

**12° CONGRESSO
NAZIONALE**



Bari, The Nicolaus Hotel - 3/5 marzo 2016



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Impiego della
robotica come
supporto alla gestione
della malattia di
Alzheimer

ANTONIO GRECO
UOC DI GERIATRIA
IRCCS

«CASA SOLLIEVO DELLA
SOFFERENZA»



12° CONGRESSO NAZIONALE

Associazione Geriatri Extraospedalieri
GERIATRIA ITALIANA TERRITORIALE

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JULIANNE MOORE
ALEC BALDWIN
KRISTEN STEWART

STILL ALICE

A FILM BY
RICHARD GLATZER AND WASH WESTMORELAND



SONY PICTURES CLASSICS RELEASE. BOB WEINSTEIN, PRESIDENT OF CLASSICS; JENNIFER WEINSTEIN, CEO OF CLASSICS; JAMES WICK, PRESIDENT OF CLASSICS; SHARON PHELPS, EXECUTIVE VICE PRESIDENT OF CLASSICS; RICHARD GLATZER AND WASH WESTMORELAND, DIRECTORS OF THE FILM "STILL ALICE".
STILL ALICE: ALEC BALDWIN, KRISTEN STEWART, JULIANNE MOORE. PRODUCED BY JENNIFER WEINSTEIN, BOB WEINSTEIN, JAMES WICK. WRITTEN BY DENIS DI NOVI, K.S.C. M.F. DIRECTED BY RICHARD GLATZER AND WASH WESTMORELAND. COSTUME DESIGNER: TONINICO OTTINO. HAIR: NICOLA TANGI. MAKEUP: STACEY DODD.
EDITED BY RIAN CASNER. EXECUTIVE PRODUCERS: DANIEL FISHER, MICHAEL GUTTER. EXECUTIVE PRODUCERS: HENRY BARBER, PAUL SCHWEITZ AND ALLISON ESTER. EXECUTIVE PRODUCERS: MARK SHAPIRO, CHRISTINE LUTSEN, BARBARA SHAPIRO.
CASTING BY STELLAN BALDWIN, ELIZABETH BELLMAN STENING. MUSIC BY LEO LUZZO, JAMES NEWTON HOWARD, PAMELA ROFFER. BASED ON THE BOOK BY LISA SEWELL. WRITTEN AND DIRECTED BY RICHARD GLATZER AND WASH WESTMORELAND.
SONY PICTURES CLASSICS

