

### CARDIO ON LINE EUROPE



# TELECARDIOLOGY FOR PUBLIC HEALTH CARE OF CARDIOVASCULAR DISEASES PUGLIA'S EXPERIENCE





### **HISTORY**



Il magico violino di Uto Ughi alla Camerata Musicale Barese (9 novembre, Basilica di San Nicola)



ASSESSORI DI DONNA: LA FORMAZIONE PROFESSIONALE ALLA REGIONE PUGLIA 

LAVORO PIU' DIFFICILE PER LE DONNE O CASA LATERZA: EDITORI ED AUTORI PER LIBRI EUROPEI O PRONTO! PARLA IL CUORE O 1934: BENITO MUSSOLINI ALLA QUINTA FIERA DEL LEVANTE O SUCCESSO AL FESTIVAL MUSICALE DI MARTINA FRANCA O MOSTRA DI ICONE RUSSE ORIGINALI DELL'800 ALLA GALLERIA ARTE SPAZIO DI BARI



Ginen Antonioni

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da pag. 25 a pag. 35)

"Prime" chitarra

NULMESE 10/06: 3

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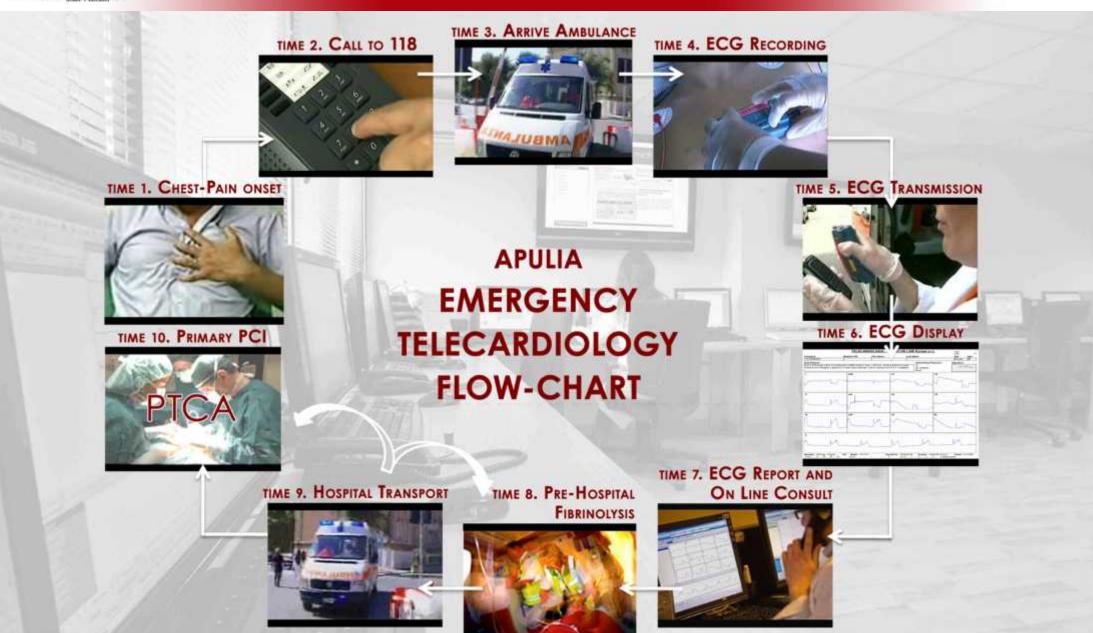


### **HISTORY**







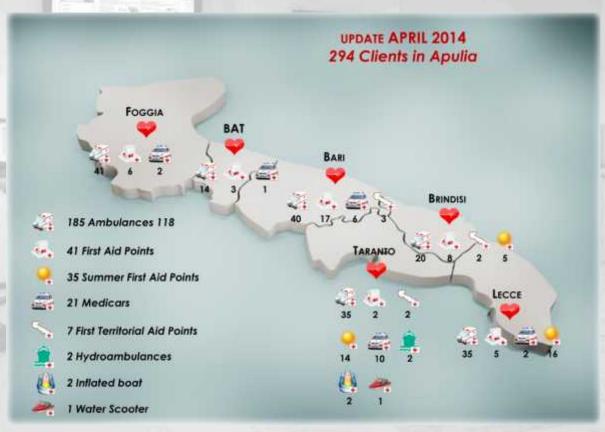








### SERVICE COVERAGE AREA







### SCOPE OF SERVICE

The service allows you to perform electrocardiogram checks electronically through the combined use of:

 A transtelephonic electrocardiograph to 12 derivations standard mod. CardioVox P12 and CardioLink, supplied to users of the services.



