Telemedicine guideline models for GPs -

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Introduction

Governments, industries, care givers seem all to understand that aging population and healthcare expenses growth will soon call time out , reaching a non reversible threshold , requiring politicians and governments to take decisions and be prepared to face the new challenging scenarios.
Today's technology offers more appropriate solutions to provide telemedicine application, nevertheless this is not exhaustive: models fitting the real requirements of healthcare providers and patients must be selected and deployed in synergy with technology.

As someone would say "it is not the case to reinvent the wheel " but to take advantage of the experience gained up to know and fit technology into the healthcare environment implementing new organization diagrams, bearing in mind that most of the stakeholders expectation are addressing both cost reduction and healthcare improvement.
As a matter of fact today's technology such as video, voice and data providing interactive videocommunication, vital parameter measurements and data management, improve elderly, disables and patients quality of life and will soon be part of the Care Givers ordinary tools.

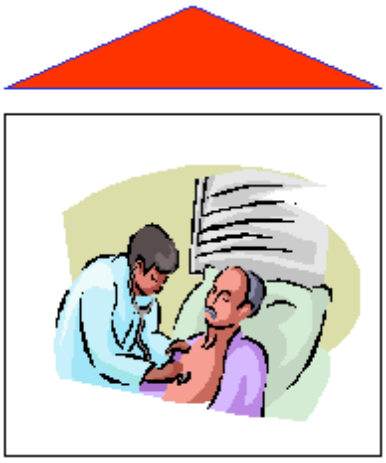
Therefore to take advantage of today's evolution models merging technology with organizations structures, are essential to reach the cost benefits expatiation, proving better healthcare services, resource optimization and quality of life improvements.

The reference models

The telemedicine service provision concept is intended as "monitoring and supporting a patient from remote no mater where the doctor or the patients himself resides", allows to draw the way healthcare assistance is provided, giving a central role to the patients and to homecare.

1.The players

In the basic model of home care the patients is assisted by the family doctor or GP directly at home during a visit, in alternative to the patients going to the doctors premises. Thus the basic link is between the GP and the patient. When designed a new model we need to keep this element in due consideration as it is the real nucleus of modern healthcare provision. GPs, thanks to the long and patient work, are widely deployed and deeply introduced into the territory building a very intergraded and spread network of human resources. The relation between patient and it's care giver is not only a matter of professional issues, factors such as trust, human support, friendship sometimes govern the psychology and behaviours in such particular report.



GP visits patients at home

GP visit patients at home form remote

In the new environment GPs keep playing a very important role over the territory, providing healthcare assistance, as they do today, with the advantage of being supported by more efficient and cost effective tools.
Structure such as hospital, clinics or other health care service providers are together with the GPs the building blocks, around which the telemedicine network must be developed. The basic level of health care should involve small local hospital or GP's studio. A higher level should be reserved to specialized doctors for consultancies or second opinion.

Social assistance provide patients with moral and safety support , thus do not necessarily need to involve medical profiles, but requires more psychological skilled personnel to provide and adequate professional interface.
Other important potential player are the pharmacies . In a territory integrated model pharmacies could be involved in two roles:

- become a point of reference for healthcare in remote areas not served with suitable communications and care support

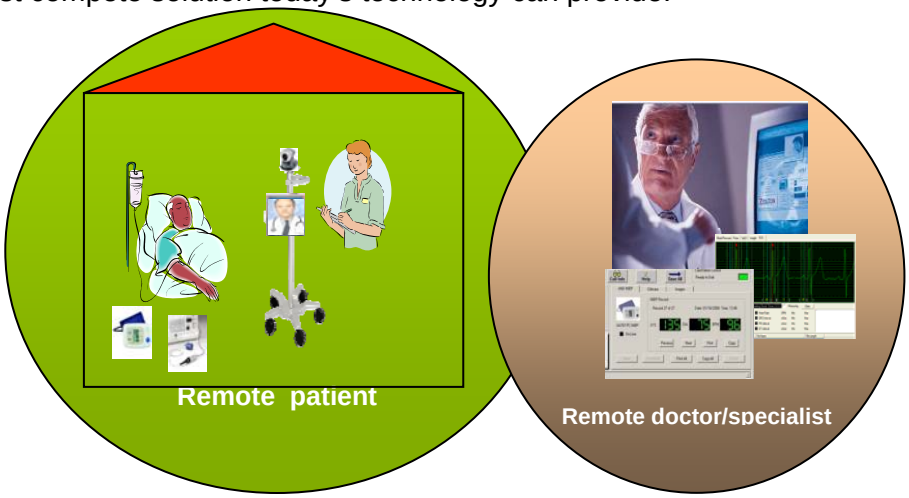
- provide a pharmacological service to patients at home

