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Quaderni dell'Osservatorio eHealth e-Sanit@

Meeting Italia /USA

un nuovo modello di formazione e ricerca per lo sviluppo della Sanità Digitale

Atti del Convegno

Bologna 3 - 4 Dicembre 2015

To Paul Sr.

Because of your life and your enthusiasm, you had been able to keep doors always open to new horizons.

Meeting Italia/Usa

Un nuovo modello di formazione e ricerca per lo sviluppo della Sanità Digitale

3 /4 dicembre 2015

ALMA MATER STUDIORUM
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Introduction

Carla Faralli

Director of CIRSFID - Interdepartmental Center of Research in History of Law

Philosophy and Sociology of Law and Legal Informatics

Healthcare has doubtless been facing a huge challenge of late.

Having radically changed our way of life, the new technologies are now transforming the delivery of healthcare services and our way of being patients.

In order for this transformation to be successful, even healthcare practitioners and professionals will have to gain a practical understanding of the way ICT tools function and the advantages they can bring, and the natural place from which to start in the effort to impart this knowledge is the university classroom, so as to then bring the know-how to healthcare facilities.

For this reason in December 2015—in marking the publication of a book that came out with Giappichelli titled Strumenti, diritti, regole e nuove relazioni di cura: Il Paziente europeo protagonista nell'e-Health (Tools, rights, rules, and new care relationships: The European patient at the centre of e-Health)—the Interdepartmental Centre for Research in the History Philosophy, and Sociology of Law and in Computer Science and Law (CIRSFID), based at the University of Bologna, promoted a conference under the title "Meeting Italia-Usa: Un nuovo modello di formazione e ricerca per lo sviluppo della Sanità Digitale" (Italy/USA meeting: A new training and research model for developing digital healthcare").

The conference was designed precisely for the purpose of reflecting on these issues with representatives and guests of the University of Illinois; the Mayo Clinic, in Rochester, Minnesota; the University of Bologna; and various Italian healthcare agencies.

The event also became an occasion to present best-practice models for industry-university partnerships, drawing on the experiences of the University of Illinois and the Mayo Clinic. Experts from Italy and the United States traded thoughts on key issues such as big data, healthcare networks and exchanges, and the new concerns of citizens 2.0.

We are thus happy bring out this e-book collecting the talks given at the conference, hoping that this may provide a cue for more constructive exchanges through which to grow our skills.

lting, Intellectual Property Management; and on numerous boards of technology-based firms.

Introduction

Bryan A. White

Professor and Director of the Mayo Clinic and University of Illinois Alliance for Technology-based Healthcare

The explosion of genomic data combined with electronic health records, environmental, exposures, and sensor data represent a great computational challenge that scientists are only beginning to appreciate. The challenge is to see how events in an individual's life-course, in combination with one's genetic makeup and epigenetic responses, result in health and disease. Precision medicine can be used to improve overall health and treat diseases such as cancer. It is a mechanism that promotes patient-centric outcomes focusing on the prevention and the treatment of different types of illnesses. With the question of "What is best for a patient?" in mind, precision medicine allows for opportunities for research and innovation. It allows clinician's access to tools to better access a patient's health, disease, or condition, and to better predict which treatment(s) may be most effective.

This encompasses what can be categorized as e-Health, the topic of the meeting based at the University of Bologna, promoted a conference under the topic of "A new training and research model for developing digital healthcare". Attended by faculty, administrators and members of the healthcare and education community from Italy, and informed by speakers from the Mayo Clinic and the University of Illinois at Urbana-Champaign, this meeting address how the healthcare community can successfully integrate and analyze a patient's genetic information, electronic medical records, and medical device data for point-of-care clinical decision-making. Building on the philosophy and experience of the Mayo Clinic and University of Illinois Alliance for Technology-based Healthcare, the European community discussed how to enable the use of traditional and non-traditional learning environments and delivery models for pre-service and in-service healthcare professionals, future health researchers and self-educating communities.

Medical research is rapidly becoming more data-intensive, enabling clinicians to use large complex, multidimensional and diverse datasets. Big data challenges the classic hypothesis driven approach. Successfully teaming together, the medical practice and computational science will have a profound impact on predictive medicine and patient care. Who hope that this book will help move this transition forward and educate the both the healthcare professional and lay community on the challenges and enormous potential of e-Health.

Introduction

Silvia Stefanelli

Stefanelli&Stefanelli Law Firm

New perspectives for the development of digital health will require competence from all inte-gral areas of the healthcare system, including Information Technology (IT) and legal skills.

To estimate how the legal system would deal with this evolving change, it would be necessary to analyze and understand the new models of healthcare service through the lens of IT.

Data protection, digital documentation, and e-healthcare service liability are just a few of the topics that the lawyers, in collaboration with the physicians and the healthcare management, will have to face in the coming years.

Aware of this challenge, Stefanelli&Stefanelli Study of Law, a leading Italian law firm speciali-zing in legal medical practice, was instrumental in the development and promotion of an in-ternational convention of significance "Meeting Italia-USA: un nuovo modello di formazione e ricerca per lo sviluppo della Sanità Digitale" ("Meeting Italy-USA: a new model of formation and reserch for the development of the Digital Health"), which brought together the leading representatives from prestigious institutes: the Mayo Clinic (Minnesota) and the University of Illinois at Urbana Champaign (Illinois) from the USA, in collaboration with the Italian dignita-ries from the government, health industry, legal system and advanced research.

The comparison between the new models of digital health – similar to "healthcare connected" of Mayo Clinic – transpires to re-think and re-model the future of healthcare service system.

Understanding the significance of the impending change and the powerful impact, we are proud to present this e-book that highlights the contributions from the interdisciplinary Convention, with a sincere hope that our efforts will encourage you to think and participate in the new initiatives pertaining to the reshaping of healthcare.

Delegazione americana - Guest Speaker BIO

Paul Magelli Sr.

Senior Director, Academy for Entrepeneurial Leadership, UIUC

Paul Magelli was one of the creator of this Convention.

He died on December 4th 2016 and he invested energies and enthusiasm in his work until the very end of his life.

Paul J. Magelli Snr was Senior Director of the Academy for Entrepreneurial Leadership.

He was educated at the University of Illinois. He was awarded an honorary Doctor of Law, honoris causa, by the University of Bristol, UK, in 2003 and upon completion he was awarded a Ford Foundation Fellowship and named to the first class of American Council of Education (ACE) Fellows. He returned to Illinois as Assistant Dean, College of Arts and Sciences and was promoted to Associate Dean and Director of Budgets. He later served as Dean, Fairmount College of Liberal Arts and Sciences, Wichita State University before being named Vice President for Academic Affairs, Drake University, Des Moines, Iowa.

Concurrently, he served as President of the National Council of Colleges of Arts and Sciences (CCAS) before joining Metropolitan State College of Denver as President and later served as President, Parkland College, Champaign, Illinois. Furthermore he served as Assistant Dean of the MBA program and Visiting Professor of Economics at the University of Illinois. During his terms as an Academic Officer, he was Chief Investigator of nearly $50 million in grants for academic program development.

Dr. Magelli collaborated with Dr. Paul O'Prey to establish the Bristol Enterprise Centre, where he was Board Director.

BEC is one of the most successful centers in the U.K. that manages intellectual property for four different institutions in Southwest England. Paul Magelli founded and was Executive Director of OSBI Consulting, the largest fee-for-service graduate student managed consulting firm in the College of Business at the University of Illinois that specializes in training students in technology commercialization. Paul was also Director of the Academy for Entrepreneurial Leadership at the University of Illinois and Scholar in Residence at the E. Marion Kauffman Foundation, Kansas City, Missouri.

Among recent assignments Dr. Magelli was served as a retained consultant for Deloitte Consulting, Intellectual Property Management; and on numerous boards of technology-based firms.

Delegazione americana - Guest Speaker BIO

Thenkurussi Kesavadas

Director of Health Care Engineering Systems Center (HCESC) - University of Illinois at Urbana-Champaign

Thenkurussi Kesavadas is the Director of Health Care Engineering Systems Center at the University of Illinois at Urbana-Champaign. Before coming to Illinois, Kesavadas was a professor in the Department of Mechanical and Aerospace Engineering at the University at Buffalo (NY), where he founded the University at Buffalo Virtual Reality Laboratory. He received his doctoral degree from the Pennsylvania State University in 1995. Kesavadas has been in the forefront of Virtual Reality and its application to medicine since 1993, when this field was still in its infancy. In 2004, Dr. Kesavadas was honored as the "Inventor of the Year" Western New York. He has also won numerous awards including SUNY Chancellor's award for Innovation in 2004 and UB Visionary of the year award in 2010. He developed the world's first stand-alone virtual reality Robotic Surgical Simulator RoSS and also co-founded two start-up companies. His own research interests are in the areas of medical robotics and simulation, virtual reality in design, haptics and human-computer interaction. Kesavadas is a Fellow of American Society of Mechanical Engineering and a member of IEEE.

As HCES Center director, Kesavadas will lead the development of the new Center and its research program. He also serves as "Engineer in Chief" of the Jump ARCHES collaborative partnership between the College of Engineering at Illinois and health care providers at OSF HealthCare and at the University of Illinois' College of Medicine at Peoria.

Delegazione americana - Guest Speaker BIO

Steve Ommen

Director of of the Cardiovascular Diseases Department of the Mayo Clinic/Mayo Center for Connected Care

Dr. Steve R. Ommen is a Professor of Medicine, Mayo Clinic College of Medicine, a Consultant in Cardiovascular Diseases and Internal Medicine, and Director of the Cardiomyopathy Clinic, Mayo Clinic. He is the Medical Director for AskMayoExpert, Associate Dean of the Center for Connected Care, and Medical Director, Connected Care Delivery Platform.

Dr. Ommen received his Bachelor of Sciences degree in Biomedical Engineering from Northwestern University. His undergraduate medical education, Internal Medicine residency and Cardiovascular Diseases fellowship were all completed at Mayo Clinic, Rochester, Minnesota.

Dr. Ommen has received several awards throughout his career including the Outstanding Achievement Award in Clinical Cardiology, the Mayo Award of Individual Excellence, the Mayo Award for Team Excellence, the Excellence in Teaching Recognition for Mayo Clinic College of Medicine, and the Outstanding Course Director Award from the Mayo School of Continuing Medical Education.

Dr. Ommen has served as a member of multiple scientific journal editorial boards. He has presented original research and keynote addresses at national and international scientific sessions.

Delegazione americana - Guest Speaker BIO

Bryan White

Director of Mayo Clinic/University of Illinois Strategic Alliance for Technology-Based Healthcare

Bryan White is a Professor of Animal Sciences in the Carl R. Woese Institute for Genomic Biology, and the Director of the Mayo Clinic/University of Illinois Strategic Alliance for Technology-Based Healthcare. He is an internationally acclaimed microbial ecologist and is regarded as an innovator in the use of multi-omics and next-generation sequencing technologies for studying microbiomes. Since 2012, he has served as the Director of the Mayo Clinic/University of Illinois Strategic Alliance for Technology-Based Healthcare (Alliance) on the Illinois Campus. The Alliance aims to blend the computational, genomic and engineering expertise of Illinois with the clinical practice and individualized medicine expertise of the Mayo Clinic to develop and implement new technologies that will transform the practice of medicine and provide innovative healthcare solutions. The Alliance provides innovative educational programs to train the next generation of clinicians and biomedical scientists in precision medicine, integrating cutting-edge research activities that focus on information-based medicine and point-of-care diagnostics, and discovering new technologies and bringing them to practical use to improve healthcare outcomes. In 2015 he was elected as a Fellow in the American Academy of Microbiology. According to the Academy, the honorific leadership group within the American Society for Microbiology, this honor recognizes excellence, originality, leadership, high ethical standards and scholarly and creative achievement.

Apertura lavori con l'intervento di:

Francesco Ubertini, Magnifico Rettore Università di Bologna

Licia Califano, Autorità Garante per la Protezione dei Dati personali

Francesco Ripa di Meana, Presidente FIASO

Mario Cavalli, Direttore Generale Ospedale Sant'Orsola di Bologna

Chiara Gibertoni, Direttore Generale ASL Bologna

Massimo Mangia, Responsabile e-Health Federsanità/ANCI

Domenico Favuzzi, Consigliere Assinform - delega eHealth

Indice dei contributi

"Modelli di sviluppo degli investimenti in Sanità Digitale"

"I BIG DATA per la Sanità"

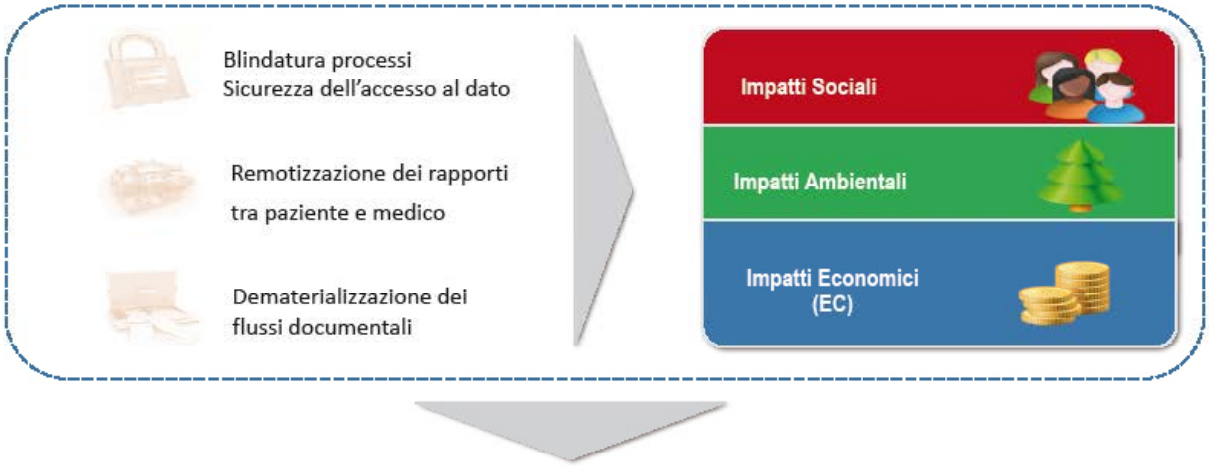
"Competenze per la Sanità 2.0"

"Reti sanitarie, assistenziali"

Carmelo Battaglia

Responsabile della Direzione Sales PMI, Ordini Professionali, PAL e Sanità di InfoCert S.p.A., dopo aver maturato l'esperienza (dal 2000 al 2009) in InfoCamere come responsabile delle relazioni istituzionali, con la costruzione di rapporti da un lato con le strutture centrali di alcuni Ministeri (in particolare per lo sviluppo economico, Economia, Agricoltura e Pubblica Amministrazione), dall'altro con il sistema delle Camere di Commercio. Nel suo ruolo di direttore delle Relazioni Istituzionali ha maturato un'esperienza che permette di svolgere il suo compito, di garantire la massima coesione tra gli interessi pubblici (Camere di Commercio e il mondo delle imprese) e gli interessi privati (Camera del sistema informatico aziendale "InfoCamere"). Il risultato della sinergia e la costante ricerca di interessi oggettivi tra le Camere di Commercio, regionali e gli organi centrali del sistema camerale e la struttura di informatica ha prodotto una serie di risultati ben definiti e misurabili in termini di efficienza della pubblica amministrazione, facilmente identificabile nel rapporto tra Enterprise e le Camere di Commercio italiane. La precedente esperienza professionale nella gestione del rapporto tra Cerved / InfoCamere e delle Camere di Commercio (novembre 1990 - settembre 2000) e precedenti esperienze in materia di contabilità e controllo di gestione (da Italcementi a RCS Editor) consentono la capacità di raggiungere i risultati attesi.

I punti di forza per il paperless 1/2



Riduce i costi | **Produce Salute** | **Migliora l'operatività** del personale sanitario

I punti di forza per il paperless 2/2

SOLUZIONI INFOCERT

1. FEA Allo sportello
2. Identity Management
3. Trattamento referti e immagini
4. Trattamento altre fonti
5. Fascicolo sanitario elettronico
6. Fatturazione elettronica
7. Sistema recupero cartelle cliniche analogiche

Soluzioni verticali InfoCert per la Sanità

Le soluzioni InfoCert consentono di remotizzare e dematerializzare il rapporto con l'utente, nel pieno rispetto della user experience definita, mediante l'adozione di soluzioni di:

- **Trattamento referti e immagini**
- **Trattamento altre fonti**
- **Fascicolo Sanitario Elettronico**

InfoCert supporta le strutture sanitarie nel ripensare il proprio back-office, nell'ottica della diminuzione dei costi e il recupero di efficienza.

Nel processo più generale di ripensamento delle attività di sportello, le soluzioni paperless InfoCert sono il fattore abilitante ai processi paperless:

- **Firma elettronica avanzata (FEA) allo sportello**
- **Identity management**

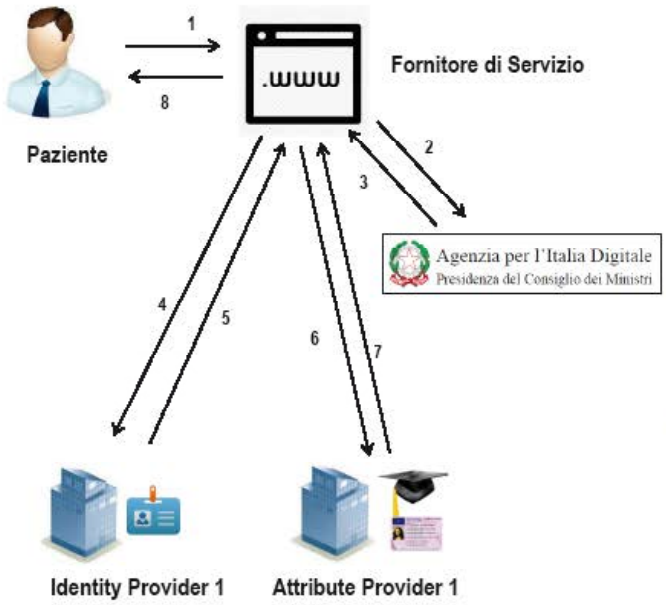
Superamento del digital devide

- **Fatturazione elettronica**
- **Sistema recupero cartelle cliniche analogiche**

Tipologie di documenti

Strutturati	Semi- strutturati	Non strutturati
Nei documenti strutturati la tipologia di informazione e la loro posizione è determinata a priori.	Nei documenti semistrutturati la tipologia di informazione presente è nota, la posizione può essere variabile.	Nei documenti non strutturati la tipologia di informazione presente è variabile, non esiste struttura a priori del documento.
Es. Referti	Es. Fattura	Es. Lettera

Identity management per l'accesso ai servizi sanitari



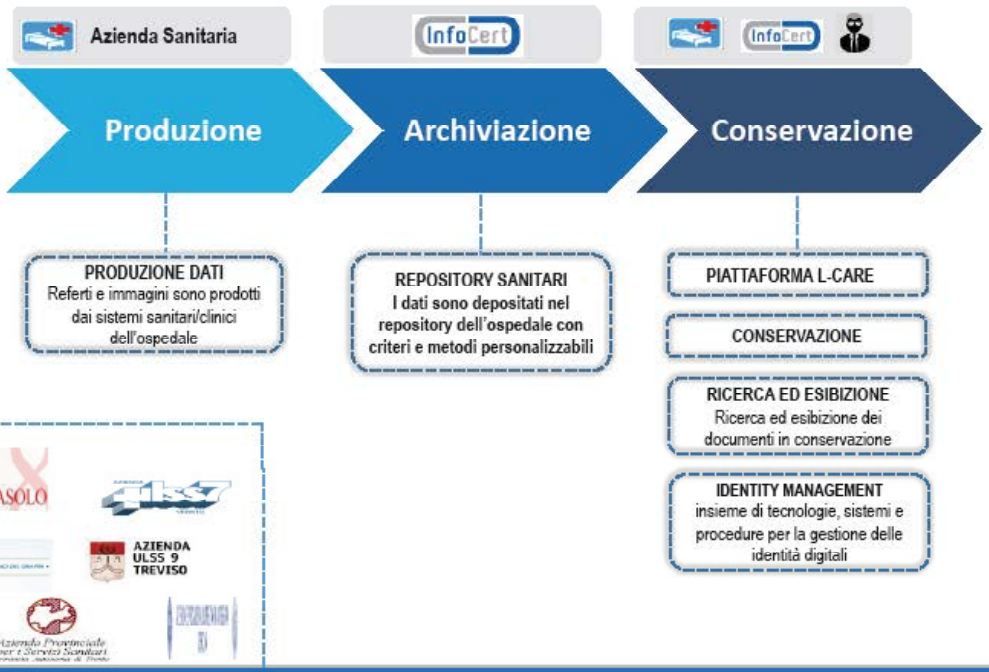
Le interazioni Fondamentali

- ✓ L'Utente richiede l'accesso ad un Servizio, fornendo il proprio identificativo e presentando una credenziale valida
- ✓ Il fornitore di Servizio interroga il registro degli Identity Provider e Attribute Provider presso AgID
- ✓ AgID restituisce copia del registro
- ✓ Il Fornitore di servizio inoltra la richiesta di autenticazione all'Identity Provider corretto
- ✓ L'identity provider, nel caso in cui l'utente disponga del corretto livello di credenziale, ne verifica la corrispondenza, fornendo al fornitore di servizio l'asserzione di identità e gli eventuali attributi richiesti.
- ✓ L'utente autenticato viene autorizzato ad accedere al servizio o alla funzione richiesta

Firma grafometrica e paziente

Trattamento referti e immagini

Il processo, garantito dalla soluzione L-Care che integra la conservazione, è legato alla conservazione dei referti, firmati digitalmente, e alle immagini referenziali



ESPERIENZE

Fascicolo Sanitario Elettronico (FSE)

Il Fascicolo Sanitario Elettronico è l'insieme dei dati e documenti digitali di tipo sanitari riguardanti l'assistito e copre l'intera vita del paziente.

Caratteristiche

- Modello standard
- Gestione di un patrimonio
- Repository documentale conforme alle specifiche XDS.b di IHE

Barra di ricerca Universale con motore semantico e ricerca in linguaggio naturale.
Suggerimenti on key type.
Single click per Apertura documento

Timeline del paziente
Menù di accesso ai documenti

InfoCert – Principali referenze

Alberto Dall'Acqua

Nella posizione attuale, ho la responsabilità di progettare e implementare le attività volte a promuovere l'accesso, l'adozione e il riconoscimento del valore della nuova tecnologia terapeutica da parte del mercato, spostando l'attenzione dal medico prescrittore (storicamente è stato il medico a richiedere la soluzione terapeutica) per la stakeholder pluralità (amministratori di ospedali, istituzioni, medici, pazienti, ecc.) In particolare, sono responsabile per l'attuazione di tutte le attività volte a identificare, ottenere, analizzare gli aspetti di economia sanitaria, i risultati di efficacia clinica, informazioni di rimborso (ossia la conoscenza dei codici DRG e il suo meccanismo di pagamento) per supportare strategie economiche e rimborsi per nuovi dispositivi medici per il trattamento di malattie cardiache, neurologiche, uro-ginecologiche, respiratorie, associato con le linee di prodotto di Boston Scientific.

Boston Scientific

Advancing science for life™

"Modelli di sviluppo degli investimenti in Sanità Digitale. Un confronto tra Italia e Stati Uniti"

Remote Patients Management

Alberto Dall'Acqua

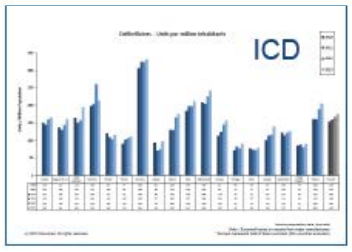
Bologna - Dicembre 2015

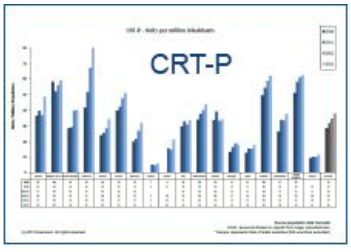
1

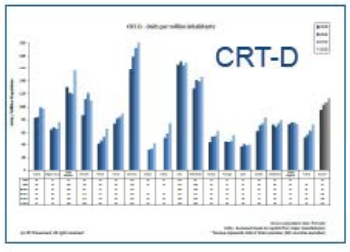
Background

Boston Scientific

EUCOMED 2014







In Italia in the period between 2008 and 2013 the implants number increased of **21,36%**

2

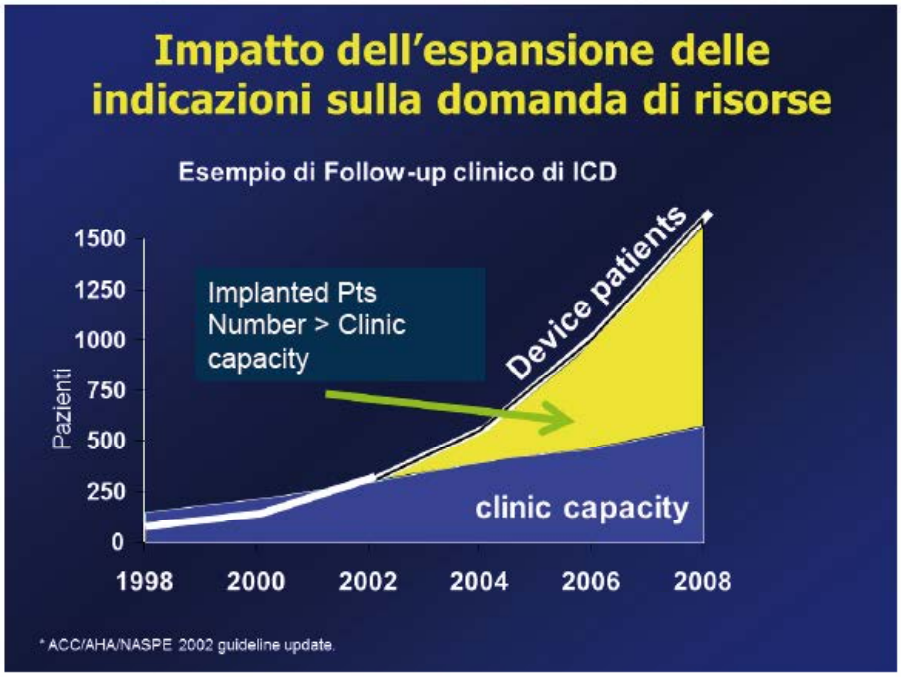
Background

In the last 5 years:

- ✓ In Italy were implanted at average 85.000 cardiac devices every year (60.000 PM e 25.000 ICD)
- ✓ Around 70.000 devices in patients over 65 years old (Older Patients)
- ✓ More than 30.000 devices in patients over 80 years old
- ✓ Assuming a survival of implanted devices recipients more than 5 years, we can estimate more than 340.000 patients over 65 years with an implanted cardiac device where around 290.000 with a PM implanted and around 50.000 ICD implanted.

3

Background



4

Background

The treatment with the device of new diseases has led to an exponential expansion of the use of the devices and to an increase in the number and clinical complexity of the patients who are in charged of the centers of cardiac stimulation.

5

Remote Monitoring

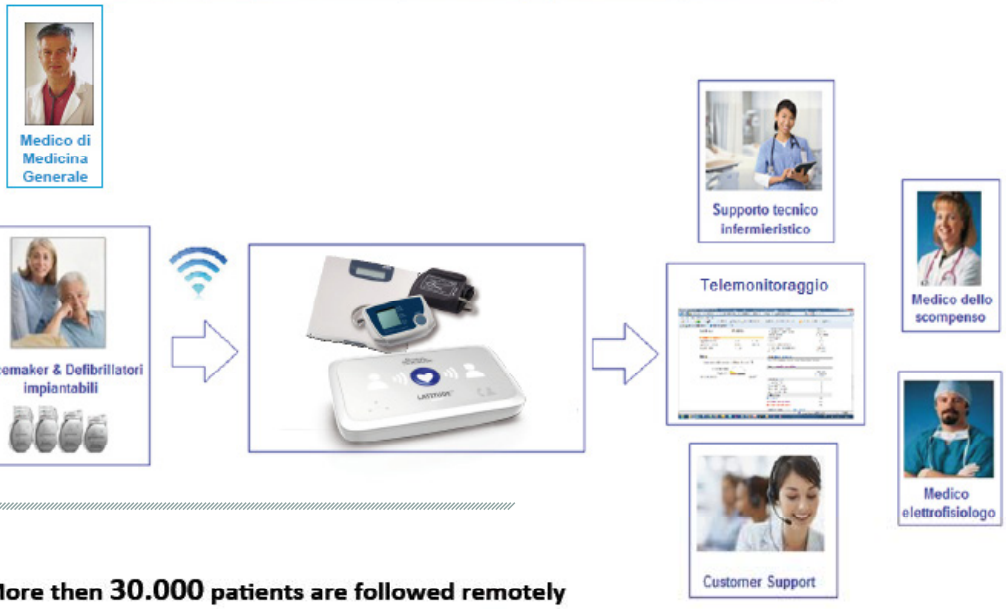
Remote Monitoring is an effective alternative to outpatient follow-up

✓ **Continuous evaluation of device functionality**

✓ **Early detection of clinical destabilization episodes**

6

Remote Monitoring



More then 30.000 patients are followed remotely

7

Clinical & Economic benefits

Hospitals / NHS	*Patients*	*Community*
Reductions: • **Unnecessary outpatient visits** *(40-78%)* • **Hospital resources (Physician & Nurse)** *(60%)* • **Hospitalization duration and number** • **Follow-up duration** *(40-67%)* • **Not scheduled in-hospital visit** *(35%)* • **Hospital costs** *(33-61%)*	**Clinical:** • **Early detection of clinical events and device failure-malfunctioning** • **Innapropriate shocks reduction** *(50%)* • **increase of quality of life** • Decrese of mortality rate **Economic:** • **rcaregiver costs reduction (indirect costs)** **Others:** • **Increase of patient compliance**	**Reductions:** • **Social costs,** • **Indirect costs** (i.e. lost of productivity) *(53%)*

Metanalisi di studi clinici (vedi slide finale rif. 1-11) e documenti di consenso AIAC e Assobiomedica

8

Italian Situation

- Remote Monitoring System used in around **88%** Cardiac Stimulation Centers to manage implanted patient
- Used in around **30.000** patients (less then 10%) despite the clinical and economic benefits

IMPLANTED PTIENTS FOLLOW-UP MANAGEMENT:

- In-office visit (control and re-programming) reimbursed according unique code (89.48.1) – apart 4 Regions that the reimbursement is differentiated on the basis of implanted device (PM: 89.48.01 e ICD: 89.48.02)
- Remote Control device: **currently none reimbursement** (either in terms of performance and in terms of delivered services)

9

European Situation

10

European Situation

PAESE	SITUAZIONE	Descrizione
Germania	Rimborsato	a controllo progetto pilota (Agosto – Ottobre 2014)
Italia	Non Rimborsato	
Spagna	Non Applicabile	Global budget
Francia	Rimborsato	Price premium 800 – 1.000€
UK	Rimborsato	Accordi per singolo ospedale (50% visita)
Olanda	Rimborsato	Accordi per singolo ospedale
Austria	Non Rimborsato	
Belgio	Non Rimborsato	
Finlandia	Rimborsato	119€ a paziente (compenso annuale)
Danimarca	Rimborsato	110€ a paziente (compenso annuale)
Svezia	Rimborsato	200€ per diagnosi via web, -50% se non vi è diagnosi
Portogallo	Rimborsato	25€ ogni controllo del dispositivo in remoto

* Dati Assobiomedica: Controllo Remoto

11

Conclusion

- Remote Monitoring System is delivered free of charge (generally associated to premium price device)
- It's reasonable consider Remote Monitoring System as a service (offered as a separated service instead of a unique lot with implantable device)
- It's desirable to obtain a reimbursement for hospital in order to support the increase of RM population, especially those at high complexity disease or high criticity.

12

Achille Grisetti

Laureato in Scienze Agrarie a Milano, ha completato la propria formazione in Italia e all'estero, spaziando dall'International Marketing, al Sales Management; dal People Leading, al Change Management, presso numerosi Istituti e scuole manageriali quali Insead e Istud.

Product Manager presso Bayer ed Ethicon, ha proseguito la propria carriera presso Bristol-Myers Squibb, maturando negli anni una grande esperienza nel mercato della Sanità, ricoprendo ruoli dirigenziali nelle aree marketing e vendite. Successivamente ha sviluppato una significativa esperienza nella direzione generale di strutture operative di importanti aziende multinazionali in Italia, che operano nel settore medicale. E' stato General Manager presso Coloplast dal 1996 al 2008 e presso Q-Med ICT dal 2008 al 2012. Ha in seguito ricoperto il ruolo di Business Unit Director presso Covidien e, a marzo 2013, ha assunto la direzione delle operazioni italiane di NoemaLife. Da febbraio 2014 a gennaio 2015 ha ricoperto la carica di Direttore Generale del Gruppo NoemaLife.

NOEMALIFESUCCESSSTORY

METHIS: IL PROGETTO DI INFORMATIZZAZIONE DEL LABORATORIO DI CITOFLUORIMETRIA DELL'OHIO STATE UNIVERSITY (USA)

OHIO STATE UNIVERSITY - WEXNER MEDICAL CENTER

Il **Wexner Medical Center** dell'**Ohio State University (O.S.U.)** è un centro di eccellenza nella ricerca medica e nella cura del paziente. O.S.U. have been recognized as one of the nation's Most Wired hospitals 13 times by Hospitals & Health Networks magazine, more than any hospital in Ohio. The award recognizes technology infrastructure and use in management, and clinical quality and safety.

Wexner Medical Center is the Midwest's highest ranked hospital for safety and patient care and have received the **highest award from HIMSS Analytics**, which tracks hospitals progress on the Electronic Medical Records Adoption Model.

The Ohio State University College of Medicine is consistently **ranked among the top 40 medical schools in the United States** and among the top 15 at public universities.

IL DIPARTIMENTO DI EMATOLOGIA E CITOFLUORIMETRIA

The Division of Hematopathology combines the diagnostic aspects of laboratory hematology and coagulation, bone marrow, and hematolymphoid tissue interpretation and **flow cytometric analysis**.

In addition to their clinical duties the Hematopathology Division **is actively involved in research projects and supports clinical studies through collaboration with oncologists, computer scientists and various cooperative research groups**.

IL PROGETTO METHIS

METHIS nasce nel 2013 dalla collaborazione fra la business unit di sviluppo del prodotto software di NoemaLife, i patologi del Dipartimento di Ematopatologia del Wexner Medical Center e la divisione di Citofluorimetria di Beckman-Coulter, leader mondiale nella produzione di strumentazione diagnostica.

Il progetto mira a dotare il laboratorio ad alta complessità di Citofluorimetria di una **soluzione informatica specialistica, completa e flessibile**, in grado di innestarsi nel tessuto informatico preesistente dell'O.S.U., raccogliendo le informazioni cliniche dei pazienti, integrando la strumentazione diagnostica e consolidando i dati in forma sintetica di referto.

METHIS unisce la complessità di un potente middleware di integrazione strumentale alla flessibilità e alla ricchezza di funzionalità tipiche di un LIS di settore, divenendo di fatto il **compagno ideale e il supporto informatico del patologo durante l'esecuzione della sua quotidiana routine di lavoro**.

L'innovazione tecnologica introdotta da **METHIS** nel laboratorio consente di gestire in modalità sicura e tracciata tutte le fasi del processo garantendo un pieno controllo sui risultati prodotti.

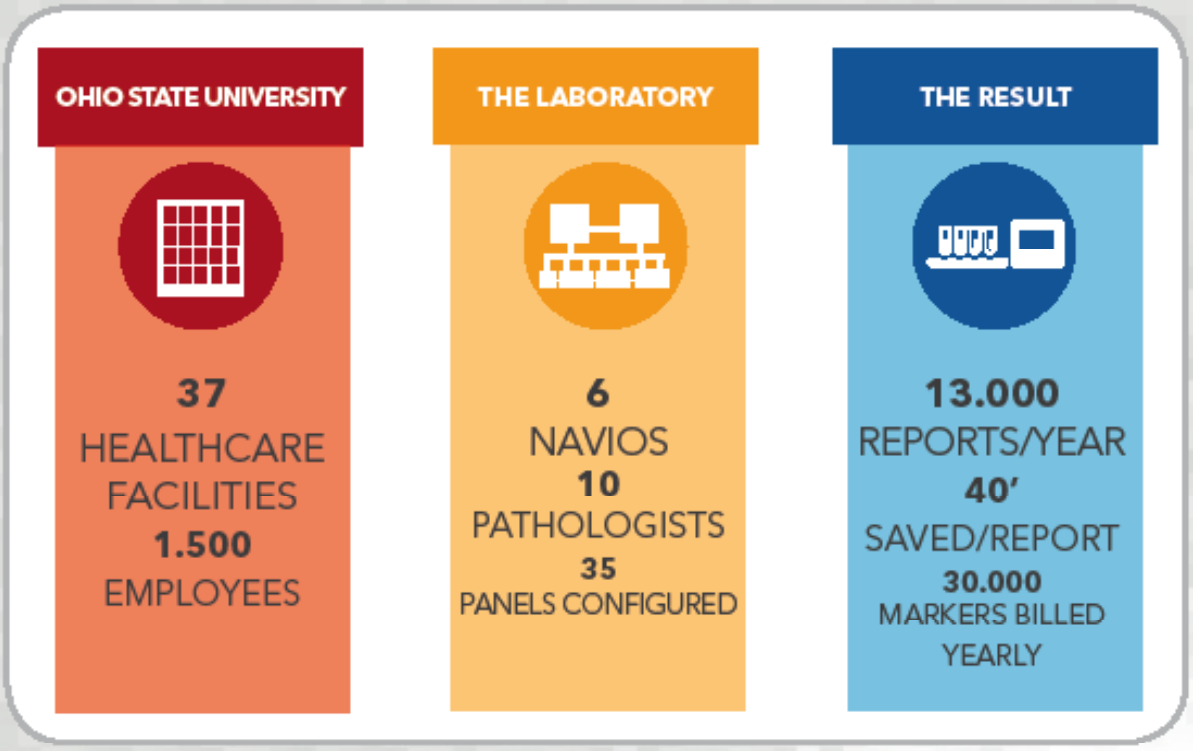
L'introduzione di **METHIS** ha consentito al laboratorio di Citofluorimetria dell'O.S.U. di **ottenere importanti benefici** nella gestione delle proprie attività, con particolare riferimento a:

1. **Completa integrazione con la rete informatica dell'O.S.U.** per la gestione delle informazioni cliniche del paziente
2. **Integrazione nativa con la strumentazione NAVIOS di Beckman-Coulter:** possibilità di gestire in maniera automatica la programmazione dei test e il ritorno dei risultati e supporto del flusso di lavoro manuale per la preparazione di aliquote e caroselli
3. **Completa tracciabilità del processo di diagnosi,** gestione in **sicurezza** dei dati clinici del paziente e **rendicontazione dei marker utilizzati**
4. **Riduzione significativa dei tempi di refertazione** tramite metodologie di compilazione rapida e strutturata dei dati
5. Possibilità di **analisi dei dati prodotti** tramite realizzazione di indicatori di performance ed epidemiologici.