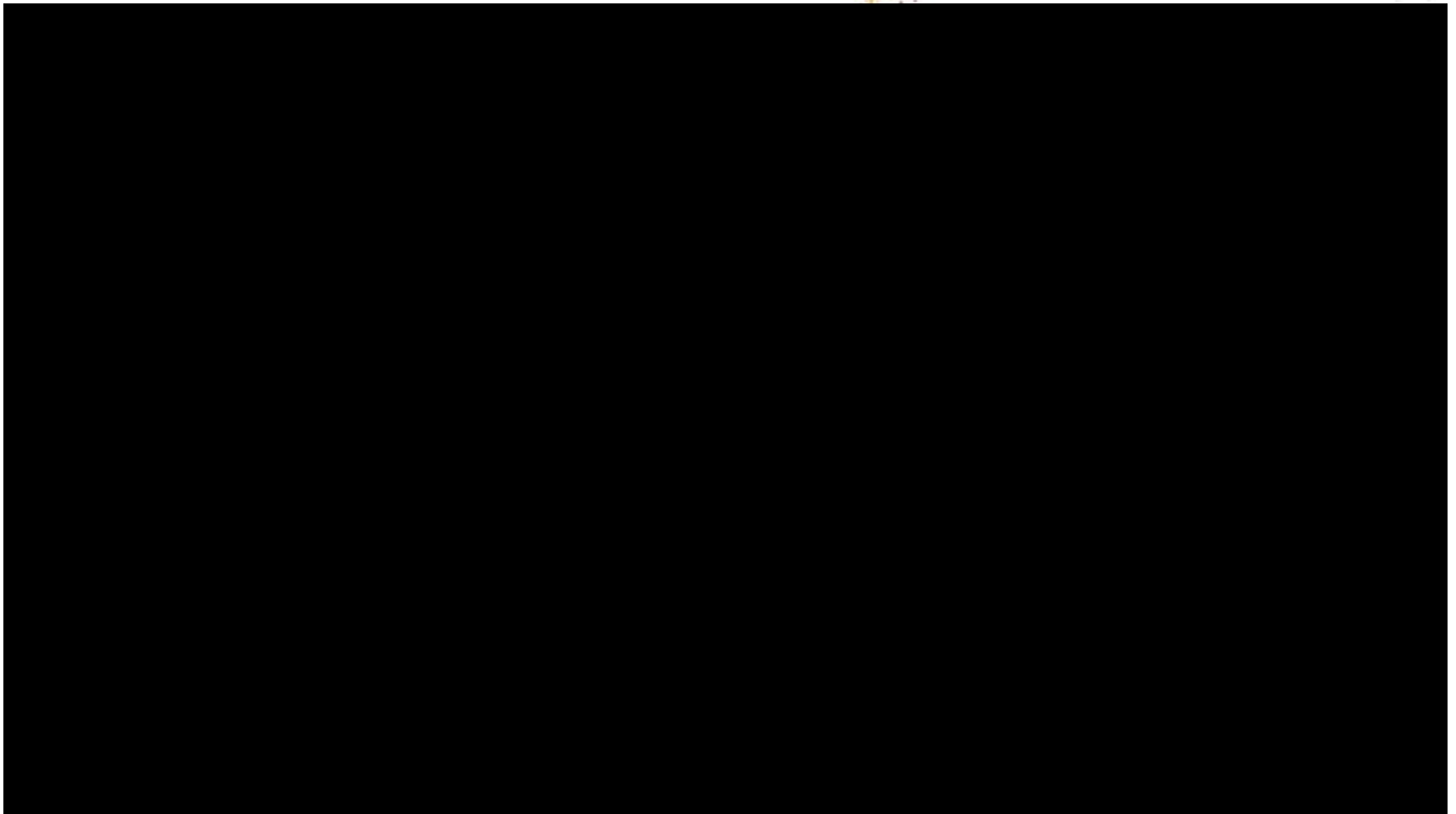
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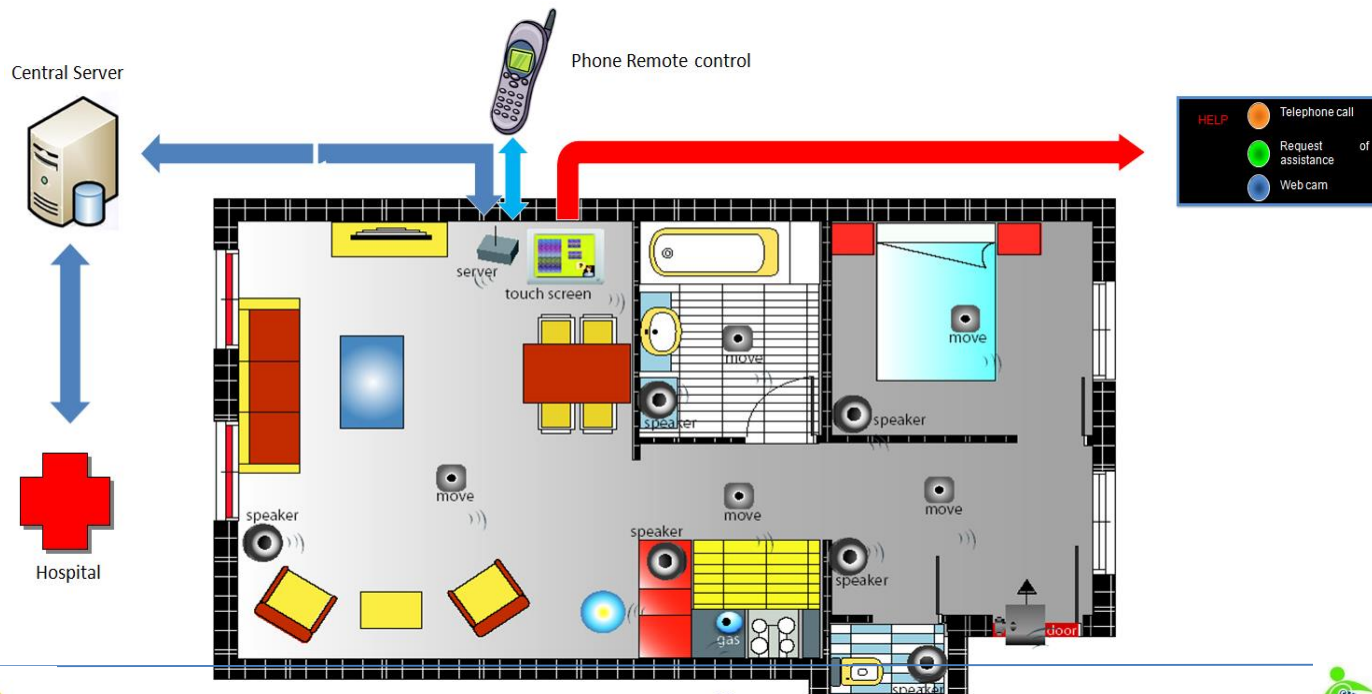
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HOPE: House plant and implemented devices