Families play today a fundamental role providing the appropriate assistance to relatives patients. Any economic healthcare organization model must take into account this important contribution. In many pathologies they support doctors and care givers to provide an appropriate therapy to their relatives. One has to bear in mind that often a member of a family is the nearest assistant to the patient, providing him with an appropriate medical training, his profile could become a powerful support to remote care givers. Many studies have shown he benefits of family tutors in patients cares.
The complete telemedicine model must includes provision of information concerning disease to provide patient a higher degree of knowledge of his pain and therapy. Thus a more informed patient has better cooperation behaviour with doctors and care givers, being more

conscientious of his disease status. The patients is the central unit, all around run our efforts to provide better and more appropriate cares.

Technology

Telemonitoring with interactive video solutions allow to visit a patient from remote, that is to say patient in its own home and the doctor in his studio or hospital. The "you see me I see you approach " is definitely the most effectiveness and performing tool, keeping a close relation between doctor and patient. Studies and pilot experiences have shown with no doubt that this is the most compete solution today's technology can provide.



Devices

Telemedical devices have as well a very important role, performing remote measurements, being a powerful tool for care givers to draw a picture of patient's real health status.
Blood pressure portable storage device, EGC recorders, hearth beet recorders, glucose readers peak flow detectors etc., are frequently employed to keep under control and detect chronicle diseases .
The vital parameters data may be detected and recorded in a specific time window or when the diseases occur , as for example some ECG devices are programmed to detect only occasional hearth beat alterations. The detected and stored data may be downloaded at a latter time, for elaboration and consultation, directly at the doctors studio, or transmitted by phone or via internet to a control centre for reporting. In both cases an appropriate software will elaborate the received data helping the doctor or specialist to interpret the patient's health care status , provide him with appropriate analysis and diagnosis .
Today's technology allows to acquire measurements and analysis of a very large set of parameters, starting from basic ones such as : temperature, blood pressure, hearth beat, glucose, ECG, weight, peak flow etc
Most devices are wearable and have small dimensions, to allow a patient to self measure and detect its daily parameters.