METHIS, LA SOLUZIONE DI NOEMALIFE PER LA GESTIONE DEL LABORATORIO DI CITOFLUORIMETRIA, OFFRE:

- **INTEGRAZIONE CON LIS/HIS**
- **INTEGRAZIONE NATIVA CON STRUMENTAZIONE BECKMAN-COULTER**
- **TRACCIAMENTO DI TUTTE LE OPERAZIONI EFFETTUATE E DEI MARKER UTILIZZATI**
- **SISTEMA DI REFERTAZIONE AVANZATA**
- **ACCESSIBILITÀ AI DATI PER ANALISI STATISTICHE**

THE OHIO STATE UNIVERSITY METHIS PROJECT IN NUMBERS



NoemaLife is an **International Group** established since 1996 in Italy, listed on the Italian Stock Exchange since 2006, and **now a leading European name in the clinical and hospital information systems market**.

NoemaLife solutions help to **optimize the workflow of healthcare structures at departmental, hospital and regional level**, through the adoption of a new management approach, integrating the various aspects of the clinical process across all the main fields of application:

- **CLINICAL SERVICES**
- **DIAGNOSTIC SERVICES**
- **COMMUNITY AND REGIONAL**

NoemaLife solutions are used with success around the world by **more than 2000 healthcare facilities** and over **200,000 healthcare professionals**, with support from a highly specialized Customer Service operating 24/7, all the year round.

Operating with a staff of 730 professionals worldwide, **NoemaLife** maintains a direct market presence in Italy, France, Germany, United Kingdom, Argentina, Chile, Belgium, Japan, United Arab Emirates, Morocco, Algeria, Croatia, Mexico.

Beckman-Coulter ....

ITSSOSU15-1

NOEMALIFE WE CARE

WWW.NOEMALIFE.COM

BECKMAN COULTER

WWW.BECKMANCOULTER.COM

SaraLuisa Mintrone

Ha iniziato la sua carriera nel mondo della Sanità Elettronica nel 1986, vivendo da allora tutte le fasi evolutive di questo ambito, ricoprendo differenti ruoli nell'area tecnica prima e marketing e commerciale poi.

Nel 2007 ha assunto il ruolo di "Workflow Solution Manager" in Siemens Healthcare, con l'obiettivo di costruire un nuovo approccio al mercato focalizzato sul "problema clinico", integrando attraverso le tecnologie informatiche diverse soluzioni e prodotti del mondo medicale, sia a livello di diagnostica per immagini che di diagnostica di laboratorio. Nel 2010 ha contribuito allo scouting del mercato della sanità elettronica cinese per Dedalus Spa, nel ruolo di Direttore Marketing e International Sales.

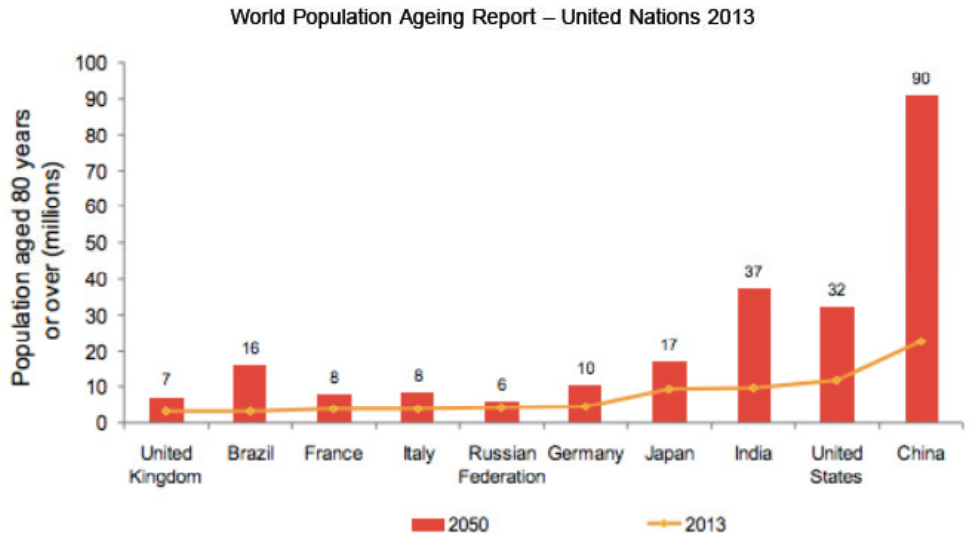
Dal 2011 al 2014 ha avuto il ruolo di Direttore dell'Innovazione e dello Sviluppo Offerta nella Direzione Pubblica Amministrazione e Sanità di Engineering Ingegneria Informatica, avendo l'opportunità di allargare le proprie competenze dall'ambito "paziente" a quello "cittadino" e "persona".

A partire dal giugno 2014 è rientrata in Dedalus per assumere la responsabilità dello sviluppo del mercato europeo, in particolare in Gran Bretagna e Turchia.

Grazie a questo lungo e variegato percorso ha avuto modo di costruire una rilevante esperienza in molti e differenti settori della Sanità elettronica italiana ed internazionale, esperienza che le consente di contribuire a disegnare con autorevolezza il ruolo delle tecnologie informatiche a supporto della sanità del futuro.

DEDALUS HEALTHCARE SYSTEMS GROUP

Population ageing Trend



Dedalus HEALTHCARE SYSTEMS GROUP

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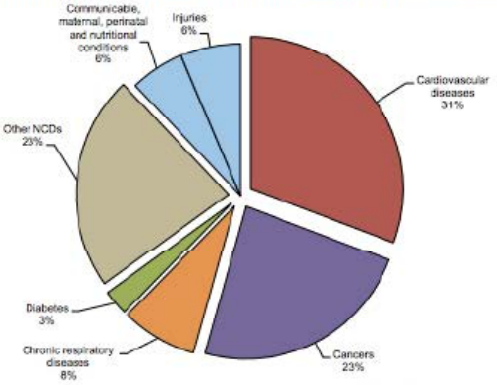
NCDs (Chronic Pathologies) situation

USA

Percentage of population living in urban areas: 82.4%
Population proportion between ages 30 and 70 years: 50.3%

Proportional mortality (% of total deaths, all ages, both sexes)

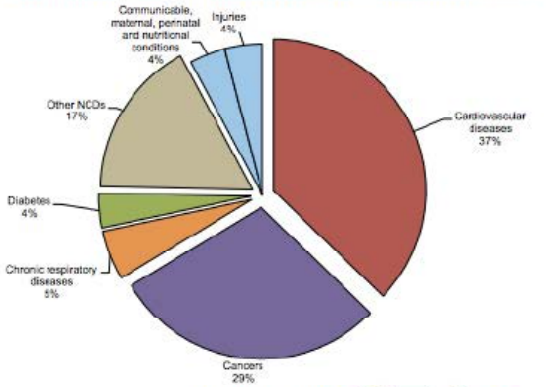


Total deaths: 2,656,000
NCDs are estimated to account for 88% of total deaths.

Italy

Percentage of population living in urban areas: 68.4%
Population proportion between ages 30 and 70 years: 55.0%

Proportional mortality (% of total deaths, all ages, both sexes)



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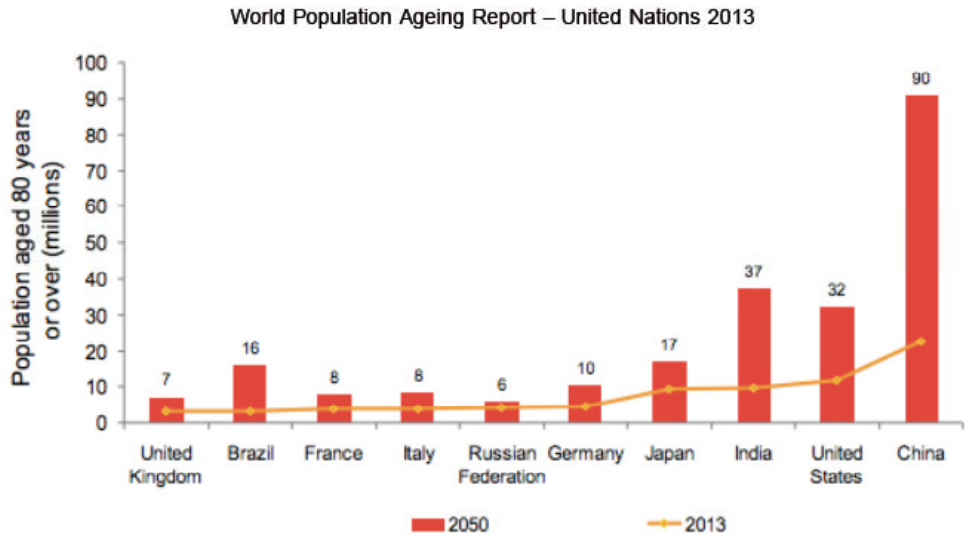
DEDALUS HEALTHCARE SYSTEMS GROUP

Population ageing Trend



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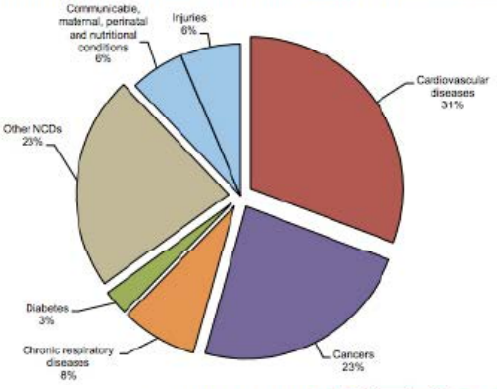

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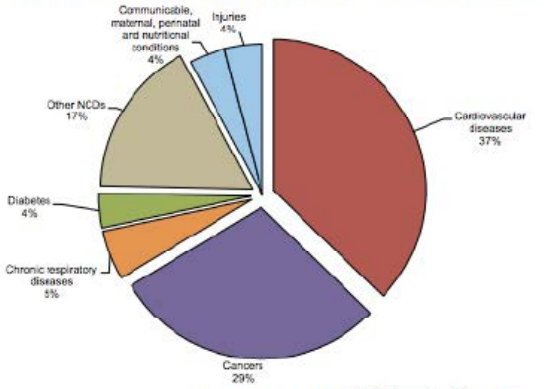

Total deaths: 573,000
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To cope these challenges....

we need

COLLABORATION and

INFORMATION SHARING

between all the different actors of the healthcare process

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Italy – Campania Region

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Primary Care & Private Care Regional Network

- GPs create eReferrals, through their EMR systems, and publish them to X1.V1
  - General population served: 5M
- Private Care clinics and centres are able to retrieve the eReferral and deliver diagnostic services accordingly
  - Laboratory, Radiology
- Reports are then published on X1.V1, notifications are sent to the GPs
- GPs are able to retrieve the published reports and import the structured data in their EMR systems

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Italy – Lazio

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Rieti Chronic Pathway network

- Chronic disease pathway network for the province of Rieti
  - General population served: 47.000
- Focused on diabetes, expansion planned to other chronic diseases pathways
- Current enrolment level: 24 GPs and opt-in patients
- X1.V1 supports GPs EMR document exchange:
  - Patient enrolment form, ePrescriptions, eReferrals, reports (radiology, lab)
- Patient Web Portal – PHR

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China

Daqing Municipality

大庆

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Daqing Project at a glance

Goal: municipal-level health information platform to strengthen the public health, medical services, new rural cooperative information exchange

Through: Standards-based interoperability between each part of the city's medical and health information system

In order to:

- **provide** timely, accurate and comprehensive **information to the Daqing** authorities
- **provide digital health services to the citizens** by realizing the interoperability among various healthcare institutions

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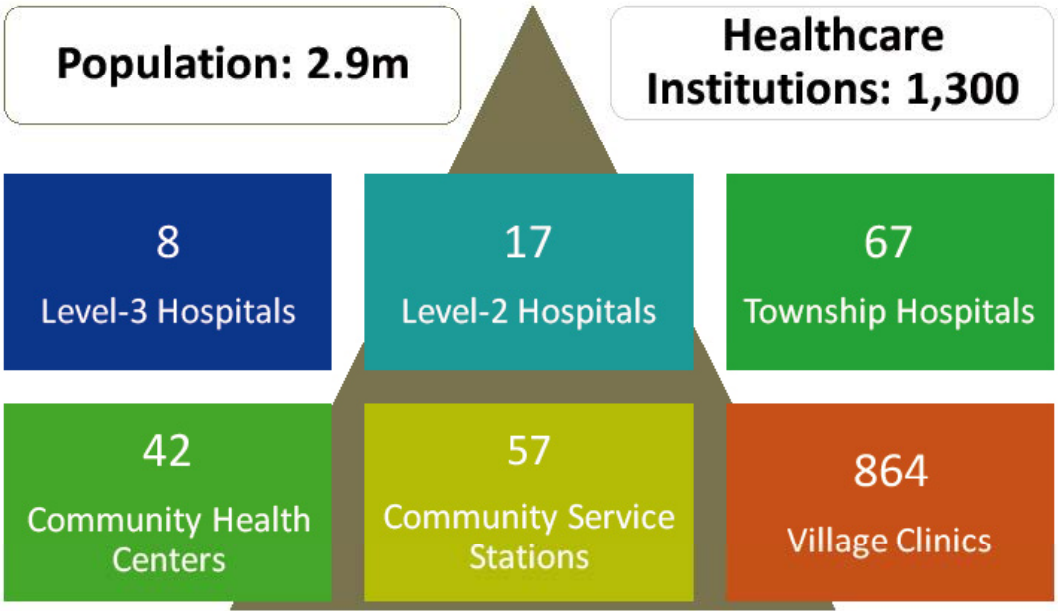
Daqing Project Figures



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X1V1 Daqing Project: functionalities

- Health data center and data integrated platform
- Unified ID identification
- Web portal for doctors and nurse (EHR Viewer)
- Web portal for citizens
- Two-way referral system
- Decision analysis: Business Intelligence and KPI
- Administrative platform
- Virtual platform: sub - healthcare authorities

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Documents managed at Daqing

- Documents managed for each year, about
  - 9.500.000 for inpatients
  - 15.500.000 for outpatients

- Type of documents managed:
  - Referrals
  - Drugs Prescription
  - Reports from HIS, LIS, RIS, EMR,...
  - CT and ultrasound reports and images from PACS
  - Generic reports by HIS of Communities

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KPI for Daqing Health Authority

Inpatient KPIs

Number of available bed
Number of occupied beds
Average hospitalization days
Average amount of inpatiens
Bed rotation rate
Inpatient number for types of disease
Inpatient incomes

Drugs KPIs

Drug Sales incomes
Quantity of drugs sold
Essential Drugs income and quantities sold

Outpatient KPIs

Daily outpatient visits
Average amount of prescriptions
Outpatient drug incomes
Other incomes (ie. registration fees, examinations, medical consumables)

Financial KPIs

Annual revenues & costs
Human resources (number of staff, working position, level, age, gender, etc.)
Fixed assets
Public healthcare information (including vulnerable categories and chronic disease patients)

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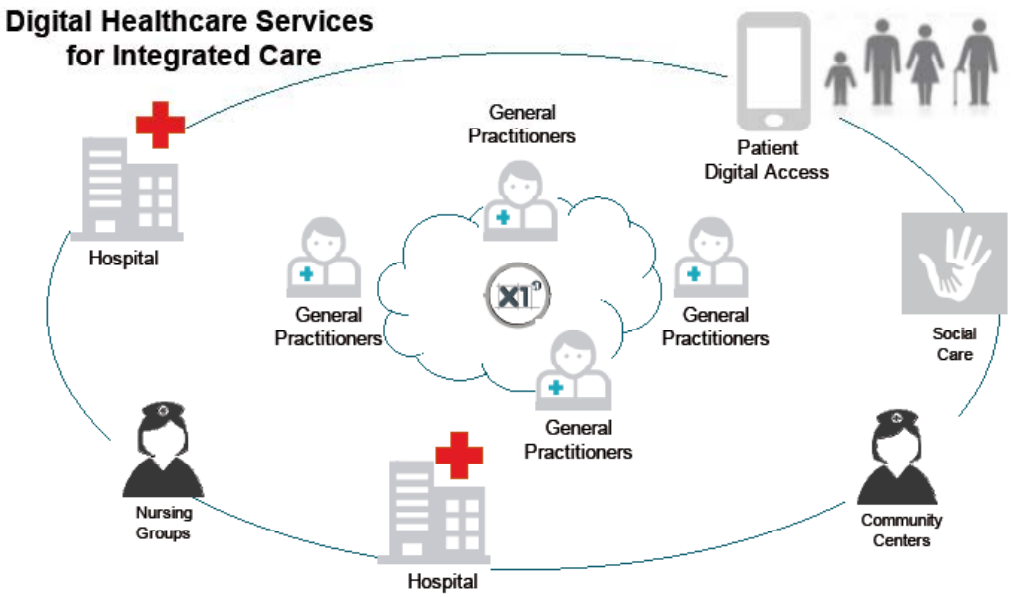
IoP and Collaboration in UK



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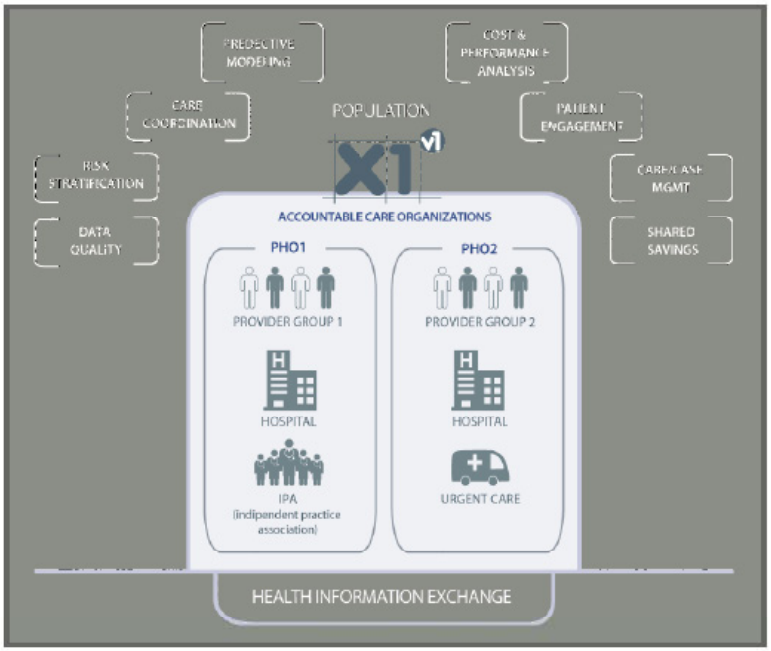
Collaboration for A.C.O. (and H.I.E.) - USA



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Collaboration in A.C.O. (and H.I.E.)

Dedalus X1.V1 as EMR Vendor Neutral

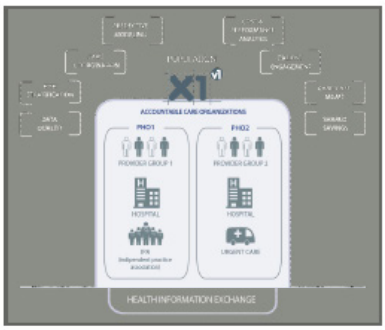
No rip and replace of existing infrastructure

Supports reduction of care fragmentation

Supports the continuum of care

Supports Reduction of clinical errors

Support on implementing "Meaningful Use" Stage 2 and 3



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Collaboration in US Health Market

USA is a "mature" Healthcare IT market... but not yet about IoP

2011-2012	2014	
Stage 1	Stage 2	Stage 3
Data capture and sharing	Advance clinical processes	Improved outcomes

Meaningful use stimulus introduced the concept, ma still too frequently Interoperability is confused with interfacing.

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Interfacing vs Collaboration

Software	Interfacing	Actors
HL7		IHE
Messages		Processes
	Collaboration	

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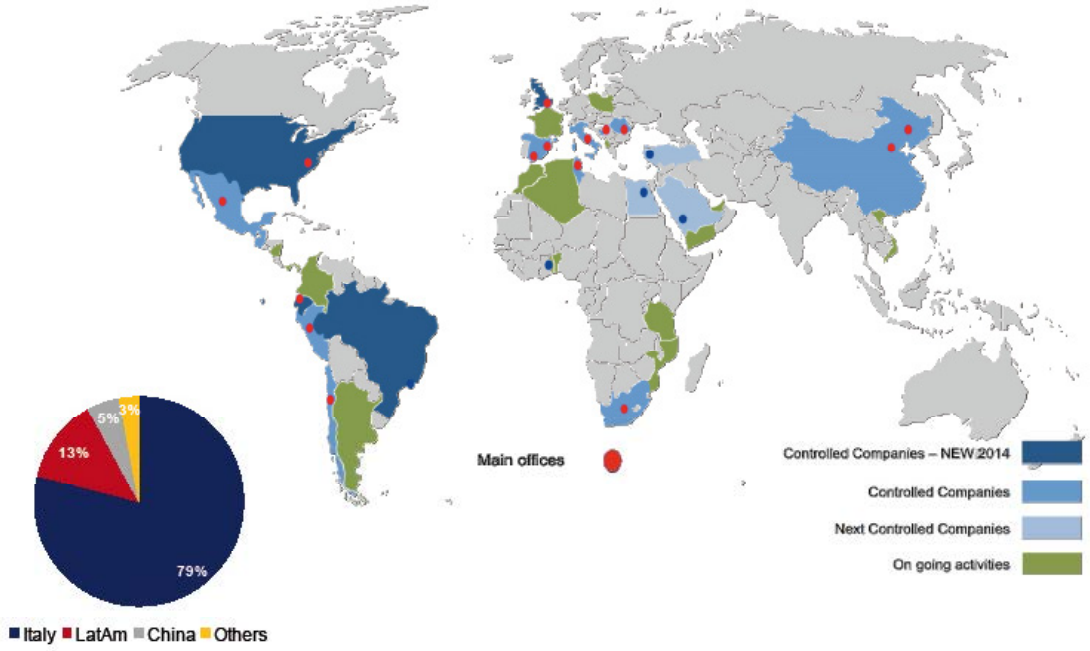
Dedalus... international footprint



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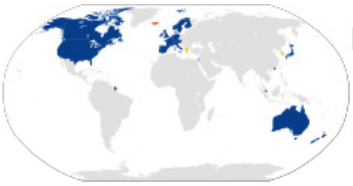
International Strategy... based on needs



Developed markets

IoP and Collaboration Approach

Emerging markets

Primary Care Systems Approach

Every market

Oncology Process Approach

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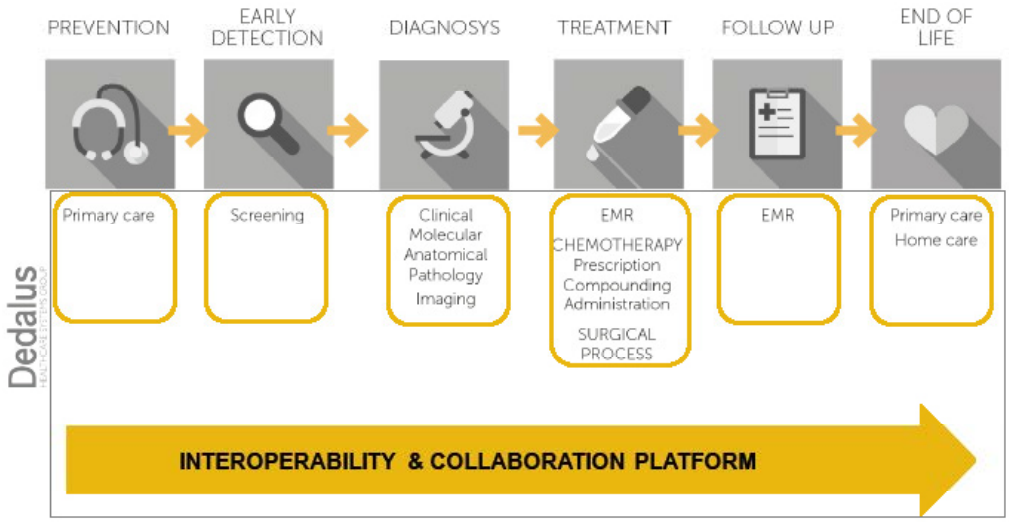
Oncology Process Approach



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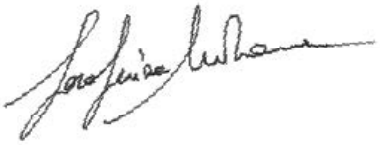
Conclusions

Every Market is different

Investments and strategies needed are different

Flexibility and strong healthcare processes knowledge are key !

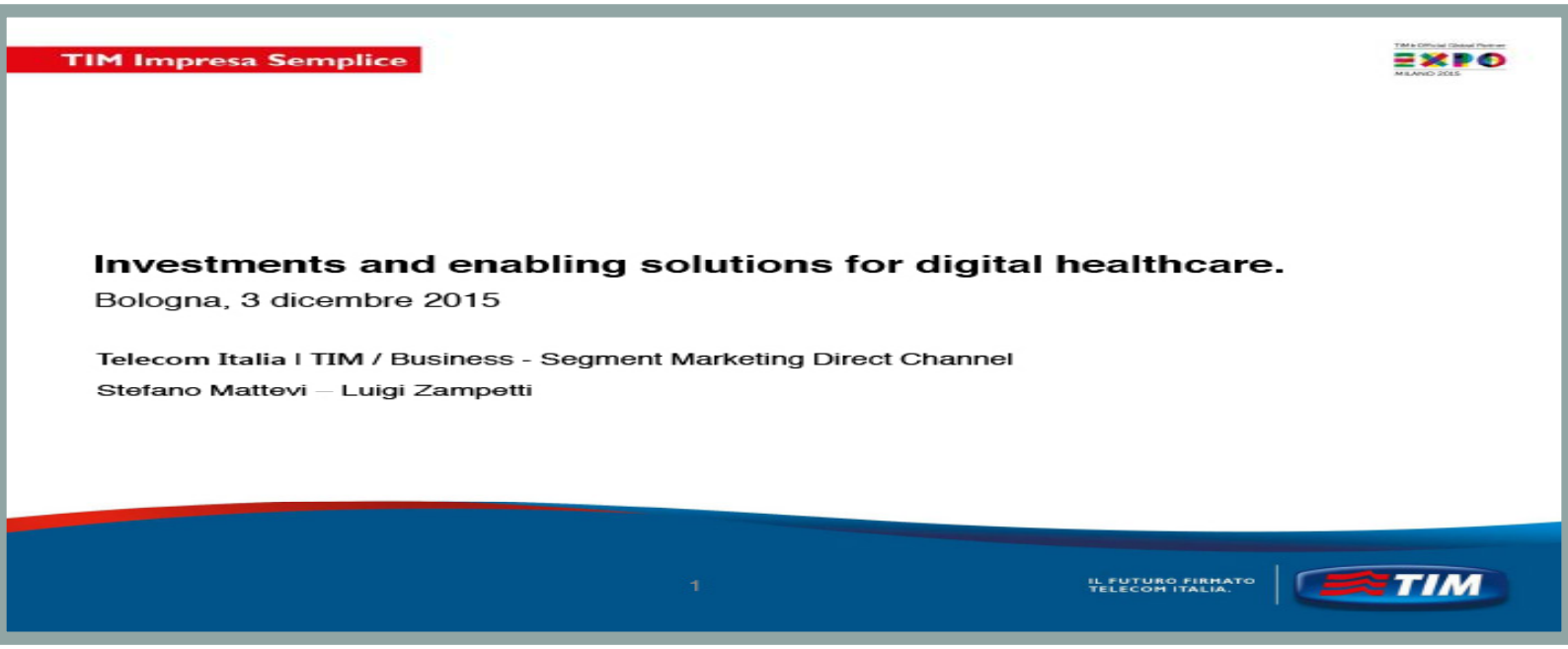
Thanks



Dedalus

Luigi Zampetti

Lavora nella Industry Marketing della Direzione Business, Sales Top & PAC. Dal 2003 si occupa di Sanità Digitale con obiettivi marketing e commerciali, partecipando alla elaborazione di studi specifici: "Il FSE" con la SIT ed il CNR-LAVSE; "Valutazione del valore dell'utilizzo dell'ICT in Sanità" con AISIS, CERGAS UniBocconi, CERISMAS UniCattolica Milano, Federsanità, Netics; "Sanità digitale e mobile health" con il PoliMI; "Patient Empowerment" con il CERMES UniBocconi; "FSE: stato dell'arte" con il CERGAS UniBocconi; "Telemedicina budget impact" con il CEIS UniTor Vergata, "Litis" con Federsanità. Entrato nel settore ICT nel 1979, ha avuto sette diverse esperienze di lavoro, tra cui due dirette con la Pubblica Amministrazione (PCM, Regione Lazio). I tre principali progetti seguiti sono: Giubileo, sito multilingua (1998-2001), Radici, telemedicina per i diabetici (2004-2009), Brasile, telemedicina nelle favelas (2008-2010).



(1) National Health Systems trends

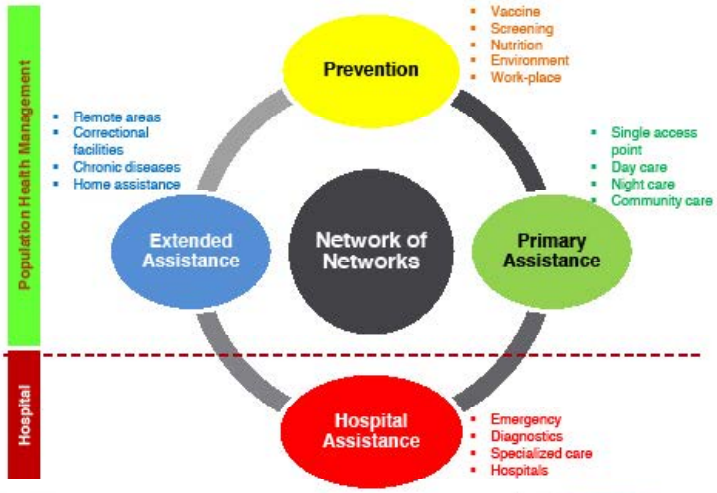
Both public and private National Health Systems are moving towards the adoption of models that balance centralized hospital care with local assistance. Such trend is driven by

- **Cost saving** objectives
- **Sustainability**
- **Pertinence**: i.e. the ability to provide to Patients the «right service at the right time with the appropriate resources».

(2) The «Network of Networks» model

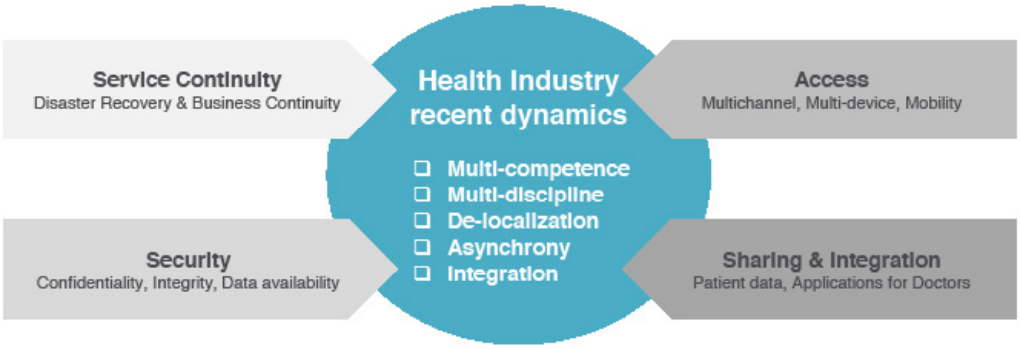
A balanced and effective health system model can be represented by a "network of health services networks" .

Such services are delivered by centralized or local structures, according to levels of cure intensity and illness seriousness and urgency



(3) Key requisites for Digital Health technologies

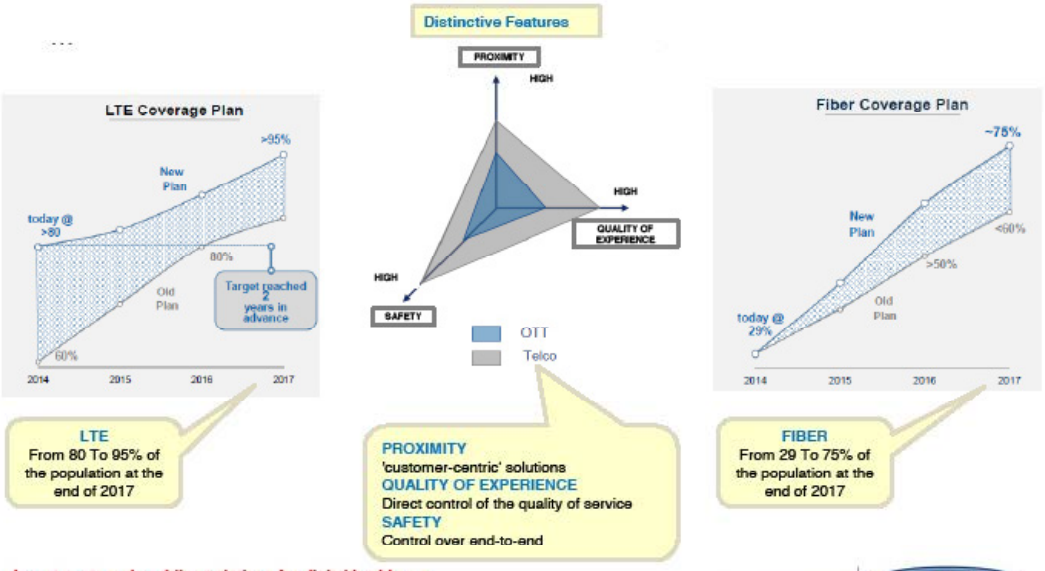
To enable a balanced health-care approach, between centralized and local structures, the newest technologies and ICT tools will be tailored to the specific requisites of health organizations



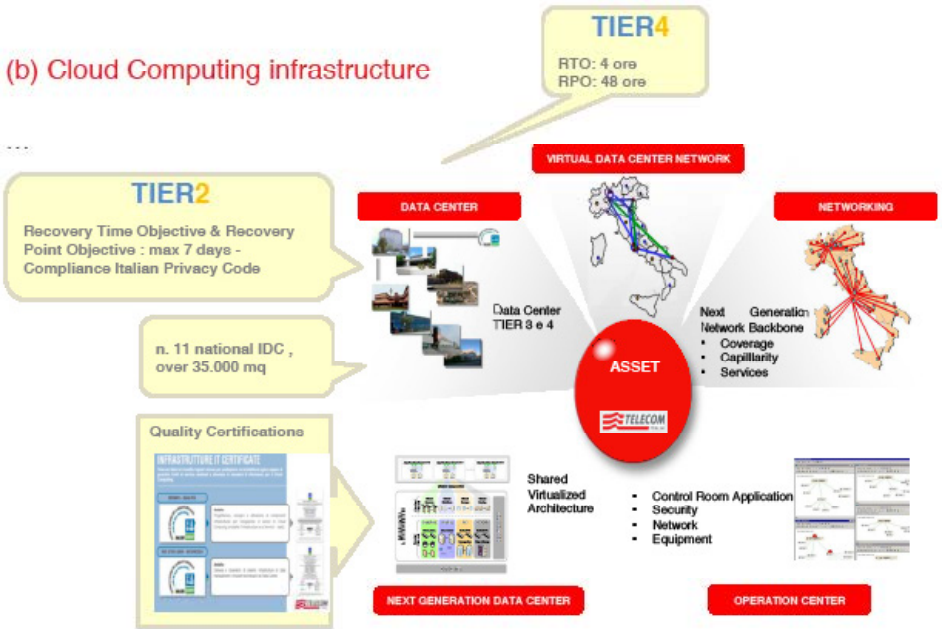
Our positioning

Not only data trasport…

(a) Telecommunications infrastructure



(b) Cloud Computing infrastructure



(c) Corporate Venture

Telecom Italia Group has committed **since 2009** to support innovation, promoting startups.

TIM #WCAP ACCELERATOR

TIM examined over 7,000 ideas and supported 220 startups, providing more than 3,000 square meters of laboratories, in Milano, Bologna, Roma, Catania.

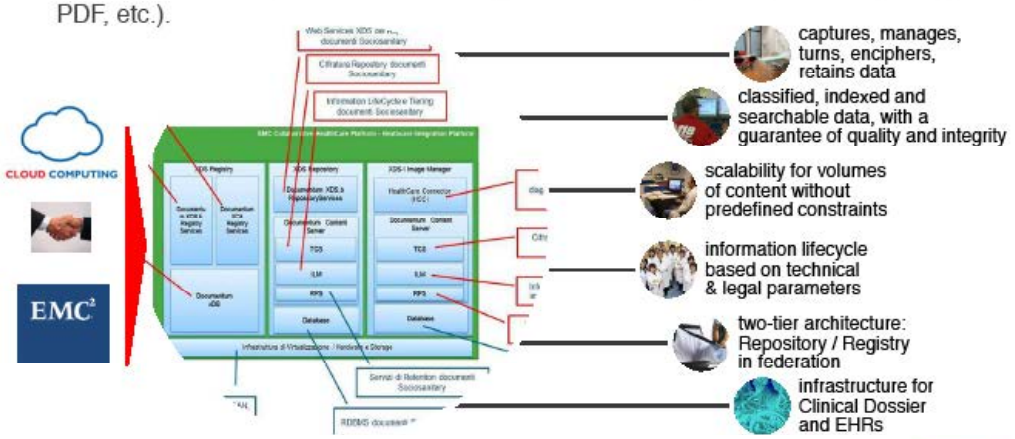
An example:

Pedius is a startup that has developed an application that allows deaf people to make regular phone calls.

