A telemonitoring program for primary and secondary prevention of cardiovascular disease

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Declaration of interest

- I have nothing to declare
Global Burden of Cardiovascular Disease

Global and Regional Patterns in Cardiovascular Mortality From 1990 to 2013

Percent of total deaths due to diabetes, chronic respiratory disease, CVD and cancer by age in 2013

Roth et al. Circulation. 2015;132:1667-1678
Global Burden of Cardiovascular Disease

Age-standardized death rates due to CVD in 2013

Roth et al. Circulation. 2015;132:1667-1678
Health System problems

- Huge and increasing Burden of CV Disease (screening, primary and secondary prevention)
- Appropriateness and timeliness of diagnostic and therapeutic interventions
- Management of chronic CV disease pts (homecare, long-stay facilities)
- High costs

Tools available

- Emergency Department
- Cardiology / Internal Medicine/ Geriatry Wards
- Rehabilitation Department
- Outpatient Clinic
- General Practitioner
- Nursing home care
Health System problems

The main problem that the national health service have to face in both developed and developing countries is to provide accessible, costeffective, high-quality health care services.

Which new tools could be useful?
«The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities»

...Telemedicine may be a part of a sustainable solution to the health care issues
“Clinical” Pharmacies in order to improve access to telemedicine

The Italian Minister of Public Health has recognized a new role of Pharmacist (decree law of December 16, 2010)

Authorized Pharmacies may:
- carry out provision of specialist outpatient care services
- receive payment of the relative share of the cost by the citizen
- withdraw reports relating to outpatient specialist care services

Only after specific training course about the indications to perform cardiological tests and about the technical aspects relating devices use/application, the Pharmacy becomes a “Clinical Pharmacy”

All the equipment used are validated and certified
All the tests performed are evaluated in remote by a team of cardiologists from The University of Brescia
Telemedicine and “Clinical” Pharmacies for CV prevention

- Immediate and easy access to multi-specialist consulting
  - regardless of distance from hospitals and outpatient clinics
  - Widespread throughout the country → 18,549 pharmacies in Italy (every pharmacy serving 3000 citizen)
- Immediate delivery of the service, short delivery time of the reports
- Immediate online availability of anamnestic, clinical, hematochemical and instrumental data (Personal Health Record) to avoid laborious and costly shifts to Healthcare Facilities
- Reports performed by the same team of specialists who would handle the test if performed in hospital
Aim of the study

To evaluate the effectiveness of a remote monitoring performed by authorized Pharmacies through the use of ECG, ABPM and ECG Holter monitoring in screening, primary and secondary prevention of CV Disease.
Methods

- 2,696 pharmacies in the country are included in a telematic network connected to a same telemedicine platform (HTN) where cardiologists were available for a 24-hour tele-consulting
- The telematic network connects: University of Brescia, HTN and authorized Pharmacies
- Pharmacies performed: 12-lead ECG, ABPM, Holter ECG
- Every subject/patient signed an informed consent for the processing of personal data
- Personal and clinical data (Personal Health Record) are stored separately in two servers and protected by multiple security codes in accordance with the international safety standards
- Cardiologists and GPs can access to the telematic network with their login credentials and can view the reports
Advantages of a single Telemedicine platform across the National territory:

- Uniformity in the collection of health data
- Uniformity of the hospital-electromedical equipment in every pharmacy
- Uniformity of specialized professional teleconsulting and reporting service provided by cardiologists
- Single database
Results – preliminary data
(From January to December 2016)

• We have analyzed 67,102 exams:
  – 44,256 ECG
  – 10,761 ABPM
  – 12,085 ECG Holter
ECG

44,256 ECG

- ECGs were performed for:
  - Secondary prevention (symptomatic or asymptomatic pts)
  - Primary prevention in high risk subjects (e.g., with diabetes, hypertension, dyslipidemia, ...)
  - Routine/Screening controls for healthy subjects, for sports practice etc (wide range of age)
44,256 ECG

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2,394 (5.4%) showed electrocardiographic abnormalities

2,140 (4.8%) GP or Cardiologist for further evaluation or further diagnostic investigations

254 (0.6%) ACS, arrhythmias Emergency Department
## 10,761 ABPM

### Clinical indication for ABPM

- Suspicion of white-coat hypertension
- Suspicion of masked hypertension
- Considerable variability of office BP over the same or different visit
- Autonomic, postural, post-prandial, siesta and drug-induced hypotension
- Elevated office BP or suspected pre-eclampsia in pregnant women
- Identification of true and false resistant hypertension

### Specific indications for ABPM

- Marked discordance between office BP and home BP
- Assessment of dipping status
- Suspection of nocturnal hypertension (e.g. sleep apnea, CKD, diabetes pts)
- Assessment of BP variability
10,761 ABPM

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3,993 (37%) showed abnormal ABPM results
- 31% high systolic-diastolic values
- 5.1% high systolic values
- 1% high diastolic values

GP or Cardiologist for further evaluation or further diagnostic investigations
12,085 Holter ECG

- Holter ECGs were performed for:
  - Unexplained, prolonged and/or frequent palpitation
  - Episodes of paroxysmal atrial fibrillation
  - Evaluation of sinus rhythm persistence after cardioversion
  - Evaluation of the effectiveness of antiarrhythmic therapy
  - Unexplained syncope or pre-syncope
12.085 Holter ECG

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4798 (39.7%) showed arrhythmias:
- 1,427 (30%) Atrial fibrillation
- 979 (20%) Supra-ventricular tachycardia
- 670 (14%) 2° degree AV block
- 804 (17%) QTc prolongation
- 918 (19%) Life threatening arrhythmias (NSVT, VT, 3° degree AV block)

GP or Cardiologist for further evaluation or further diagnostic investigations

Emergency Department
Conclusions

• Our data confirm the important role of a telematic network in primary and secondary prevention of CV diseases, by promoting everywhere:
  – CV screening
  – early diagnosis and treatment of CV events in symptomatic and asymptomatic subjects and monitoring of treatment efficacy
  – appropriateness and timeliness of the access to the ED or to other health facilities
• This project can promotes multidisciplinary management of CV disease and could have positive impact on health care and National Health System expenditure
Conclusions

• Tele-cardiology has a great potential for reducing the variability of diagnoses as well as improving clinical management and delivery of health care services by enhancing access, quality, efficiency, and cost-effectiveness.

• In particular, telecardiology can help communities usually underserved – those in remote or rural areas with few health services and staff – because it overcomes distance and time barriers between health-care providers and patients.

• The implementation of telecardiology may have important socioeconomic benefits to patients, families, health practitioners and the health system.
Other ongoing projects

- ECG Tele-consulting for General Practitioner
- Remote follow-up for Heart Failure patients (nursing home care)
- Real time continuous web monitoring of ECG in hospital without intensive care unit
- ECG and clinical parameters tele-consulting for long stay facilities