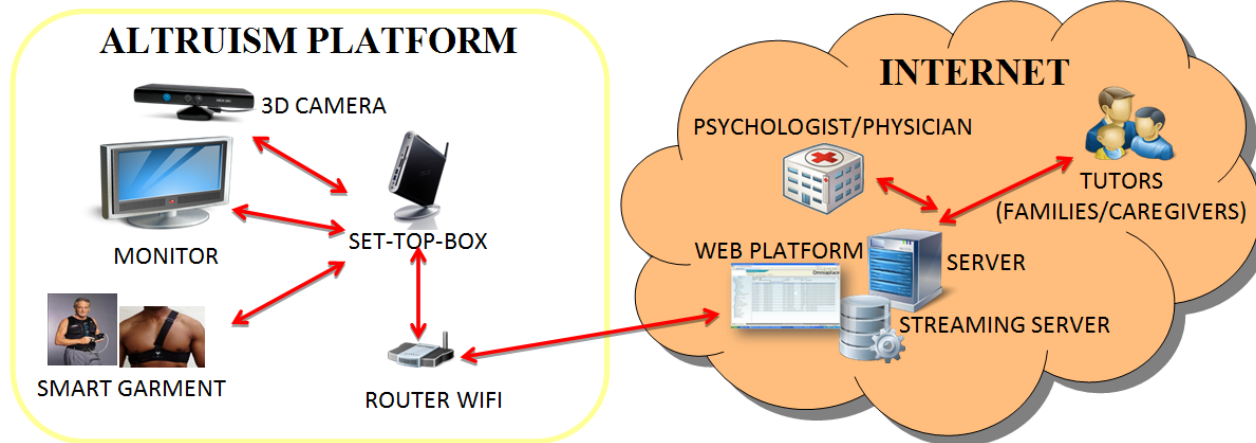




AL.TR.U.I.S.M.



AL.TR.U.I.S.M. (Alzheimer patient's home by a rehabilitation-based Virtual Personal Trainer Unique Information System Monitoring) is a project funded by Regione Puglia with the aim to provide a tool for cognitive home rehabilitation in patients with dementia through the use of a "Virtual Personal Trainer" (VPT) using advanced, modular and affordable ICT technologies easily installable in most home environment.