PEDIUS

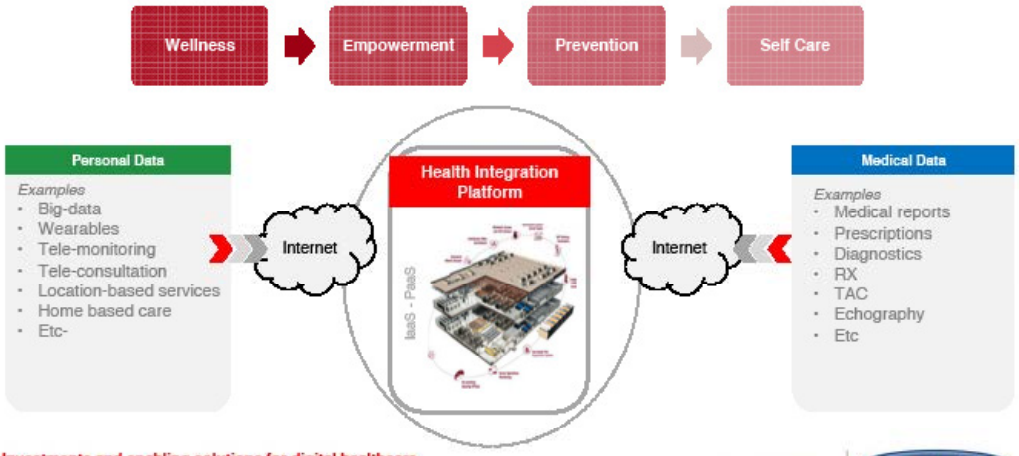
(d) Interoperability platform

The interaction between different systems requires interoperability solutions. The "*eHealth Integration Platform*" of EMC on Cloud TIM allows the management of all types of health data, that meet the leading standards (HL7, CDA2, DICOM3, XDS, PDF, etc.).



(d1) Integration infrastructure

...



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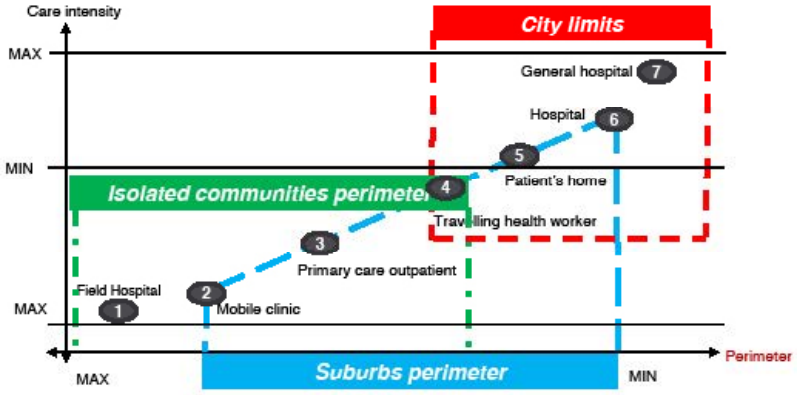
(e) Scenarios for the use of telemedicine

Telemedicine is useful in all types of health facilities that provide several levels of care intensity, in three geographical and anthropogenic perimeters.



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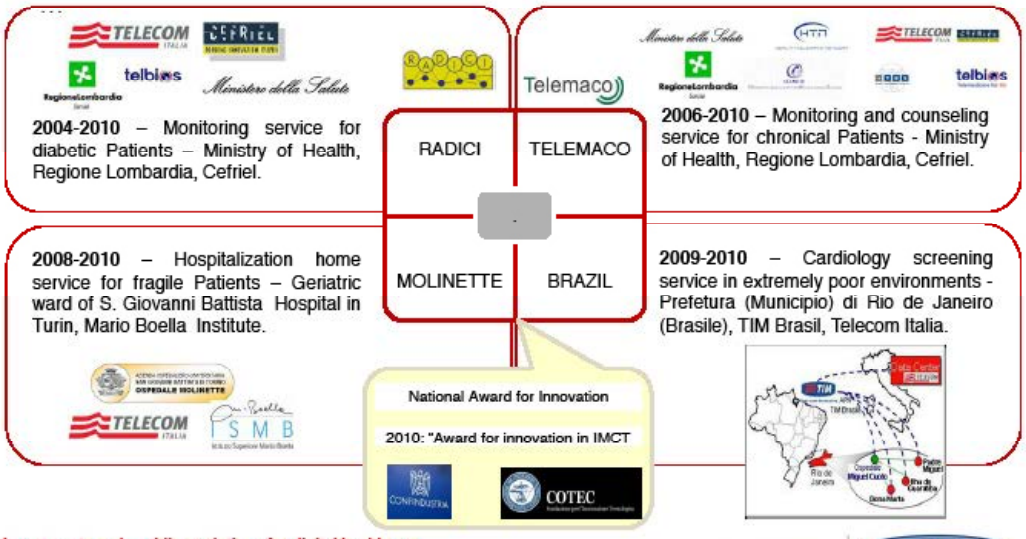
(e1) Experiences and telemedicine projects



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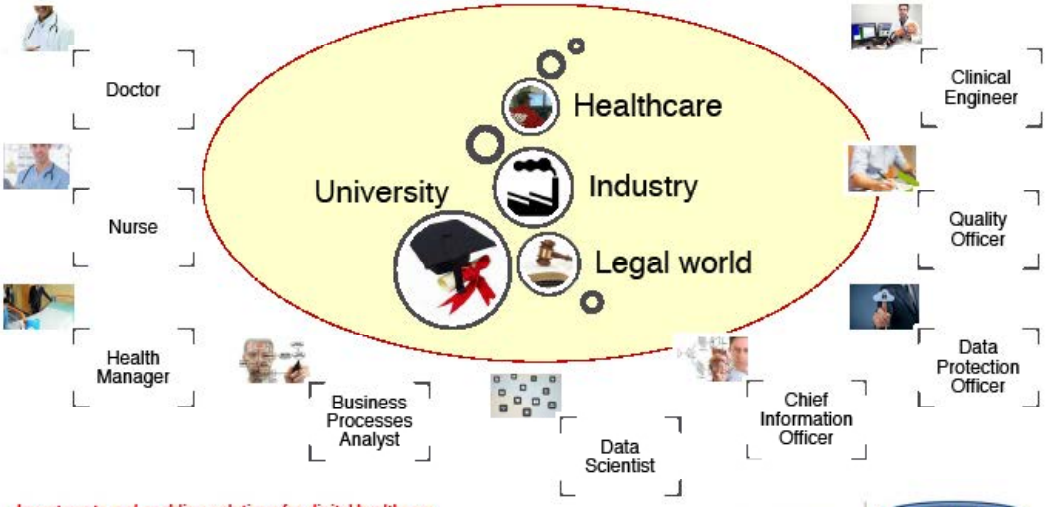
15

(f) Synergies between professionals and actors

Our vision…



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IL FUTURO FIRMATO TELECOM ITALIA.

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Lorenzo Polo

Short Profile of Polo Lorenzo (M), MD, PhD, Senior Medical Officer, INAIL Milano

He is specialized in Legal Medicine and in Work and Industrial Deseases.

He is a Professor in the School of Specialization in Legal Medicine in the University of Insubria, at the faculty of Medicine and Surgery.

He is a Specialist Physician of the major Insurance Company in Italy.

He is currently scientific director for Brain Srl where promotes research in insurance and walfare.

He actively participates in research on the effects of pulsed electromagnetic fields which is aimed at optimizing the neuro psychophysical.

He collaborates as Legal Medical with hospitals like Fondazione Carlo Besta di Milano, Istituto Nazionale Tumori di Milan, IEO (Istituto Oncologico Europeo) di Milano, Istituto Cardiologico Monzino.

He collaborates as occupational physician with A2A, the largest Italian multi-utility company, a leader in the energy, environment, heat and networks sectors.

He received his PhD in medical forensic sciences at the University of Brescia in the period 2011-2014.

He is the co-author in more than 40 articles published on scientific journals with impact factor and an active Member of several medical associations like "Società Italiana di Medicina Legale e delle Assicurazioni" and the International Academy of Legal Medicine.

He's been an invited speaker in national and international conferences.

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

It is evident, that the impoverishment of economic resources in support of the public health involves a reallocation of these in the health sector declined in its aspects more properly welfare, social security and insurance.

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

- 31.000.000.000 €

-27.000 beds

-LEA (elementary levels of assistence)

- Service (parenteral nutrition)

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

It increases the demand for care and support, but for the first time decreases the private health spending (-5.7%): the family welfare and 'in crisis.

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

"The toothache became a costly problem, sometimes unsolvable. That's why more and more Italians choose to give to dental care (or pay them in black), because of the high cost of this type of health care. On average 14.2% of Italians in 2014 decided not to go to the dentist, a percentage that rises to 32.3% if we consider only the low-income people"

Font Censis

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

Inventiveness

Innovation

Speed

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

We believe that the liability costs and their pricing is an issue that interferes significantly and conditionally on the efficiency and sustainability of the whole health system; and this in any organizational health sector: public, private with agreement, exclusively private.

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

- Defensive medicine (increase in the cost of the benefits of 20% approximately)
- Professional Liability: defects in organizational congruencies increase the responsibility of the structure and personnel with costs which are "spread on the performance" as a function of insurance premiums (structures who insure themselves - hypothesis of damage revenue)
- evaluation of the congruence between performance and charging adequacy
- assessment of the costs of the performance

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

Necessary performance

Unnecessary performance

Inappropriate performance

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

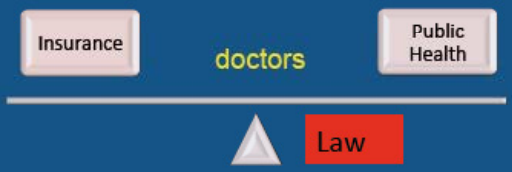
Cost control will also have a utility to harmonize the innovation and speed of scientific progress with economic resources both public and private in order to make the social security system sustainable by avoiding unnecessary and harmful speculation.

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

The Government, with its own program, is proceeding in an attempt to clear up the matter of responsibility but never, as in this phase of history , there is uncertainty and difficulty

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

We think of an ideal model that allows a virtuous balance between all parties:



Scenarios for digital health: a comparison between Italy and USA
Big data for Health

Make efficient systems for managing health
Reduce costs and free resources
Enhance inclusion of citizens to health care and social security
Reduce labor costs
Properly calibrate the risk to be protected with the aim of bringing stakeholders today uninterested

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

It is through the synergistic use of all scientific, technological and legal that can contribute to ensuring the sustainability of health activities, ensure that they can work with ethical manner and the maximization of health performance on behalf of the citizen and the synergy management resulting in a reduction of the expenditure.

Scenarios for digital health: a comparison between Italy and USA
Big data for Health

Thank You of Your Attention

Luca Sangiorgi

He is Head of the Department of Medical Genetics and Coordinator of Rare Disease Centre at Rizzoli Orthopaedic Institute, Bologna, Vice Director IOR RIT Department and Contract professor of Clinical Genetics of Bologna University.

He is responsible of 3 National Registries for Rare Diseases (Li-Fraumeni, MHE and OI) and a Member of National Coordination Team for Clinical Genetics Department.

For the Emilia Romagna region, he's the Coordinator for the Regional "Agency for Health and Social Care" of the commitment EIP-AHA Action Plan 1 and a Coordinator for many Regional Bioinformatics Labs.

As a member of many different medical and scientific societies, he has been appointed as President of Connective

Tissue Oncology Society and of International Skeletal Dysplasia Society.

He is the first author or co-author in more than 60 articles published on journals with impact factor and an active Member of several international medical associations, serving on the Executive Committee of CTOS as President.

Since 2013, he's been appointed as Italian government representative for the Assembly of Member States for BBMRI

Italy in Europe and he's Member of National Node Coordination Office and Coordinator of Rare Disease Interest

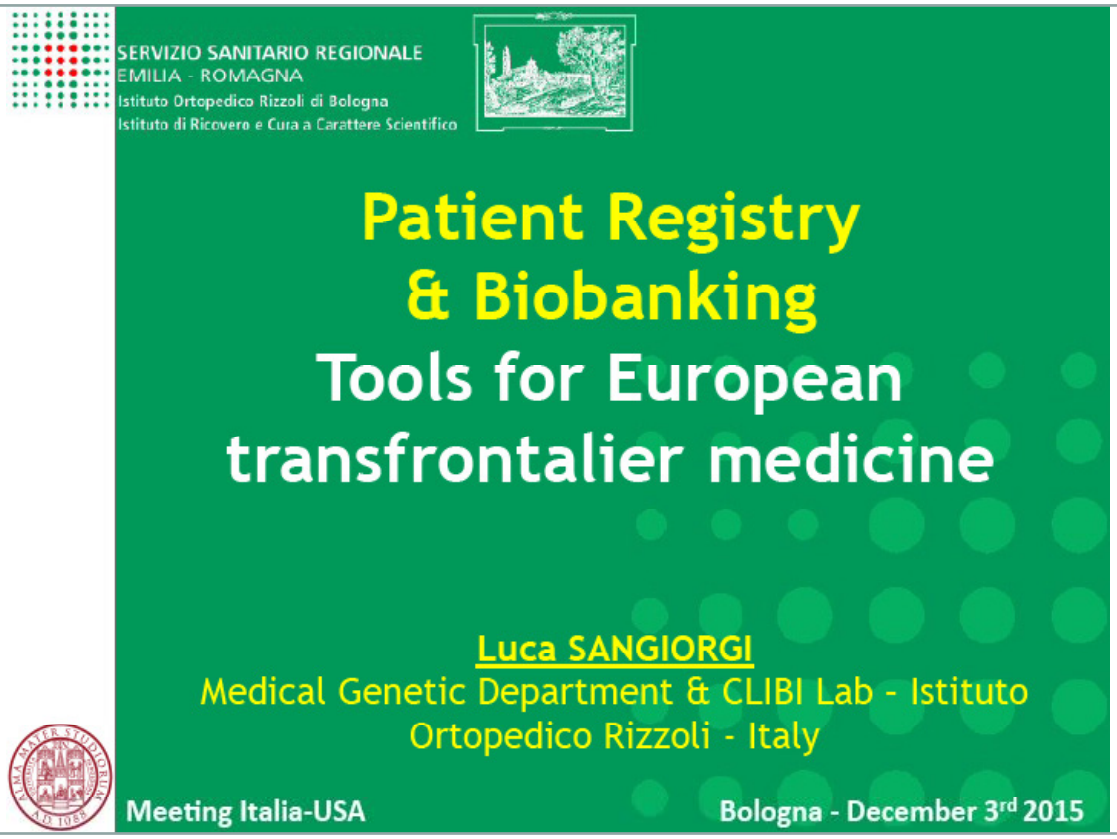
Group. He's also Member of BBMRI-ERIC Steering Committee and Vice-Chair of Finance Committee.

In 2014, he's been nominated as Alternate of Representative of Italian Government for the Committee for Advanced Therapies (CAT) by Italian Minister of Health.

Expert Reviewer for the EU Commission for FP6 and FP7 grants and H2020, he's Coordinator for a European Reference

Network which consists of 16 Centres of Excellence located in 14 EU countries for the treatment of Skeletal Rare Diseases.

He's been an invited speaker in national and international conferences.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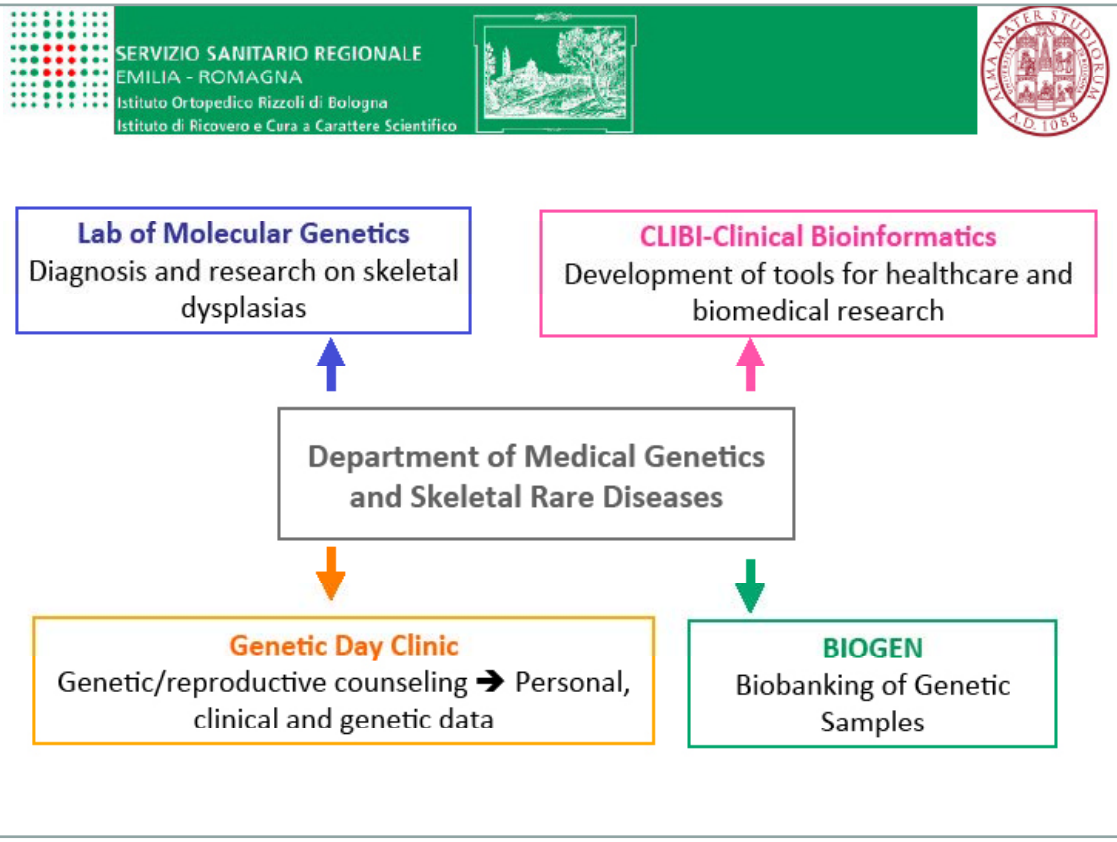
Istituto Ortopedico Rizzoli di Bologna
Istituto di Ricovero e Cura a Carattere Scientifico
Patient Registry
& Biobanking
Tools for European
transfrontalier medicine
Luca SANGIORGI
Medical Genetic Department & CLIBI Lab - Istituto Ortopedico Rizzoli - Italy
Meeting Italia-USA
Bologna - December 3rd 2015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Lab of Molecular Genetics
Diagnosis and research on skeletal dysplasias
CLIBI-Clinical Bioinformatics
Development of tools for healthcare and biomedical research
Department of Medical Genetics and Skeletal Rare Diseases
Genetic Day Clinic
Genetic/reproductive counseling ➔ Personal, clinical and genetic data
BIOGEN
Biobanking of Genetic Samples

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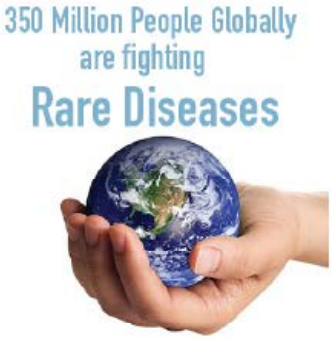
Rare Diseases

Rare diseases (orphan diseases) are defined strictly according to prevalence, as affecting fewer than 1 in 2,000 people. To date six to seven thousand rare diseases have been discovered and described as orphan diseases, with at least 30 million people affected in the 27 European Union member states. Rare diseases usually are genetic, at least 80% of them have identified genetic origins.



To date six to seven thousand rare diseases have been discovered and described as orphan diseases

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Rare Skeletal Dysplasias - Definition

The skeletal dysplasias are a large, heterogeneous group of genetic conditions characterized by abnormal development, growth and maintenance of the bones that comprise the human skeleton

Best Pract Res Clin Endocrinol Metab. 2002 Sep;16(3):547-60

Genetic disorders involving the skeletal system arise through disturbances in the complex processes of skeletal development, growth and homeostasis and remain a diagnostic challenge because of their variety

Am J Med Genet A. 2011 May;155A(5):943-68

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Cluster of diseases

The rare skeletal dysplasias (SDs) or osteochondrodysplasias represent a heterogeneous group of hereditary diseases of the connective tissue differing by clinical, radiographic and genetic aspects

- Diagnosis is difficult and proper treatments are thus a challenge to the healthcare system.
- SDs result from mutations in various families of genes that encode extracellular matrix proteins, transcription factors, tumour suppressors, signal transducers, etc.
- Patients with SDs have marked physical difficulties, which affect their quality of life, participation in society and their financial situation

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Patient Registry & Biobanking

The rarity and diversity of rare diseases and their associated biomaterials result in a pressing need for transnational collaboration, high demand for expert input for quality control of biomaterial, and high need for the training and education of scientists using the biomaterials.

Biobanks are collections of biological samples and their associated data, organised in a structured, readily analysable format.
This assumption is achievable only if samples are collected together with clinical, genealogical and molecular data of donors, in a word, with disease registries.

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RARE DISEASES-ORIENTED BIOBANK

*The Organisation for Economic Co-operation and Development - OECD - **defines biobanks** as 'structured resources that can be used for the purpose of genetic research and which include: a) human biological materials a nd/or information generated from the analysis of the same; and b) extensive associated information'*

- store a much more heterogeneous set of biospecimens
- samples are collected within the context of clinical care
- biological materials (usually collected from patients) can be eventual re-sampled at follow up during diseases treatment
- work through the active participation of patients and patient organizations and share benefits with them

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RARE DISEASES REGISTRY

***Disease Registry** these registries use the state of a particular disease or condition as the inclusion criterion. In disease registries, the patient may always have the disease (e.g., a rare disease) or may have the disease or condition for a more limited period of time (e.g. some cancers, obesity).*

- to observe the course of disease
- to increase knowledge on epidemiology and natural history
- to understand variations in treatment & outcomes (monitor safety and harm)
- to examine factors that influence prognosis and quality of life
- to describe care patterns, including appropriateness of care and disparities in the delivery of care and to measure quality of care
- to assess effectiveness

DATA COLLECTION

Selection of data elements (balancing of factors):
› integrity of the registry
› the analysis and reliability of primary outcomes
› the contribution to the overall burden for respondents
› the incremental costs associated with collection

It is important to determine which elements are absolutely necessary and which are desirable but not essential

Selection of data sources depends on:
› form
› structure
› availability
› timeliness of the required data

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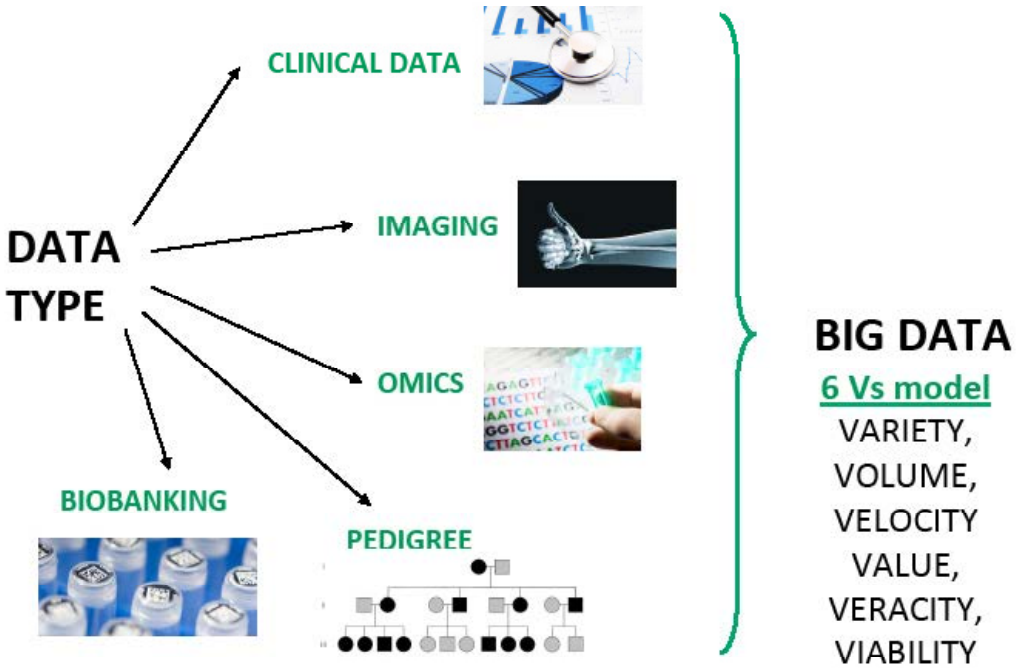

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INFORMATION & COMMUNICATION TECHNOLOGY: why?

Rely on information technology approach!

Innovations in information technology enable the systematic collection, linkage and tracking of samples and data and also provide the tools for analysis across vast sample and datasets

→ Follow the interdisciplinary of this specific research area
→ Form rapidly flexible and dynamic research collaborations around the world
→ Facilitate the linkage of different registries & biobanks as part of a meta-level infrastructure across Europe
→ Pursue the integration of various forms of data

DATA MANAGEMENT & INTEROPERABILITY

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GePhCARD: our Diseases Registry

→ A digital platform to increase knowledge
→ A pathology-oriented IT instrument
→ For pooling of patients information, description of clinical signs, collection of genetic results and familiar data
→ To perform statistics

The disease registry brings healthcare professionals to:

1. a complete **overview of disease**
2. an individuation of **sub-cohort of patients** with specific manifestations
3. an identification of disease **causative pathways**
4. provide **high quality** and **cost-effective healthcare**

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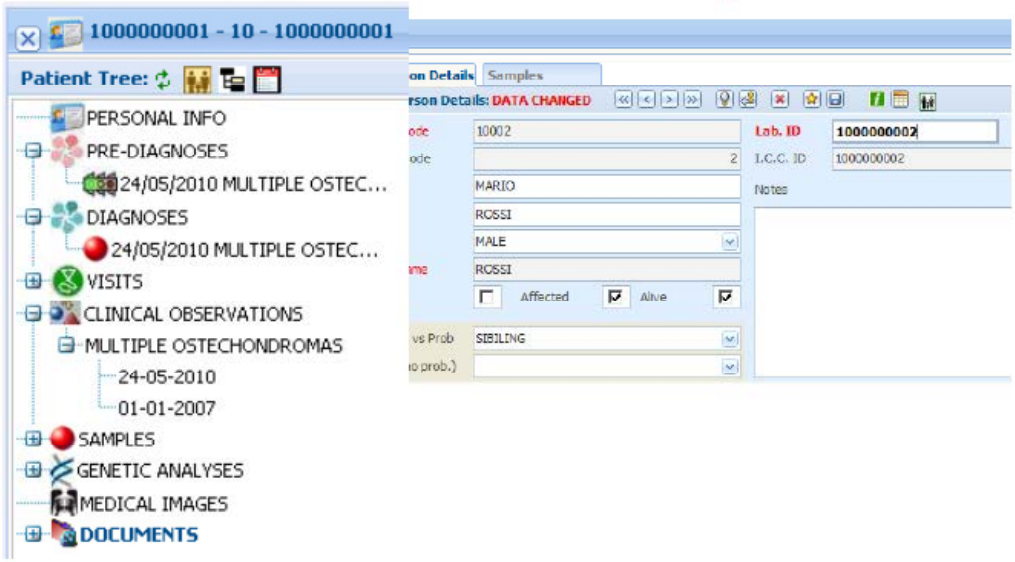
GePhCARD database for Collection of all patients data



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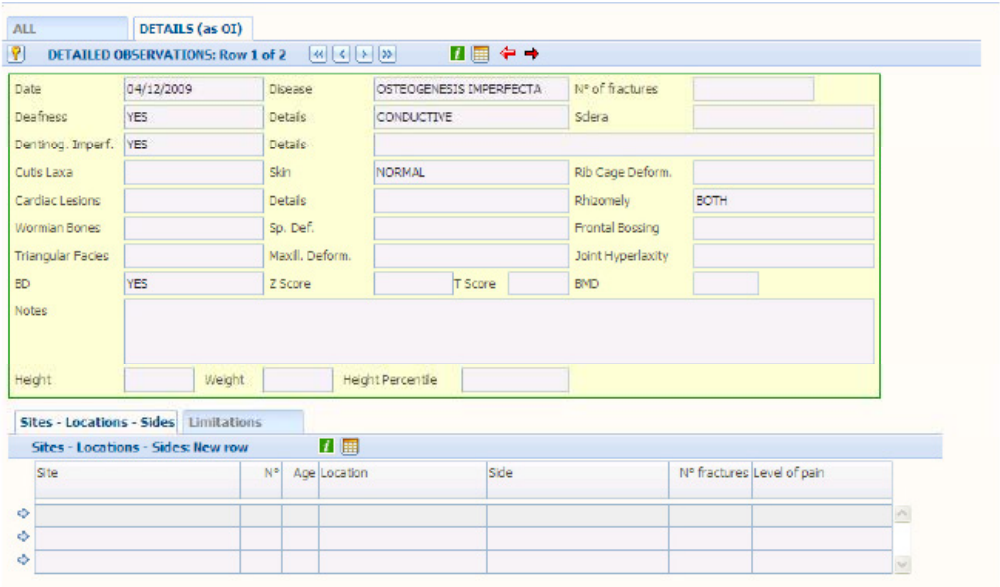
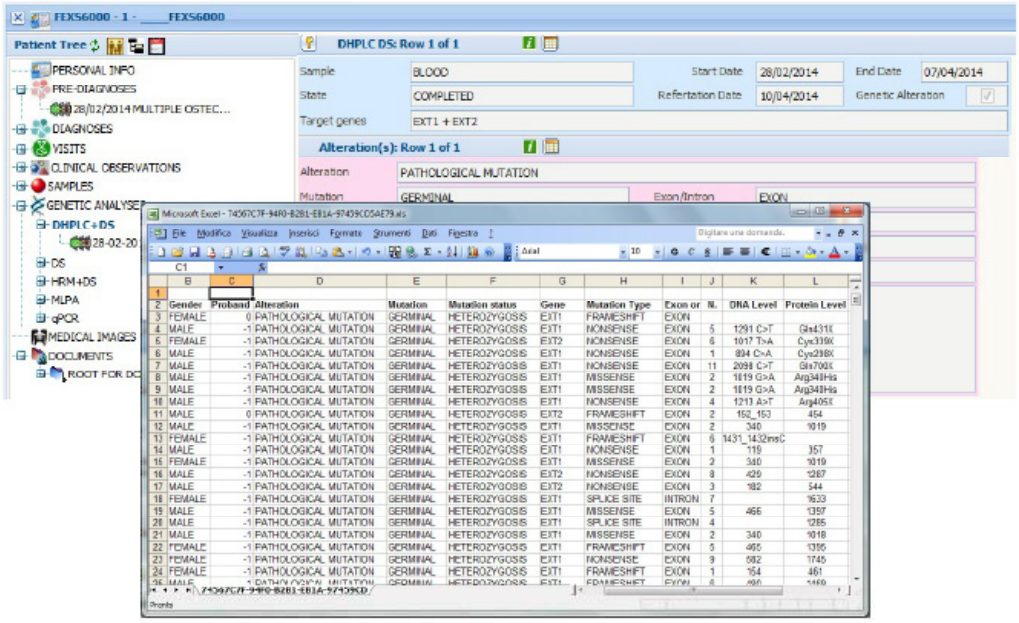
GePhCARD interface



GePhCARD interface



GePhCARD skills 1

Highly configurable modules →

extend clinical and genetic domains due to two kinds of extension mechanism

Improvement of visits and observations typologies →

highly configurable for different diseases for potentially different clinical domains

Multi-language engine and multi-organization structure →

suitable for being used by different clinical and research organizations

GePhCARD skills 2

Imaging management & search system →

articulated query system useful for statistical and specific algorithms that can find out a survey on metadata

Data Exchange →

improve collection and sharing of clinical and genetic data in according to international health care standard HL7

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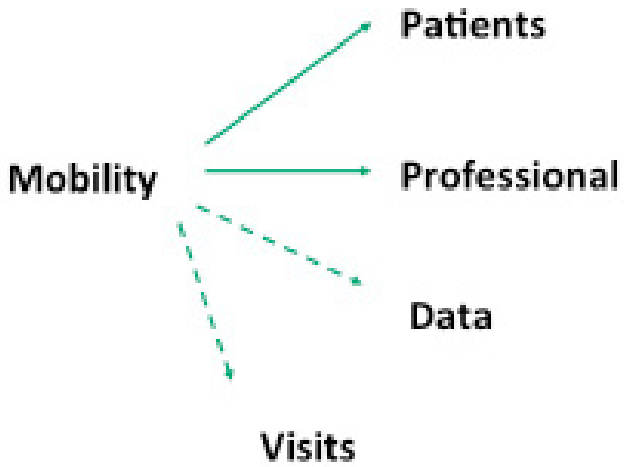
Cross-border Mobility



Cross-border healthcare in EU Legislative timeline

Legislative Timeline

1971	Council Regulation (EC) No. 1408/71 of 14 June 1971 on the application of social security schemes to employed persons, to self-employed persons and to members of their families moving within the Community
1998	Two linked rulings by the CJEU in the cases of Kohll and Decker that patients could use internal market provisions to gain access to health care in other Member States
1998	Process launched to modernize the coordination of social security systems
1998–ongoing	Continuing CJEU on patient mobility
2002	European Health Insurance Card (EHIC) established Council to replace paper forms required for occasio in another Member State
2003	European Commission convened a High Level Proce address the issue of patient mobility, leading to a s sought to maximize the potential benefits of patie
2004	Adoption of Regulation (EC) No. 883/2004 on the c systems, replacing Council Regulation (EC) No. 1408
2004	European Commission Draft Directive on Services i to codify CJEU case law
2005	Directive on the Recognition of Professional Qualif
2006	Adoption of the Directive on Services in the Internal Market; health care excluded
2008	European Commission proposes a directive on the application of patients' rights in cross-border health care
2009	Adoption of the regulation (EC) No. 987/2009 laying down the procedure for implementing Regulation (EC) No. 883/2004 on the coordination of social security systems
2010	Regulation (EC) No. 883/2004 on the coordination of social security systems to be transposed into national law
2011	Directive on the Application of Patients' Rights in Cross-Border Healthcare adopted
2011	European Commission puts forward a proposal for amending the Professional Qualifications Directive
2013	Directive on the Application of Patients' Rights in Cross-Border Healthcare to be transposed into national law
2013	Agreement reached between Irish Presidency of the Council and the European Parliament representatives to modernize the current Professional Qualifications Directive
2013	Council plans formally to adopt the updated Professional Qualifications Directive by the end of 2013. Member States will then have two years to transpose the Directive into national law

Sources: Authors' own adaptation, based on Bertinato et al. (2005) and Legido-Quigley et al. (2011b).

Sources:
Bertinato et al. 2005
Legido-Quigley et al. 2011b

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Cross-border healthcare: Patient Care

Application of patients' rights in cross-border service and care among Europe countries

- Cross-border collaborations
- Protocols for Patient Management
- Trans-frontalier Patient Mobility (flows)
- Sharing of relevant information ➔ Continuity of Care
- Data Mining

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Main critical issues involving clinical & research scenarios

- No unique and uniform definition of a Centre of Excellence (CoE)
- Too many diseases (more than 500) for each CoE or national COEs group
- Missing knowledge on SDs biomarkers and potential treatments

European Networking

Practical problems in networking:

- ↘ Data merge (Registries)
- ↘ Biospecimens access and transfer (Biobanks)
- ↘ Guidelines for patients management
- ↘ Procedures for molecular diagnosis

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Identification of Centers of Eccellence (CoE)
[Seven criteria]

1. Coordinated care
2. Adequate caseload for expertise
3. Arrangements for transition from children's to adults' services
4. Engaged with people with rare conditions
5. Research active
6. Education and training for medical professionals
7. Membership of international networks of excellence

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ERN

European reference networks (ERNs) for rare diseases should serve as research and knowledge centres, updating and contributing to the latest scientific findings, treating patients from other Member States and ensuring the availability of subsequent treatment facilities where necessary. The definition of ERN should also reflect the need for services and expertise to be distributed across the EU.