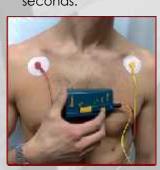
2. A landline or mobile phone.



 A Central Telecardiology, manned by a team of Cardiology Specialists Operating 24 hours on 24, 365 days for year, ready at all times to receive and report in real-time 12-lead ECG standard.



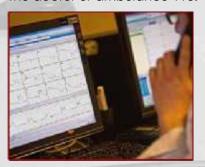
 The operator, through CardioVox
 P12 or CardioLink record the ECG of the patient in 50 seconds.



5. The operator, in 50 seconds, trasmit by Telephone, an ECG at Central Telecardiology Cardio On Line Europe.



 The specialist receive, analyze, and report, in real-time, the ECG just received; he provides a specialist referral telephone at the doctor or ambulance 118.



7. Reported electrocardiogram with a legal medical validity, is sent through fax (maximum within 3 minutes) to the operational Centre of 118, then it is made available in internet through the access to HRS - NET on

www.cardioonlineeurope.com

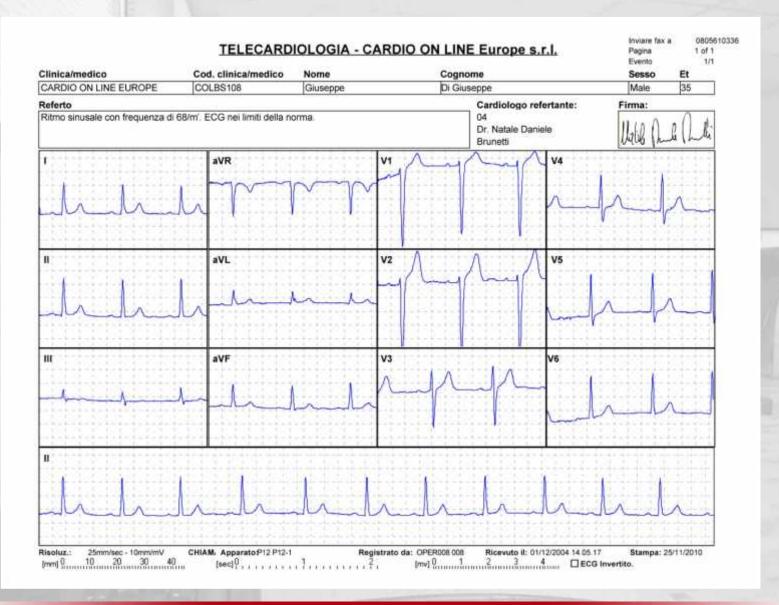








### **ELECTROCARDIOGRAM**







### TELECARDIOLOGY CENTRAL







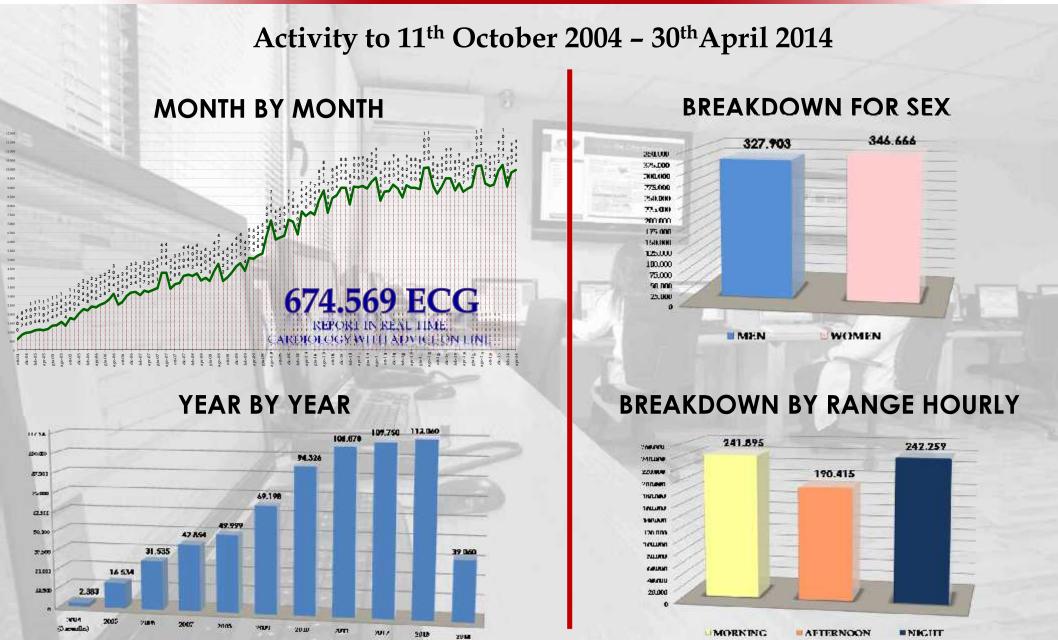


### **BACK-UP ROOM**











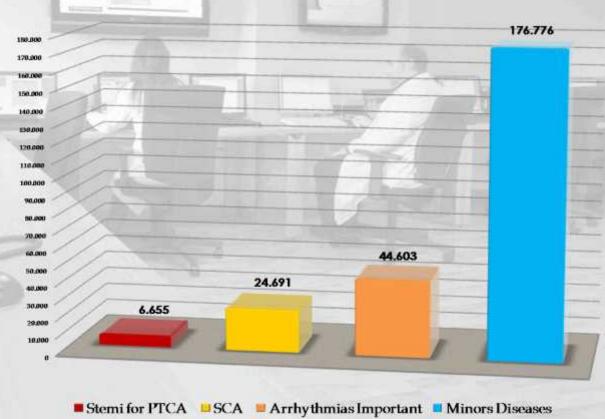


### Activity to 11<sup>th</sup> October 2004 - 30° April 2014





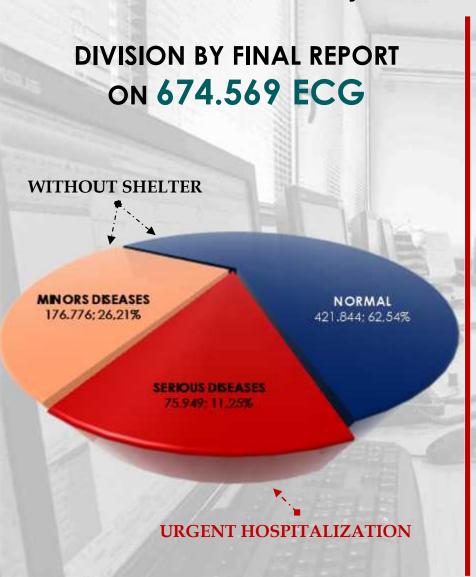