Platform achieved by the following low-cost commercial component





Methodology and Instruments of Building Automation and
Information Technology for pervasive models of treatment and Aids
for domestic Healthcare

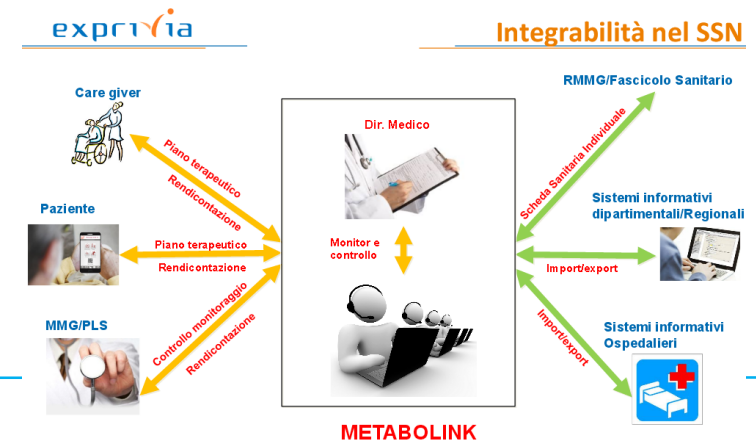
PON 2007-2013 – ICT 12 – Apulia Region

Aim: Develop and implement ICT solutions in helping dependent subjects to improve their independence at home. Train new professional figures capable to understand the real need of the patients and dialogue with the ICT workers.

Metabolink

PCP funded by Apulia Region

ICT Solution for elderly patients with diabetes capable of monitoring diet, health style, drugs compliance, health parameters (glycemia, BP, weight, steps per day) using a phone with a NFC protocol.





Integrated home care technology assistance in frail older patients with heart failure

Aim of the Care@Home project funded through the call: “ICT Apulian Living Labs” (European Regional Development Fund. 2013-2014) is to implement and evaluate an IT system capable of providing to frail older persons affected by heart failure the possibility to remain in their own home as long as possible thanks to an integrated telemonitoring system reducing also the mortality and the rehospitalisation rate.

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IBM Watson Health *How It Works*

IBM Watson Health is improving health by bringing the world's data to our daily lives.

The cause of health is all about the choices and taking a complete picture of the factors that affect one's health. It's not just what you eat, tap into and analyze your information in real-time.

How do I reduce my risk for heart disease?



Is your community and individual genetic conditions like amount of health related data from concepts ranging to genetics, diet, social and environmental factors that occur in clinical and non-clinical settings so much more difficult to view and then provide goals of improvement.



The world's health data is being brought together in a way that is more accessible and more actionable. It's not just about the data, it's about the insights that can be gained through data analysis.



Individual patients and their health information, when combined and analyzed, can provide a more complete picture of their health and help them make better decisions about their health.



IBM Watson Health is helping you live longer and healthier.

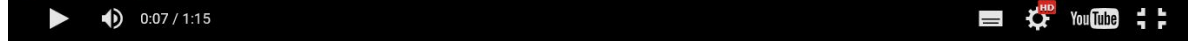
IBM Watson Health

Introducing IBM Watson Health



The average person is likely to generate more than **one million gigabytes** of health-related data in their lifetime. Equivalent to 300 million books.

Source: IBM Research



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Age of Loneliness

In 2050 16% world
population over 65





Dementia

- ▶ Another 20 people
- ▶ By 85 one person in every 3 will have dementia
- ▶ Dementia
 - ▶ worsens over time,
 - ▶ erodes your memory,
 - ▶ language,
 - ▶ communication,
 - ▶ changes your moods and personality.





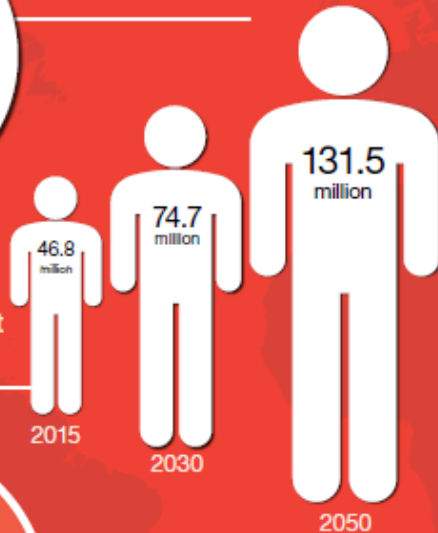
INFOGRAPHIC

The global impact of dementia



Around the world, there will be 9.9 million new cases of dementia in 2015, one every 3 seconds

46.8 million people worldwide are living with dementia in 2015. This number will almost double every 20 years.