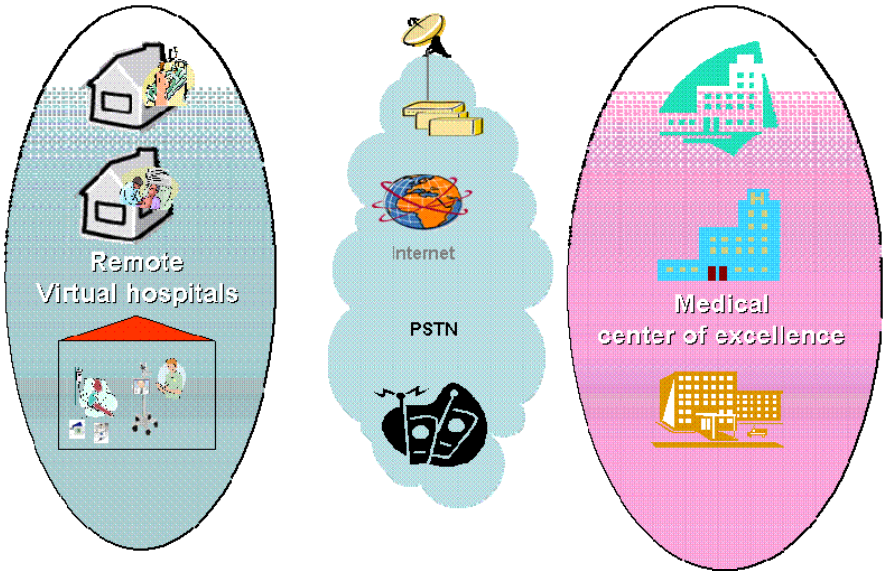


E-Scope Chest Piece
Transducer

Telecommunications

To provide remote monitoring of patients health a telemedicine network must be implemented that connects the remote telemedicine devices to a medical centre, a hospital or a care giver. The control centre can be either a call centre or a desktop pc of a doctor's ambulatory.

Telecommunication techniques play a prime role in any telemedicine network model, therefore these aspects need to be taking into due account to reach a patient in any remote geographical area .
Today's market offers off the shelf access agnostic telemedicine solutions that allow to reach a patient anywhere.

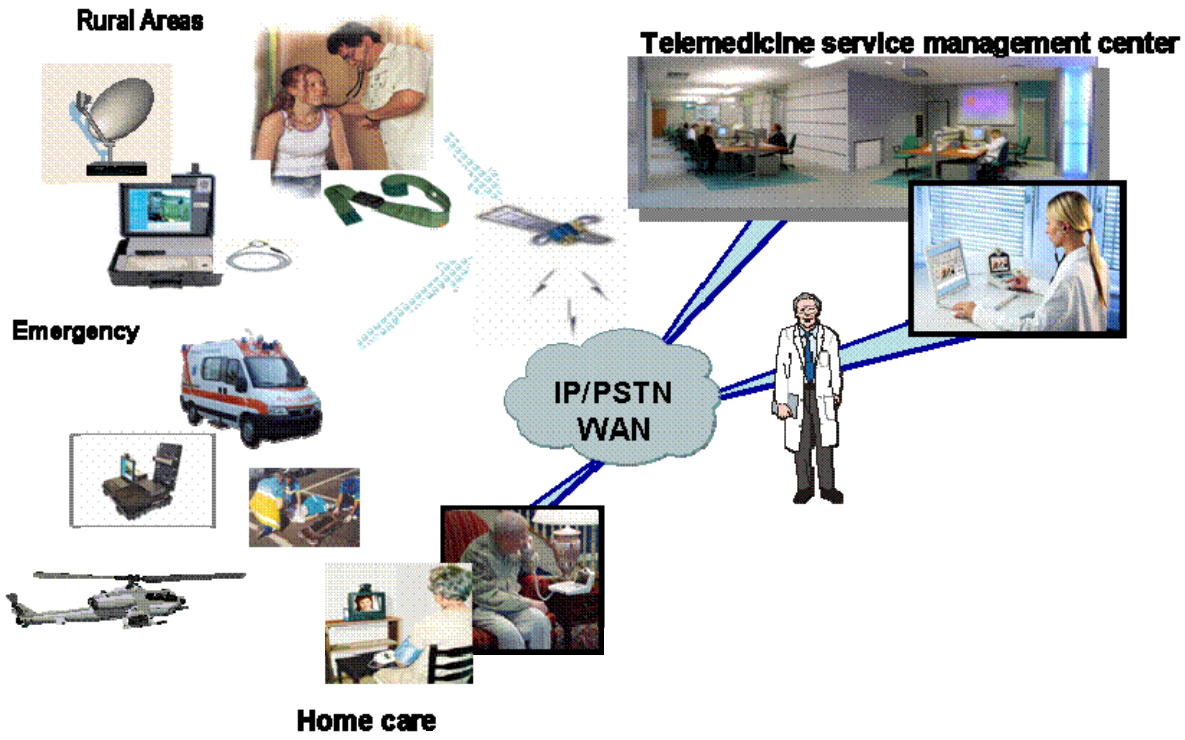


Services

The telemedicine model is strictly related to the provided service . As for instance services addressing both healthcare and moral support have been tested and deployed in many pilot networks and have shown succeeding benefits for the most common applications:

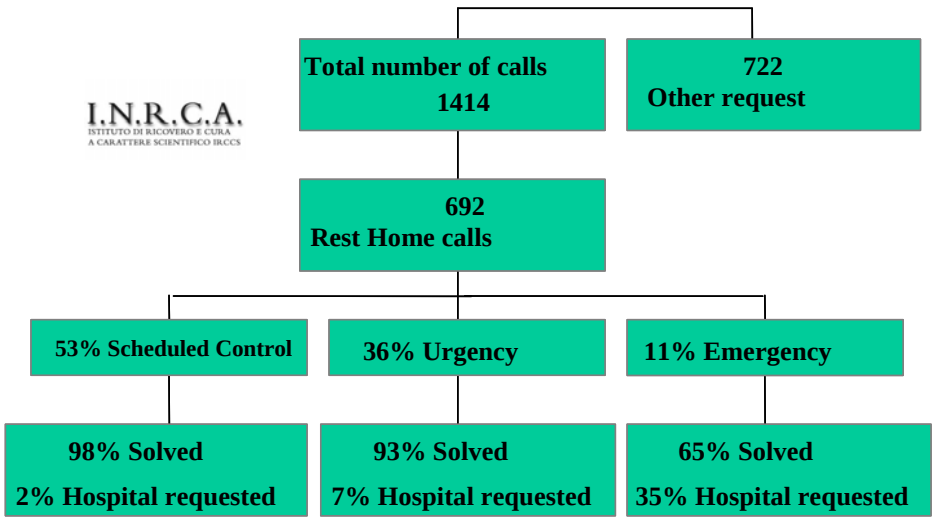
- **Tele Assistance**: moral and physiological support to weak and elderly people
- **Tele Control** : safety monitoring of lonely living people
- **Tele Information** : health education, health care information, e-health
- **Tele Rescue:** remote alarm activations when hazardous and dangerous events occur to patients
- **Tele monitoring:** remote vital parameter monitoring such as for home care or hospital early discharge

Services address moral support and personnel safety aspects are not to be considered apart from medical monitoring. Sometimes these features can hide the origin of many other effects and serious disease, especially when dealing with elderly, weak and lonely people . Each of the above services may require a different deployment network and each may involve different care givers profile. The following is a schematic telemedicine network configuration that merges together the most important telemedicine aspects.

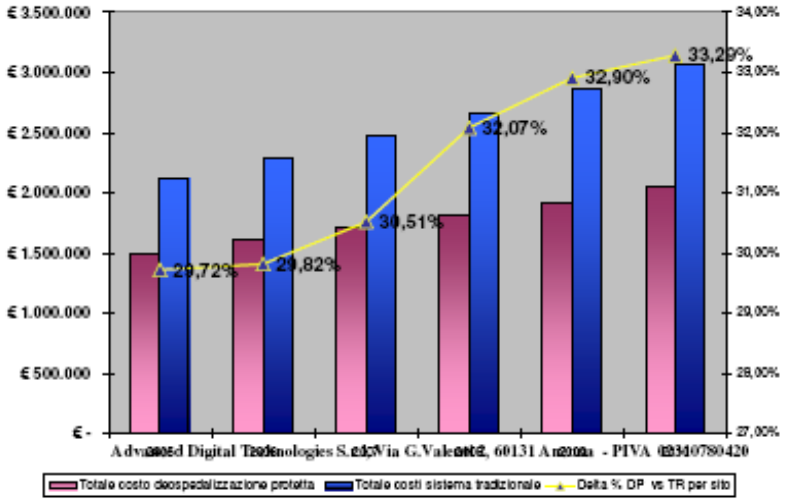


Case history

A telemedicine experience conduced in 2001 in the Marche region by INRCA (Italian National institute for elderly cardiology disease) linking together a number of elderly homes and health care structures, with video monitoring and telephone consultancy has achieved great results significantly reducing the request and need for hospitalization and emergency charge.
The following graphic gives an idea of the results:



The model used during the trial was based on a central video call centre located in the cardiology department of the INRCA healthcare structure , a number of video communication and telephony terminals were deployed over the territory in private homes or public healthcare structures. The call centre was managed by nurses and doctors. During a scheduled visit the nurse would first call the patient and drive him correctly wear the telemedicine devices and take the vital parameters measurements. After receiving the data the cardiologist would take over the patient and continue the visit. The model demonstrated to be appropriate for the hospital cardiology department and did not require huge resource investments or drastic changes in the organization
A simulation of a similar model, based on the Marche region population growth and health care statistics, has show enormous cost benefits achievements for a small hospital structure using home care telemedicine solution for early hospital discharge . The graphic below summarises the results .(9)



Organization Models

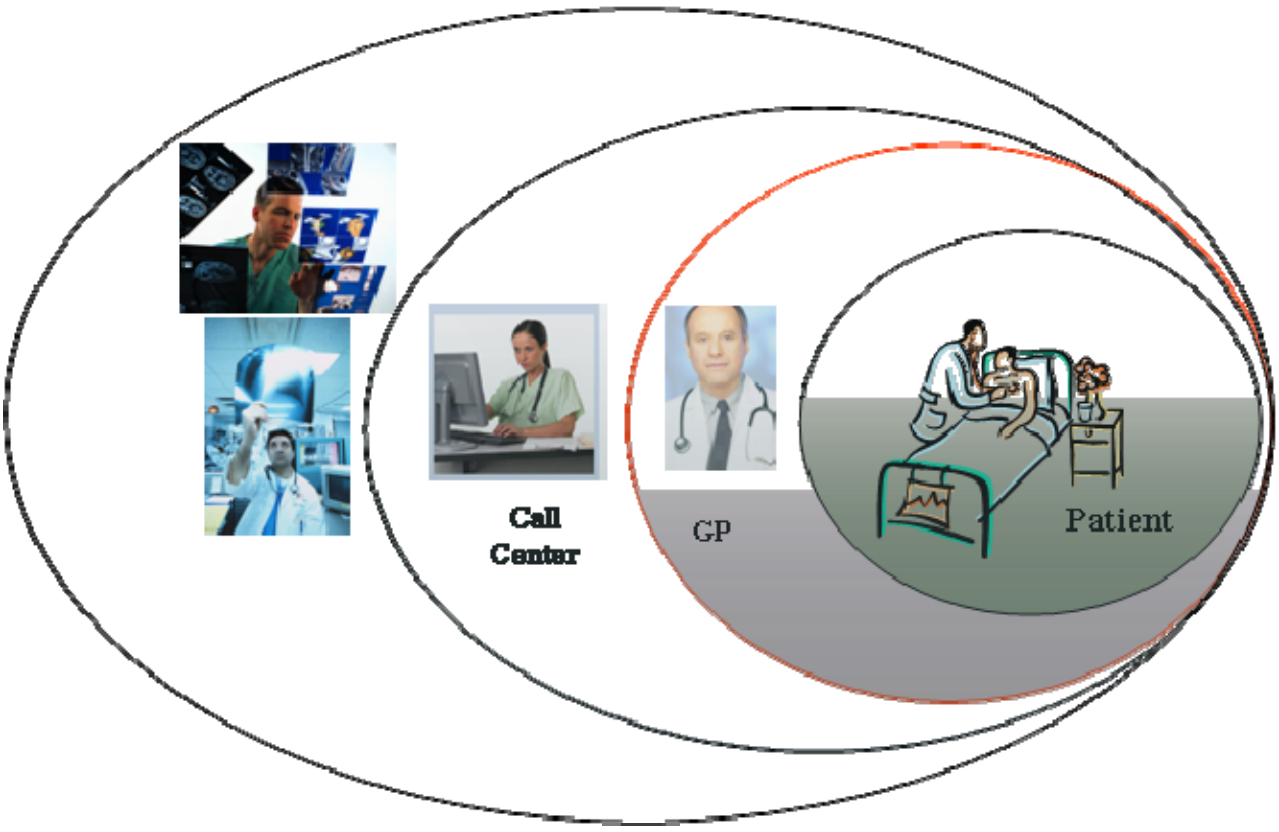
In a simplified diagram the GP plays the central role as the patient's reference. The Video Call Centre acts at a higher level connecting the GP and the patient to specialist doctors or hospital structures thus providing second opinion to patients with the support and direct intervention of the GP. The advantage of such model for the patient is:

- continuous healthcare assistance from it' home
- access to immediate specialist consulting assisted by its own doctor
- no need to book specialist visit or to stay in long waiting queues
- remote visits and vital parameter measurements in it's own house

The doctor benefits are :

- to provide a more appropriate service,
- better schedule management, time optimization
- higher control of the patients health status,

all resulting in a much better care giver service.
In our models the patients interface is either the call centre or the GP, depending on the local territory organization .In a rural area with a small amount of patients the GP could manage the call centre itself, in a wider environment care giver operators or service providers would be appointed.

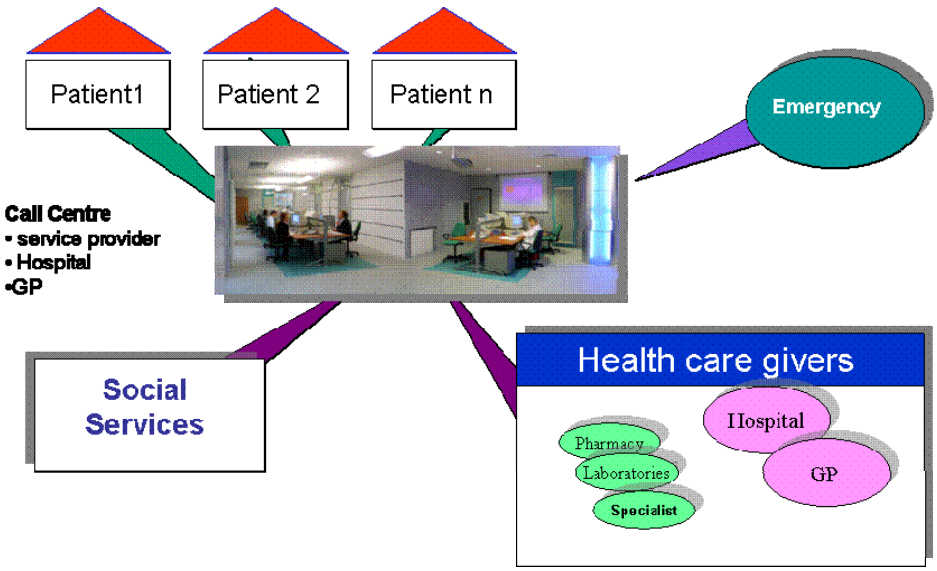


Furthermore in the organization model the patients are equipped with interactive telemedicine terminals including video facilities such as videophones .