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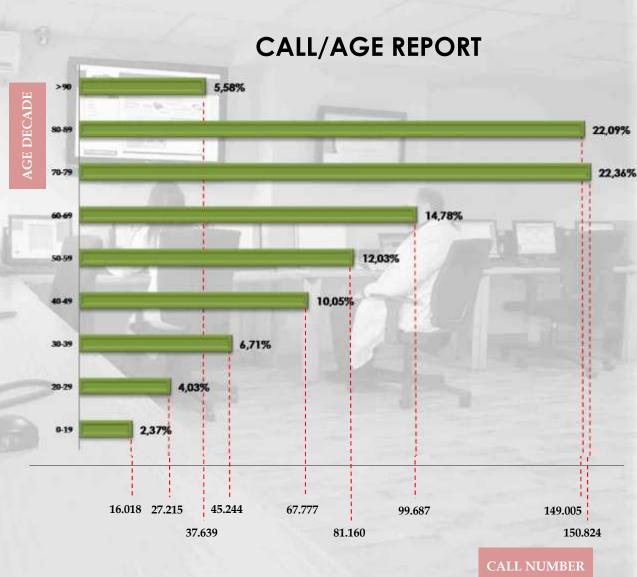






### Activity to 11<sup>th</sup> October 2004 - 30<sup>th</sup> April 2014











# Cardio On Line Europe Telemedicine Center Critical Success Factors

Giuseppe DI GIUSEPPE - ICT Area Director





### CULTURAL READINESS TOWARDS TELEMEDICINE

- \*CARDIO ON LINE EUROPE IS A TELEMEDICINE CENTER THAT IS CONSTANTLY CHAIRED BY AN OPERATOR, TECHNICIANS AND CARDIOLOGISTS 24 HOURS A DAY FOR 365 DAYS A YEAR. IT RECEIVES ALL ELECTROCARDIOGRAMS FROM ANY STATION (AMBULANCES, FIRST AID, OTHER) OF THE REGIONAL 118 EMERGENCY SYSTEM.
- \*CARDIO ON LINE EUROPE ALSO RECEIVES HOLTER CARDIAC OR ABPM FROM SOME SOCIO-HEALTH DISTRICTS LOCATED ACROSS THE REGION AND RECORDED ON CHRONIC PATIENTS WHO NEED A PERIODICAL CHECK-UP OR FOR FOLLOW UP.
- PATIENTS AND 118 ARE BEEN HAPPY TO USE THIS TELECARDIOLOGY SYSTEM, BECAUSE THE READY RESPONSE OF CARDIOLOGY IS A VALID SUPPORT FOR THEM AND THEIR MEDICAL DECISIONS. IN THE FIRST MONTH OF ACTIVITY, FROM 11st OCTOBER 2004, 601 ELECTROCARDIOGRAM (ECGS) WERE RECORDED.
- \*TODAY, CARDIO ON LINE EUROPE RECEIVES MORE THAN 10,000 ECG PER MONTH. THIS DETERMINES HOW THE TELEMEDICINE IS VIEWED POSITIVELY AND IS EMBRACED BY ALL.