Much of the increase will take place in low and middle income countries (LMICs): in 2015, 58% of all people with dementia live in LMICs, rising to 63% in 2030 and 68% in 2050.

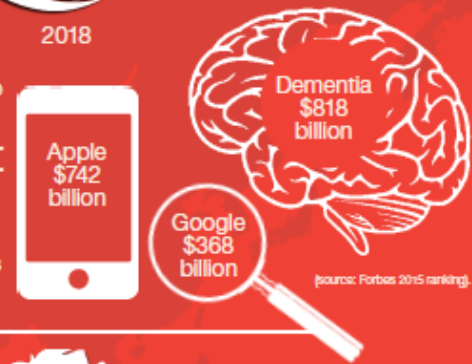


The total estimated worldwide cost of dementia in 2015 is US\$ 818 billion. By 2018, dementia will become a trillion dollar disease, rising to US\$ 2 trillion by 2030

If global dementia care were a country, it would be the

18th largest economy

in the world exceeding the market values of companies such as Apple and Google



(source: Forbes 2015 ranking)



This map shows the estimated number of people living with dementia in each world region in 2015.

We must now involve more countries and regions in the global action on dementia.



Older People Most at Risk

- ▶ Loneliness major public health challenge
 - ▶ In the UK 1/3 of people with dementia reported that there were lonely (Alzheimer UK 2013)





Partners



RUROBOTS
Cognitive Science at Work

robosoft
Advanced
Robotics
Solutions



caretta-net
Innovative IT Services and Systems

R2M
RESEARCH TO MARKET
SOLUTION

**UNIVERSITÄT
PASSAU**



STOCKPORT
METROPOLITAN BOROUGH COUNCIL

ortelio

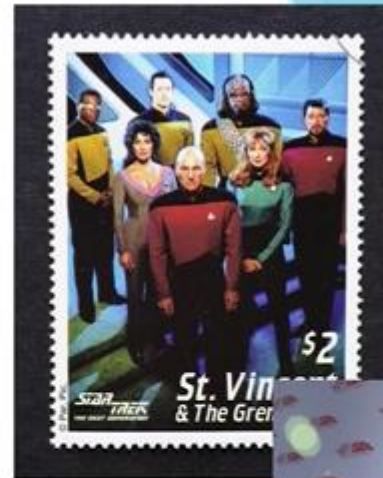


- ✓ National University of Ireland, Galway
- ✓ ROBOSOFT
- ✓ RU Robot
- ✓ Ortelio Ltd
- ✓ City of Stockport
- ✓ Consiglio Nazionale delle Ricerche
- ✓ R2M Solution
- ✓ Casa Sollievo della Sofferenza Hospital
- ✓ Caretta-Net
- ✓ University of Passau



MARIO : Our Companion Robot

- ▶ Science fiction movies
- ▶ Technological colleagues





MARIO's Prime Directive!

- ▶ To provide companionship
- ▶ Always patient and friendly never wavering in his task to provide friendly companionship.





Imagine MARIO with Brian

- Knows Brian as a person
- Support his failing memory





MARIO objectives 1/2

- ✓ To address and make progress on the challenging problems of loneliness, isolation and dementia in older persons through multi-faceted interventions delivered by service robots.
- ✓ To conduct near project length interaction with end users and assisted living environments.
- ✓ To assist caregivers and physicians in the comprehensive geriatric assessment (CGA) through the use of service robots.
- ✓ The use of near state of the art robotic platforms that are flexible, modular friendly, low cost and close to market ready.



MARIO objectives 1/2

- ✓ To make MARIO capable to support and receive “robot applications” similar to the developer and app community for smartphones.
- ✓ Through novel advances in machine learning techniques and semantic analysis methods to make MARIO more personable, useful, and accepted by end users (e.g. gain perception of non-loneliness).
- ✓ To bring MARIO service robot concepts out of the lab and into industry.



