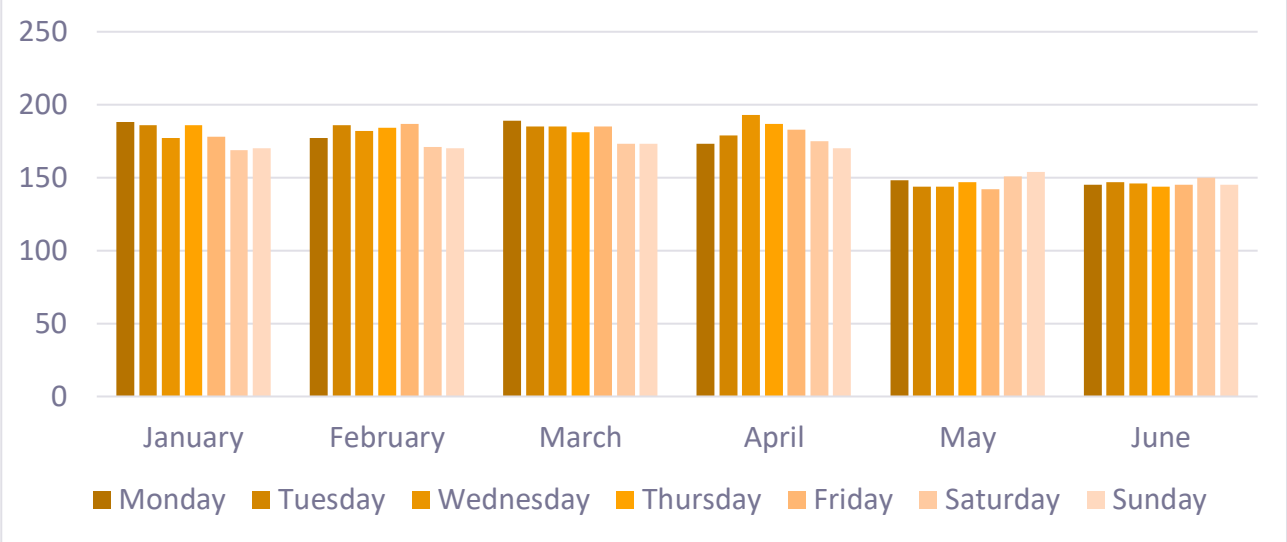


Figure 14: Call processing time (in seconds)

Call processing time (time used to define an incident and complete a call-taker's activity) can also be considered slower than an emergency call to 112 (whose processing time should be between 40 and 80 seconds). This may be explained by the fact that a more thorough collection of data by the call-taker for 116117 increases the workload and processing time. As in the previous example, comparisons with an emergency service may be unjustified.

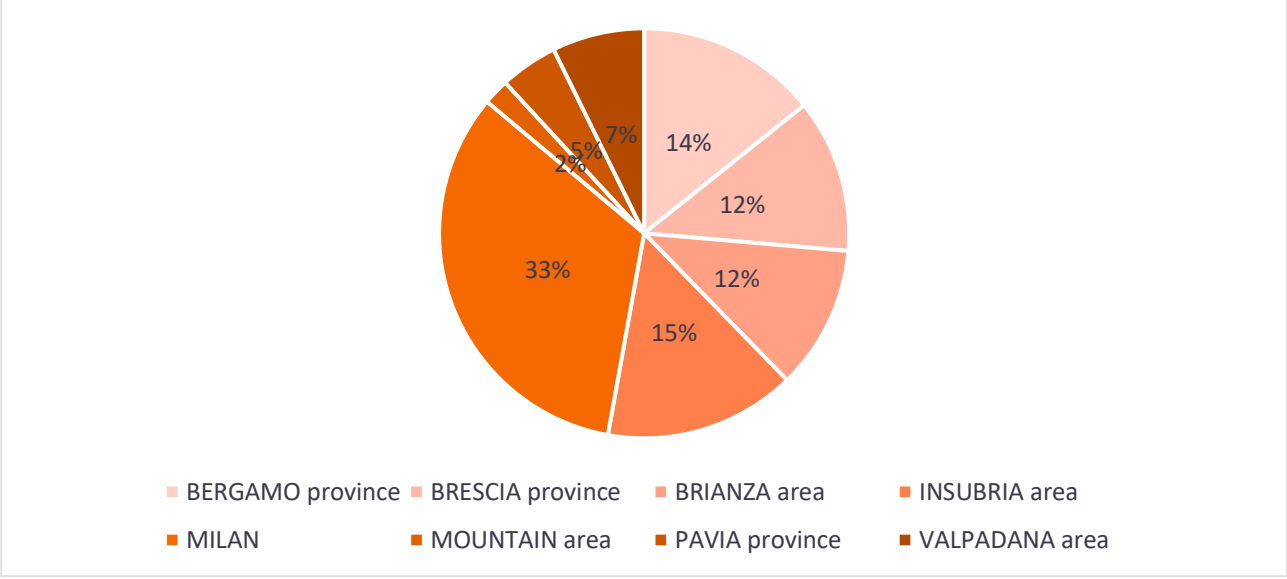


Figure 15: Origination of calls based on geography

As expected, most of the calls originate from the metropolitan city of Milan which contains more than 3 million citizens (i.e. 1/3 of Lombardy's population).

5 | REFERENCES

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***Commission Decision of 30 November 2009 amending Decision 2007/116/EC** as regards the introduction of additional reserved numbers beginning with '116' (notified under document C(2009) 9425)*

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