### **COMPELLING NEED**

- •APULIA WAS THE FIRST REGION IN ITALY TO APPLY TELECARDIOLOGY SYSTEM IN THE REGIONAL EMERGENCY SYSTEM. THE PATHOLOGIES SUBDIVISION IS VERY IMPORTANT TO SEND PATIENTS TO AN APPROPRIATE HOSPITAL. TO SEND A PATIENT WITH A CHEST PAIN TO AN ORTHOPEDICAL CENTRE IS NOT A GOOD IDEA. WITH TELECARDIOLOGY SUPPORT, THE SAME PATIENT WILL BE SENT TO THE CARDIOLOGY DEPARTMENT.
- •IN THE REGION OF APULIA, THE STEMI PROTOCOL HAS BEEN SET UP. WHAT IS THIS? ALL PATIENTS WITH STEMI, WILL BE SEND, IMMEDIATELY, TO THE HUB OR SPOKE UNIT THAT IN SOME MINUTES STARTS THE PTCA PROCEDURE.
- •FOR SOME YEARS, MORTALITY FOR IMA IN PUGLIA HAS BEEN REDUCED BY 50% THANKS TO THE SYSTEM, COMPOSED BY CARDIO ON LINE EUROPE, THE APULIA REGION, HEMODYNAMIC, AND THE 118 EMERGENCY SYSTEM.
- •IN THIS CASE, IN AN EMERGENCY, TELEMEDICINE SUPPORT CAN SUPPLY A FIRST SOLUTION.





### HEALTH CARE PROFESSIONALS AND DECISION MAKERS

THE TELECARDIOLOGY SYSTEM FOR THE EMERGENCY REGIONAL SERVICE 118, IS A FIRST LEVEL METHOD ONLY. IN THE APULIA EMERGENCY SERVICE 118, 90% OF AMBULANCES HAVE A MEDIC ON BOARD. IN THE SITE WHERE THE ELECTROCARDIOGRAM IS RECORDED AND SENT BY NORMAL TELEPHONE, THE AMBULANCE-BASED MEDIC LISTENS AND TALKS - IN REAL TIME - WITH CARDIO ON LINE EUROPE CARDIOLOGISTS WHO THEN MAKE THEIR REPORT. WITHIN A FEW SECONDS, THE SAME REPORT WILL HAVE BEEN COMMUNICATED TO THE 118 RESPONSE. IN THE CASE OF PATHOLOGICAL REPORT, THE UNIT WILL SEND THE TEAM AND PATIENT TO THE APPROPRIATE HOSPITAL.

THE SYMPTOMS AND CARDIOVASCULAR RISKS OF PATIENTS ARE VERY IMPORTANT: WITH THIS, TELECARDIOLOGY CENTER CARDIOLOGISTS ARE MORE SURE OF THEIR ECG INTERPRETATION.

THE EMERGENCY MEDIC IS AN INNOVATION FIGURE THAT WILL BE DECISIVE IN THE FUTURE.





### PATIENT IS AT THE CENTRE OF SERVICE

- •IT IS VERY IMPORTANT IS THAT THE PATIENT IS EVER THE CENTRE OF ATTENTION OF HEALTHCARE. IN FACT, WITH THE TELECARDIOLOGY SYSTEM, THE PATIENT DOESN'T GO TO FIRST AID FOR A CHEST PAIN! HE CALLS 118 ON HIS PHONE. IN A MAXIMUM OF 15 MINUTES, THE AMBULANCE CAN COME TO HIS HOME.
- THIS PERMITS EQUITY OF ACCESS FOR ALL PEOPLE IN THE REGION, THE SAME MEDICAL TREATMENT IN EVERY PLACE IN THE REGION, WHETHER IN A CITY OR IN A VERY FAR SITE THAT IS GEOGRAPHICALLY INCONVENIENT. THINK OF DISTANCES TO A HOSPITAL IN THE CITY OR IN THE COUNTRYSIDE.
- IN THIS MANNER, THERE AREN'T CULTURAL DIFFERENCES IN AGE OR SOCIAL LEVEL.
- THE PATIENT IS THE MOST IMPORTANT FIGURE IN THE HEALTHCARE SYSTEM.