MARIO target groups

We connect older persons to 4+ main target groups:

- ✓ Their **community** and **social support programs**
- ✓ The **medical community** and **caregivers**
- ✓ Their **social network** (family & friends)
- ✓ Their **interests** (stimulation for cognitive aspects)
- + The **developer community** that can make available new robot applications



People that will benefit

- ✓ **Nurse practitioners / Dementia specialists**
- ✓ **Geriatricians**
- ✓ **Psychologists**
- ✓ **PWD** and their **carers**
- ✓ **Technologists**



Impact

- ✓ Less demand on social workers, caregivers, and medical experts:
 - MARIO robots are able to perform **CGA** and **MPI** assessments
 - MARIO robots tackle the problems of **loneliness, isolation** and **depression** giving simple access to a range of support functionality both within and outside the home / institution.
- ✓ Highly **personalised applications** to robots, while reducing the development costs and the response time to address existing and new needs.



MARIO main unique selling points

MARIO will:

- ✓ perform **CGA**
- ✓ be a benchmark for robotics in **dementia**
- ✓ be a tool for assisting elderly to stay **connected**
- ✓ be **acceptable** by end-users
- ✓ be a **market leader** and a commercially viable product
- ✓ provide an **ethical framework** for assisted living
- ✓ provide a framework for **measuring life improvements**
- ✓ **save money**



KOMPAI PLATFORM

from Robosoft

Robot semantics based on Semantic Web practices and technologies: Linked Data principles, RDF, SPARQL, RIF.

Semantic Web-based machine reading/listening in robots. FRED, will be extended and improved for dealing with context-based grounding and interpretation of natural language input.

"Entity-centric" knowledge management: each entity and its relations have a public identity that provides a first "grounding" to the knowledge used by robots. Such identity is given by resolvable URIs that use simple Web and Internet protocols to provide useful knowledge as a representative of real world entities.



Mario Ontology Network (MON) will reuse and extend the Ontologies for Robotics and Automation. MON will evolve over time by integrating ontologies emerging from interaction with assisted humans, sensors or with other robots.

Ability to advance robot knowledge by learning new ontology patterns from its experience with users and the robot network in place. New emerging patterns and expressions are fed back to the robot's cognitive system in order to address emotional needs of end users in compliance with the social and behavioral objectives of MARIO.

Robot social skills: a sentiment analysis framework based on deep parsing of natural language and supported by MON will deal with moods and expression recognition providing robots.

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Benefits to Society

costs

- Mass production of MARIO €5 - 7K
- Affordable solution in tackling loneliness

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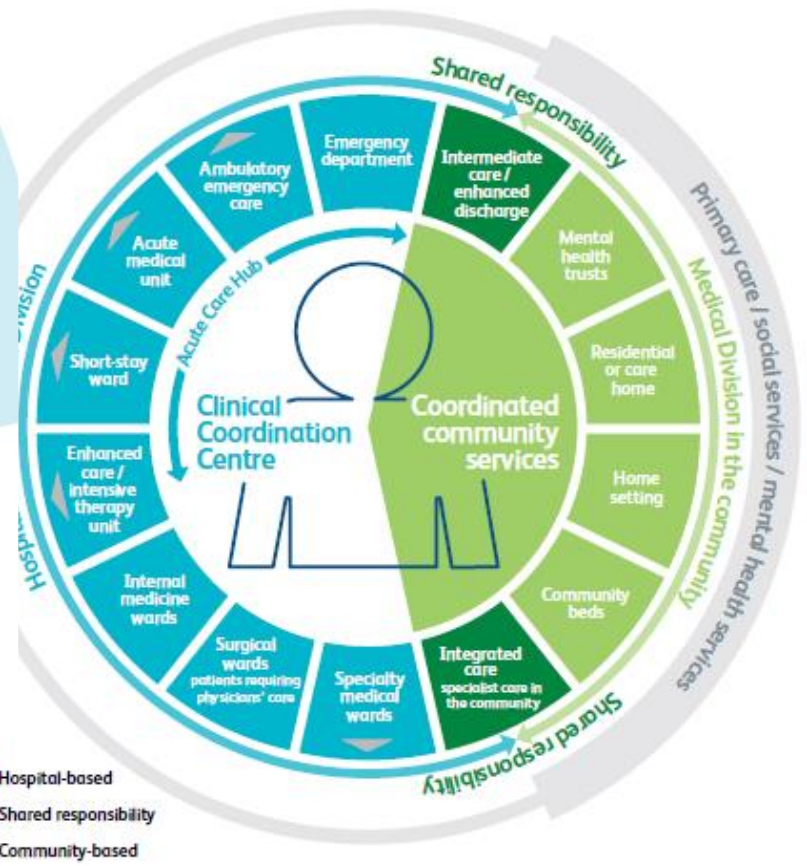