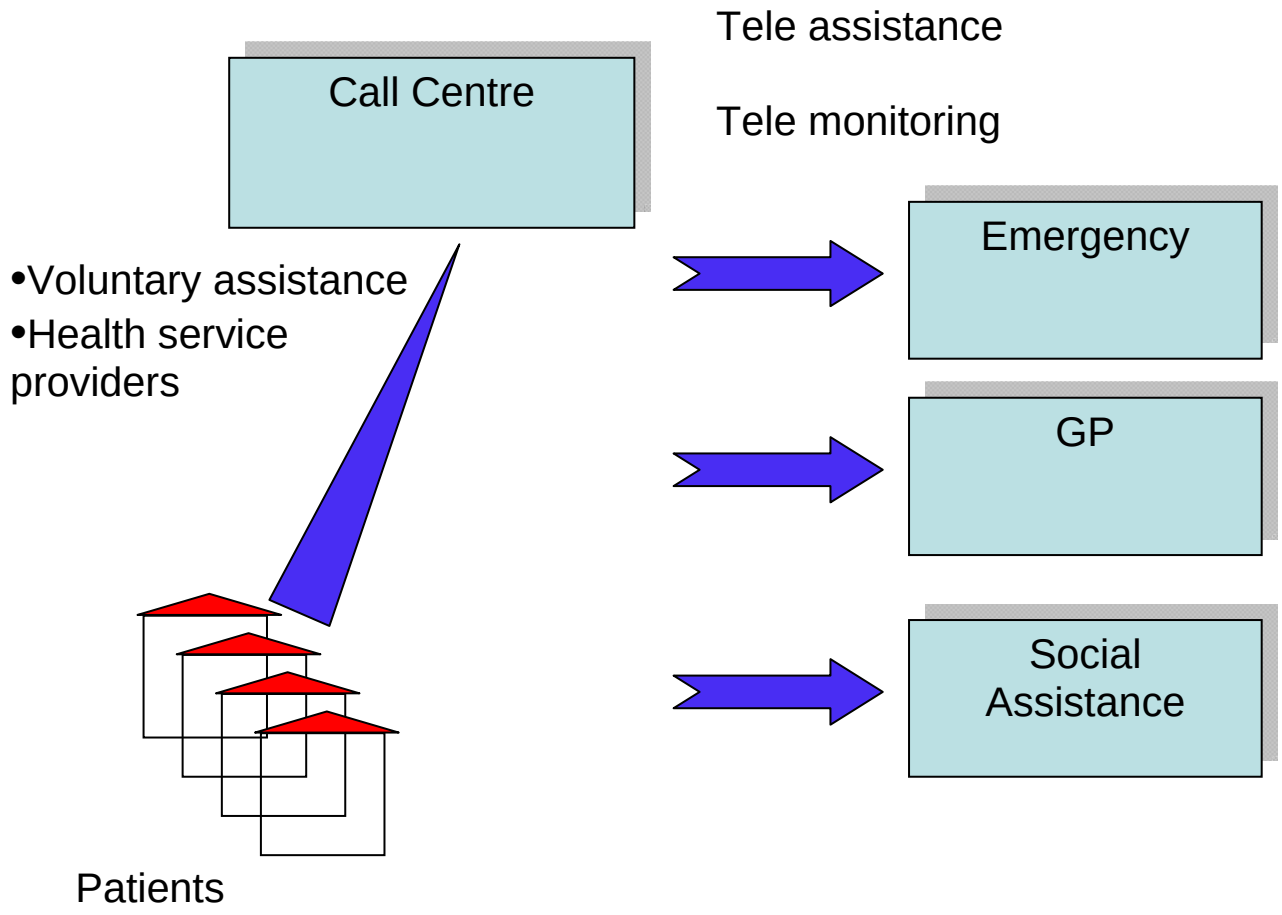
The GP has access to the call centre resource, to provide remote assistance, check patient's database and provide cares directly from his laboratory.
Other important expect to be taking in due account is patient's data management. Solutions must grand privacy and data security but in the main time must grand access to doctors and to care givers from any where, allowing to provide always appropriate and secure health assistance.

The configuration

An efficient telemedicine network has to integrate into one configuration all healthcare players such as : GPs, Social Assistance, Pharmacies, Hospitals, Specialist, Emercency as shown in the following model.
The hearth of the network is usually a control centre, which can be either a simple computer with an appropriate software (GP's manage directly) or a more complex system with operators managing incoming call.



The GPs can interact directly “vis a vis” with the patient in his own house or from remote. In the absence of the doctor the Call Centre will take care of the patients, support cares, and put him in contact with other health structure as it is the case.
When required the GP can assist the patient in a virtual specialist visit, form it’s own studio or form the patients home. All this is possible thanks to the video call centre configuration allowing the patient, the GP and the specialist to conference together.
The Call Centre acts as a communication hub and in our model as the interface between the doctors and the patients .



Conclusions

This article is mainly a brain storming of how an efficient organization model could fit the present healthcare organization keeping the GPs activities in a central key role. The models show that whatever the territory is like, a central control centre must be the essential part of the network. Thus optimizing economic ad human resources and providing a better service. Our attention has stressed the homecare concept, taking advantage of the conclusions and suggestions of well known experiences and pilot projects implemented over the world, with cutting edge technology such as videocommunication, data transmission, telemedicine devices and low cost IP networks.

All the above wants to summarise some of most relevant features that draw the guidelines for an efficient telemedicine network.

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