### TELEMEDICINE LEGALITY POLICIES

- \*CARDIO ON LINE EUROPE USES DEVICES AND SOFTWARE CERTIFIED BY THE FDA AND THE ITALIAN HEALTH MINISTRY.
- \*SOFTWARE AND DEVICES ARE DEVELOPED AND MANUFACTURED IN ISRAEL, AND THEY ALL HAVE LICENSES AND AUTHORIZATIONS FOR USE AND SALE.
- •IN OUR SYSTEM, THE ECG REPORT IS SIGNED BY A SPECIALIST CARDIOLOGIST. SO, WE ARE SURE THAT TELEMEDICINE SYSTEM IS NOT INHIBITED BY LAW AND WE ARE CERTAIN THAT OUR TELECARDIOLOGY SYSTEM IS NOT CONSIDERED TO BE IN CONFLICT WITH THE REQUIREMENTS FOR BEST PRACTICE IN MEDICINE.
- THIS IS VERY IMPORTANT FOR US, BECAUSE OUR DOCTORS ARE HAPPY TO WORK SAFELY.





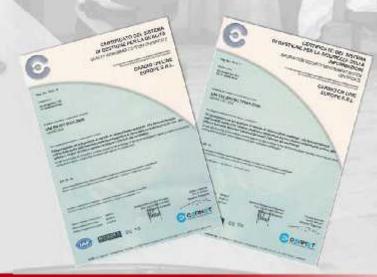
### LEGAL, ETHICAL, PRIVACY AND SECURITY EXPERTS

\*THIS IS A CONSIDERABLE SUCCESS FACTOR FOR CARDIO ON LINE EUROPE. IN FACT, THIS SOCIETY IS THE ONLY ONE IN ITALY THAT HAS AN INTEGRATED CERTIFICATION FOR "INFORMATION SECURITY MANAGEMENT SYSTEM" IN TELEMEDICINE.

\*CARDIO ON LINE EUROPE IS CERTIFIED, IN BOTH ITS QUALITY AND SECURITY SYSTEM, FOR "DESIGN AND PROVIDING TELEMEDICINE SERVICES APPLIED TO TELECARDIOLOGY FOR ELECTROCARDIOGRAPHIC REPORTING AND "ON LINE" CONSULTING; READING AND ANALYSIS OF CARDIAC/PRESSURE HOLTER REPORTED BY CARDIOLOGISTS".











### CARDIO ON LINE EUROPE: IT AND E-HEALTH INFRASTRUCTURE

- THE TELECARDIOLOGY SYSTEM OF CARDIO ON LINE EUROPE HAS THE MOST RECENT HARDWARE TECHNOLOGY, WHILE THE SOFTWARE USED, FOR THE HEARTLINE RECEIVING SYSTEM (HRS) WORKS ON AN ORACLE DATABASE. LAST YEAR, ORACLE DEVELOPED A NEW HARDWARE PRODUCT THAT ALL THE BEST FEATURES FOR THE SCOPE OF THIS TASK. THE ORACLE DATABASE APPLIANCE, ON A SCALE OF VALUES, OCCUPIES ONE OF THE TOP PLACES IN TERMS OF PERFORMANCE. THIS IS ANOTHER SUCCESS FACTOR, BECAUSE THE ICT INFRASTRUCTURE MUST ALWAYS BE FUNCTIONAL.
- \*CARDIO ON LINE EUROPE HAS THREE LEVEL OF NETWORKS WITH THE DATABASE SYNCHRONIZED. THE ELECTRICITY AND THE TELEPHONE DASHBOARDS ARE TESTED DAY BY DAY BY TECHNICAL STAFF.

  CARDIO ON LINE EUROPE, ALSO HAS ANOTHER ROOM IN THE SAME OFFICE FOR A CENTRAL TELECARDIOLOGY BACKUP SYSTEM.
- THE OUTPUT FILE OF THE ECG REPORT CAN BE DOWNLOADED IN REAL TIME FROM THE INTERNET AS JPEG OR PDF.
- •HRS DATA FILES AND ITS DATABASE ARE INTEROPERABLE WITH THE HEALTH INFORMATION SYSTEMS.