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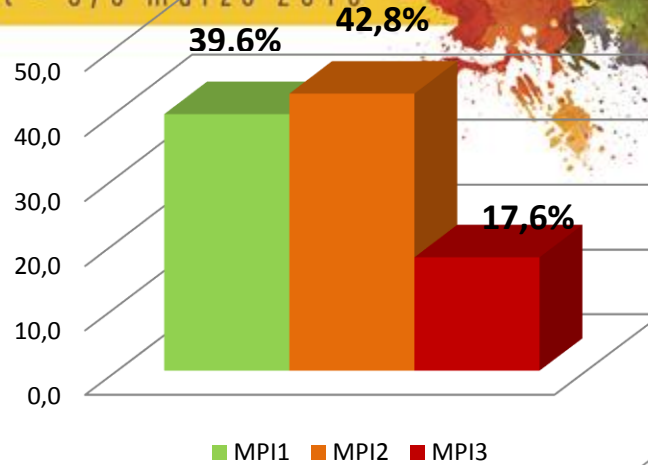
Future hospital: Caring for medical patients

A report from the Future Hospital Commission to the Royal College of Physicians
September 2013



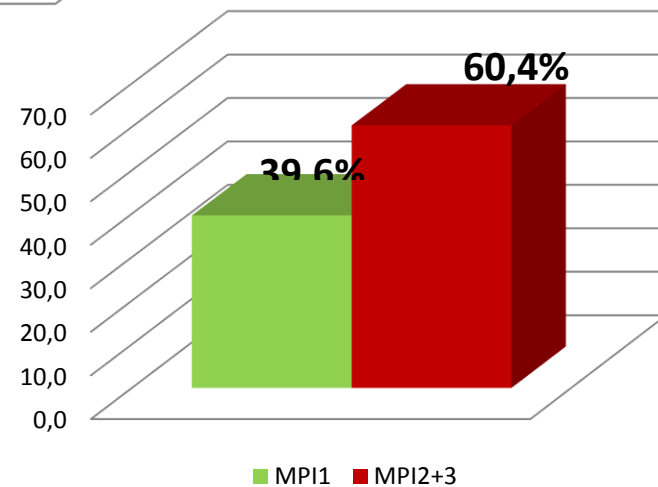
- Hospital-based
- Shared responsibility
- Community-based

FRAGILITA' IN GERIATRIA



luglio 2013 - ottobre 2014

1490 pazienti
Età media 81,18±7,89



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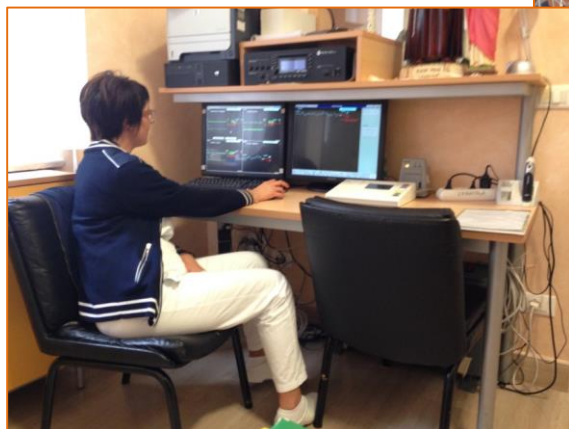


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UNITÀ OPERATIVA DI GERIATRIA

Terapia semi-intensiva





Our Message!

- Age of Loneliness affects us all
- Human companionship is best but not available
- MARIO has a role in society combatting the devastating impact of loneliness



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SEE YOU SOON