European Reference Networks

cit. http://ec.europa.eu/health/rare_diseases/european_reference_networks/erf/index_en.htm#fragment0

ERN on Rare Bone Diseases - BOND

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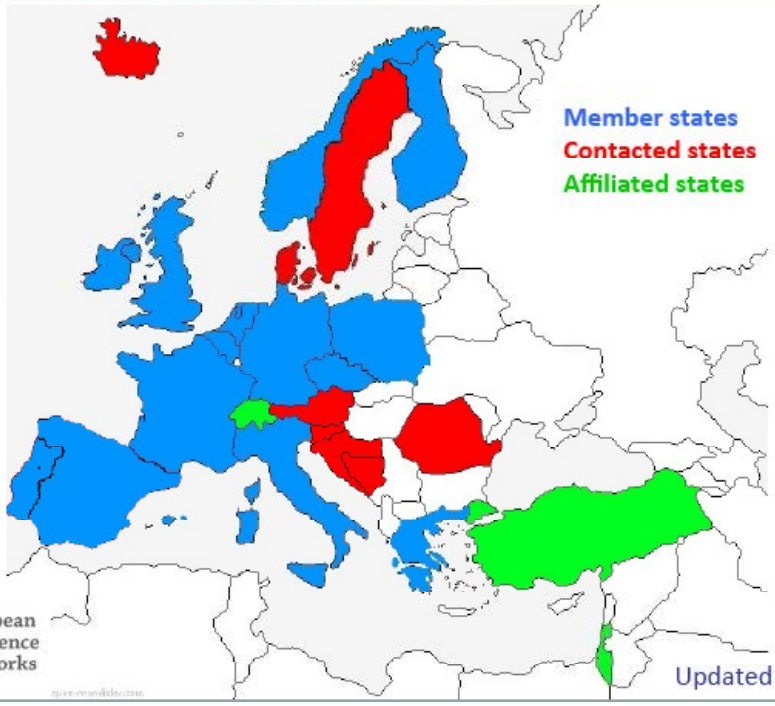

European Reference Networks

Updated November 2015

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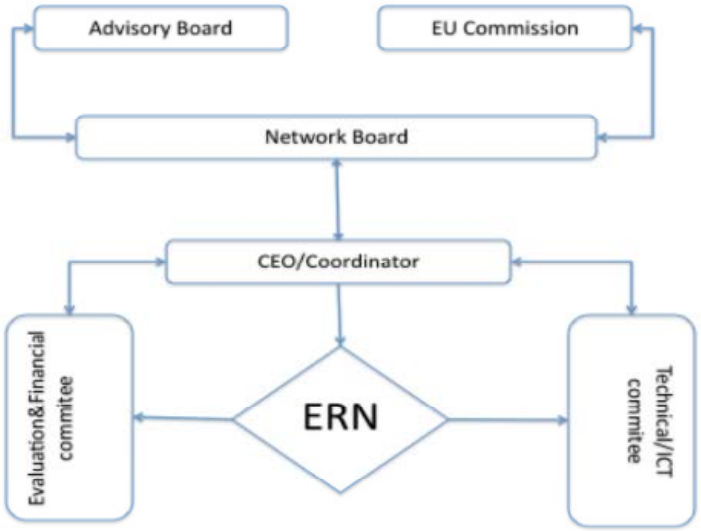
ERN Governance



Transparent and effective coordination & governance Networks can be flexible & have different architectures and internal relations but there are key organizational features

European Reference Networks

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Telecare

Not only cross-border healthcare, but also telemedicine

Use of ICT in order:

- To provide clinical health care at a distance
- To increase communications between patient and medical staff
- To translate into real improvements in the delivery of care
- To reduce costs using telehealth and telecare delivery

European Reference Networks

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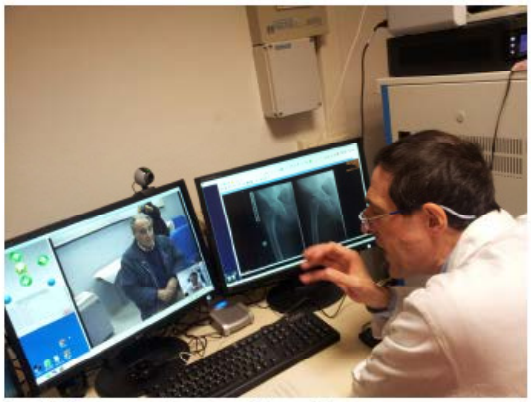
Teleconsultation – the IOR network 1



Hub – Rizzoli

- Analysis of diagnostic material by orthopedic doctor
- Synchronous videoconference session between the patient (Spoke) and the orthopedic doctor (Hub)
- The orthopedic doctor can remotely control the camera for example to see how the patient walks, to check the posture, to zoom, etc.

European Reference Networks

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Teleconsultation – the IOR network 2

Spoke – teleambulatory

- Transmission and digitalization of diagnostic material (X-Ray, CT, MR, reports)

European Reference Networks

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Teleconsultation – Future Prospective

- Collaboration Platform - allow clinicians from different centers collaborating on complex cases
  - Multiple video conferencing
  - Case record repository (NMR, PET, CT)
- Data acquisition from external sources (the patient) and directly from PACS, LIS, RIS
- Follow up clinician-patient teleconsultation through Hub & Spoke Model
- E-learning platform (training in secondary Centers), Video Tutorials for patients and associations

European Reference Networks

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The Disease Registry we have implemented is:

A digital platform for research

A instrument for supporting diagnosis process

An ICT support to telemedicine

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A data repository among ERN CoEs

European Reference Networks

An instrument that supports biobanking

A tool that helps cross border medicine

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Claudio Caccia

Claudio Caccia degree in Business Administration at Pescara University and Executive Master in Healthcare Management at School of Management Bocconi University.

Expert on Organization and Information Systems in Healthcare, for over 25 year was CIO in public and private hospitals. Actually I'm Healthcare senior consultant and Owner of i2 Consulting.

I work from the 90's as a contract researcher at the University Bocconi CeRGAS (Centre for research on health social care management) and I'm an external professor of the School of Management of the Bocconi University and Co-Scientific Director of the CeRGAS eHealth Research Program - Bocconi University.

I'm President of AISIS - Italian Healthcare CIO's Association

As part of the Round Table 'Competenze per la Sanità 2.0' I would like explain the "new way" that Italian Healthcare CIO's Association has started to improve the competence both ICT healthcare professionals and e-leader of healthcare.

Associazione Italiana Sistemi Informativi in Sanità

New "scenario" of helthcare

Digital Innovation
App, Social Media, mHealth, health IoT, patient empowered

Economic Sustainablity
(The impact of Chronical pathways)

Technological Explosion
Nanorobotics, surgical robots, pharmacogenomics and pharmacogenetics....

New Digital culture
Of clinical users
(not only user but new actor of digital innovation

Invvovation of clinical ICT System
Collaboration, Integration, EMR - EHR - PHR

Organisational Change
Break up generale Hospital
More Homecare- eCare
Clinical Patways (no silos)

THE PERFECT OPPORTUNITY

THE PERFECT STORM
(When they break, they break hard - Jhon Snow)

New requirement and new competence for ICT healthcare CIO

Innovation Trend
and user experience

Design new interaction (user and clinician) information intesive based

Trend Healthcare organization
(more pathways)

eHealth Academy

Design a "new way" to improve new competence for Helthcare CIO:

"3C4P"

CONSCIOUSNESS who is "now" the CIO

CULTURE new culture of "management information system" not only technology

COMPETENCE new way with european scenario

PARTNERSHIP with new clinical digital users (patient and clinician)

European e-Competence Framework 3.0: the model

European e-Competence Framework versione 3.0 visione di insieme

Dimensione 1 5 aree e-CF	Dimensione 2 40 e-Competences identificate	Livelli identificati per ciascuna competenza e-CF Dimensione 3 – Livelli di Capacità - livelli da e-1 a e-5, collegati ai livelli EQF 3-8				
		e-1	e-2	e-3	e-4	e-5
A. PLAN						
	A.1. Allineamento Strategie IS e di Business					
	A.2. Gestione dei Livelli di Servizio					
	A.3. Sviluppo del Business					
	A.4. Pianificazione di Prodotto o di Servizio					
	A.5. Progettazione di Architetture					
	A.6. Progettazione di Applicazioni					
	A.7. Monitoraggio delle Tendenze Tecnologiche					
	A.8. Sviluppo Sostenibile					
	A.9. Innovazione					
B. BUILD						
	B.1. Sviluppo di Applicazioni					
	B.2. Integrazione dei Componenti					
	B.3. Testing					
	B.4. Diffusione della Soluzione					
	B.5. Produzione della Documentazione					
	B.6. Ingegneria dei Sistemi					
C. RUN						
	C.1. Supporto dell'utente					
	C.2. Supporto al Cambiamento					
	C.3. Erogazione del Servizio					
	C.4. Gestione del Problema					
D. ENABLE						
	D.1. Sviluppo della Strategia della Sicurezza Informatica					
	D.2. Sviluppo della Strategia della Qualità ICT					
	D.3. Fornitura di Istruzione e Formazione					
	D.4. Acquisti					
	D.5. Sviluppo dell'Offerta					
	D.6. Gestione del Canale di Vendita					
	D.7. Gestione delle Vendite					
	D.8. Gestione del Contratto					
	D.9. Sviluppo del Personale					
	D.10. Gestione dell'Informazione e della Conoscenza					
	D.11. Identificazione dei Fabbisogni					
	D.12. Marketing Digitale					
E. MANAGE						
	E.1. Formulazione delle Previsioni					
	E.2. Gestione del Progetto e del Portfolio					
	E.3. Gestione del Rischio					
	E.4. Gestione della Relazione					
	E.5. Miglioramento del Processo					
	E.6. Gestione della Qualità ICT					
	E.7. Gestione del Cambiamento del Business					
	E.8. Gestione della Sicurezza dell'Informazione					
	E.9. IS Governance					

e-Competence Framework 3.0

only one european framework and language to define competence of ICT Professionals

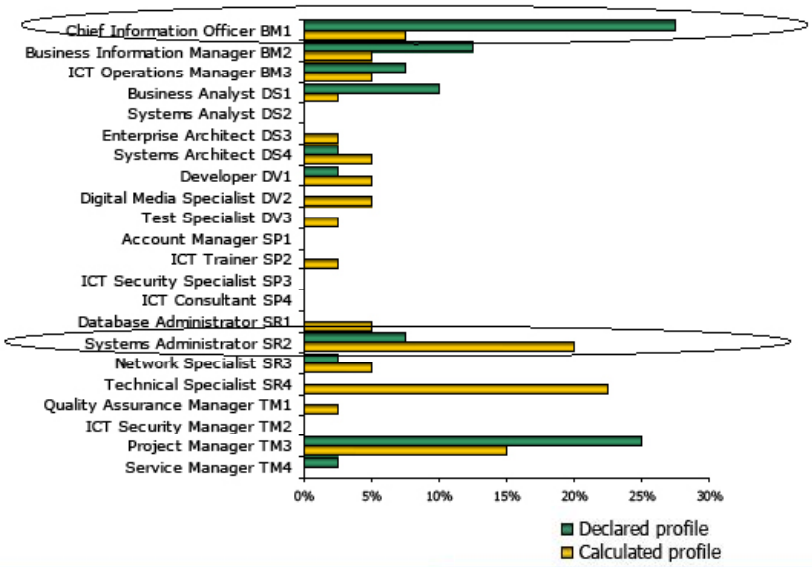
"CEN Workshop on ICT Skills".
In Italy guidance UNI11506

40 e-Competence
21 ICT professional profile

CONSCIOUSNESS who is "now" the healthcare CIO

Assessment on line by the "e-CFplus framework" with AICA- CEPIS

Comparison between chosen (declared) professional profile and and proximity profile (calculated)



CULTURE new culture of "management information system" not only technology

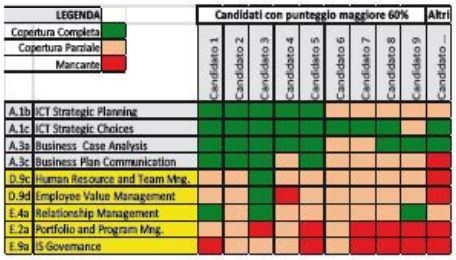
Results of eCF Plus after competence validation: the "Gap":

mainly technological skills, lack/insuffiicent skill of management information system and soft skill (ICT governance, leadership, relationship management)

LEGENDA		Candidati con punteggio maggiore 60%									Altri
Copertura Completa		Candidato 1	Candidato 2	Candidato 3	Candidato 4	Candidato 5	Candidato 6	Candidato 7	Candidato 8	Candidato 9	Candidato ...
Copertura Parziale											
Mancante											
A.1b	ICT Strategic Planning										
A.1c	ICT Strategic Choices										
A.3a	Business Case Analysis										
A.3c	Business Plan Communication										
D.9c	Human Resource and Team Mng.										
D.9d	Employee Value Management										
E.4a	Relationship Management										
E.2a	Portfolio and Program Mng.										
E.9a	IS Governance										

COMPETENCE new way of "management information system"

We designed new specific "course" with School of Management of Bocconi University and final evaluation of eCF Plus Auditor



LEGENDA		Candidati con punteggio maggiore 60%									Altri
Copertura Completa		Candidato 1	Candidato 2	Candidato 3	Candidato 4	Candidato 5	Candidato 6	Candidato 7	Candidato 8	Candidato 9	Candidato ...
Copertura Parziale											
Mancante											
A.1b	ICT Strategic Planning										
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A.3a	Business Case Analysis										
A.3c	Business Plan Communication										
D.9c	Human Resource and Team Mng.										
D.9d	Employee Value Management										
E.4a	Relationship Management										
E.2a	Portfolio and Program Mng.										
E.9a	IS Governance										

Course content:

- Trend of change in Healthcare Organisation
- Trend of Innovation Digital Technology (with focus to patient and clinician empowerment)
- Management of healthcare information system
- Project Management
- ICT Governance
- Team leadership e team maangement
- Relationship management
- Success histories of management healthcare information System (Barcellona Hospital)

PARTNERSHIP with new healthcare digital users

Improve the Customer Experience: new *user's requirements*:

The ICT user (citizen and clinician)

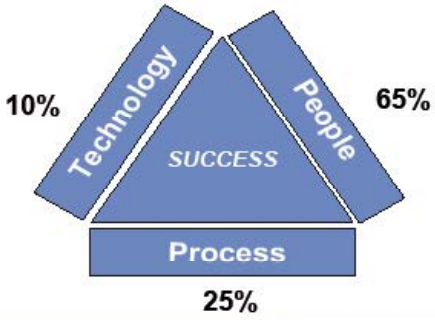
- **is alwaredy "on line": ict services 24x7**
- **uses only m-Health services**
- **likes devices/services to improve collaboration and interaction patient vs doctor or doctor vs doctor**
- **wants services disegned on his user experience**

PARTNERSHIP with new healthcare digital users

We are designing a new specific "course" with School of Management of Bocconi University to ICT e-leader

- Management of healthcare organisation
- Management of nursing

The "goal" is improve a unique language, a "shared" language about digital innovation of healthcare e new approch to manage ICT project in healthcare



Vi ringrazio per l'attenzione

Claudio Lamberti

Claudio Lamberti received the doctoral degree in mechanical engineering from the University of Bologna in 1974. In 1978 he received the post-graduate degree in biomedical technology from the University of Bologna School of Medicine.

He is currently Associate Professor at the Department of Ingegneria dell' Energia Elettrica e dell' Informazione "Guglielmo Marconi" at University of Bologna. Since 1991 he is in charge at University of Bologna of several Biomedical Engineering Courses (i.e. Computer and Systems Science in Health Care, Clinical Engineering, Bio-imaging). His research activity is focused on biomedical signal and image processing and biomedical technology assessment. He has published more than 170 papers, among them 95 papers on International Journals and International Conferences Proceeding. The papers are on arrythmias recognition, left ventricular wall motion, echocardiography image processing, estimation of motion in 3-D echocardiography, computer aided virtual surgery and computer systems for management of biomedical technology. He has participated to several UE founded Projects based on his research activity.

He has served on the Board of the Centro Ricerche e Studi Tecnologie Biomediche e Sanitarie (CRSTBS) at Scientific Park of Trieste (Italy) during 1989-1998. He has also served on the Board of the Associazione Italiana degli Ingegneri Clinici (AIIC) during 1993-1999. Since 2004 he is the Director of Master in Clinical Engineering by the University of Bologna.

Home Care

&

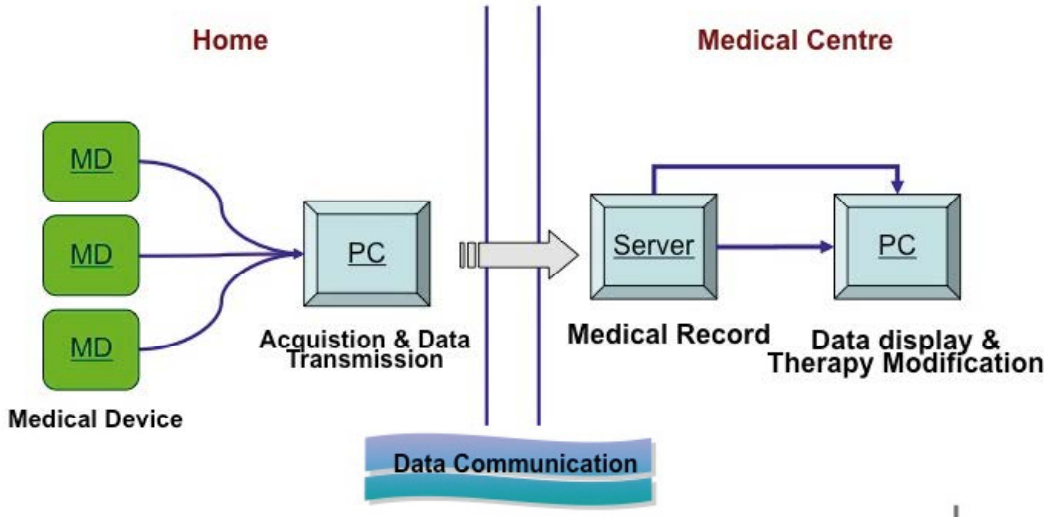
e-Health

Telemedicine

Home-care:Medical Device

- Glucometer Bluetooth
- Scales Bluetooth
- Sphygmomanometer Bluetooth
- Pulse Oximeter Bluetooth
- 1-lead ECG Bluetooth
- Kitchen scale wireless
- Ambient sensors

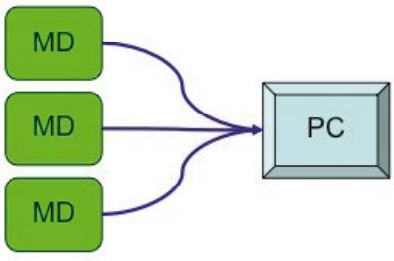
Integrated system for home-care



Features of Medical Device

Patient at home

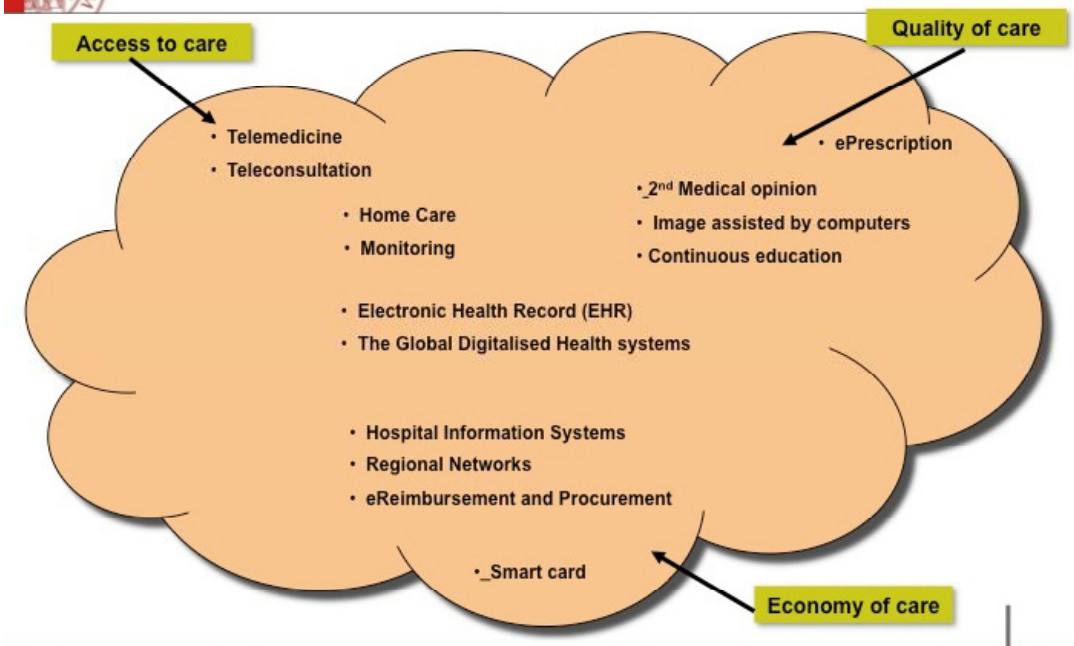
Vital signs acquisition



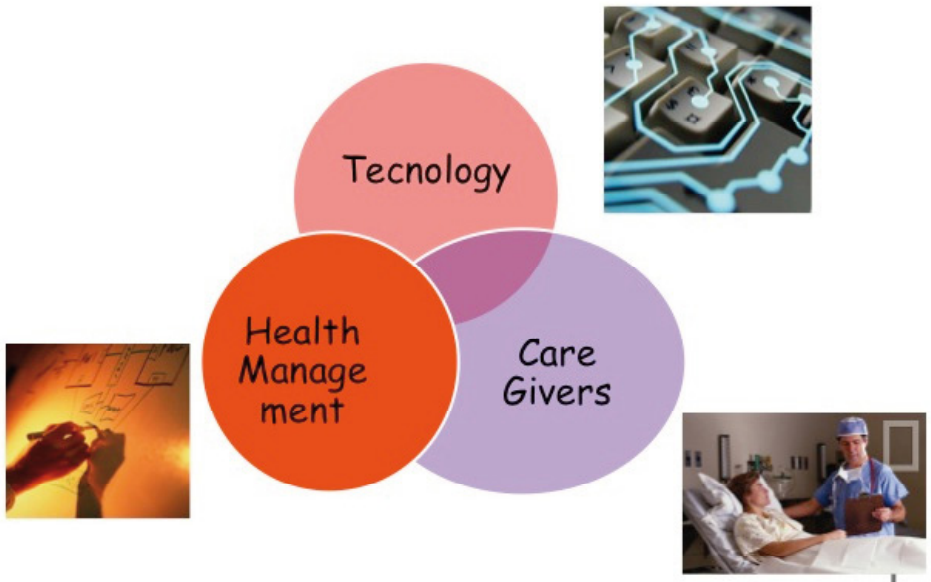
Features of MD:

- Clinical Validity
- Wearability
- Easy use during daily life
- Reliability
- Low cost

From telemedicine to "eHealth cloud"



Success Requirements



Elena Bellio

Not Academic Professor at Marketing Department, Bocconi University and Researcher at CERMES Bocconi (Centre for Research on Marketing & Services) - Milan - Italy.

Research activities, both in Italian and international contexts for consultancy and scientific publications.
Projects focused mainly on the use of technology in service marketing.

Main Areas of interest: Customer Service Science in public services; Healthcare, Government and Non Profit Marketing; Green Marketing; Silver Marketing, E-Government; E-Health, E-Commerce.

Luca Buccoliero

Professore a contratto, Dipartimento di Marketing, Università Bocconi, Milano
Ricercatore presso il CERMES, Università Bocconi, Milano
Exhange Researcher e Visiting Professor, Waseda University, Tokyo

Aree di interesse e di ricerca
Marketing e scienza dei servizi pubblici
Social Marketing
Innovazione nei servizi pubblici e Citizen Relationship Management
Healthcare, Government e Non Profit Marketing
E-Government
E-Health
Tecnologie dell'informazione e della comunicazione nelle aziende sanitarie e ospedaliere e negli enti locali: sistemi informativi contabili e direzionali nelle aziende sanitarie e ospedaliere e negli enti locali
Management Pubblico e sanitario

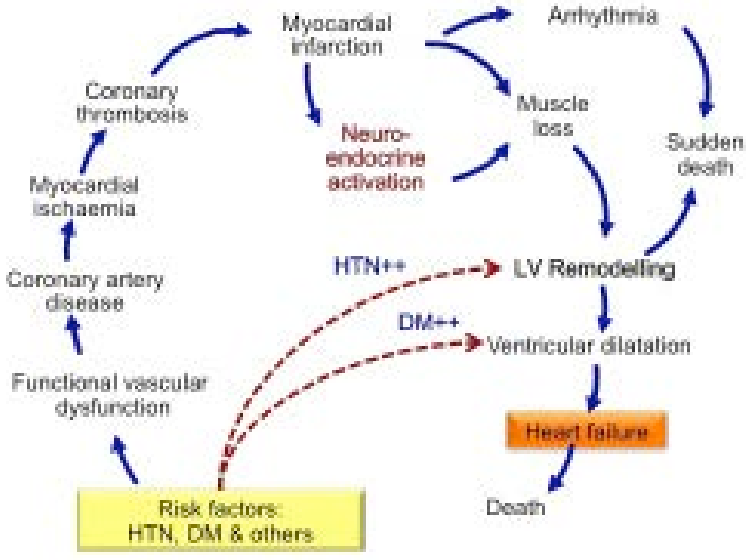
SDA Bocconi

Università Bocconi, Marketing Department and CERMES

- Università Bocconi, founded in 1902, was the first Italian university to grant a degree in management.
- For over a century, Bocconi has played a leading role in Italy's social and economic modernization. It has remained true to its founding values of being a **major research university, with democratic values and open to the world**, as well as financially and politically independent.

CERMES Centro di Ricerca sul Marketing e i Servizi Citizens Lab © 2015

Chain of events leading to CV diseases



Dzau V et al, Circulation 2009

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Citizens Lab

- Public, healthcare and social marketing are the research priorities of «Citizens Lab»;
- «Citizens Lab» fosters innovation through marketing strategies and tools in the area of public services provided to citizens (in markets or quasi-market contexts or where public administration is the main player).

- The main research fields of Citizens Lab include:
  - Healthcare services (hospitals and local healthcare units)
  - Sm@rtcities and Public utilities (transportation, urban network, energy, telecoms, etc.)
  - Not for profit sector and Corporate Philantropy
  - Value creation for patients and citizens through empowerment
  - Territorial branding and value
  - Social marketing: the systematic application of marketing, along with other concepts and techniques, to achieve specific behavioural goals for a social good

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«Citizens» Lab researches

Patient Behaviour

- Healthcare services use
- Patient Empowerment
- Patient Trust
- Innovation

Citizen-Customer Behaviour

- Public Services use
- Lifestyle
- Empowerment and participation
- Citizen Trust

Senior Citizen Behaviour

- Attitude towards innovation
- Attitude towards healthcare
- Consumption behaviour
- Senior Citizen Trust

Donor Behaviour

- Understanding donor's motivations
- Innovation in fundraising

Social Marketing and «consumer» behaviour

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Marketing definition (AMA)

Marketing is the activity, set of institutions and processes for creating, communicating, delivering, and exchanging offerings that have ***value for customers, clients, partners, and society at large.***
(Approved July 2013)

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THE PATIENT 2.0

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Patients' healthcare demand evolution

- Wider extent of demand: from «healthcare» to «wellbeing»;
- Growing expectations (low acceptance of queues, travels, waste of time, medical doctors arbitrary behaviours);
- Patient more aware of his own rights to manage and control his clinical data;
- Patient more «informed» and «connected».

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The new «educated» patient

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The new «educated» patient

Good news. According to Google, you are healthy!

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Growing attention over new Patient's behaviors

theguardian
Winner of the Pulitzer prize

It's difficult being a doctor in the age of the empowered patient
Ann Robinson

As a GP, I know that people differ in their approach to serious illness. Some want to make their own choice about treatment, even if it runs counter to the experts' advice

The Washington Post

Washington Post Live

Firms gear health-related technology toward baby boomers

THE HUFFINGTON POST

Why Is Our Health Care System Disconnected from What Matters to Patients?

- Patients want transparency in their care
- Patients want easy access to their medical information
- Patients want clearer and more efficient interactions

San Francisco Chronicle

'Sick blogs' help afflicted share news, seek comfort

June 14, 2006 | Justin Berton

... Sick blogs and patient pages are evidence that that moment has arrived, Frank said, a sign that the new patient has gained an unprecedented sense of empowerment from his online community. ...

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Patients new demand

Patients are bearers of new demand:

- Access to authoritative, customized and immediately usable health information (*Hesse et al. 2005*);
- Greater control over their own personal conditions of health, through personal management of pertaining data, and over the various diagnostic and therapeutic options available (*Cox et al. 2008, Kevin et al. 2008, Buccoliero and Prenestini 2009*);
- Direct and informal relationships with healthcare structures and professionals, also via non-traditional channels (*Leong et al. 2005, Giustini 2006*);
- Role as 'active player' within the network, also by sharing their own health problems with others (*Barak et al. 2008, Frost and Massagli 2008, Van Uden-Kraan et al. 2009*) and seeking out information on the experiences of others; web 2.0 logic (*O'Reilly 2007, Eysenbach 2008*) has considerably amplified this latter development.

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Patients' healthcare demand evolution

Patient's behaviors are changing over time.
The emerging health behaviors can be summarized as follow:
(Masters Ken et al 2010)

1. Patient education

(Khalid M. AlGhamdi et al 2012; Fox Susannah 2006, Horrigan J. et al 2000);

2. Patient Empowerment

(Kjeken I. et al. 2006; Nerney M. et al. 2001; Hjortdahl P. et al 2001; Webb 2007);

3. New patient-doctor relationship

(Masters Ken et al. 2010; Forkner-Dunn J. 2003; Eysenbach G. 2003);

4. Engagement in health-related social media platforms

Whelan T et al. 2003; Eysenbach Gunther 2003; Powell John et al. 2004; Skiba 2009; Lober William B. 2011)

13

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1. Patient Education

- Today's patients want to know when, how, and why they need to make a lifestyle change; (Cooper H., 2001)
- They realize the benefits of health education: skill building and responsibility. Informed lifestyle choices, disease or condition better understanding improve health outcomes; (Robert John Adams 2010)
- Patient education refers to an active **patient self-management**: educated patients interact with responsive health care teams, relying on better information and communication practices so that they become effective **managers of their own health** (Wills J., 2009).

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2. Patient Empowerment

- For years patient empowerment has been subject of thinking and research. First discussions started in the mid 1990s (Saltman RB., 1994)
- "The term "patient empowerment" describes a situation that citizens are encouraged to take an **active part** in their own health management, individual involvement in health decision making; (Lodewijk Bos, 2008, José Luis Monteagudo, 2007)
- Under this operating system, health care providers explain treatments and alternatives to patients in order to provide the necessary resources for patients to make an **informed choice** of the treatment option that most closely aligns with their unique cultural and personal beliefs. (Florin, J; 2004)

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3. New patient-doctor relationship

- Satisfaction with the doctor–patient relationship is a critical factor in people's decisions to join and stay with a specific organization *(Tessler R, 1995)*
- Today's patients ask for **direct and informal relationships** with healthcare structures and professionals, also via non-traditional channels (Leong et al. 2005, Giustini 2006);
- Examples of the ongoing needed methods of information exchange relate to:
  - Direct messaging through a secure email (CORHIO, 2014);
  - Apps for instant messaging (e.g. SMS) (Bones E., 2007)

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4. Engagement in health-related social media platforms

- Patient becomes an 'active player' within the network, also by **sharing** their own health problems with others (Barak et al. 2008, Frost and Massagli 2008, Van Uden-Kraan et al. 2009) and seeking out information on the experiences of others - web 2.0 logic (O'Reilly 2007, Eysenbach 2008).
- "The new Web sites facilitate the exchange of health information and personal stories in a way that transcends both medical textbooks and chatting with a friend on the phone - yet offers some of the benefits of both: deepening knowledge and being supported from the community. (Jane Sarasohn Kahn, 2008)

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Patient 2.0 Empowerment (I)

- It's only with recent developments in the application of Internet, more specific **Web 2.0**, that patient empowerment becomes a "2.0" reality; (Ferguson, T., 2002)

- Patient 2.0 Empowerment is the active participation of the citizen in his or her health and care pathway with the interactive use of Information and Communication Technologies.
(Lodewijk Bos, 2008)

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Patient 2.0 Empowerment (II)

ICTs enable patients to:

- Access to relevant, adequate and immediately usable health information simply Googling the "question" (Hesse et al. 2005);
- Have a greater control over their own personal conditions of health(Cox et al. 2008, Kevin et al. 2008, Buccoliero and Prenestini 2009);

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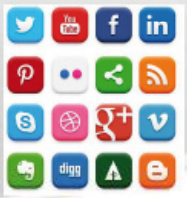
The Patient 2.0 profile

Summary of the main findings from a literature review

Please listen to me
respect me
involve me in my care

The patient 2.0 seeks the empowerment: asking health practitioners to be involved in the decision-making process

The patient 2.0 is more informed: Seeks health-related information online



The patient 2.0 is more connected: actively participates on online health-related communites to get information and support from other patients

The patient 2.0 wants an immediate communication via messages delivered almost in real time.

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CERMES BOCCONI RESEARCH

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CERMES research framework

What is the state of the art in Italy in patient empowerment supported by ICT?

What are the main patients' value drivers in Italy?

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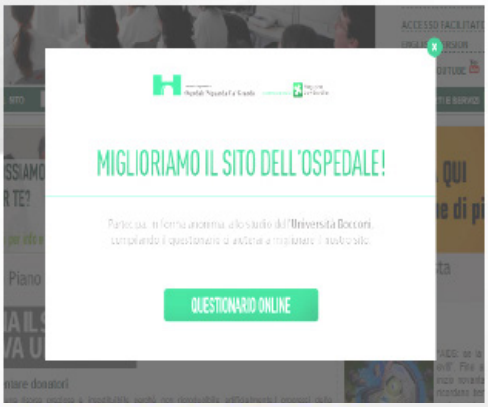
Methods

- Interviews to Niguarda Hospital outpatients (n=737), paper-based questionnaire to outpatients;
- Interviews to Niguarda Hospitals inpatients. Niguarda (n=861), paper-based questionnaire to inpatients;
- Online questionnaire on Niguarda website (n= 1210), online survey to hospital website users.



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Remark #1

Patients would like to have access to web services through **mobile device** (smartphones and tablets).

No significant services are offered on mobile platforms

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Remark #2

Inpatients and outpatients are quite used to the **web as a resource for administrative purposes** (booking, general information on admission, etc).

Web personalized health information and web tools for improving relationships with medical doctors are less known and used (even e-mail).

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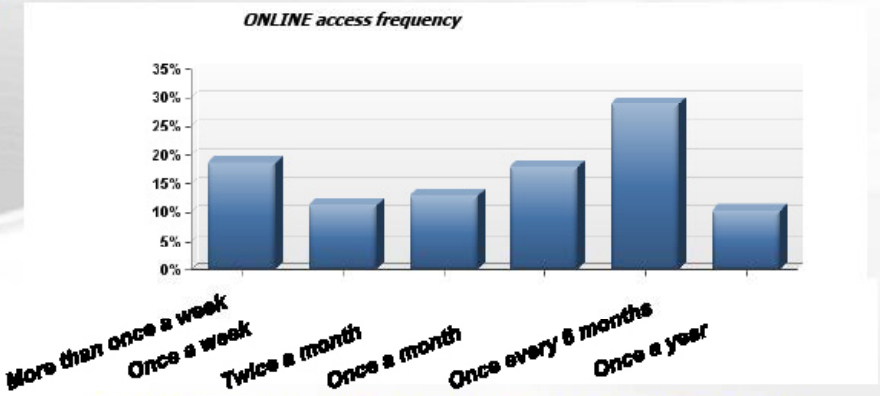
Remark #3

The ONLINE Citizen is looking on the web for health **information** and **direct relationship** with clinical professional.



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Remark #4

Inpatients and outpatients who are **using PHR** tools are on average more satisfied of their experience at Niguarda Hospital (**higher customer satisfaction** for all evaluation items).

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Remark #5

All investigated groups show great **interest** to the use of **ICT** based **new services**.

Some **wishes** are quite easy to satisfy.

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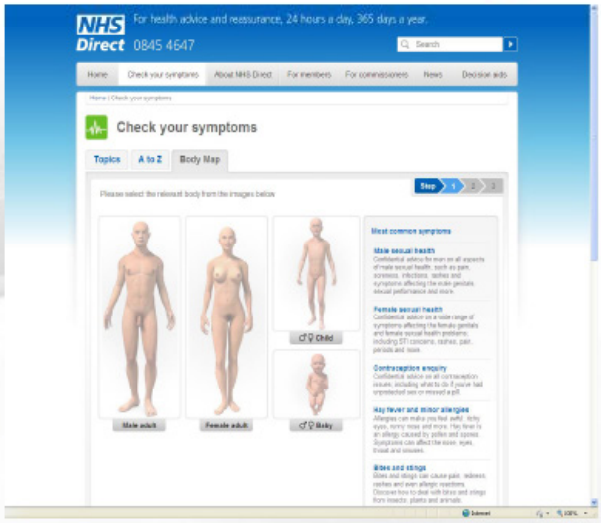
New services

- 51% would like to use **self-diagnosis tools** (mainly for chronic diseases and oncologic prevention).



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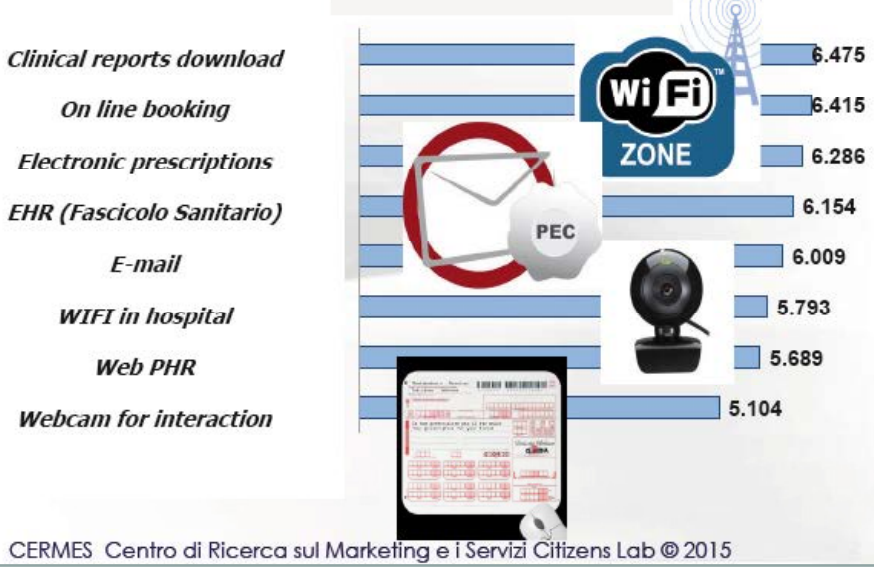
New services perceived usefulness (min 1, nax 7)

Fascicolo Sanitario elettronico



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DISCUSSION & CONCLUSION

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Main conclusions

- The **«empowered»** patient is on average **more satisfied;**
- **Mobile strategy** is now unavoidable and compulsory;
- Online citizens are bearer of **expectations** that the system must take into account;
- Some expectations are still quite **«easy»:** even basic digital needs are still unsatisfied!!!

A new approach for citizen participation in service design must be implemented

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A profile of patient 2.0
Results from CERMES Bocconi research

The detected Patient 2.0 profile presents the following behavioural and socio-demographic characteristics:

- ❑ Women;
- ❑ Well-educated;
- ❑ Young;
- ❑ More demanding – compared to the conceived "traditional one";
- ❑ Patient is willing to accept health technology applications;
- ❑ Patient engages in online groups for health support.