### CARDIO ON LINE EUROPE: USER-FRIENDLY TECHNOLOGY

THE ELECTROCARDIOGRAPHS USED (AEROTEL MEDICAL SYSTEM CARDIOVOX P12) ARE EXTREMELY SIMPLE TO USE: WITH ONLY ONE BUTTON THE 118 DOCTOR RECORDS AND IN A FEW MINUTES SEND A 12 LEADS STANDARD ELECTROCARDIOGRAM. THE TRANSMISSION IS FOR ACOUSTIC COUPLING. THE SOUND PRODUCED CAN BE TRANSMITTTED BY EVERY TELEPHONE SYSTEM, FROM THE AMBULANCE'S TELEPHONE, FROM THE DOCTOR'S PHONE, FROM THE PATIENT'S HOME, OR FROM ANY DEVICE CAPABLE OF MAKING A PHONE CALL. WE KNOW THAT OTHER COMMUNICATION SYSTEMS EXIST. BUT WE ALSO KNOW THAT EVERY SIGNAL TRANSMITTED BY INTERNET OR ANY DIGITAL SYSTEM, MUST BE TRANSMITTED FROM START TO END. IF NO, THE TRACE CANNOT BE RECOGNIZED. FOR THIS REASON, WE HAVE OPTED FOR AN ANALOG SOLUTION, BECAUSE THE SOUND CARDIOVOX P12 CAN **PRODUCED** BY BE **TRANSMITTED** IN EVERY MODE. FINALLY. ELECTROCARDIOGRAPHS ARE EASY TO USE AND HAVE A USER-FRIENDLY DESIGN.















### CARDIO ON LINE EUROPE: MONITOR THE SERVICE

- CARDIO ON LINE EUROPE HAS A DEDICATED SECTION THAT FOLLOWS UNIQUELY CUSTOMER SATISFACTION LEVELS. WE HAVE TO MONITOR THE SERVICE AND THE ACTIVITIES CONTINUOUSLY 24 HOURS ON 24 HOURS FOR 365 DAYS A YEAR.
- WE HAVE A QUESTIONNAIRE REPORT TO CONSIDER THE NEEDS OF USERS, FROM ISSUES AROUND INSTRUCTIONS FOR USE TO TECHNICAL ASSISTANCE.
- WE ARE ABLE TO GUARANTEE THE REPLACEMENT OF DEVICES IN 24 HOURS FROM THE CALL. THE DEVICES ARE FREQUENTLY TESTED. EVERY 5 YEARS, THE EQUIPMENT ARE COLLECTED AND SENT TO REVISION CENTRES. THIS IS WHAT THE LAW STIPULATES.





### WITH TELECARDIOLOGY SYSTEM SUPPORT WE HAVE:

- **✓ RAPID INTERVENTION TIME** 
  - ( ... DIAGNOSIS NETWORK AND AT HOME)
- ✓ APPROPRIATENESS
  - ( ... LESS HOSPITALIZATION)
- **✓** EQUITY
  - ( ... WIDESPREAD EASY OPEN ACCESS, REGARDLESS OF SEX, AGE, TIME, SOCIO-ECONOMIC FACTORS)
- ✓ TRANSFERABILITY
  - (... DEVICES, PHONE CONECTIONS, NETWORKING, ORGANIZATIONAL MODEL)
- ✓ HIGH COST SAVINGS
  - (... EACH SINGLE ECG COSTS LESS THAN 17 EUROS FOR THE PUBLIC ADMINISTRATION)





### **SUSTAINABILITY**



PROVIDES
EDUCATION
AND SUPPORT

IMPROVES
LIFESTYLES
AND HEALTH
BEHAVIOUR

IMPROVES
CLINICAL
OUTCOMES

REDUCRS NUMBER
OF
ACUTE EVENTS

REDUCES
HOSPITALIZATION
AND HEALTHCARE
COSTS

REDUCES
INAPPROPRIATE
HOSPITAL STAYS
AND SAVINGS
IN OPERATING
COSTS

INTRODUCES TELEMEDICINE

PERFORMS
SERVICES
IN THE RIGHT
SETTING

GUARANTEES
WIDESPREAD
AND MORE
EFFECTIVE
SERVICE

INCREASES
POINT OF ACCESS
TO HEALTHCARE



**EQUITY IN HEALTH** 





### CARDIO ON LINE EUROPE: COST ANALYSIS

### **Quality** and Outcomes

### Prehospital Telemedicine Electrocardiogram Triage for a Regional Public Emergency Medical Service: Is It Worth It? A Preliminary Cost Analysis

Natale Daniele Brunetti, MD, PhD; Giulia Dellegrottaglie, MD; Claudio Lopriore, Giuseppe Di Giuseppe, Luisa De Gennaro, MD, PhD; Saverio Lanzone, MD; Matteo Di Biase, MD

Department of Cardiology (Brunetti, De Gennaro, Di Biase), University of Foggia, Foggia, Italy; Cardio On Line Europe S.R.L. (Dellegrottaglie, Lopriore, Di Giuseppe), Bari, Italy; Department of Cardiology (Lanzone), Hospital Di Venere, Bari, Italy Address for correspondence:

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Background: Telemedicine has been shown to improve quality of health-care delivery in several fields of medicine; its cost-effectiveness, however, is still a matter of debate.