Claudio Borghi

Claudio Borghi is Professor of Medicine at the University of Bologna.

He received his medical degree at the University of Bologna and completed his internship, residency and clinical fellowship at the Department of Cardiology and at the Department of Clinical Pharmacology of the University of Bologna.

His research experience is mainly focused the pharmacological and therapeutic aspects of hypertension, coronary artery disease and congestive heart failure.

He is currently Chief of the Department of Medicine of the Policlinico S.Orsola-Malpighi-Bologna and Head of the Hypertension Unit.

He is the current President of the Italian Society of Hypertension

He is Director of the post-graduate medical specialization for Respiratory diseases

He is Delegate for the International relationships of the School of Medicine of University of Bologna

Prof.Borghi is member of the Editorial Board of several scientific journals (PLOS ONE, J Hypertension, International J of Hypertension) and contributes to the board of reviewers for the European Heart Journal, British Journal of Clinical Pharmacology, American Journal of Hypertension, American Journal of Medicine, Lancet. Circulation, Atherosclerosis, Journal of Endocrinology.

He has lectured to primary care physicians and several specialists (cardiologists,internists, diabetologists, nephrologists) about hypertension, cardiovascular risk factors, lipid lowering drugs, clinical pharmacology of cardiovascular drugs, drug treatment of CV diseases.

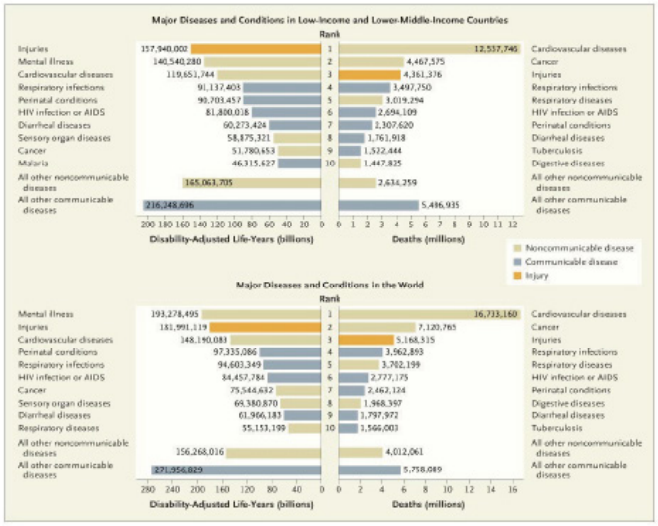
He is currently National Coordinator for the ACCELERATE Study, FORWARD Study

Dr.Borghi is member of the Working Group of the European Society of Cardiology for the guidelines about the management of cardiovascular diseases during pregnancy

Dr.Borghi is ordinary and honorary member of many international scientific societies (ISH, ESH, ESC, ASH, Venezuelan Society of Cardiology, Mexican Society of Cardiology)

Prof.Borghi is author and co-author of over 350 peer-review scientific papers and many other scientific publications and scientific contributions in the field of hypertension, CHD and drug treatment of cardiovascular diseases.

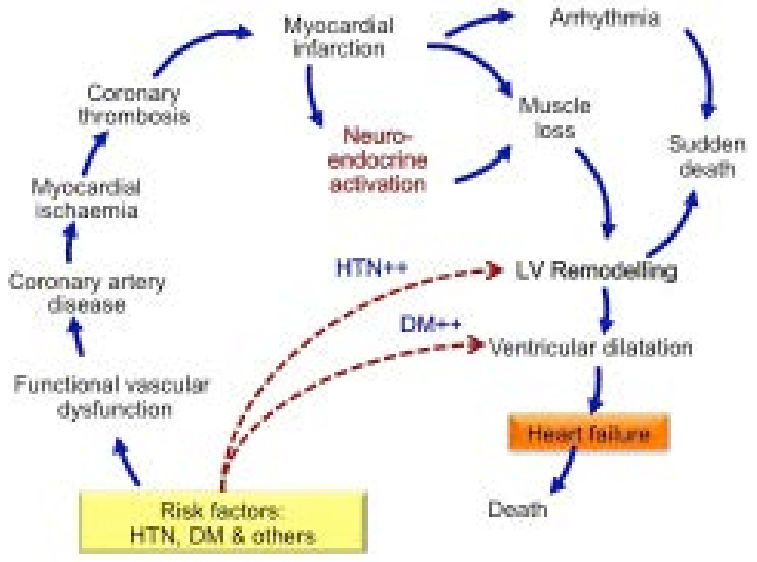
Years of Healthy Life Lost (Disability-Adjusted Life-Years) and Deaths According to Disease or Condition.



Anderson GF, Chu E. N Engl J Med 2007;356:209-211.

The NEW ENGLAND JOURNAL of MEDICINE

Chain of events leading to CV diseases



Dzau V et al, Circulation 2009

Disease management of CVD

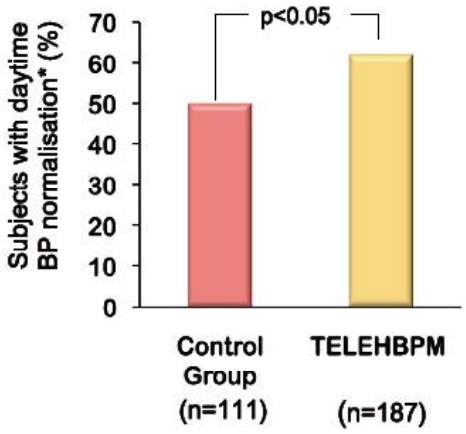
1. Primary prevention
2. Management of acute disease (ACS, CHF, etc.)
3. Management of post-acute complications
4. Management of co-morbidities
5. Secondary prevention
6. Home care and assistance

Modified from Tocci G, Volpe M, et al. High Blood Press Cardiovasc Prev 2014;21(1):29-36

HBPM monitoring+teletransmission, BP control and patient compliance vs. office BP monitoring

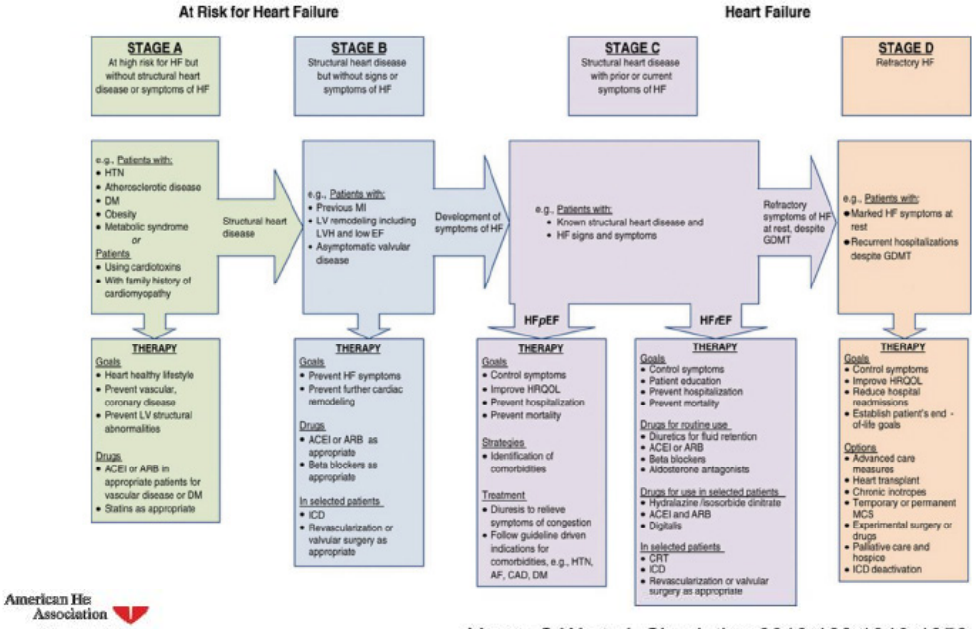
TeleBPCare study

*SBP <130 mmHg and DBP <80 mmHg



Parati et al. *J Hypertens* 2009:27:198–203

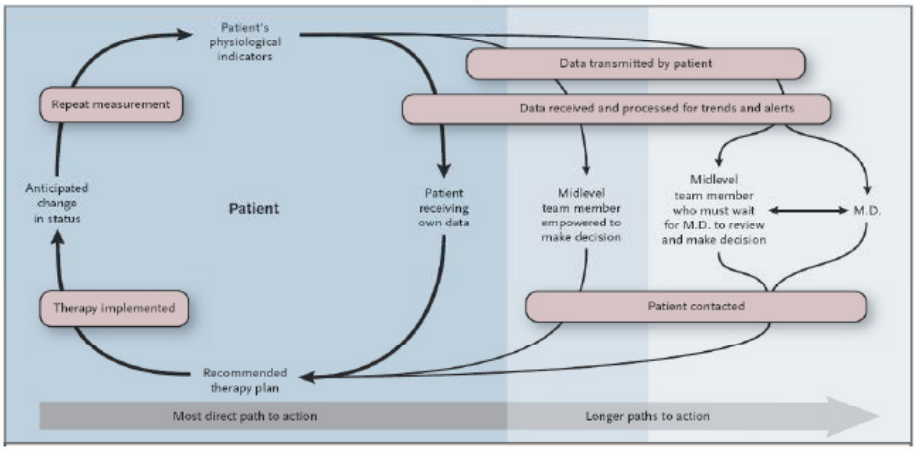
Stages in the development of HF and recommended therapy by stage.



American Heart Association
Learn and Live

Yancy C W et al. Circulation 2013;128:1810-1852

The Circle of Home Management of Heart Failure



Many connections are required to allow for incorporation of physiological information obtained from patients at home to trigger interventions and potentially improve outcomes by means of heart-failure disease management. The telemonitoring intervention in the trial by Chaudhry and colleagues9 requires triangulation between the data- rocessing staff, the midlevel professional, and the physician before the patient is contacted to change therapy. An independent midlevel professional functioning independently may provide more timely feedback to the patient. Ideally, in the future, patients would be empowered to interpret and respond to their own physiological information

The New England Journal of Medicine
2010; 363(24): 2364-2367

Integrated vs. Current management GC

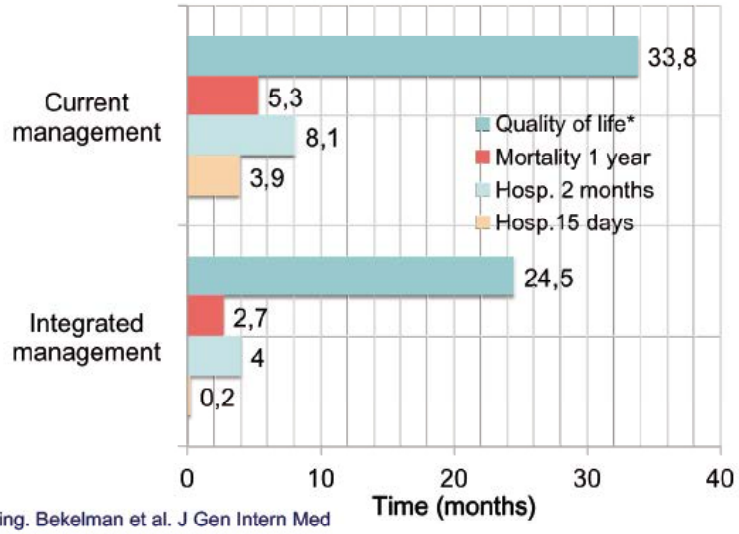
CM

- Patients release dfom hospital with diagnosis of CHF
- Follow-up 6 and 12 months in outpatient clinic
- Clinical observation, vital parameters, BP, Biochemical assessment, Echo evaluation

IM

- Patients release fom hospital with diagnosis of CHF
- Management by multi-professional team
- Follow-up 6 and 12 months in outpatient clinic
- Home weekly contact by trained nurses/doctors
- Clinical schedule including weight, diuresis, drug adherence
- Centralized management of alert

1-year mortality and hospitalization in patients with CHF allocated to CM or IM



*Spiritual Well-being. Bekelman et al. J Gen Intern Med 2007;22:470–7

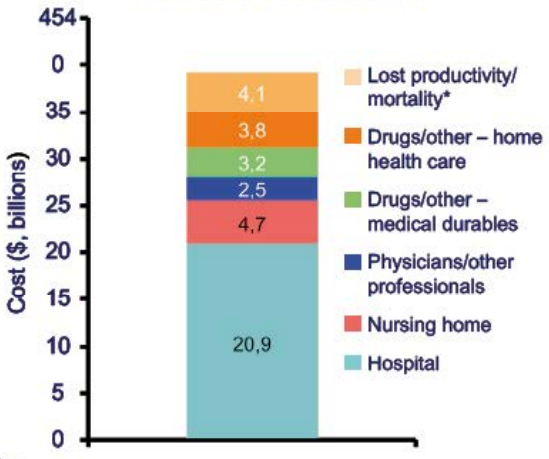
Department of Medicine-University of Bologna

Heart failure imposes a significant economic burden on the healthcare system

- The estimated direct and indirect cost of HF in the USA in 2010 was $39.2 billion[1]
  - This estimate is likely to be greatly understated as it is based on data for HF as the primary diagnosis or underlying cause of death[1]
- In the first year following HF diagnosis, total costs per patient in the USA are approximately $25,000[2]
- More than 2% of the total healthcare budget in many countries is spent on the treatment of HF, with up to 70% of this due to the cost of hospitalizations[3]

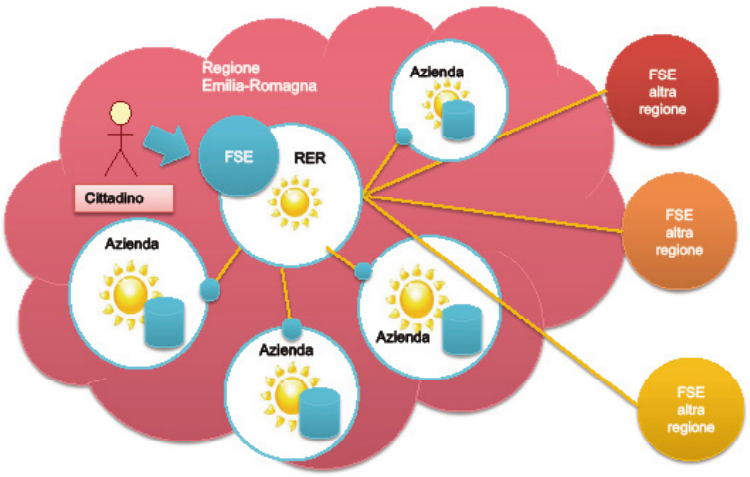
*Does not include lost productivity due to morbidity

HF costs in the USA in 2010[1]

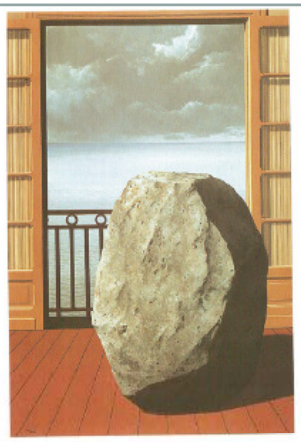


1. Lloyd-Jones et al. Circulation 2009;119:480–6; 2. Liao et al. Arch Intern Med 2006;166:112–18; 3. Dickstein et al. Eur Heart J 2008;29:2388–442

FSE and Emilia-Romagna Region



Open problems-Italy

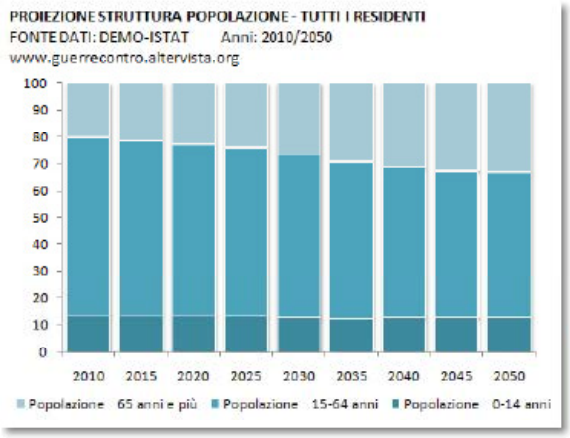


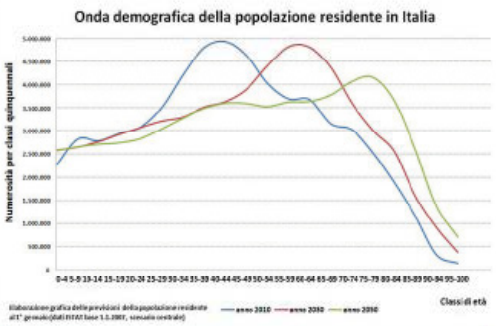
- Data limited to some patients populations
- Lack of universal recommendations
- Confounding factors for efficacy (drop-in treatment)
- Limited and local experiences
- Inrecetion with the National Health System
- Management of responsability

Alberto Dall'Acqua

Nella posizione attuale, ho la responsabilità di progettare e implementare le attività volte a promuovere l'accesso, l'adozione e il riconoscimento del valore della nuova tecnologia terapeutica da parte del mercato, spostando l'attenzione dal medico prescrittore (storicamente è stato il medico a richiedere la soluzione terapeutica) per la stakeholder pluralità (amministratori di ospedali, istituzioni, medici, pazienti, ecc.) In particolare, sono responsabile per l'attuazione di tutte le attività volte a identificare, ottenere, analizzare gli aspetti di economia sanitaria, i risultati di efficacia clinica, informazioni di rimborso (ossia la conoscenza dei codici DRG e il suo meccanismo di pagamento) per supportare strategie economiche e rimborsi per nuovi dispositivi medici per il trattamento di malattie cardiache, neurologiche, uro-ginecologiche, respiratorie, associato con le linee di prodotto di Boston Scientific.

Italian Population





- Increased Longevity
- Increase in the population over 65 years old

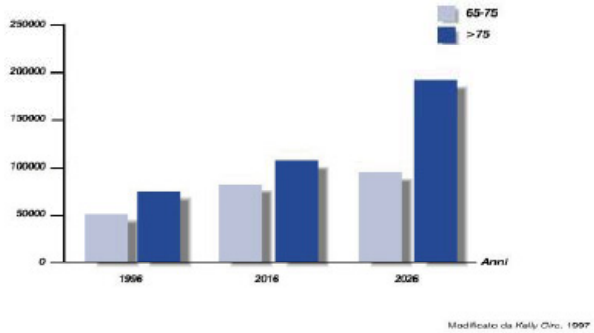
Older population is at high risk to suffer of:

- **Heart Failure (HF)**
- **Atrial Fibrillation (AF)**

1

Heart Failure

- More then 1.500.000 HF patients *
- 170.000 new patients every year*
- 500 re-hospitalization every day due to HF*
- Increase of 40% hospitalization in the last 5 years*
- HF incidence is strictly correlated to increase the patients age
- HF patients number will double in 2030*

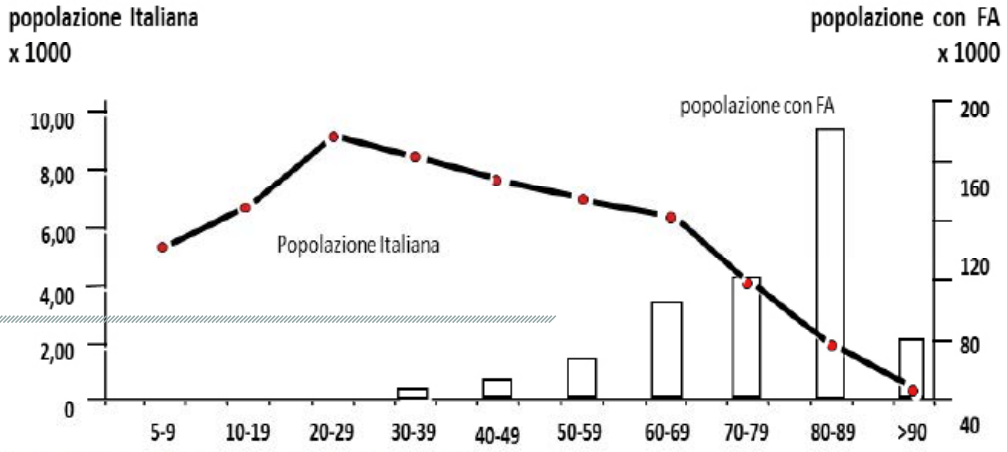


Modificato da Kelly Circ. 1997

2

Atrial Fibrillation

- More then **850.000** AF patients*
- **114.000** new AF patients every year*
- **70%** AF patients has an age more then 65 years*



*Dr. Themistoclakis - HTA Ablazione transcatetere FA. Documento AIAC 2013

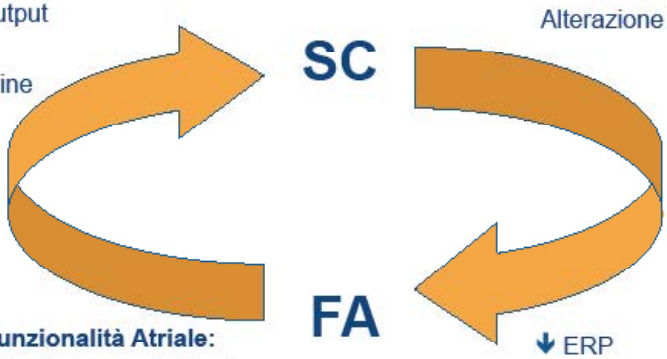
3

Comorbidity AF – HF

Compromissione del riempimento Diastolico:
- ↓ Stroke Volume
- ↓ Cardiac Output
- ↑ LVEDP
- ↑ Catecolamine

Dilatazione Atriale
Ipertrofia Atriale
- ↑ Pressione Atriale

Alterazione Neuro-Ormonale



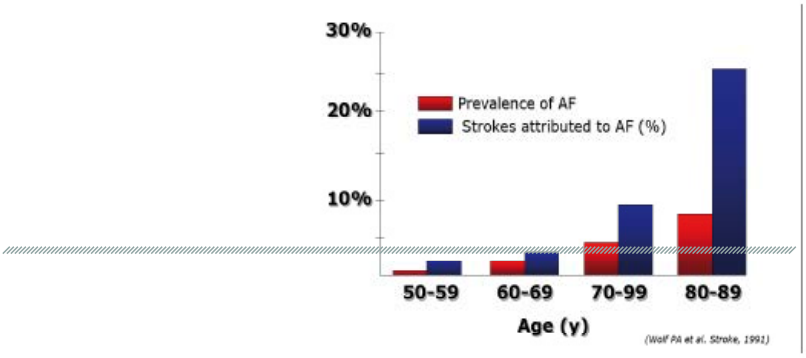
Perdita della Funzionalità Atriale:
- Frequenza Cardiaca non fisiologica
- Risposta Ventricolare Irregolare
- Perdita del Sincronismo A-V

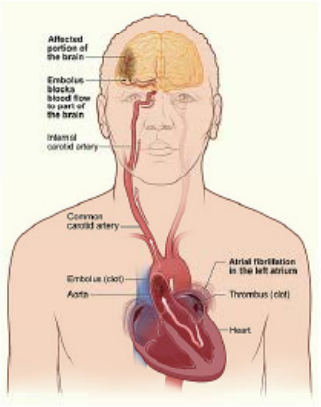
- ↓ ERP
- ↓ Velocità di Conduzione
- ↑ Refrattarietà
- ↑ Attività Ectopica

4

AF Complications: stroke

- **66%** AF patients has at high risk of stroke
- **200.000** of stroke events every year
- Stroke is the third mortality cause, **the first invalidity cause**
- In the **15 – 20%** of ischemic's stroke events the responsability is associated to AF





Dati AIAC: Controllo remoto dei dispositivi: HTA – RP Ricci & al. 2013

5

Background

A high number of elderly patients with potential multiple-diseases they need assistance, more or less continuously, they have a cardiac device implanted that it requires frequently in-hospital control

6

Clinical Practice

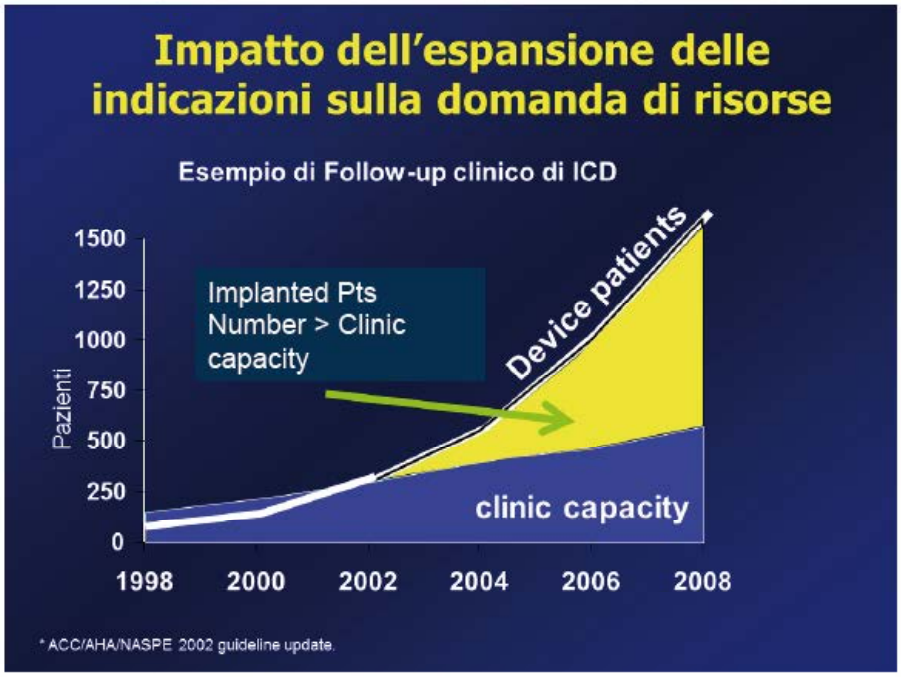
- A PM patient performs an ambulatory visit every 12 – 18 months
- An ICD patient perform an ambulatory visit every 6 – 12 months.

Ambulatory device control duration:

- ✓ **15±7 min** (ICD single chamber)
- ✓ **16±8 min** (ICD dual chamber)
- ✓ **20±9 min** (ICD bi-ventricular)

7 [Luzi M. Interact J Med Res 2013,vol. 2, iss. 2, e27]

Background



8

Remote Monitoring

Boston Scientific

Remote Monitoring is an effective alternative to outpatient follow-up

- ✓ **Continuous evaluation of device functionality**
- ✓ **Early detection of clinical destabilization episodes**

9

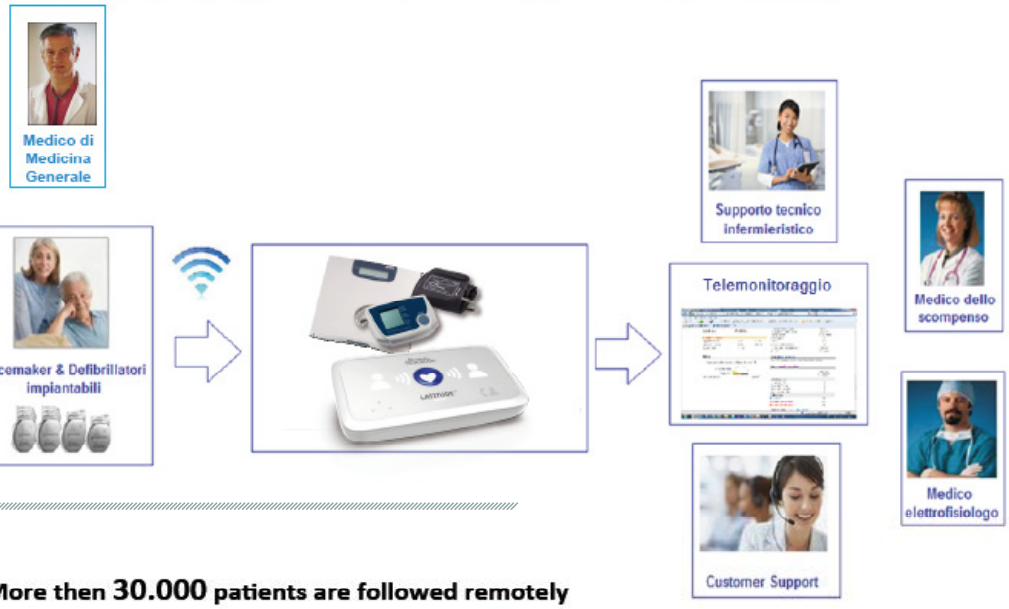
Remote Monitoring

Boston Scientific

- **Potential Advantages**
  - Time and cost saving for both patients and the health organizations by minimizing routine clinic appointments when no action is needed
  - Early notification of problems with the ICD system
  - Early notification of clinical issues
  - Early signs of decompensated heart failure
- **Potential Barriers**
  - Reimbursement
  - Legal liability
  - Management of patients and data under a new or alternative method

10

Remote Monitoring

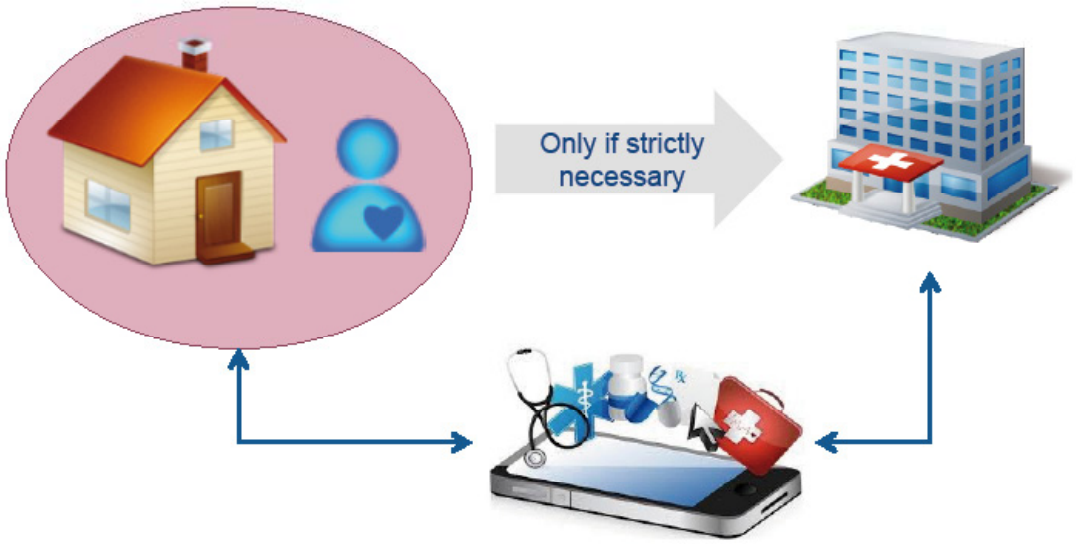


More then 30.000 patients are followed remotely

11

Remote Monitoring

Export the hospital at patient's home



12

Remote Monitoring

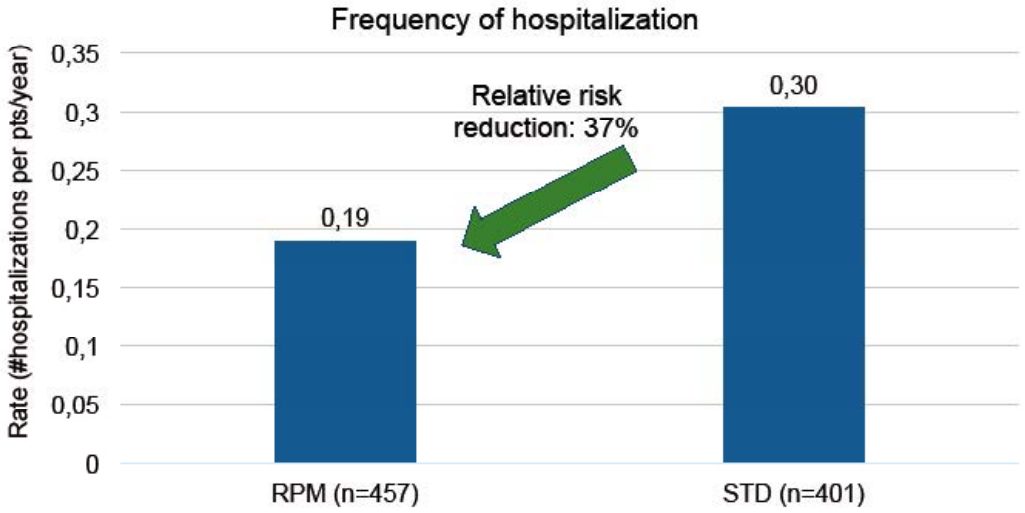
Boston Scientific

Early detection of clinical destabilization episodes and/or device malfunctioning can reduce the frequent hospitalization and/or hospitalization duration

13

Economic Analysis - Outcomes

Boston Scientific



During the first 12 months of observation, subjects in the RPM group experienced fewer hospitalizations than in the STD group

EFFECT Study. In press

14

Clinical & Economic benefits

Hospitals / NHS	*Patients*	*Community*
Reductions: • **Unnecessary outpatient visits** *(40-78%)* • **Hospital resources (Physician & Nurse)** *(60%)* • **Hospitalization duration and number** • **Follow-up duration** *(40-67%)* • **Not scheduled in-hospital visit** *(35%)* • **Hospital costs** *(33-61%)*	**Clinical:** • **Early detection of clinical events and device failure-malfunctioning** • **Innapropriate shocks reduction** *(50%)* • **increase of quality of life** • Decrese of mortality rate **Economic:** • **caregiver costs reduction (indirect costs)** **Others:** • **Increase of patient compliance**	**Reductions:** • **Social costs,** • **Indirect costs** (i.e. lost of productivity) *(53%)*

Metanalisi di studi clinici (vedi slide finale rif. 1-11) e documenti di consenso AIAC e Assobiomedica

15

16

Carlo Descovich

Nato a Bologna il 28.03.1970, residente a Bologna.

Laurea in Medicina e Chirurgia nel 1995, Specialità in Medicina Interna nel 2000.

Dal 2000 al 2002 ha svolto attività libero professionale presso Case di Cura Private e come ecografista.

Dal 2002 Dirigente Medico nella disciplina di Medicina e Chirurgia d'Accettazione e d'Urgenza presso la Azienda U.S.L. Bologna Nord, poi Azienda USL Bologna. Dal 2006 al 2008 ha lavorato presso la Medicina d'Urgenza e PS dell'Ospedale Maggiore.

Dopo un percorso formativo nei temi della Evidence Based Practice, Governo Clinico e Metodologia della Ricerca Clinico, ha iniziato a collaborare con il Centro Studi del Gruppo Italiano per la Medicina Basata sull'Evidenza sia in progetti formativi che su progetti operativi.

Da Dicembre 2008 Resp. ff dell'unità operativa dello Staff della Direzione AUSL Bologna che si occupa di governo clinico, attualmente identificata nella UOC Governo Clinico e Sistema Qualità.

Meeting Italia/Usa

Un nuovo modello
di formazione e ricerca per lo sviluppo
della Sanità Digitale

ore 9,00 - 3 /4 dicembre 2015
Università di Bologna

Sala Armi Scuola di Giurisprudenza
Via Zamboni, 22 - Bologna

Reti Sanitarie Assistenziali

Carlo Descovich, Aldo Bonadies
AUSL Bologna

INAPPROPRIATEZZA IN ECCESSO

- 20-25% of the care provided is not needed or could potentially cause harm

INAPPROPRIATEZZA IN DIFETTO

- 30-45% of patients are not receiving care according to scientific evidence

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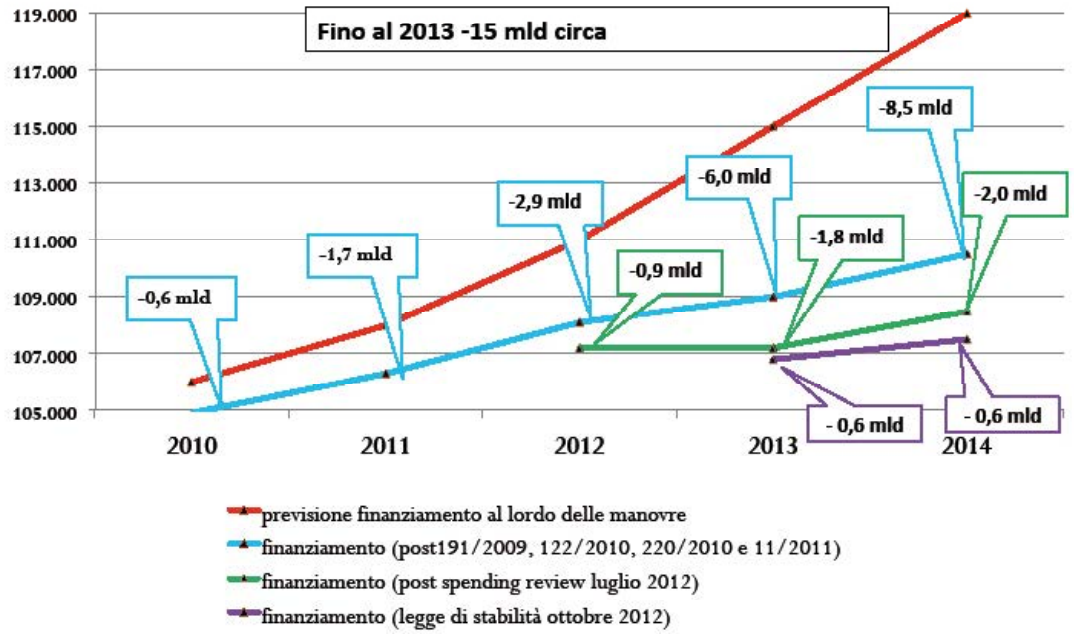
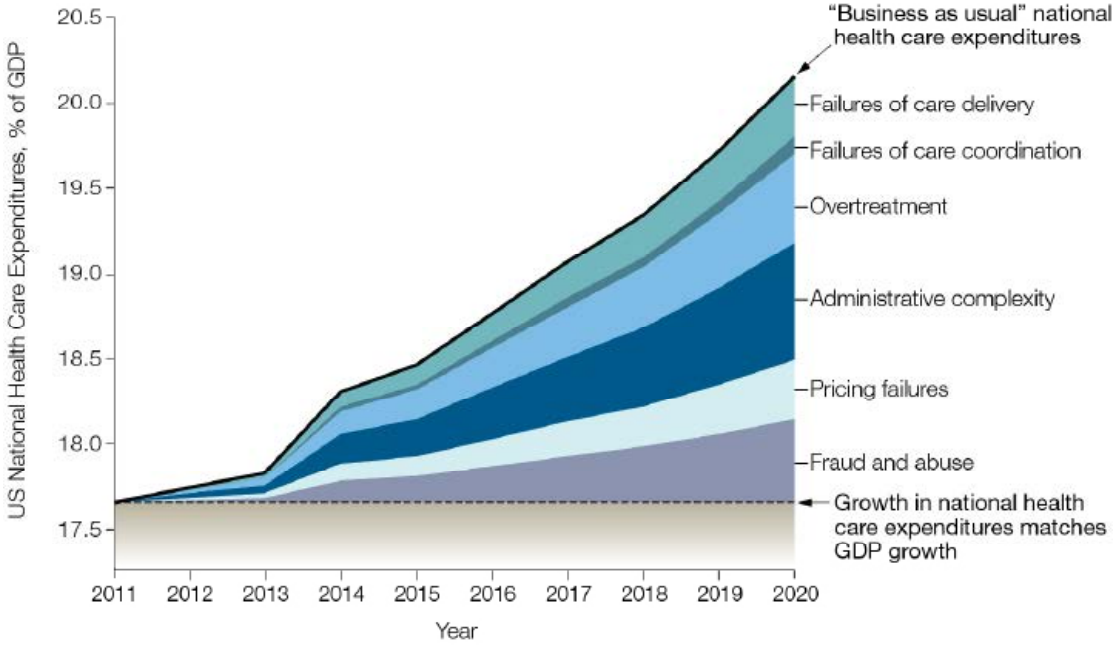


Dato elaborato da CGIL e Centro Interregionale Studi e Documentazione e Sole 24 Ore, 2012

Descovich C., Bonadies A
AUSL Bologna



Una strada possibile per migliorare la qualità dell'assistenza è di ridisegnarla partendo dalle evidenze disponibili

Anderson GM, et al. Lancet, 2001

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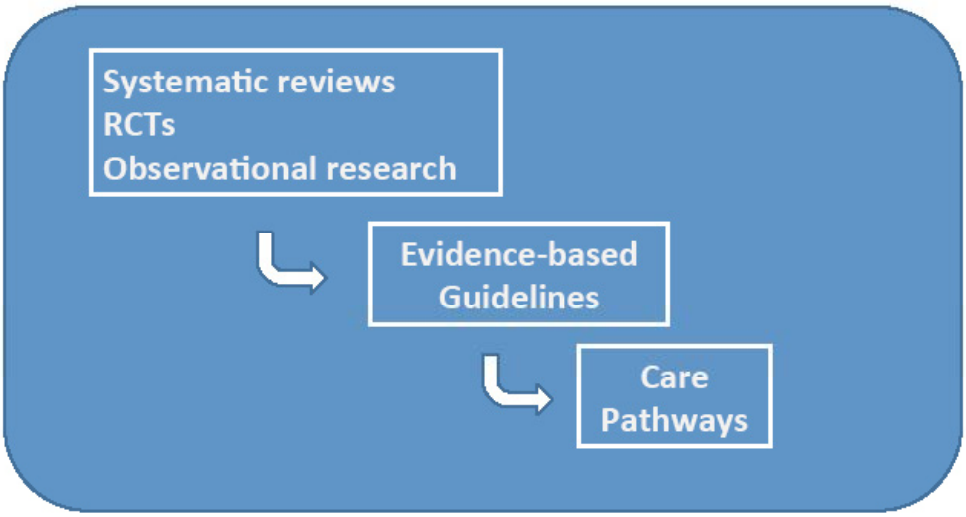
AUSL Bologna

Individuals shape organizations

Organization facilitates the development of individuals

Muir Gray JA. Churchill Livingstone,2009

EVIDENCE – BASED CARE PATHWAYS



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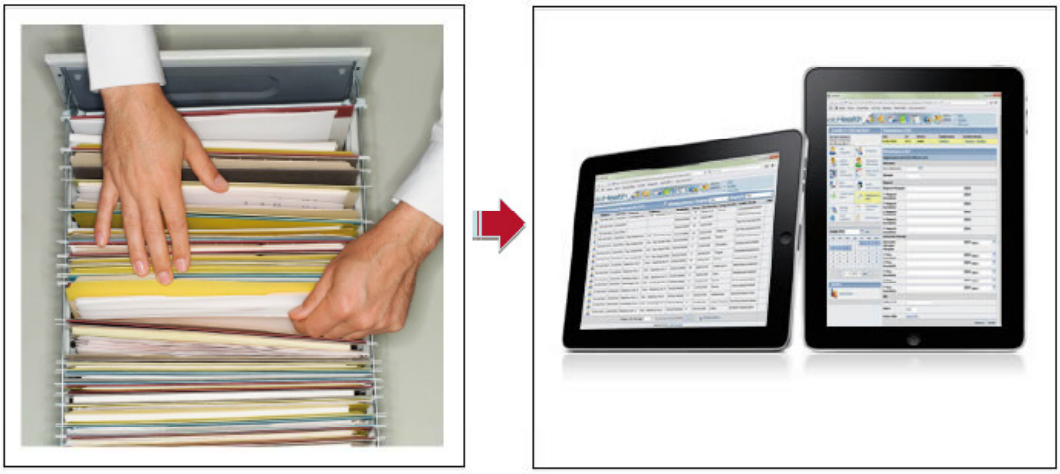
Redesign (Patient Centered Care)

Descovich C., Bonadies A
AUSL Bologna



3 OBIETTIVI PRIORITARI:

- Supportare il miglioramento della qualità assistenziale
- Irrobustire le attività di monitoraggio dell'assistenza
- Incentivare la ricerca (traslazionale)

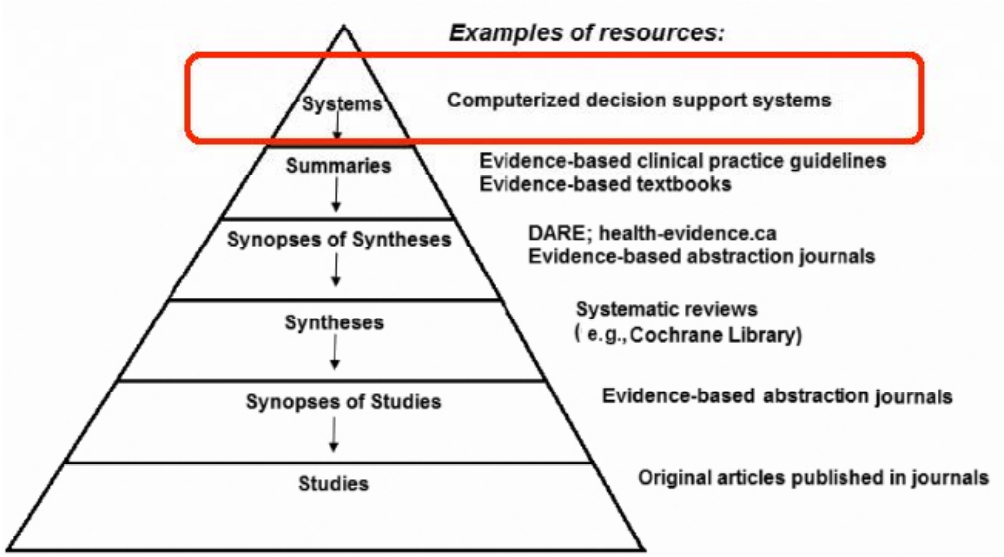
Descovich C., Bonadies A
AUSL Bologna

1

Editorial

Accessing preappraised evidence: fine-tuning the 5S model into a 6S model

15 September 2009 | ACP Journal Club | Volume 151 • Number 3



Descovich C., Bonadies A
AUSL Bologna

Monitoraggio

Reclutamento popolazione | Outcomes | Consumi e Costi | Esperienza professionisti | Continuità | Esperienza pazienti | Equità

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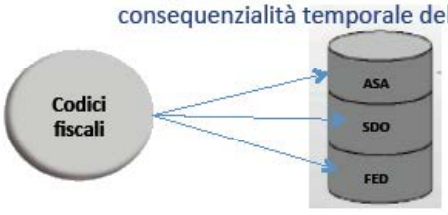
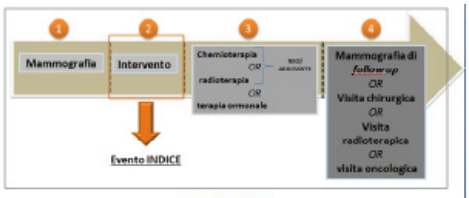
AUSL Bologna

Monitoraggio

- Il modello è scomponibile in 4 fasi:
  1. Individuazione **LEA di percorso** (e definizione limiti temporali di esecuzione);
  2. Individuazione **evento indice** (denominatore)
  3. Interrogazione flussi informativi correnti (SDO, ASA, AFT, FED, etc.) ed **estrazione dati di consumo**
  4. ***Linkage*** dati **con codici fiscali** dell'evento indice, nel rispetto della consequenzialità temporale delle prestazioni

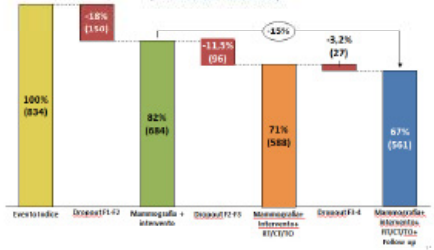


CF	F1	F2	F3	F4	n
ABC	01/01/2010	02/01/2010	03/01/2010	04/01/2010	05/01/2010
EFG	01/01/2010	02/01/2010			



LEA di PDTA

Pazienti presi in carico nel PDTA Mammella
(evento indice: anno 2012)



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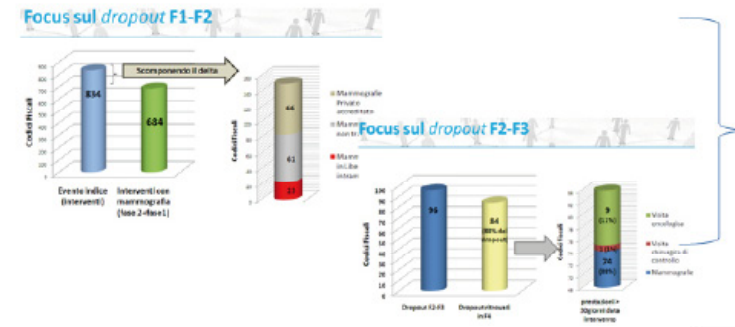
Monitoraggio



Budget di percorso – anno 2014	Storico	Budget	Responsabilità
% pazienti con visita oncologica post intervento sul totale di pazienti con intervento chirurgico AUSL/AOU	71%	85%	PDTA Mammella
% pazienti con PN attivato (presso i consultori aziendali) sul totale parti/anno	46%	60%	Percorso Nascita

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3

Translational Research

Richard Smith: How to fill the void of evidence for everyday practice?
11 Aug, 15 | by BMJ

The **current research system doesn't provide an answer** to the problem of producing more high quality, applicable trials. It is geared to produce long term, high quality, and expensive trials **driven by researchers not clinicians**. Such trials are needed, but they need to be supplemented by **trials produced in routine care answering practical questions asked by clinicians**—or, to put it another way, they must produce evidence that is applicable and will convince clinicians to base their practice on the research.

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Translational Research

T1
- TRANSLATION TO HUMAN: dal laboratorio all'essere umano attraverso i primi trial ("first in human")

T2
- **TRANSLATION TO PATIENTS:** dai trial clinici controllati esplicativi (efficacy) ai reali setting assistenziali ed alla comunità (effectiveness)

T3
- **TRANSLATION TO PRACTICE:** trasferimento delle conoscenze nei sistemi sanitari, attraverso l'adattamento necessario per generare miglioramento dell'as-sistenza ed incidere sulla salute della popolazione

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AUSL Bologna

PLOS | MEDICINE

GUIDELINES AND GUIDANCE

The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement

Eric I. Benchimol[1,2]*, Liam Smeeth[3], Astrid Guttmann[2,4], Katie Harron[3], David Moher[5], Irene Petersen[6], Henrik T. Sørensen[7], Erik von Elm[8‡], Sinéad M. Langan[3‡]*, RECORD Working Committee[¶]

Published: October 6, 2015

Antonio Vittorino Gaddi

Director of "Giancarlo Descovich" Atherosclerosis Centre of the Italian National Study Group of Atherosclerosis and Metabolic Diseases affiliated to the International Atherosclerosis Society.

Currently works in EuroGenLab & Caravelli Lab in Bologna.

Past President of the degree course in Medicine and Surgery (Bologna University) and expert for cardiovascular prevention and metabolic disease of the Italian Health Ministry (2005-2011).

Main investigator of EU projects ("Euro Olive" EU-5th FP and "Oldes" EU-6th FP) and of Massa Lombarda Project, under the high patronage of EU Parliament.

Editor of several books ("Medical Data, Information Economy and Federative Networks", Nova Publisher, 2012; "eHealth Care and Quality of Life", Springer, 2013).

IF 745, RG 43,8. www.researchgate.net/profile/Antonio_Gaddi -

(Big) data – (Big) information – (Big) complexity – (Big) confusion

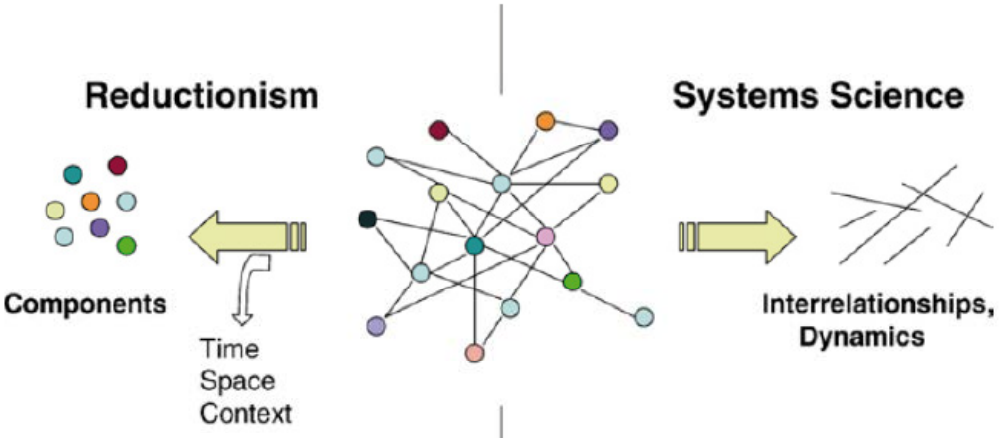
1- Many patient data were recorded (on stone, in human memory, in computer memory, on paper, on cloud, on mobile etc.). Therefore are not available nor retrieved (in EU about 35000 billions of "information")

2- Big Data clinical outcomes ?

3- About 35% of medical literature (2217 papers of the last 5 years) reports no benefit or risk

The socio-technical concept *Information.*
(M. Martin, 2015)

The socio-cultural View	*Norms, Values and principals.*	We negotiate new meanings and govern practice.
The Conversational View	*Roles and relationships and transactions*	Meaning includes the interpretation of intentions and responsibilities.
The Communications View	*Codes and denotations*	Meaning is pre-defined explicit and concrete.
The Engineering View	*Bits and terabytes, rates and capacities*	We can talk about where and how much but not about meaning.



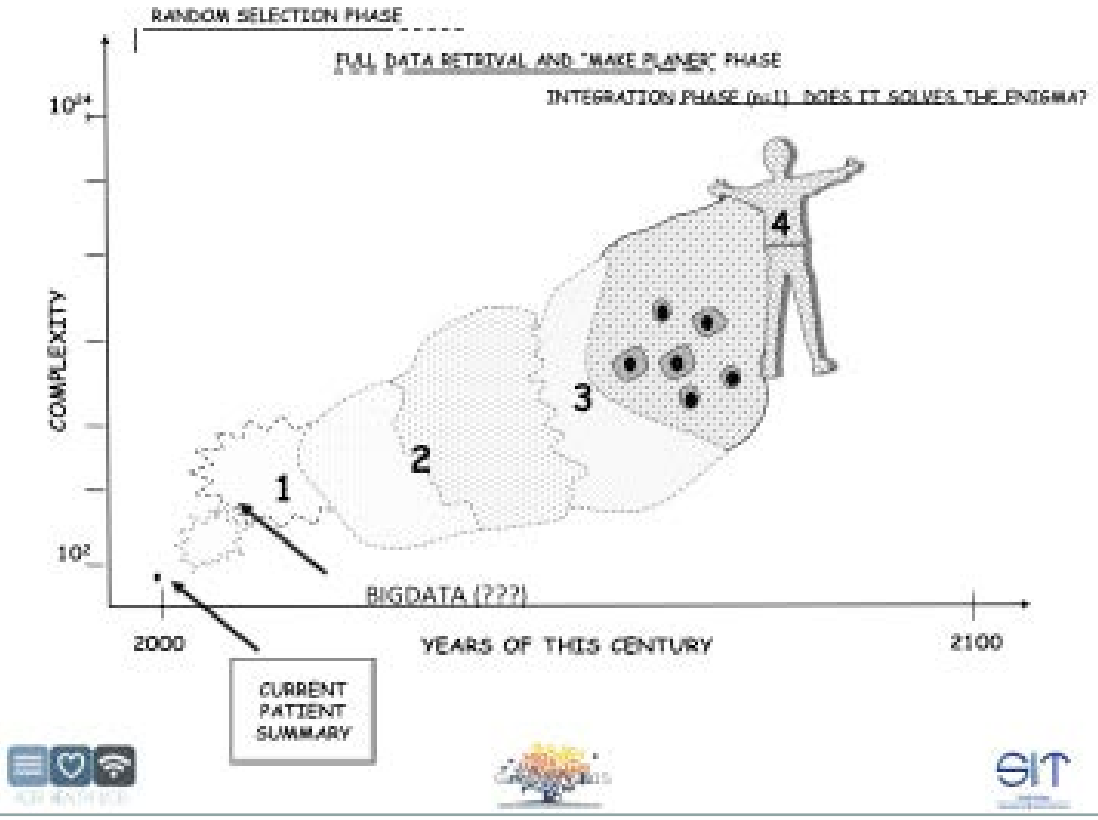
Medical Treatments

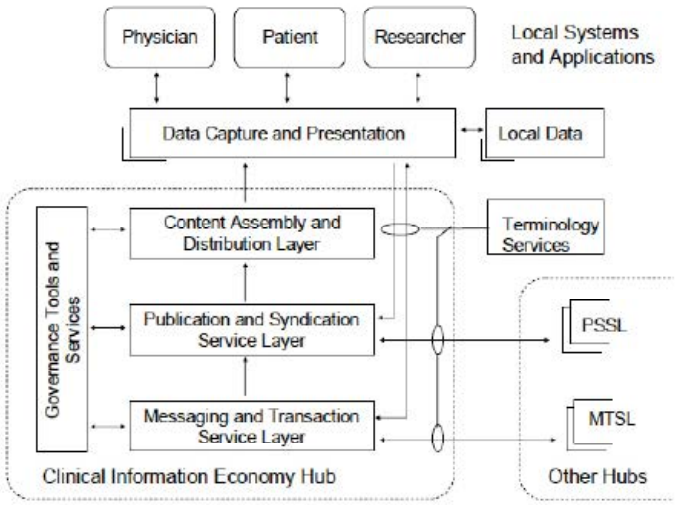
Disease-driven
Aimed for normalcy (normal range)
Additive

Medical Treatments

Individualized
Multidimensional use of drugs
Time-sensitive
Space-sensitive
Synergistic

Gaddi AV, 2015 4





Gaddi AV, 2015 6

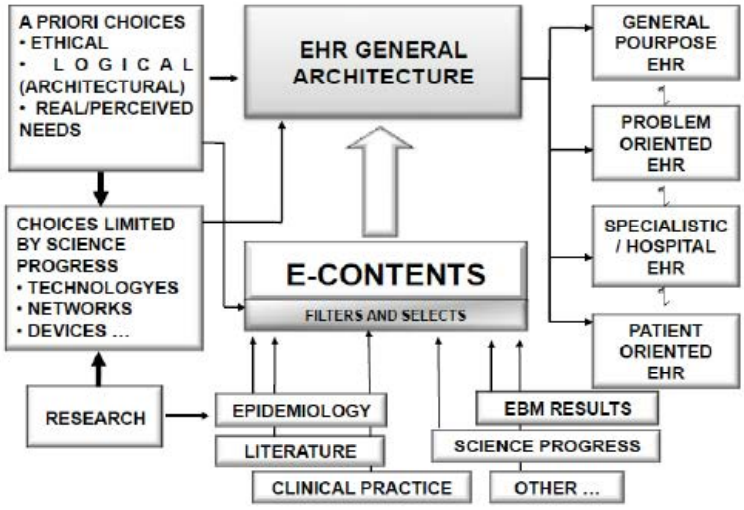


Figure 1.2. Science governed & logical approach for the definition of the requirements. The EH
listed in the boxes on the right (general purpose EHR, Problem oriented EHR, Specialistic EH
Oriented EHR) are just some examples of all the possible records that can be designed starting
architecture.

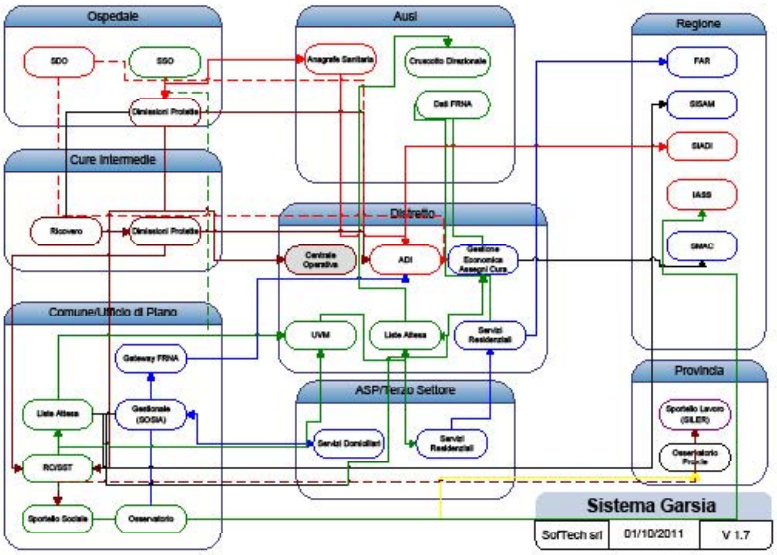
Il contesto metropolitano bolognese

- 9 ospedali Ausl Bologna
- Aosp e IOR
- 54 comuni
- 6 distretti socio-sanitari
- 20 strutture cure intermedie
- 116 strutture residenziali
- 200 IP
- Circa 2500 operatori coinvolti
- Circa 900000 abitanti

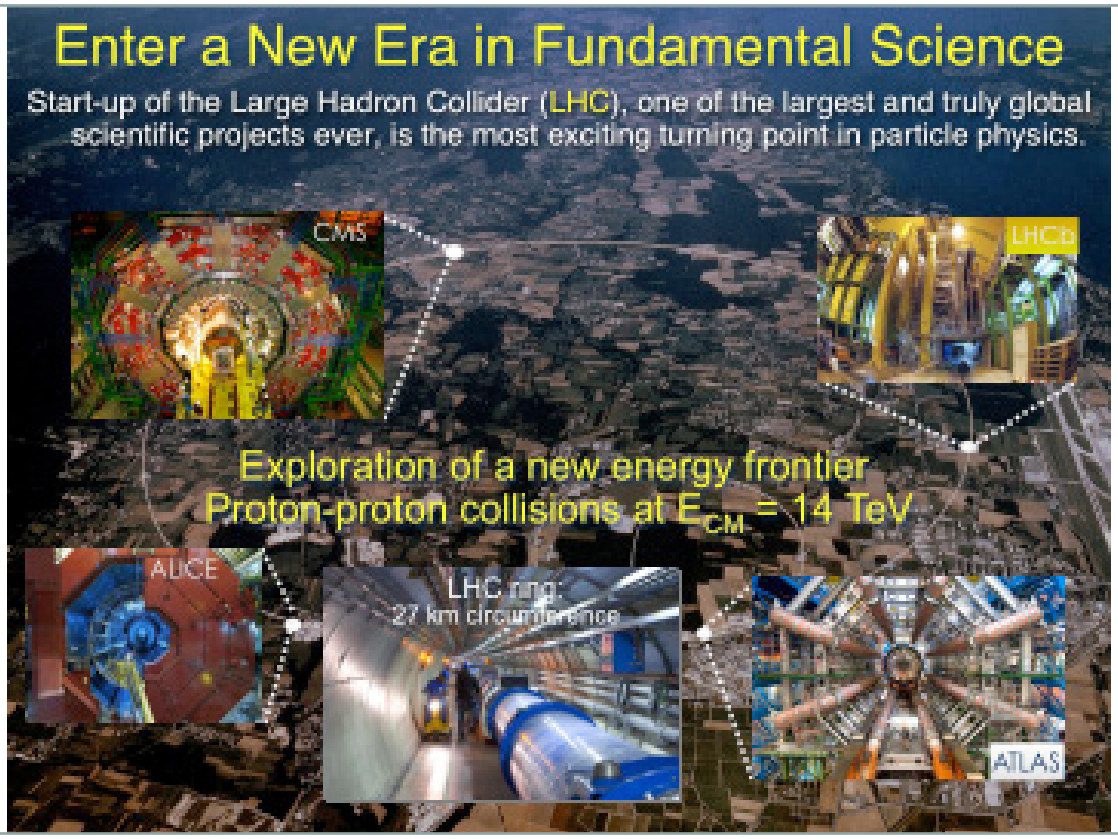
Gaddi AV, 2015 8

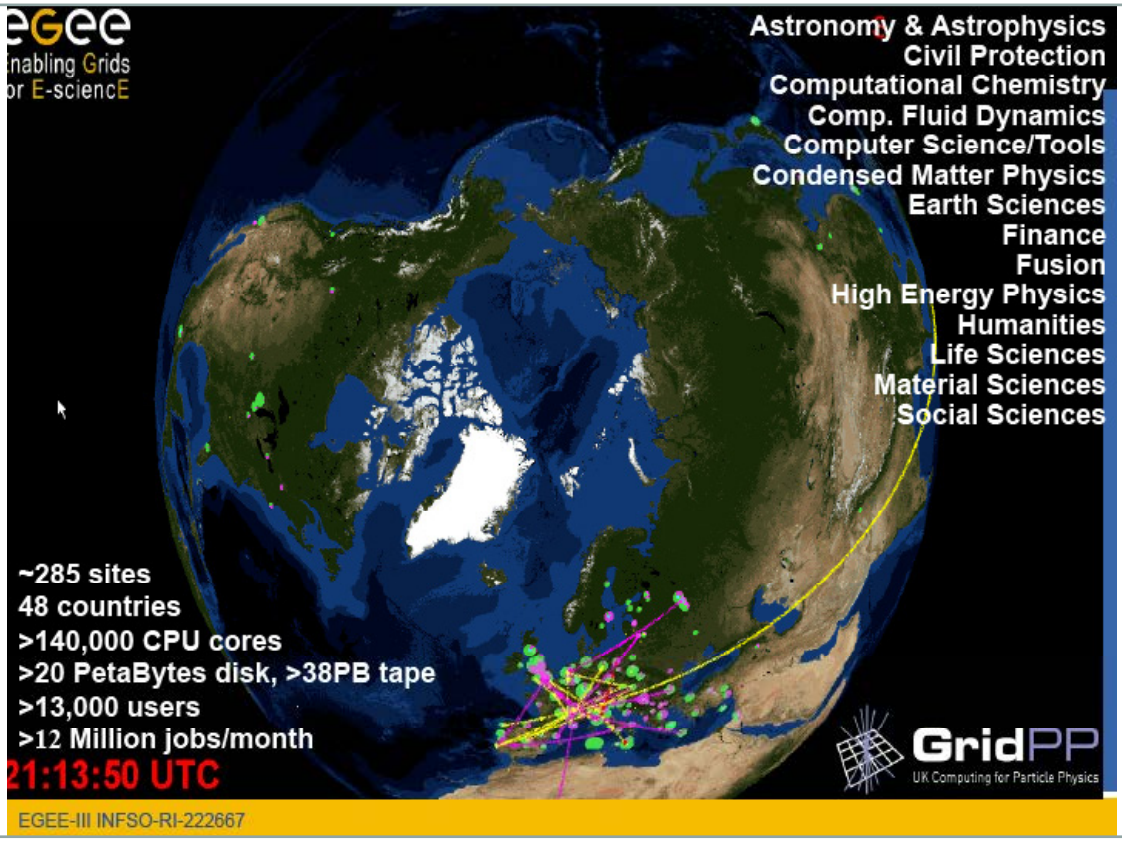
La rete socio-sanitaria dell'aera metropolitana di Bologna:

il progetto Garsia



Gaddi AV, 2015 9


Enter a New Era in Fundamental Science
Start-up of the Large Hadron Collider (LHC), one of the largest and truly global scientific projects ever, is the most exciting turning point in particle physics.
CMS
LHCb
Exploration of a new energy frontier
Proton-proton collisions at E_{CM} = 14 TeV
ALICE
LHC ring:
27 km circumference
ATLAS


eGee
Enabling Grids
for E-sciencE
Astronomy & Astrophysics
Civil Protection
Computational Chemistry
Comp. Fluid Dynamics
Computer Science/Tools
Condensed Matter Physics
Earth Sciences
Finance
Fusion
High Energy Physics
Humanities
Life Sciences
Material Sciences
Social Sciences
~285 sites
48 countries
>140,000 CPU cores
>20 PetaBytes disk, >38PB tape
>13,000 users
>12 Million jobs/month
21:13:50 UTC
GridPP
UK Computing for Particle Physics
EGEE-III INFSO-RI-222667

Health-e-Child

European e-Health Platform for Pediatrics

David MANSET,
maatG

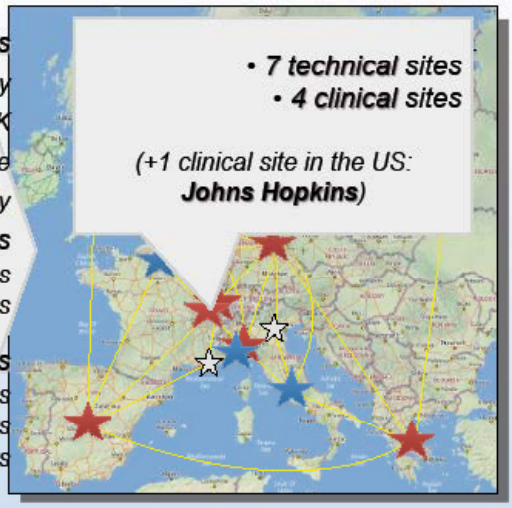
Gaddi AV, 2015

On behalf of the Health-e-Child Consortium

Health-e-Child

Health-e-Child Network

- *4 paediatric hospitals*
  - *IGG - Gaslini, Genoa, Italy*
  - *GOSH, London, UK*
  - *NECKER, Paris, France*
  - *OPBG, Rome, Italy*
- *Strong interdisciplinary team across*
  - *Countries and languages*
  - *Technical and clinical fields*
- *Research on three paediatric areas*
  - *Arthritis*
  - *Cardiac Disorders*
  - *Brain Tumours*

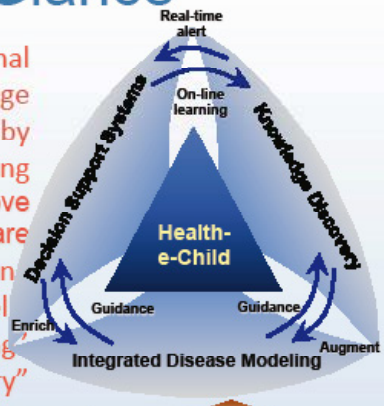


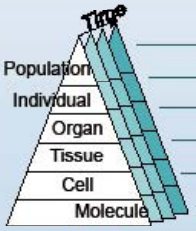
13 Health-e-Child

Health-e-Child

Health-e-Child at a Glance

- Establish multi-site, vertical, and longitudinal integration of data, information and knowledge
- Develop a GRID based platform, supported by robust search, optimisation and matching
- Build enabling tools and services that improve patient care
- Two main use case scenarios leveragin disease model
  - "Aiding the Clinician in Decision Making
  - "Clinical Studies, Knowledge Discovery"

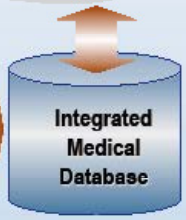




Observation Process Sensors

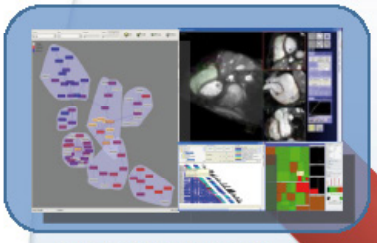
Imaging
Lab Data
Genomics
Proteomics
Demographics
Physician Notes
Life Style

Vertical Data Integration

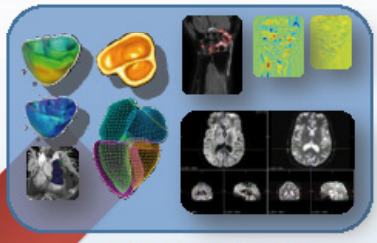


Health-e-Child

Decision Support



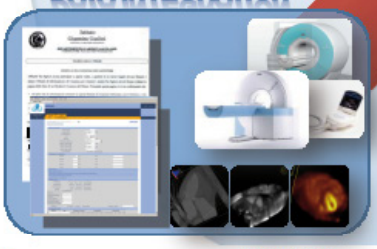
MEDICAL DSS



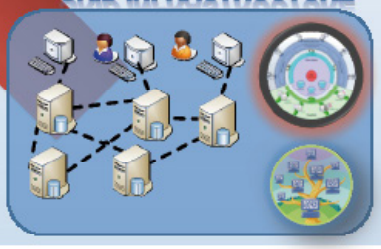
DISEASE MODELS

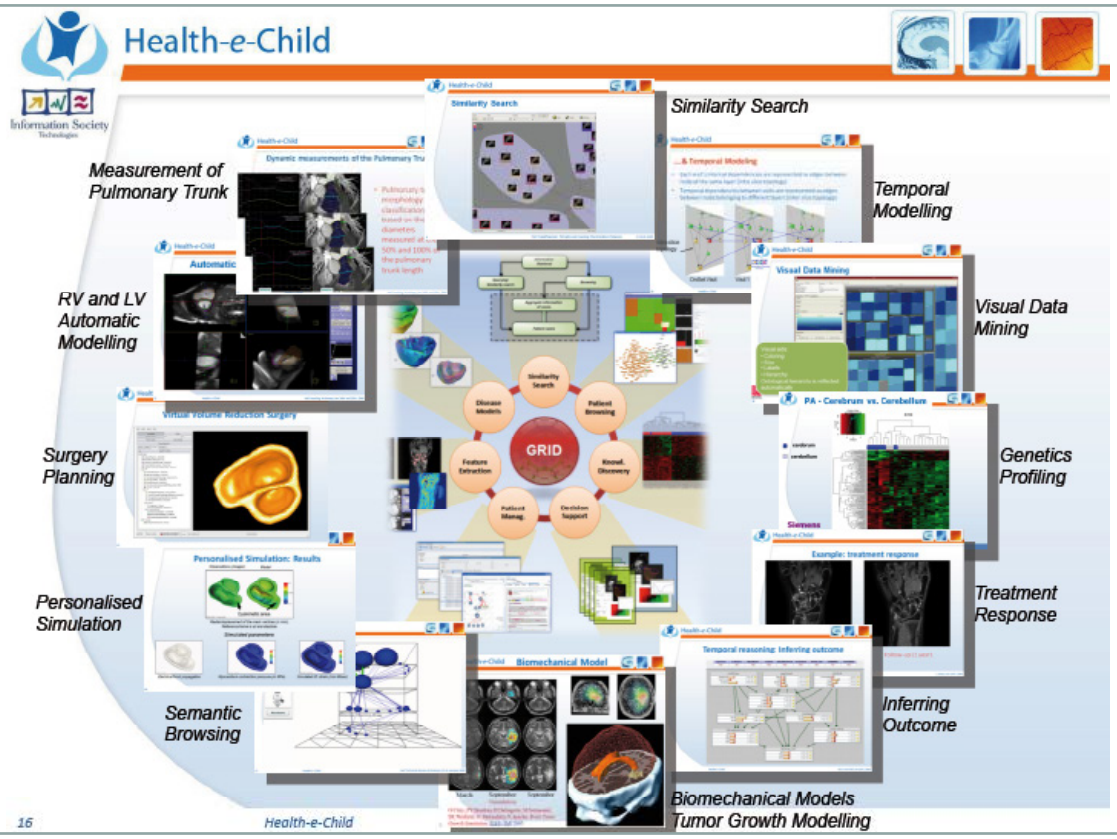
Virtual Physiological Child

DATA INTEGRATION



GRID INFRASTRUCTURE





in other words, before you (I) move your hands, we have to connect the brain and thinking, and study, and try again and again .....

Error & Challenge =start from scratch

Loreto Gesualdo

His scientific interest is mainly focused on the cellular and molecular mechanisms in the pathogenesis of glomerulonephritis and in the progression of renal damage. He has an extensive research experience in immunology of renal disease and renal cancer in relation to inflammation, renal fibrosis, immunotherapy and regenerative medicine. His group has contributed to major developments in the field of renal fibrosis. His recent research is aimed at searching, by using omics approaches, urinary biomarkers useful for the diagnosis, prognosis and therapeutic outcome in several chronic kidney diseases (diabetic nephropathy, IgA nephropathy, Membranous GN).