Hypothesis: Pre-hospital telemedicine electrocardiogram triage for regional public emergency medical service may reduce costs.

Five months ago a study was published that showed the cost of a single electrocardiogram. The cost derives from the division of the amount paid to Cardio On Line Europe for the number of electrocardiograms performed in the year evaluated (2012). Each ECG, including cardiological consultation, costs the public administration only 16,7 euro! Of course, the more ECGs are performed, the lower the cost of each electrocardiogram.





# CARDIO ON LINE EUROPE: TIME TO TREATMENT – DIFFERENCE TIME BETWEEN IMA DIAGNOSIS TO HEMODYNAMIC

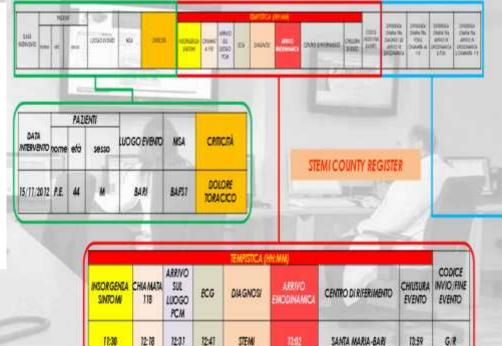
Original scientific paper

Pre-hospital electrocardiogram triage with tele-cardiology support is associated with shorter time-to-balloon and higher rates of timely reperfusion even in rural areas: data from the Bari- Barletta/Andria/Trani public emergency medical service 118 registry on primary angioplasty in ST-elevation myocardial infarction

European Heart Journal
ACUTE
Cardiovascular
Care
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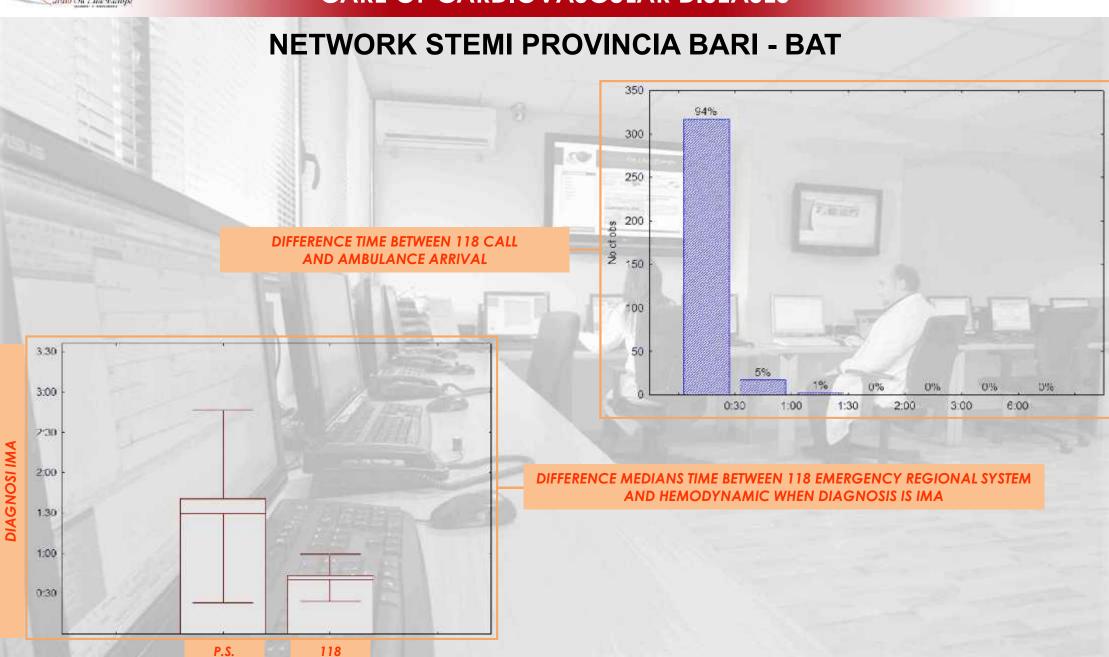
WE HAVE COLLECTED ALL THE TIMES
FROM THE 118 OPERATIVE CENTRE.
THESE TIMES ADDED TO OUR TIMES,
ALLOW US TO PUBLISH A WORK NEVER
MADE IN CARDIOLOGICAL LITERATURE.



| DIFFERENTA ORARIA TRA<br>DIA GNOSI ED ARRIVO IN<br>EMODINAMICA | DIFFERENZA ORARIA TRA<br>CHIA MATA AL 178 E PCM | DIFFERENTA CRARIA TRA PCM<br>ED ARRIVO IN EMODINAMICA | DIFFERENZA ORARIA TRA CHIA MATA<br>118 ED ARRIVO IN EMODINA MICA |
|--|---|---|--|
| 0.21   | 0:13  | 0.37  | 0.44   |











### CARDIO ON LINE EUROPE: "THINK GREAT, THINK BIG!"

- •FOR SOME YEARS, THE SERVICE IS NOT DIRECTED ONLY TO THE EMERGENCY BUT ALSO THE SEVERITY OF THE CONDITION ("CHRONICITY"). MANY PATIENTS NEEDS CARE AND REGULAR CHECKS, SO THE PUGLIA REGION, HAS DECIDED TO MAKE THE SAME TECHNOLOGIES (ELECTROCARDIOGRAMS PLUS HOLTER) AVAILABLE TO THESE INDIVIDUALS EXPERIENCING AN EMERGENCY.
- THE AIM OF CARDIO ON LINE EUROPE IS NOT TO STOP AT ONLY ONE REGION, BUT TO EXTEND THE SAME SERVICE IN OTHER ITALIAN REGIONS, WHEN POLICY-MAKERS AND CARDIOLOGISTS AGREE AS IT HAS BEEN THE CASE FOR THE PUGLIA REGION.
- \*TODAY, THE CARDIO ON LINE EUROPE AREA WORKPLACE, INCLUDING OFFICES AND OPERATIONS CENTRE, IS JUST 190 SQUARE FEET. IN THREE MONTHS' TIME, WE WILL MOVE INTO A NEW OFFICE OF 630 SQUARE METERS, OF WHICH 120 WILL BE DEDICATED TO THE OPERATIONS CENTRE AND 80 TO THE HOLTER DIVISION. THERE WILL BE A TRAINING ROOM, A KITCHEN, A SECRETARY, A CONTROL ROOM, A SERVER ROOM AS REGULATIONS REQUIRE, A RELAXATION AREA, AND AN ENTERTAINMENT AREA.
- •IN THIS MANNER, ALL OUR EMPLOYEES ARE HAPPY TO WORK HERE ... THIS MEANS THINKING BIG.



### CARDIO ON LINE EUROPE: OTHER CUSTOMERS



All PuGlia Regional Prisons



Some Italian Air Force Planes



A lot of General Practitioners



A lot of Nursing Homes



A lot of Italian Military Navy ships



A lot of Italian Pharmacies





# CARDIO ON LINE EUROPE: REAL SUCCESS FACTOR, USEFUL TO EXPORT IN OTHER SITUATIONS

THE COMPLEXITY OF THE ORGANIZATION AND MANAGEMENT OF A TELECARDIOLOGY CENTRE, COMPUTERS AND THEIR HARDWARE, TELEPHONE CONNECTIONS, NETWORKS, REDUNDANT SERVERS, "ON SITE" CARE FOR BOTH HARDWARE AND SOFTWARE, MANAGEMENT OF DATA, AND - LAST BUT NOT LEAST - THE TRAINING AND RELIABILITY OF THE STAFF, ARE THE MAJOR FACTORS TO COORDINATE IN ORDER TO OBTAIN THESE HARMONIOUS RESULTS. THIS CAN ONLY BE ACHIEVED WITH ABSOLUTE DEDICATION OF HUMAN RESOURCES AND ABOVE ALL STEP-BY-STEP. COUNTLESS PUBLICATIONS, MANY SCIENTIFIC PAPERS AND A FEW PHOTOGRAPHS, ACCOMPANY AND COMPLEMENT THE TOTAL PICTURE. YOU CAN DO BETTER, HARDLY MORE PASSION!

•FOR FURTHER INFORMATIONS, PLEASE VISIT OUR SITE: WWW.CARDIOONLINEEUROPE.COM





### THANK YOU FOR YOUR ATTENTION AND SEE YOU SOON IN ...

# PUGLA!!!









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