Honors, Awards and Grants

Cum Laude Medical School Diploma, 1986; R.H. "Mike" Mohrman Research Fellowship, Kidney Foundation of Ohio, 1988-89; Italian Ministry of Public Education, Award 1988-1991; American Heart Association - Northeast Ohio Affiliate, Research Fellowship 1989-90; Kidney Foundation of Ohio, Research Grant 1989-90; "Young Investigator Scholarship" 22 July 1990, Tokyo, Japan; EDTA-ERA travel grant 1991, 1993, 1995; Gambro Fellowship, Lund, Sweden 1991-92; EDTA-ERA Junior Award 1992; CNR-NATO Fellowship 1997; NATO Collaborative Research grant; Baxter Extramural Grant, 1997-2000; Cassa di Risparmio di Puglia Foundation, Research Grant 2004-2005; Ministry of Health, Research Grant 2002-2015; PRIN MIUR, Research Grant 2002-2005; FIRB MIUR, Research Grant 2004-2008-2016;

Membership: Italian Society of Nephrology; International Society of Nephrology; European Dialysis and Transplant Association; American Society of Nephrology; New York Academy of Sciences; European Macrophage & Dendritic Cell Society; Renal Pathology Society.

Loreto Gesualdo, MD, FERA
University of Bari, Italy

Policlinico di Bari - Ospedale Giovanni XXIII

Public Policy Series

The Coming Fiscal Crisis: Nephrology in the Line of Fire

Martin J. Andersen and Allon N. Friedman

Summary

Nephrologists in the United States face a very uncertain economic future. The astronomical federal debt and unfunded liability burden of Medicare combined with the aging population will place unprecedented strain on the health care sector. To address these fundamental problems, it is conceivable that the federal government will ultimately institute rationing and other budget-cutting measures to rein in costs of ESRD care, which is generously funded relative to other chronic illnesses. Therefore, nephrologists should expect implementation of cost-cutting measures, such age-based rationing, mandated delayed dialysis and home therapies, compensated organ donation, and a shift in research priorities from the dialysis to the predialysis patient population. Nephrologists also need to recognize that these changes, which are geared toward the population level, may make it more difficult to advocate effectively for the needs of individual patients.

Clin J Am Soc Nephrol 8: 1252–1257, 2013. doi: 10.2215/CJN.00790113

What can be done?

No linear cuts,
but new healthcare models

BACKGROUND

- ✓ Increase in chronic degenerative diseases
- ✓ Increase in costs
- ✓ Poor hospital-territory integration

New models of healthcare services

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UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

Università degli Studi Bari
SCUOLA DI SPECIALIZZAZIONE IN NEFROLOGIA

Objectives

- Optimize clinical paths
- Reduce the clinical risk
- Support the development of prevention policies
- Empowerment of patients and healthcare providers
- Development of telemedicine services and advanced sensors

UBICARE

del 16 Marzo 2014

COME STAI MILANO/ITALIA

estratto da pag. 28, 29, 30, 31

LA PAROLA AL MEDICO

IL FUTURO È DELLA TELEMEDICINA

I MIGLIORI SPECIALISTI SEMPRE A PORTATA DI MANO, CURE PER I MALATI CRONICI SENZA SPOSTARSI DALLA PROPRIA CASA, EMERGENZE RISOLTE CON TEMPESTIVITÀ. A QUESTE E AD ALTRE ESIGENZE RISPONDE LA TECNOLOGIA MEDICA A DISTANZA

E-HEALTH/DOMOTICS/HOME AUTOMATION IS THE FUTURE

Telbios. Telemonitoring of scientific evidence

Whole System Demonstrator Programme (UK, 2010-2011):

- ✓One of the main telemonitoring experiments up-to-date: **6,191 patients, 238 GPs**
- ✓15% reduction in P.S. access and 20% reduction in following hospital stays
- ✓14% reduction in hospitalization
- ✓8% service cost reduction
- ✓45% reduction in mortality

Veteran-Affair Department - Telehealth (USA, 2003-2007):

- ✓Enrolled 17.025 patients aged 50-90
- ✓25% reduction in hospitalization days
- ✓19% reduction in hospital stays
- ✓86% of average satisfaction among the programme participants
- ✓Average annual cost of $1,800 per patient, far lower than conventional treatments.

BACKGROUND AND MODELS OF CARE (Chronic Setting)

Objectives to achieve

- ✓Continuous provision of care
- ✓Homecare management of the patient
- ✓Limit to health expenditure
- ✓Improved efficiency and high quality standards

CONTINUOUS PROVISION OF CARE
HOSPITAL/TERRITORY INTEGRATION

NODAL NETWORK

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RATIONALE OF MANAGEMENT OF THE PATIENT AT HOME

IMPROVED QUALITY OF LIFE

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OUR ANSWER

Università degli Studi Bari
SCUOLA DI SPECIALIZZAZIONE IN NEFROLOGIA

- **SMART – HEALTH 2.0**
  (PON ReC 2007-2013 "Smart Cities and Communities")
- **UBICARE**
  (POR Puglia FESR 2007-2013)
- OPLON
  (Smart Cities and Communities at national level)
- CCM 2011
  (Project for Apulia)
- DIADOM
  (Pre-Commercial Procurement Apulia)
- PRISMA
  (PON ReC 2007-2013 "Smart Cities and Communities")
- HELP LARGE
  (Living Labs Smart Apulia 2020)

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UBIquitous knowledge-oriented social framework for continuing health**CARE**

«An innovative social networking model for the remote management of the patient, continuous training, and reduction of healthcare expenditure»

UNIONE EUROPEA
FONDO EUROPEO DI SVILUPPO REGIONALE

Intervento cofinanziato dall'U.E.
F.E.S.R. P.O. Regione Puglia 2007-2013
Asse I – Linea 1.2 - Azione 1.2.4
"Aiuti a Sostegno dei Partenariati Regionali per l'Innovazione"

REGIONE PUGLIA
AREA POLITICHE PER LO SVILUPPO IL LAVORO E L'INNOVAZIONE

UBICARE

OBJECTIVES

Development and experimentation of a **"Social Network"** in the field aimed at:

- ✓Remote clinical management of patients
- ✓Training and empowerment of involved players
- ✓Support for decision-making processes

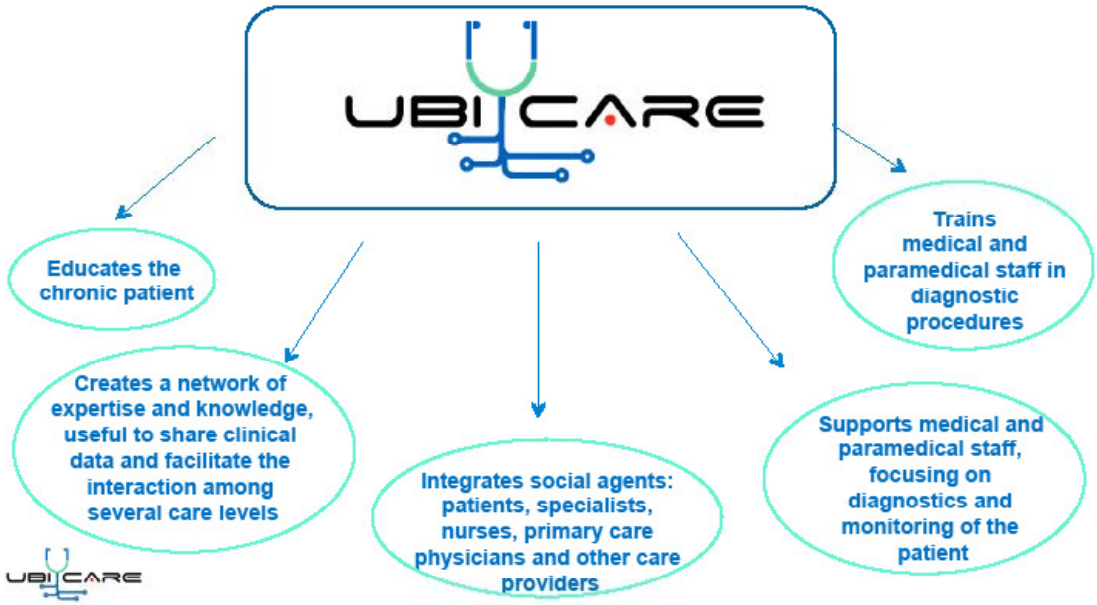
OBJECTIVES

- ✓ Support to medical and paramedical staff with regards to diagnosis and monitoring of the patient
- ✓ Education of patients to a life-style that is suitable to their health condition

OBJECTIVES

- ✓ Training of medical and paramedical staff in relation to diagnostic procedures, therapeutic interventions, and patients' follow-up, both in a "focused" way, i.e. whilst carrying out work activities, and at specifically training-dedicated events

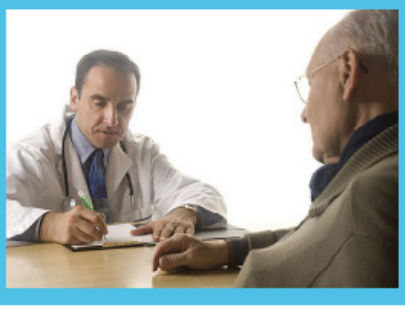
UBICARE
The Social (Healthcare) Network



THE USERS

Specialist doctor

General practitioner



Specialist nurse

Patient and their family

SPECIALIST DOCTOR

Research

Sharing

Monitoring

Research: Online access to the most prestigious medical journals

Sharing:

- Addition of new clinical cases and consultation of clinical cases with attached documentation
- Possibility to contact other specialist doctors who have treated similar cases (second opinion)

Monitoring:

- Of data collected in the system, both manually and automatically
- Of their staff's work

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SPECIALIST NURSE

Learning

Support for decision-making processes


Video call


Monitoring

Learning: Support to learning activities on site and remotely

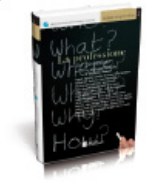
Support to decisions: User's guide based on the history of data available in the system and defined medical protocols

Video call: A video conference system allows the nurse to guide the patient remotely in the execution of activities at home (e.g. peritoneal dialysis procedure)

Monitoring:

- Display of collected data
- Display and management of alerts

GENERAL PRACTITIONER



E-learning


Patients' history


Prescriptions

E-learning: Management of learning activities on site and remotely

Patients' history: Display of data contained in medical records, examinations, and past and present drug therapies

Prescriptions: A service that allows the general practitioner to enter all of patient's prescriptions and pathologies, albeit not strictly related to the nephrological or cardiac condition

PATIENT AND CAREGIVER

Learning

Help

Video call

Learning: Management of learning activities on site and remotely

Help: Patient or caregiver's guide based on the history of data available in the system and defined medical protocols

Video call: A video conference system allows the patient or their caregiver to be guided remotely in the execution of activities at home (e.g. peritoneal dialysis)

AREAS OF EXPERIMENTATION

The UbiCare platform has been tested through a pilot test in a real healthcare environment to understand the potential of the service provided and validate the demo prototype in two contexts:

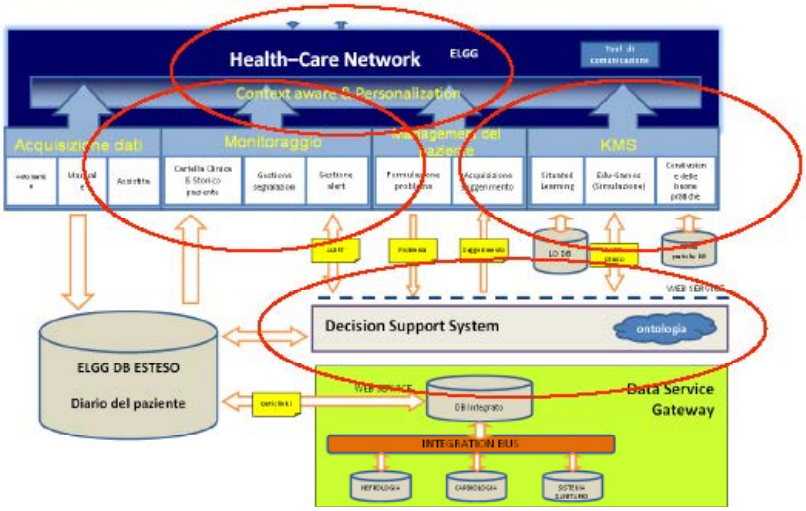
- ✓**chronic heart failure**
- ✓**home dialysis**

Departments of Cardiology and Nephrology at Policlinico in Bari

TECHNOLOGIES

UbiCare services are accessible on a conventional mode (PC) and on mobile devices (smartphones, tablets and laptops).

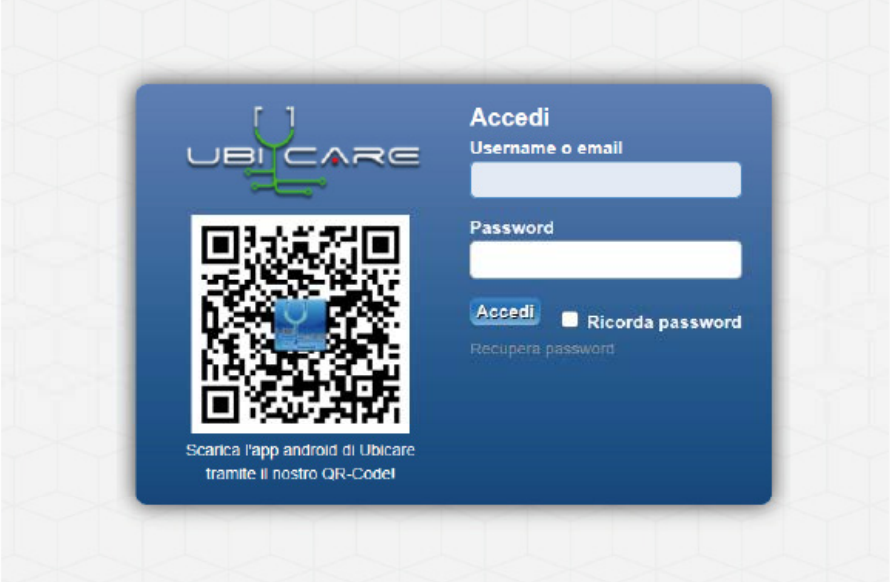
APPLICATION ARCHITECTURE



- ✓Social network platform
- ✓Support system for decision-making processes
- ✓Knowledge management system
- ✓Patient's monitoring system

USER INTERFACE (Homepage)

The UbiCare Platform
Login



THE «SOCIAL» FEATURE

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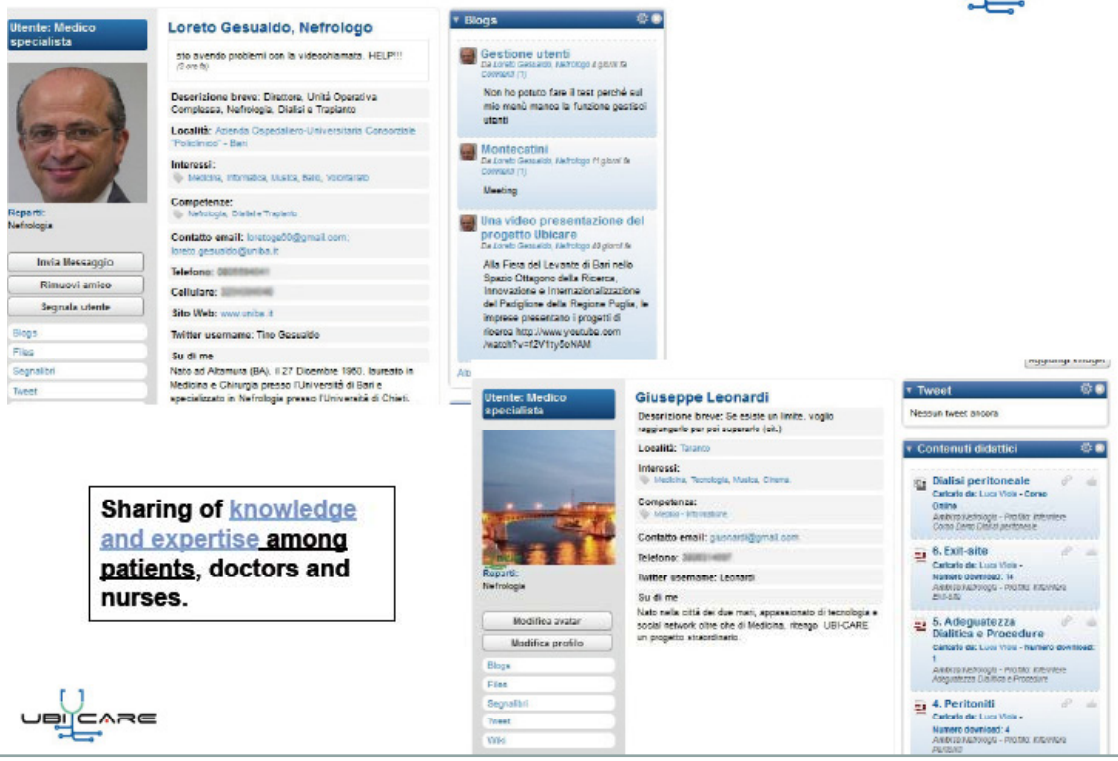
USER PROFILES

UBICARE



Sharing of knowledge and expertise among patients, doctors and nurses.

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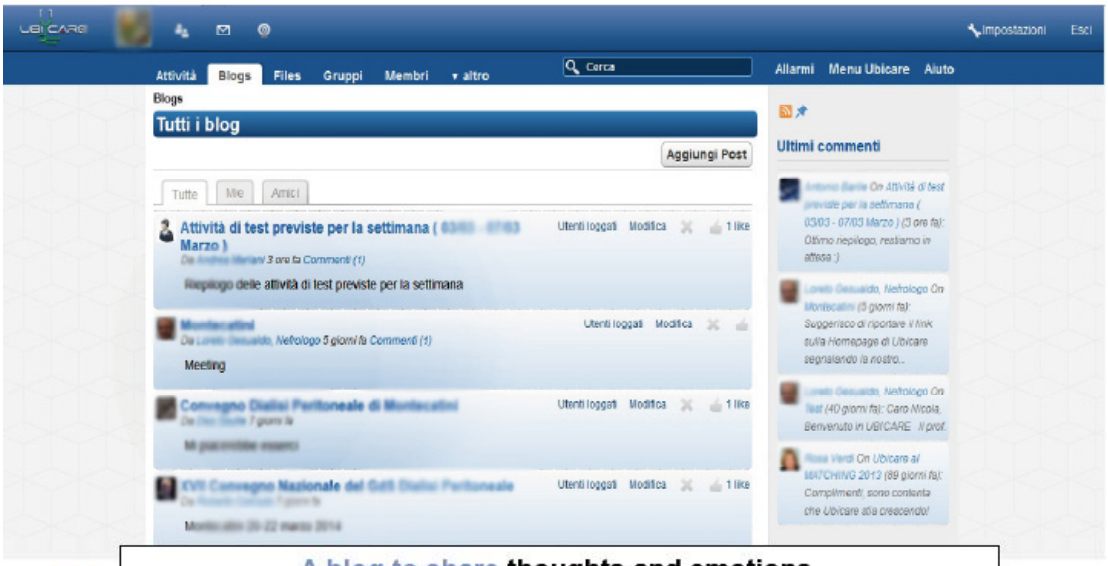
UBICARE

USER INTERFACE (Blog)



A blog to share **thoughts and emotions**

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USER INTERFACE (Groups)

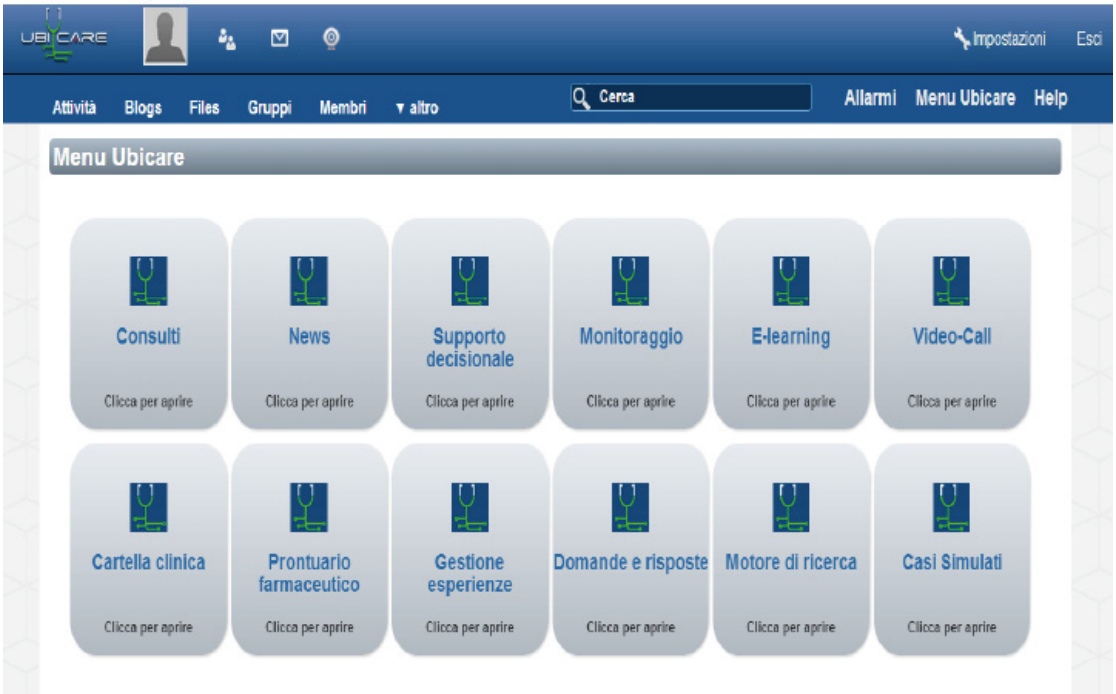
UBICARE

Participation in discussion groups with other patients

USER INTERFACE (Edu-Games)

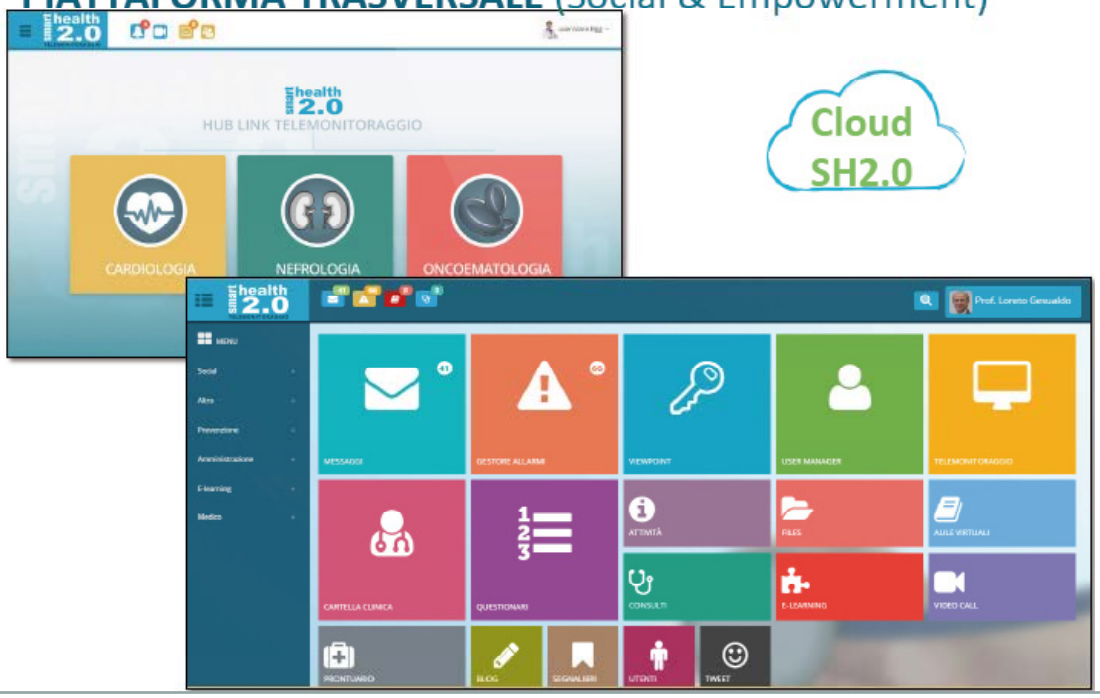
Educational games based on real clinical cases

USER INTERFACE (Menu)

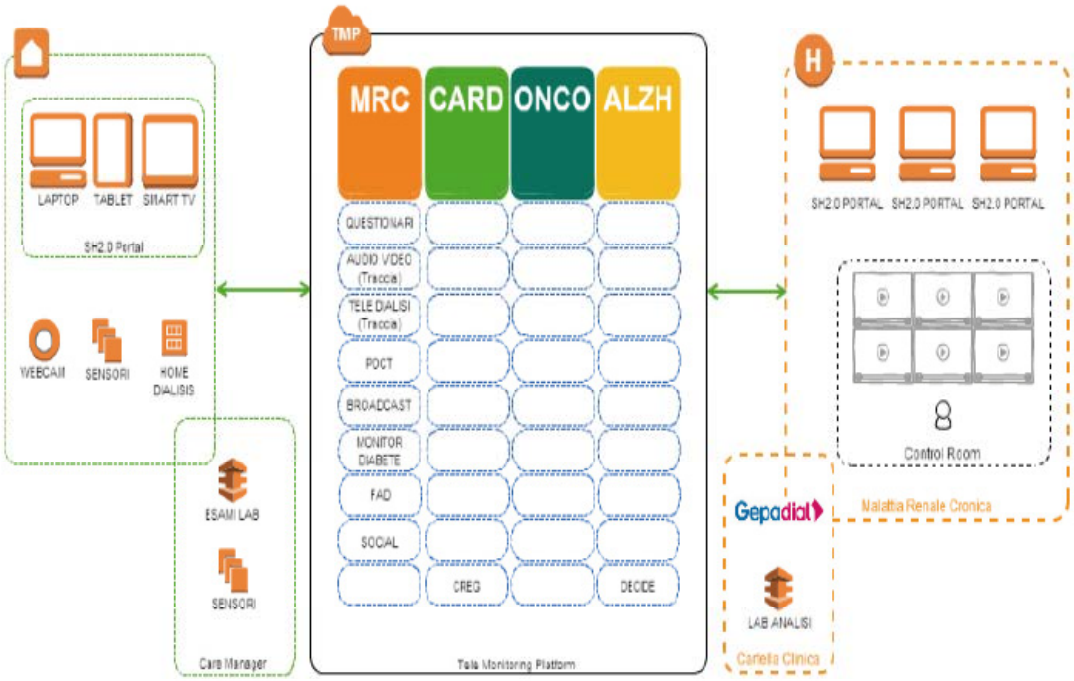


Sperimentazione in Regione Puglia

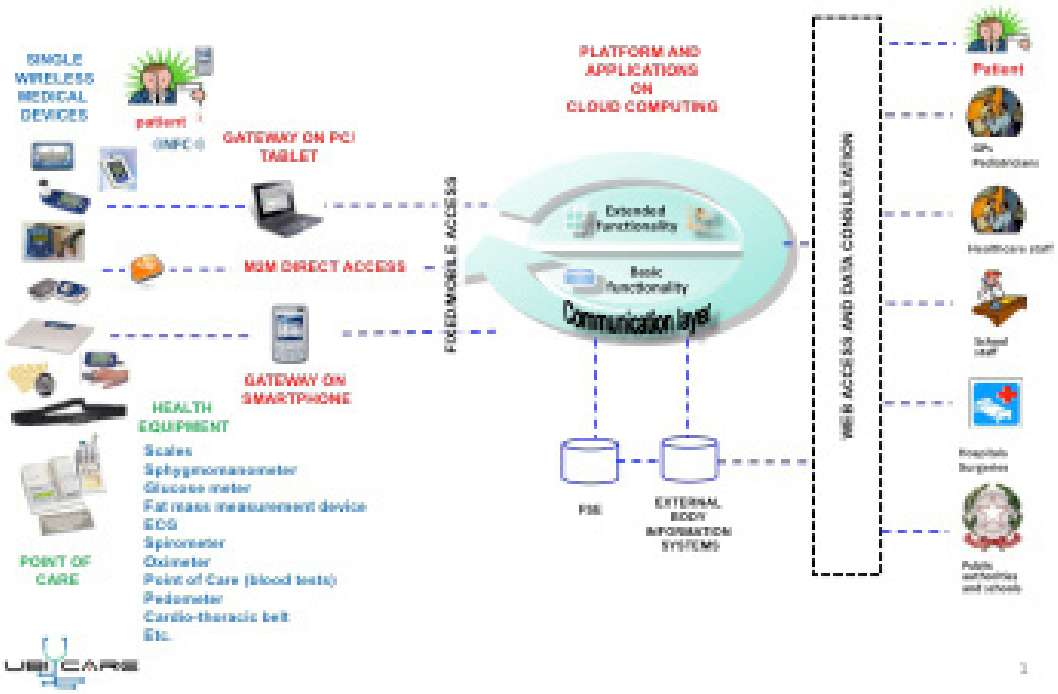
PIATTAFORMA TRASVERSALE (Social & Empowerment)



Telemonitoring diagram



SENSORS AND DEVICES



AXIS 214 PTZ

PTZ camera with 18x optical zoom and auto-focus

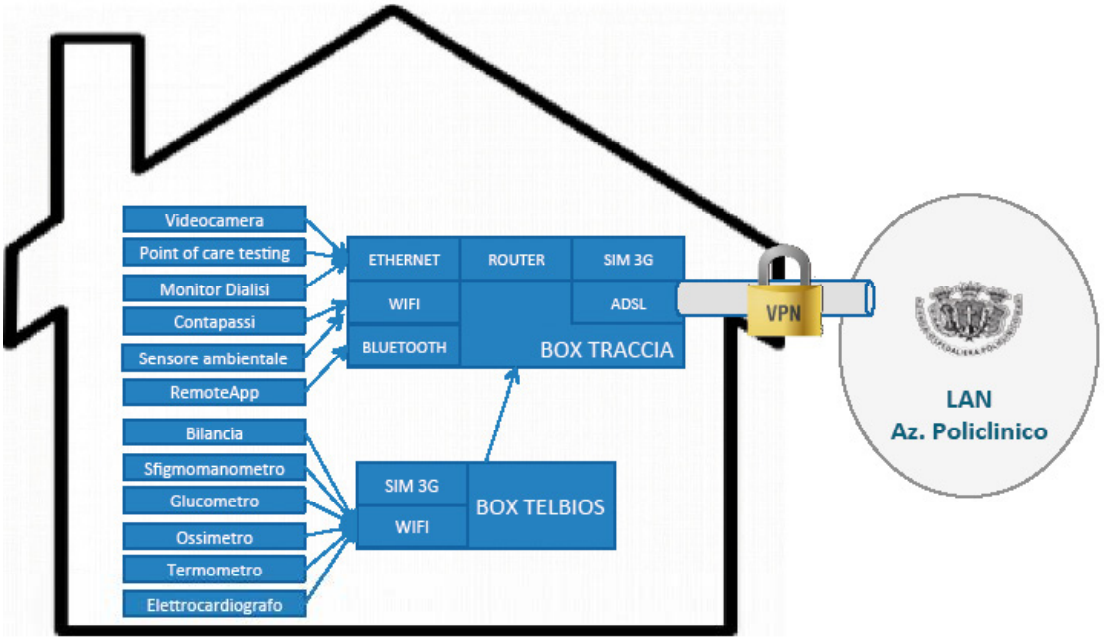
Day/night operation with poor light conditions

Bidirectional audio support

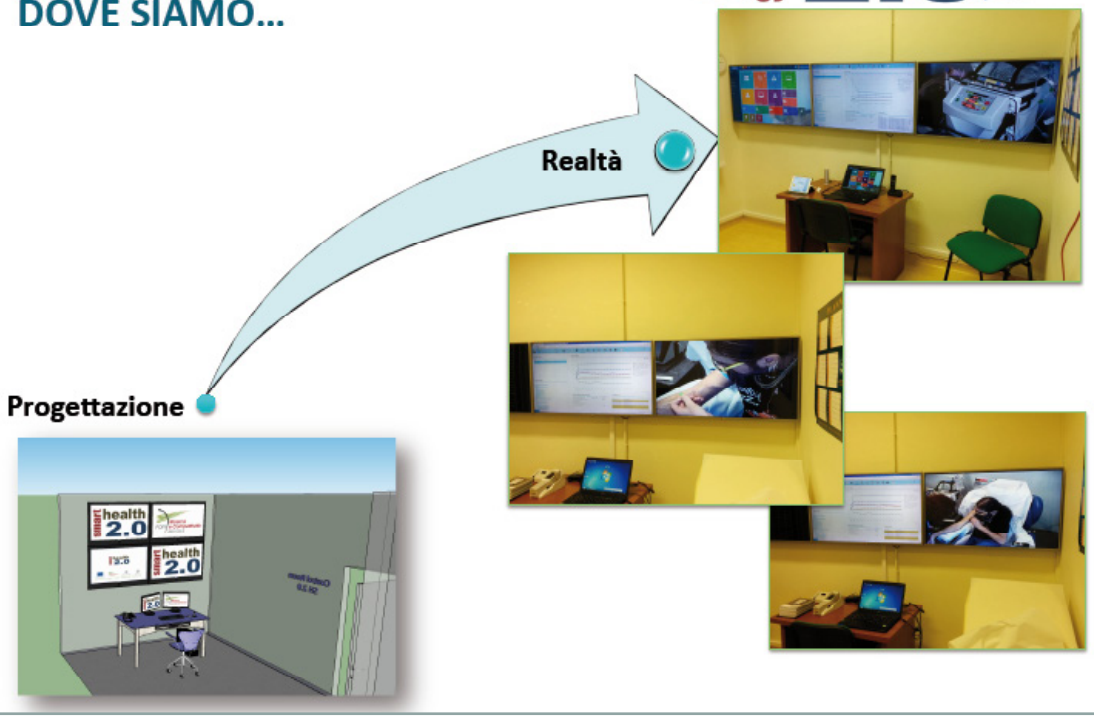
Control Room

CAD infections

Sperimentazione in Regione Puglia
A CASA DEL PAZIENTE

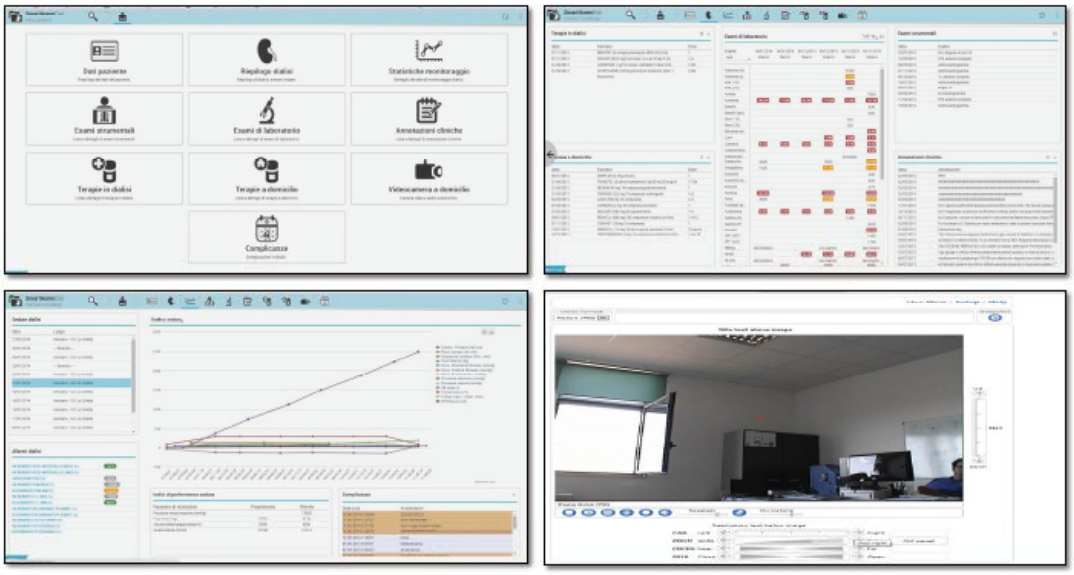


Sperimentazione in Regione Puglia
DOVE SIAMO...



Sperimentazione in Regione Puglia
VERTICALE MRC (SMART DIAL)

smart health 2.0



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VALIDATION

Functionality tests have verified:

- The **correctness** and **automatic function** of alarms
- The display and the inclusion of data **through multimedia devices**
- The **video call**
- The connection to **social networks**

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Sperimentazione in Regione Puglia
CHI E DOVE...

smart health 2.0

- Paziente
- Caregiver
- Medico di Medicina Generale
- Medico Specialista
- Medico Specialista sul territorio
- Care-Manager
- Case-Manager

Le sperimentazioni coinvolgono in

- Puglia: gli Ospedali Riuniti di Foggia, il Policlinico dell'Università di Bari, il Polo Oncologico di Bari, le ASL e MMG di Foggia e di Bari

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

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RESULTS

- The system is **efficient**
- The ***social functions*** encourage **the sharing of information and emotions**
- The virtual games **are a valuable educational tool**
- Important clinical situations are recognized **at an early stage**

UBICARE

STRENGTHS

- ✓ Improved communication among various players
- ✓ Increased awareness, compliance with therapies, and patient's empowerment
- ✓ Continuous training to non-specialist staff
- ✓ Support to remote diagnosis and monitoring of the patient
- ✓ Reduced hospitalization
- ✓ Reduced health expenditure

OPEN ACCESS Freely available online

PLOS ONE

Patients' Perceptions of Information and Education for Renal Replacement Therapy: An Independent Survey by the European Kidney Patients' Federation on Information and Support on Renal Replacement Therapy

Wim Van Biesen[1]*, Sabine N. van der Veer[2], Mark Murphey[3], Olga Loblova[4,5], Simon Davies[6]

1 Renal Division, Ghent University Hospital, Ghent, Belgium, 2 Department of Medical Informatics, Academic Medical Center, Amsterdam, The Netherlands, 3 Irish Kidney Association, Dublin, Ireland, 4 A&R Edelman, London, United Kingdom, 5 Department of Public Policy, Central European University, Budapest, Hungary, 6 Department of Nephrology, University Hospital of North Staffordshire, Stoke on Trent, United Kingdom

Conclusions: Kidney patients reported to be overall satisfied with the information they received on their disease and treatment, although information seemed mostly to have been focused on one modality. Patients involved in modality selection were more satisfied with their treatment. However, in the perception of the patients, the freedom to choose an alternative modality showed room for improvement.

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CONCLUSIONS

- A network of assistance and knowledge has been set up, which is able to adequately meet the needs of chronic patients allowing, at the same time, the training of healthcare staff
- The platform is working and will be validated through a trial

OUTLOOK

- Real improvement in the patient's quality of life
- Optimization of human and structural resources
- Improvement of care setting adequacy
- Cost reduction
- Development of nodal network

Fabio Sebastiano

Graduate with honors in Electronic Engineering at "La Sapienza" University of Rome, Fabio Sebastiano received PhD in "Experimental Neuroscience" at Department of Neurological Sciences at the same university with the thesis : "A rapid and reliable procedure to localize subdural electrodes in presurgical evaluation of patients with drug resistant focal epilepsy". (Sebastiano et al, 2005).

His research activity was always focused on epilepsy, in particular he did various neuroimaging studies in the field of epilepsy. He also attended various courses focused on functional and structural neuroimaging, such as the "2nd course of the International School on Magnetic Resonance Functional MRI and Electrophysiological Methods".

In particular, his studies were focused on:

- Software development for the localization of subdural electrodes for drug-resistant epilepsy surgery, based on processing of CT and MR images in MATLAB environment, in order to automatically detect electrodes positions and visualize them on patient specific brain model (PCT/IB2014/000678, patent pending);
- Cortical target localization techniques for Deep Brain Stimulation electrodes implantation, through neuroimaging (MRI, CT) as well as electrophysiological approaches, in order to develop direct localization methods of Deep Electrodes through CT-MRI coregistration in 3D environment and post-surgery LFP (Local field Potential) registration;
- Development of wireless, implantable devices for long-term epilepsy monitoring (patents PCT/IT2011/000162, PCT/IB2012/051909).

Actually, he is the head of Bioengineering Unit and Clinical Engineering Unit at IRCCS INM Neuromed in Pozzilli (IS), Italy, and he is the Scientific Manager of "Cyber Brain" Project for Fondazione Neuromed.

Fondazione NEUROMED

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NEUROMED@RESEARCH:
Le nuove frontiere in Neuromed:
il Cyber Brain
Ing. Fabio Sebastiano

HEALTH Care Research Training

Il progetto CyberBrain

Approvato dal Ministero della Ricerca all'interno Programma Operativo Nazionale per la Ricerca e Competitività 2007-2013.

Obiettivi:

✓Creare un'infrastruttura innovativa nel settore delle Neuroscienze nel Sud Italia con applicazioni nella robotica, nella telemedicina e nella tele-diagnosi;

✓Implementare la prima piattaforma Europea per la Neuro Cibernetica.

Istituto Euro Mediterraneo Scienza e Tecnologia

FONDAZIONE NEURONE onlus

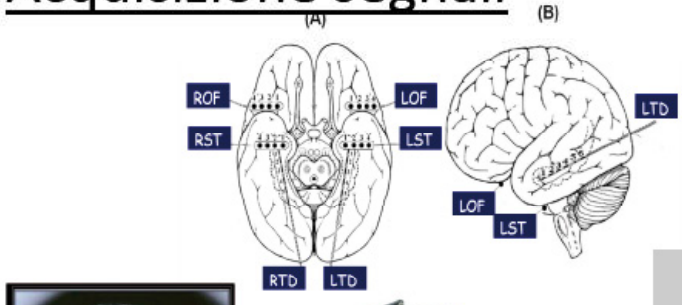
Fondazione NEUROMED

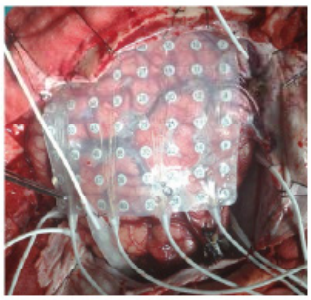
Il progetto CyberBrain

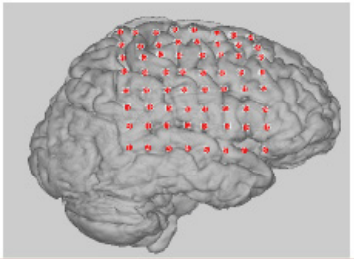
OBIETTIVI GENERALI	Descrizione obiettivi di potenziamento (OP)	Soggetto proponente – partner responsabile
OP1: LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCE)	Sviluppo di dispositivi impiantabili, neuroprotesi e sistemi bionici di arti e organi da poter gestire con il brain computer interface	FONDAZIONE NEURONE
OP2: LABORATORIO DI NEUROANATOMIA	Prototipazione sistemi di monitoraggio e amplificazione del segnale EEG	IEMEST
OP3: LABORATORIO DI CHIRURGIA ROBOTICA E DI IMAGING AVANZATO	Sviluppo di piattaforma software e hardware a supporto della micromovimentazione e sistemi di imaging avanzato per la localizzazione delle neuroprotesi	NEUROMED
OP4: LABORATORIO DI TELEDIAGNOSI E TELECONTROLLO	Trasmissione in tempo reale di informazioni a carattere scientifico tra medico e cittadino, attraverso sistemi di comunicazione di tipo telematico/informatico	NEUROMED

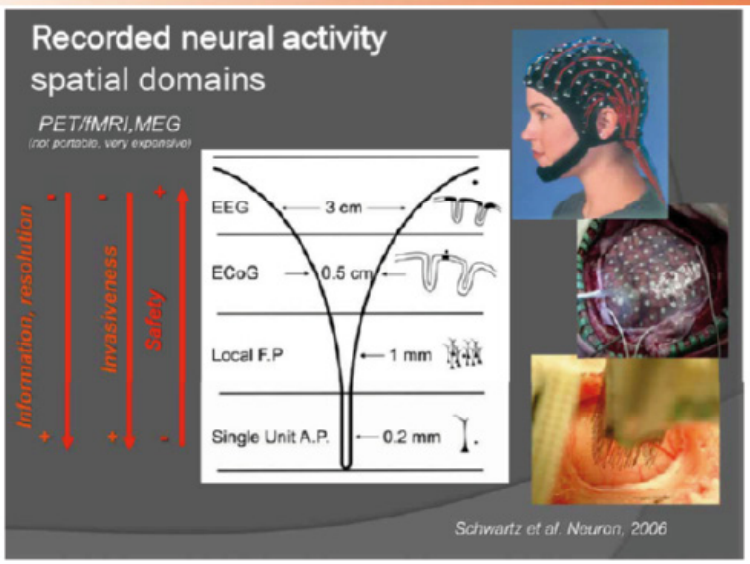
LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Acquisizione segnali



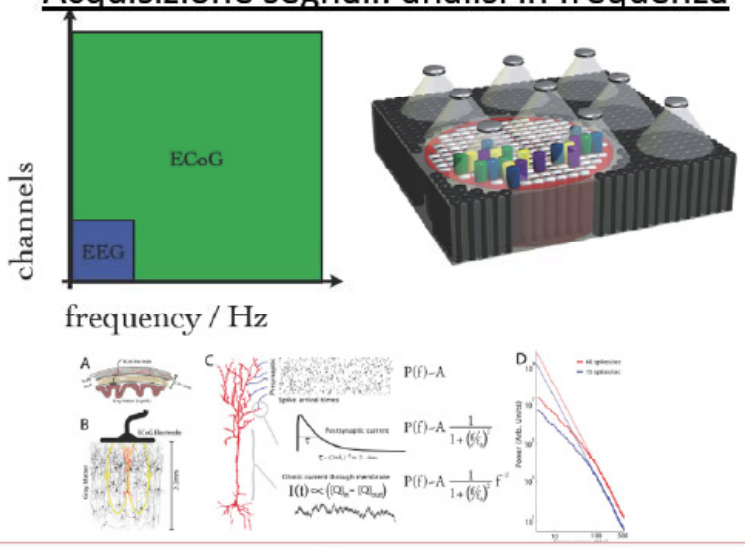




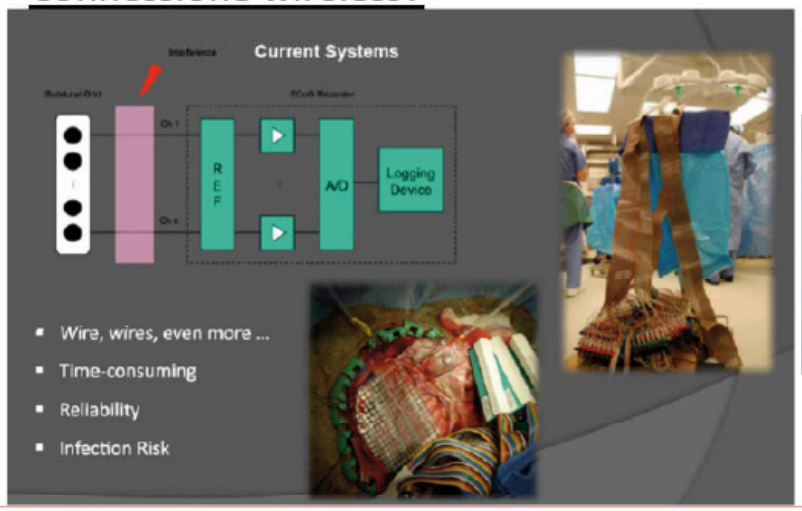


LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Acquisizione segnali: analisi in frequenza



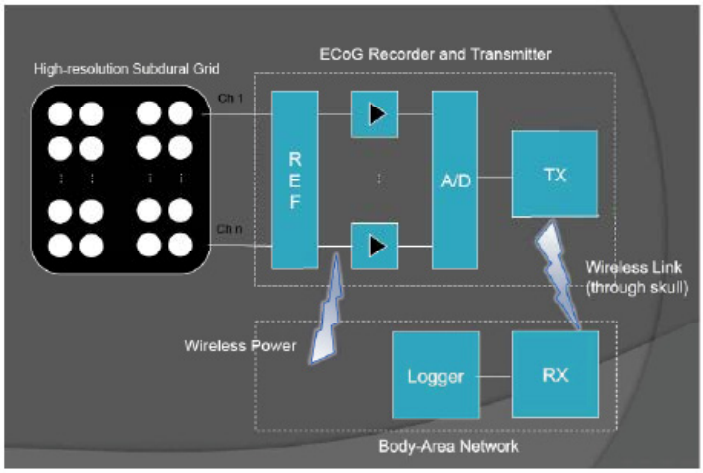
Connessione wireless?



LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

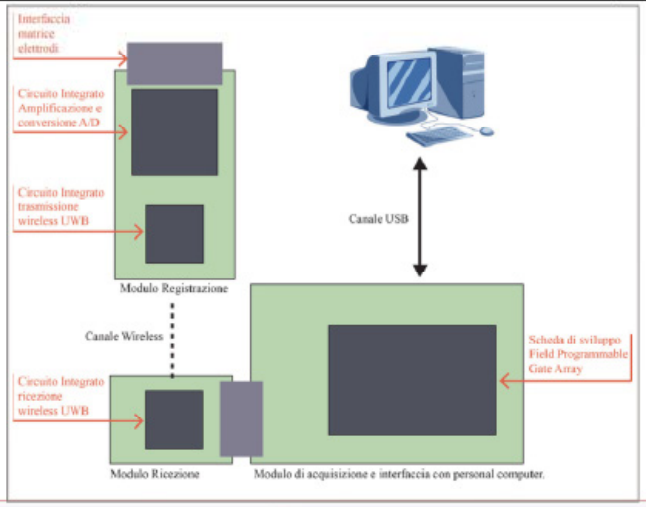
Connessione wireless? primordi....1950

Connessione wireless....alta risoluzione

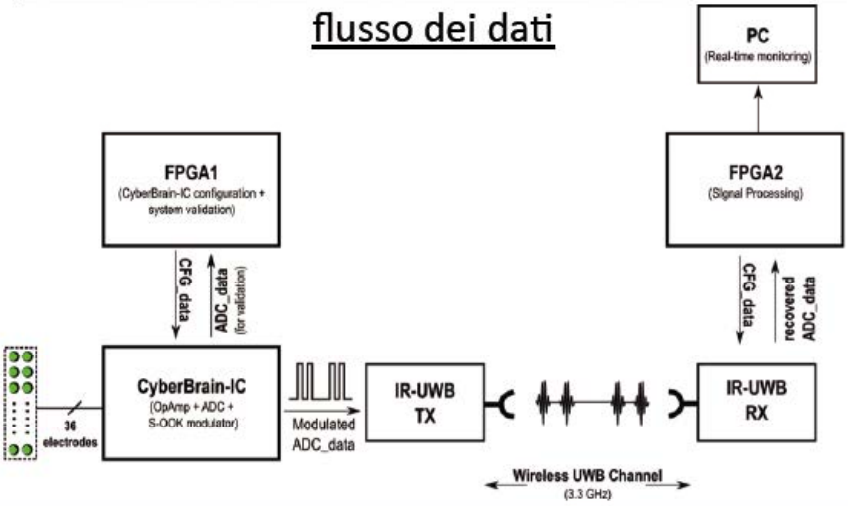


LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

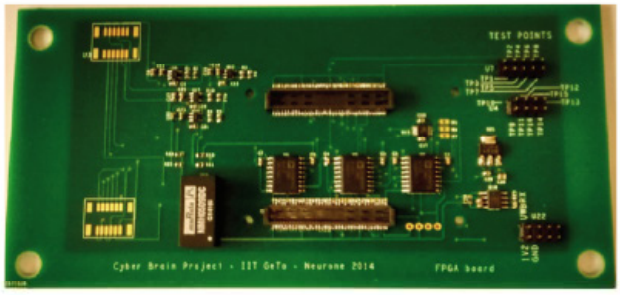
Schema generale funzionamento neuroprotesi



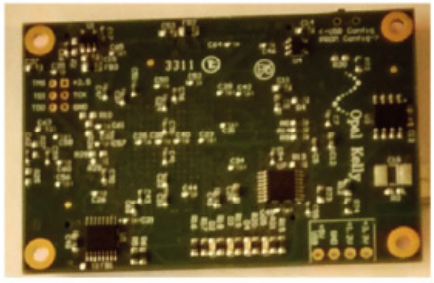
Schema generale funzionamento neuroprotesi: flusso dei dati



Schede a circuito stampato

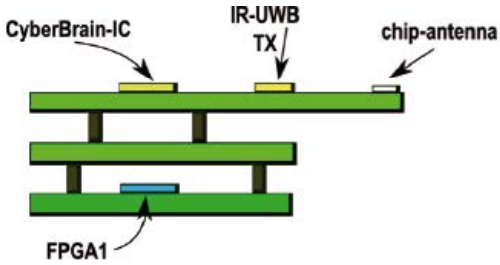


Modulo di acquisizione

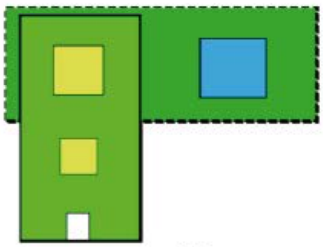


Modulo di interfaccia PC

Sistema modulare con due microchip progettati

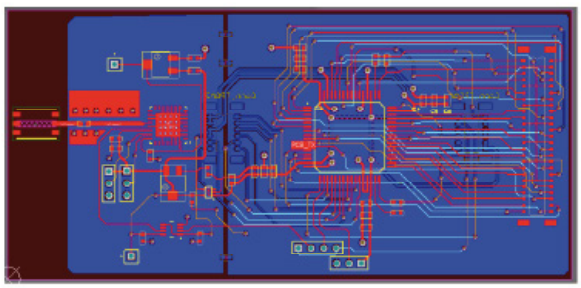


a) Sezione verticale

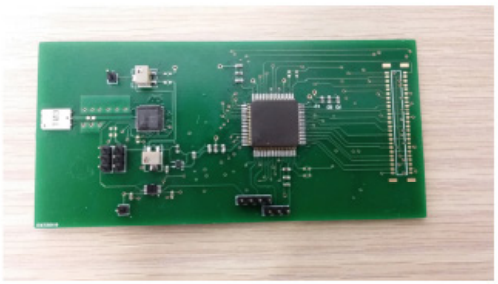


b) Vista planare

Layout del progetto

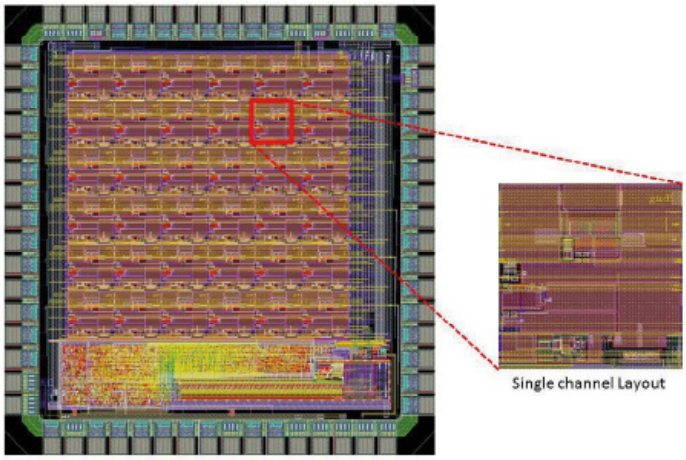


Scheda PCB progettata



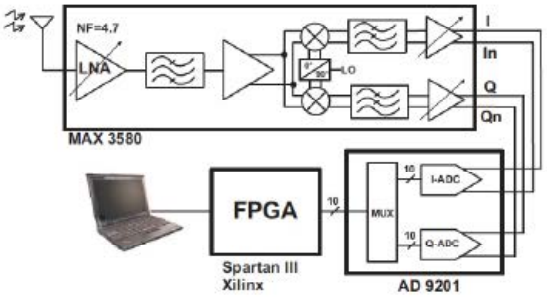
Scheda PCB realizzata

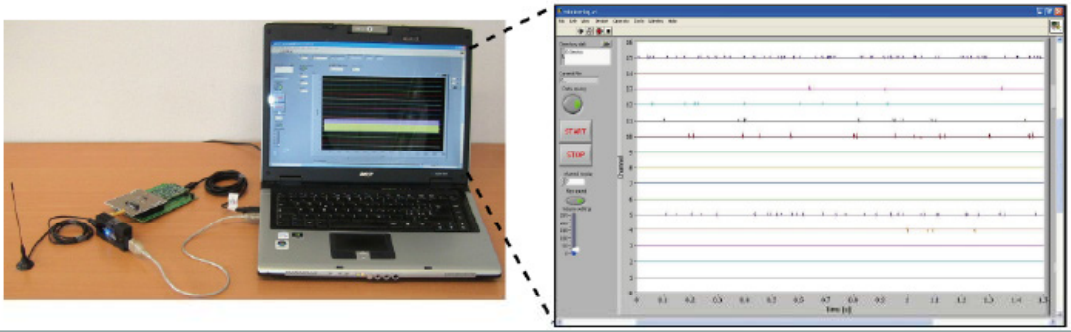
Layout del chip



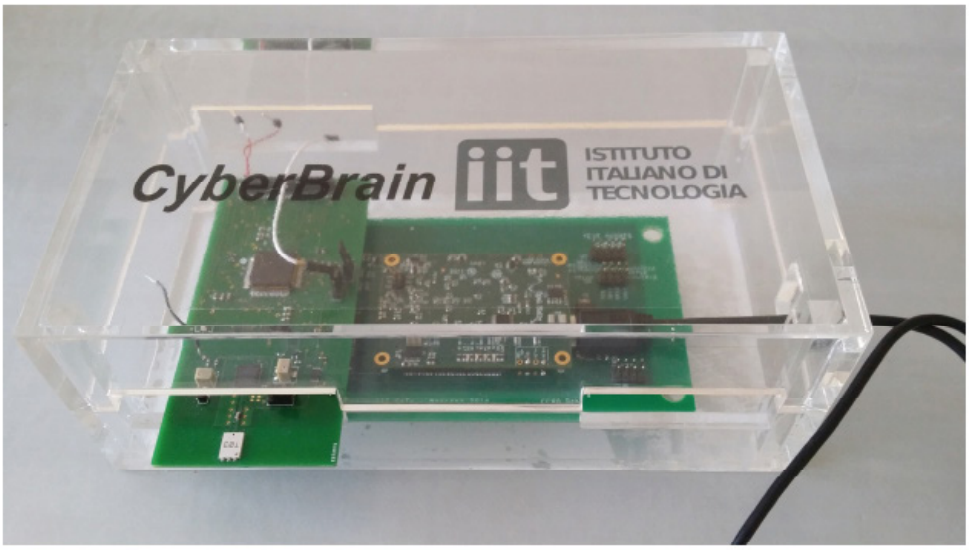
LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Unità ricevente



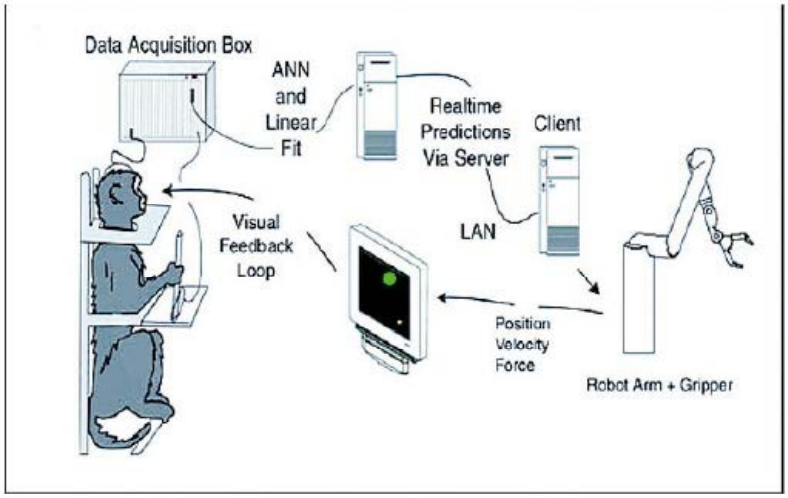


LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)



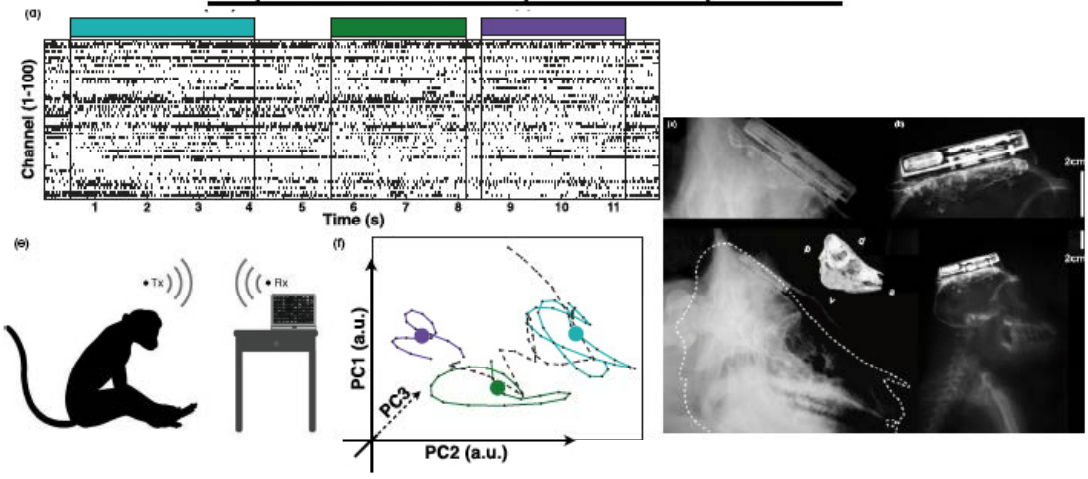
LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Impianto di neuroprotesi su primate



LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Impianto di neuroprotesi su primate

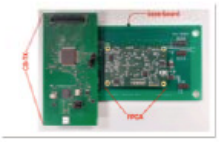


LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

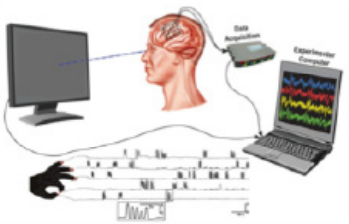
Neuroprotesica e Brain Computer Interface (BCI)

Figura 1: Schema a blocchi del sistema *WirelessCyberBrain* completo



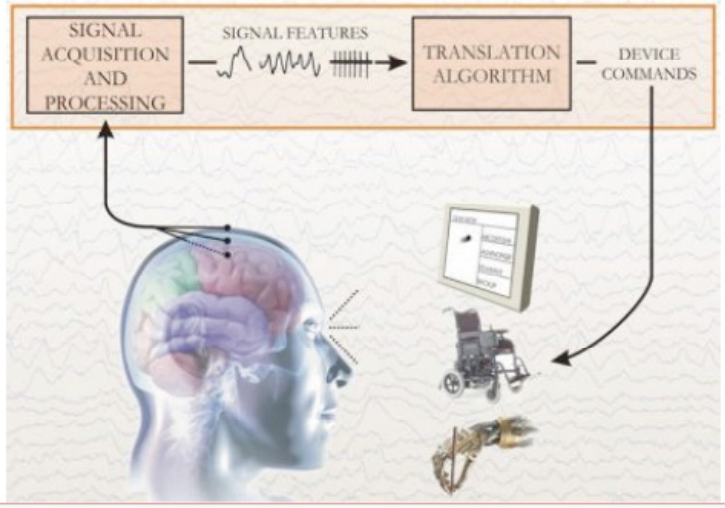
LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Neuroprotesica e Brain Computer Interface (BCI)



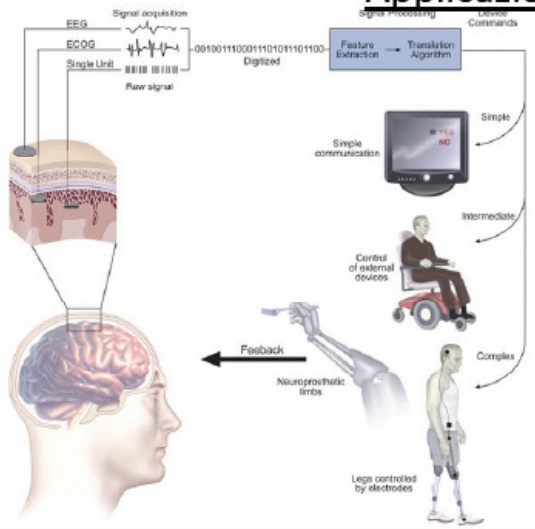
LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

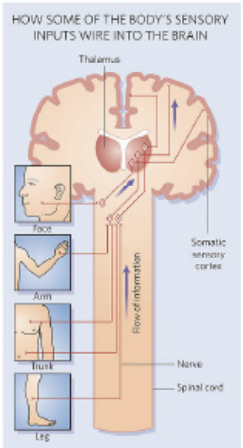
Neuroprotesica e Brain Computer Interface (BCI)



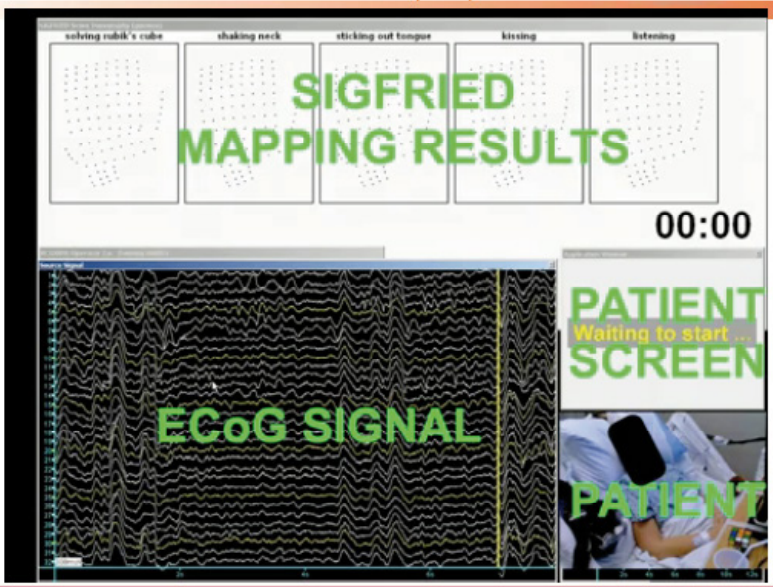
LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Applicazioni BCI



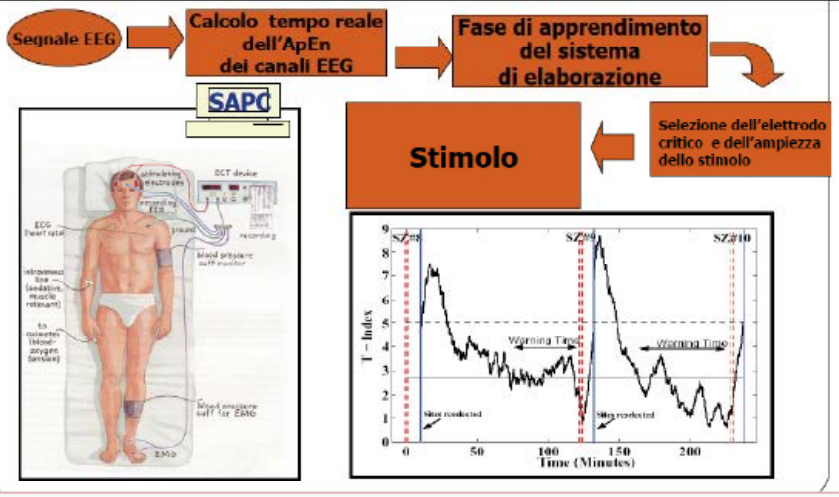


LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)



LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Analisi del segnale EEG per la predizione delle crisi epilettiche



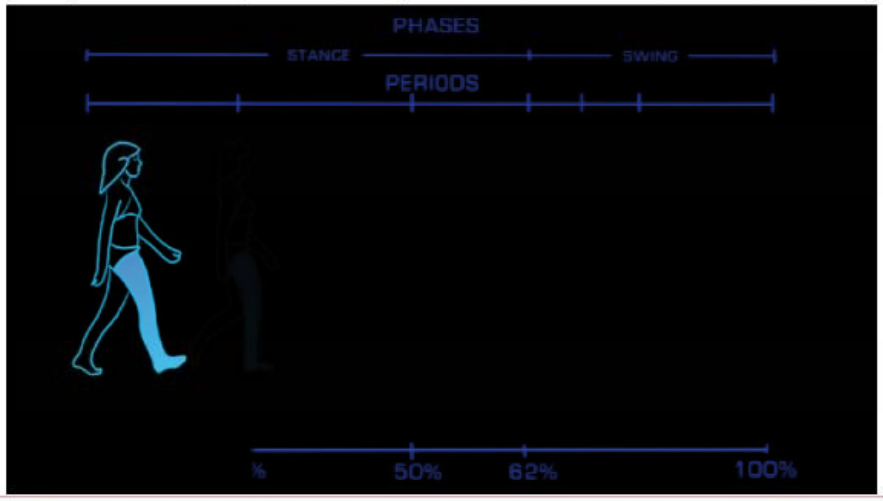
LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

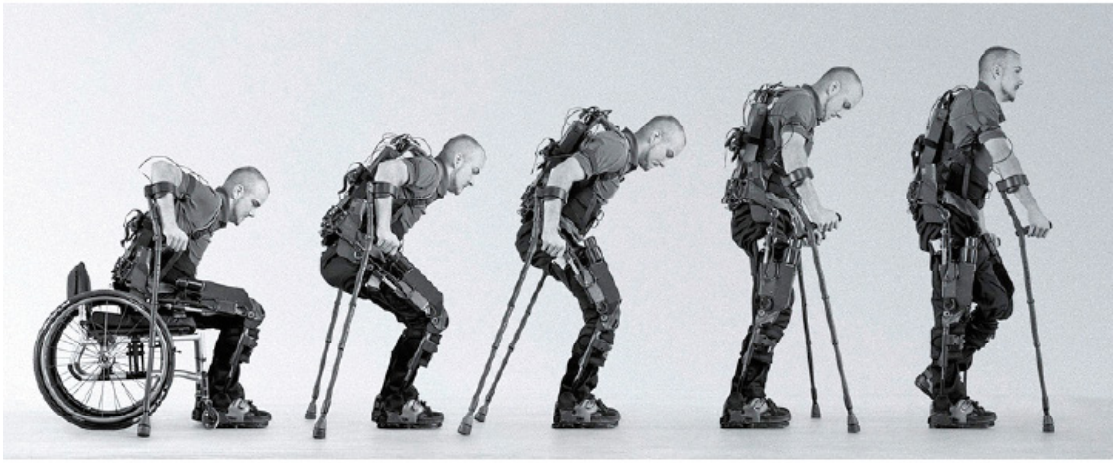
Robotica protesica, riabilitativa e di assistenza

LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)

Robotica protesica, riabilitativa e di assistenza

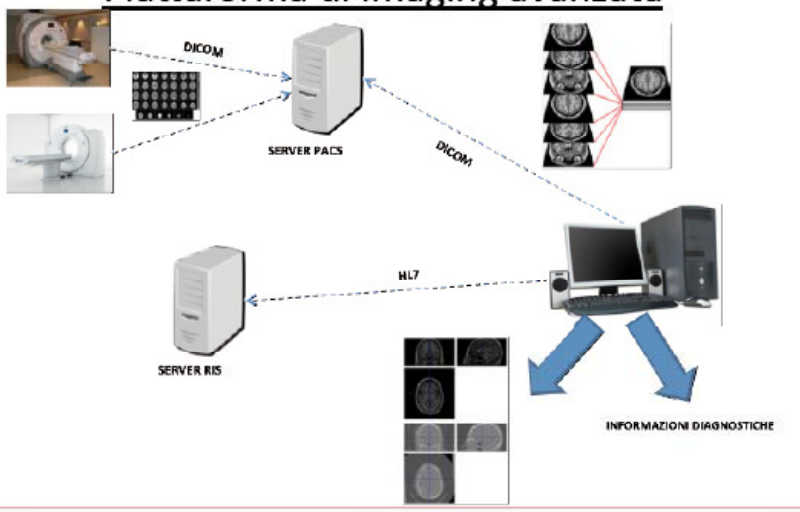


LABORATORIO DI NEUROPROTESICA, DI ROBOTICA PROTESICA, RIABILITATIVA, DI ASSISTENZA E DI HUMAN COMPUTER INTERFACE (HCI)



LABORATORIO DI IMAGING AVANZATO

Piattaforma di imaging avanzata

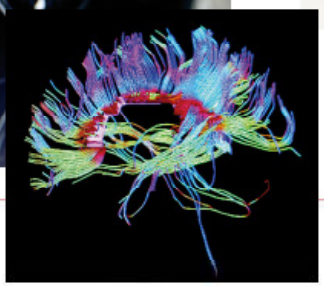


LABORATORIO DI IMAGING AVANZATO

Piattaforma di imaging avanzata

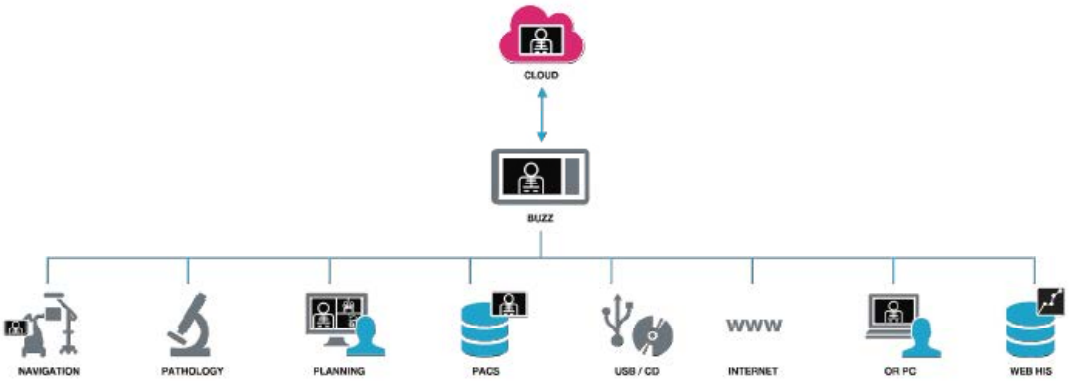
LABORATORIO DI IMAGING AVANZATO

Piattaforma di imaging avanzata

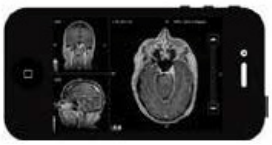


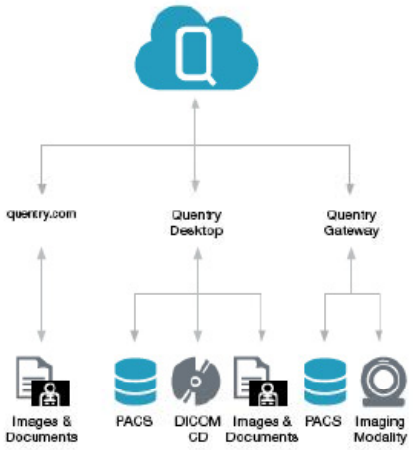
LABORATORIO DI TELEMEDICINA

Piattaforma di telemedicina



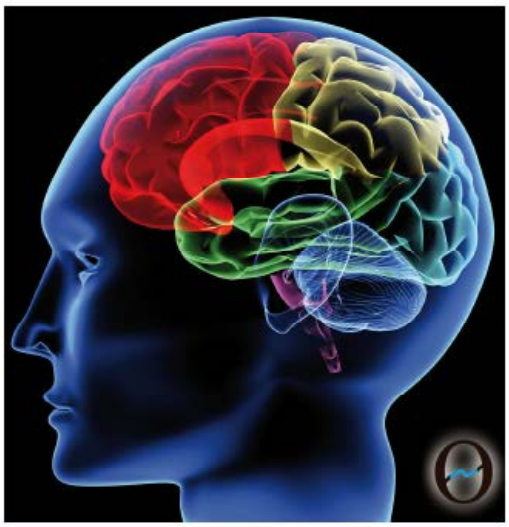
LABORATORIO DI TELEMECINA





Cyber Brain verso il 2020

- INTEGRAZIONE CON AZIENDE E STRUTTURE DI RICERCA NAZIONALI ED INTERNAZIONALI;
- CONSOLIDAMENTO POSIZIONAMENTO SUL MERCATO EUROPEO ED INTERNAZIONALE;
- REALIZZAZIONE DI PROGETTI DI RICERCA E SVILUPPO NELL'AMBITO DI PROGRAMMI NAZIONALI ED EUROPEI



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